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**APPENDIX H.2**  
**Operation Emissions**



# Appendix H2. Operation Emissions

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Table H.2.NFA/NPA.Un.Max.BP.2015-14. 2015 No Federal Action/No Project Alternative BP Berth Summary of Maximum Daily Unmitigated Emissions.

### **No Federal Action/No Project Alternative Average Daily Unmitigated Emissions 2015 (Tesoro)**

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### **No Federal Action/No Project Alternative Maximum Daily Unmitigated Emissions 2015 (Tesoro)**

Table H.2.NFA/NPA.Un.Max.Ts.2015-1. 2015 No Federal Action/No Project Alternative Tesoro Main Engines Maximum Daily Unmitigated Emissions.

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Table H.2.NFA/NPA.Un.Max.Ts.2015-14. 2015 No Federal Action/No Project Alternative Tesoro Berth Summary of Maximum Daily Unmitigated Emissions.

### **No Federal Action/No Project Alternative Average Daily Unmitigated Emissions 2015 (Exxon Mobil)**

Table H.2.NFA/NPA.Un.Ex.2015-1. 2015 No Federal Action/No Project Alternative Exxon Mobil Main Engines Average Daily Unmitigated Emissions.

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Table H.2.NFA/NPA.Un.Ex.2015-10. 2015 No Federal Action/No Project Alternative Exxon Mobil VDU Legs Average Daily Unmitigated Emissions.

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Table H.2.NFA/NPA.Un.Ex.2015-12. 2015 No Federal Action/No Project Alternative Exxon Mobil Berth Summary of Average Daily Unmitigated Emissions.

**No Federal Action/No Project Alternative Maximum Daily Unmitigated Emissions 2015 (Exxon Mobil)**

Table H.2.NFA/NPA.Un.Max.Ex.2015-1. 2015 No Federal Action/No Project Alternative Exxon Mobil Main Engines Maximum Daily Unmitigated Emissions.

Table H.2.NFA/NPA.Un.Max.Ex.2015-2. 2015 No Federal Action/No Project Alternative Exxon Mobil Project Auxiliary Generator Maximum Daily Unmitigated Emissions.

Table H.2.NFA/NPA.Un.Max.Ex.2015-3. 2015 No Federal Action/No Project Alternative Exxon Mobil Summary of Maximum Daily Unmitigated Vessel Emissions.

Table H.2.NFA/NPA.Un.Max.Ex.2015-4. 2015 No Federal Action/No Project Alternative Exxon Mobil Boiler Warm-Up Maximum Daily Unmitigated Emissions.

Table H.2.NFA/NPA.Un.Max.Ex.2015-5. 2015 No Federal Action/No Project Alternative Exxon Mobil Summary of Boiler Warm-Up Maximum Unmitigated Emissions.

Table H.2.NFA/NPA.Un.Max.Ex.2015-6. 2015 No Federal Action/No Project Alternative Exxon Mobil Berth Operations Maximum Daily Unmitigated Emissions.

Table H.2.NFA/NPA.Un.Max.Ex.2015-7. 2015 No Federal Action/No Project Alternative Exxon Mobil Summary of Berth Operations Maximum Daily Unmitigated Emissions.

Table H.2.NFA/NPA.Un.Max.Ex.2015-8. 2015 No Federal Action/No Project Alternative Exxon Mobil Tug Main Engines Maximum Daily Unmitigated Emissions.

Table H.2.NFA/NPA.Un.Max.Ex.2015-9. 2015 No Federal Action/No Project Alternative Exxon Mobil Tug Auxiliary Generator Engines Maximum Daily Unmitigated Emissions.

Table H.2.NFA/NPA.Un.Max.Ex.2015-10. 2015 No Federal Action/No Project Alternative Exxon Mobil Summary of Tug Maximum Daily Unmitigated Emissions.

Table H.2.NFA/NPA.Un.Max.Ex.2015-11. 2015 No Federal Action/No Project Alternative Exxon Mobil VDU Crude Maximum Daily Unmitigated Emissions.

Table H.2.NFA/NPA.Un.Max.Ex.2015-12. 2015 No Federal Action/No Project Alternative Exxon Mobil VDU Legs Maximum Daily Unmitigated Emissions.

Table H.2.NFA/NPA.Un.Max.Ex.2015-13. 2015 No Federal Action/No Project Alternative Exxon Mobil VDU Maximum Daily Unmitigated Emissions.

Table H.2.NFA/NPA.Un.Max.Ex.2015-14. 2015 No Federal Action/No Project Alternative Exxon Mobil Berth Summary of Maximum Daily Unmitigated Emissions.

## **No Federal Action/No Project Alternative Average Daily Unmitigated Emissions 2025 (BP)**

Table H.2.NFA/NPA.Un.BP.2025-1. 2025 No Federal Action/No Project Alternative BP Main Engines Average Daily Unmitigated Emissions.

Table H.2.NFA/NPA.Un.BP.2025-2. 2025 No Federal Action/No Project Alternative BP Project Auxiliary Generator Average Daily Unmitigated Emissions.

Table H.2.NFA/NPA.Un.BP.2025-3. 2025 No Federal Action/No Project Alternative BP Boiler Warm-Up Average Daily Unmitigated Emissions.

Table H.2.NFA/NPA.Un.BP.2025-4. 2025 No Federal Action/No Project Alternative BP Berth Operations Average Daily Unmitigated Emissions.

Table H.2.NFA/NPA.Un.BP.2025-5. 2025 No Federal Action/No Project Alternative BP Summary of Average Daily Unmitigated Vessel Emissions.

Table H.2.NFA/NPA.Un.BP.2025-6. 2025 No Federal Action/No Project Alternative BP Tug Main Engines Average Daily Unmitigated Emissions.

Table H.2.NFA/NPA.Un.BP.2025-7. 2025 No Federal Action/No Project Alternative BP Tug Auxiliary Generator Engines Average Daily Unmitigated Emissions.

Table H.2.NFA/NPA.Un.BP.2025-8. 2025 No Federal Action/No Project Alternative BP Summary of Tug Average Daily Unmitigated Emissions.

Table H.2.NFA/NPA.Un.BP.2025-9. 2025 No Federal Action/No Project Alternative BP VDU Crude Average Daily Unmitigated Emissions.

Table H.2.NFA/NPA.Un.BP.2025-10. 2025 No Federal Action/No Project Alternative BP VDU Legs Average Daily Unmitigated Emissions.

Table H.2.NFA/NPA.Un.BP.2025-11. 2025 No Federal Action/No Project Alternative BP VDU Average Daily Unmitigated Emissions.

Table H.2.NFA/NPA.Un.BP.2025-12. 2025 No Federal Action/No Project Alternative BP Berth Summary of Average Daily Unmitigated Emissions.

## **No Federal Action/No Project Alternative Maximum Daily Unmitigated 2025 Emissions (BP)**

Table H.2.NFA/NPA.Un.Max.BP.2025-1. 2025 No Federal Action/No Project Alternative BP Main Engines Maximum Daily Unmitigated Emissions.

Table H.2.NFA/NPA.Un.Max.BP.2025-2. 2025 No Federal Action/No Project Alternative BP Project Auxiliary Generator Maximum Daily Unmitigated Emissions.

Table H.2.NFA/NPA.Un.Max.BP.2025-3. 2025 No Federal Action/No Project Alternative BP Summary of Maximum Daily Unmitigated Vessel Emissions.

Table H.2.NFA/NPA.Un.Max.BP.2025-4. 2025 No Federal Action/No Project Alternative BP Boiler Warm-Up Maximum Daily Unmitigated Emissions.

Table H.2.NFA/NPA.Un.Max.BP.2025-5. 2025 No Federal Action/No Project Alternative BP Summary of Boiler Warm-Up Maximum Unmitigated Emissions.

Table H.2.NFA/NPA.Un.Max.BP.2025-6. 2025 No Federal Action/No Project Alternative BP Berth Operations Maximum Daily Unmitigated Emissions.

Table H.2.NFA/NPA.Un.Max.BP.2025-7. 2025 No Federal Action/No Project Alternative BP Summary of Berth Operations Maximum Daily Unmitigated Emissions.

Table H.2.NFA/NPA.Un.Max.BP.2025-8. 2025 No Federal Action/No Project Alternative BP Tug Main Engines Maximum Daily Unmitigated Emissions.

Table H.2.NFA/NPA.Un.Max.BP.2025-9. 2025 No Federal Action/No Project Alternative BP Tug Auxiliary Generator Engines Maximum Daily Unmitigated Emissions.

Table H.2.NFA/NPA.Un.Max.BP.2025-10. 2025 No Federal Action/No Project Alternative BP Summary of Tug Maximum Daily Unmitigated Emissions.

Table H.2.NFA/NPA.Un.Max.BP.2025-11. 2025 No Federal Action/No Project Alternative BP VDU Crude Maximum Daily Unmitigated Emissions.

Table H.2.NFA/NPA.Un.Max.BP.2025-12. 2025 No Federal Action/No Project Alternative BP VDU Legs Maximum Daily Unmitigated Emissions.

Table H.2.NFA/NPA.Un.Max.BP.2025-13. 2025 No Federal Action/No Project Alternative BP VDU Maximum Daily Unmitigated Emissions.

Table H.2.NFA/NPA.Un.Max.BP.2025-14. 2025 No Federal Action/No Project Alternative BP Berth Summary of Maximum Daily Unmitigated Emissions.

**No Federal Action/No Project Alternative Average Daily Unmitigated Emissions 2025 (Tesoro)**

Table H.2.NFA/NPA.Un.Ts.2025-1. 2025 No Federal Action/No Project Alternative Tesoro Main Engines Average Daily Unmitigated Emissions.

Table H.2.NFA/NPA.Un.Ts.2025-2. 2025 No Federal Action/No Project Alternative Tesoro Project Auxiliary Generator Average Daily Unmitigated Emissions.

Table H.2.NFA/NPA.Un.Ts.2025-3. 2025 No Federal Action/No Project Alternative Tesoro Boiler Warm-Up Average Daily Unmitigated Emissions.

Table H.2.NFA/NPA.Un.Ts.2025-4. 2025 No Federal Action/No Project Alternative Tesoro Berth Operations Average Daily Unmitigated Emissions.

Table H.2.NFA/NPA.Un.Ts.2025-5. 2025 No Federal Action/No Project Alternative Tesoro Summary of Average Daily Unmitigated Vessel Emissions.

Table H.2.NFA/NPA.Un.Ts.2025-6. 2025 No Federal Action/No Project Alternative Tesoro Tug Main Engines Average Daily Unmitigated Emissions.

Table H.2.NFA/NPA.Un.Ts.2025-7. 2025 No Federal Action/No Project Alternative Tesoro Tug Auxiliary Generator Engines Average Daily Unmitigated Emissions.

Table H.2.NFA/NPA.Un.Ts.2025-8. 2025 No Federal Action/No Project Alternative Tesoro Summary of Tug Average Daily Unmitigated Emissions.

Table H.2.NFA/NPA.Un.Ts.2025-9. 2025 No Federal Action/No Project Alternative Tesoro VDU Crude Average Daily Unmitigated Emissions.

Table H.2.NFA/NPA.Un.Ts.2025-10. 2025 No Federal Action/No Project Alternative Tesoro VDU Legs Average Daily Unmitigated Emissions.

Table H.2.NFA/NPA.Un.Ts.2025-11. 2025 No Federal Action/No Project Alternative Tesoro VDU Average Daily Unmitigated Emissions.

Table H.2.NFA/NPA.Un.Ts.2025-12. 2025 No Federal Action/No Project Alternative Tesoro Berth Summary of Average Daily Unmitigated Emissions.

### **No Federal Action/No Project Alternative Maximum Daily Unmitigated Emissions 2025 (Tesoro)**

Table H.2.NFA/NPA.Un.Max.Ts.2025-1. 2025 No Federal Action/No Project Alternative Tesoro Main Engines Maximum Daily Unmitigated Emissions.

Table H.2.NFA/NPA.Un.Max.Ts.2025-2. 2025 No Federal Action/No Project Alternative Tesoro Project Auxiliary Generator Maximum Daily Unmitigated Emissions

Table H.2.NFA/NPA.Un.Max.Ts.2025-3. 2025 No Federal Action/No Project Alternative Tesoro Summary of Maximum Daily Unmitigated Vessel Emissions.

Table H.2.NFA/NPA.Un.Max.Ts.2025-4. 2025 No Federal Action/No Project Alternative Tesoro Boiler Warm-Up Maximum Daily Unmitigated Emissions.

Table H.2.NFA/NPA.Un.Max.Ts.2025-5. 2025 No Federal Action/No Project Alternative Tesoro Summary of Boiler Warm-Up Maximum Unmitigated Emissions.

Table H.2.NFA/NPA.Un.Max.Ts.2025-6. 2025 No Federal Action/No Project Alternative Tesoro Berth Operations Maximum Daily Unmitigated Emissions.

Table H.2.NFA/NPA.Un.Max.Ts.2025-7. 2025 No Federal Action/No Project Alternative Tesoro Summary of Berth Operations Maximum Daily Unmitigated Emissions.

Table H.2.NFA/NPA.Un.Max.Ts.2025-8. 2025 No Federal Action/No Project Alternative Tesoro Tug Main Engines Maximum Daily Unmitigated Emissions.

Table H.2.NFA/NPA.Un.Max.Ts.2025-9. 2025 No Federal Action/No Project Alternative Tesoro Tug Auxiliary Generator Engines Maximum Daily Unmitigated Emissions.

Table H.2.NFA/NPA.Un.Max.Ts.2025-10. 2025 No Federal Action/No Project Alternative Tesoro Summary of Tug Maximum Daily Unmitigated Emissions.

Table H.2.NFA/NPA.Un.Max.Ts.2025-11. 2025 No Federal Action/No Project Alternative Tesoro VDU Crude Maximum Daily Unmitigated Emissions.

Table H.2.NFA/NPA.Un.Max.Ts.2025-12. 2025 No Federal Action/No Project Alternative Tesoro VDU Legs Maximum Daily Unmitigated Emissions.

Table H.2.NFA/NPA.Un.Max.Ts.2025-13. 2025 No Federal Action/No Project Alternative Tesoro VDU Maximum Daily Unmitigated Emissions.

**No Federal Action/No Project Alternative Average Daily Unmitigated Emissions 2025 (Exxon Mobil)**

Table H.2.NFA/NPA.Un.Ex.2025-1. 2025 No Federal Action/No Project Alternative Exxon Mobil Main Engines Average Daily Unmitigated Emissions.

Table H.2.NFA/NPA.Un.Ex.2025-2. 2025 No Federal Action/No Project Alternative Exxon Mobil Project Auxiliary Generator Average Daily Unmitigated Emissions.

Table H.2.NFA/NPA.Un.Ex.2025-3. 2025 No Federal Action/No Project Alternative Exxon Mobil Boiler Warm-Up Average Daily Unmitigated Emissions.

Table H.2.NFA/NPA.Un.Ex.2025-4. 2025 No Federal Action/No Project Alternative Exxon Mobil Berth Operations Average Daily Unmitigated Emissions.

Table H.2.NFA/NPA.Un.Ex.2025-5. 2025 No Federal Action/No Project Alternative Exxon Mobil Summary of Average Daily Unmitigated Vessel Emissions.

Table H.2.NFA/NPA.Un.Ex.2025-6. 2025 No Federal Action/No Project Alternative Exxon Mobil Tug Main Engines Average Daily Unmitigated Emissions.

Table H.2.NFA/NPA.Un.Ex.2025-7. 2025 No Federal Action/No Project Alternative Exxon Mobil Tug Auxiliary Generator Engines Average Daily Unmitigated Emissions.

Table H.2.NFA/NPA.Un.Ex.2025-8. 2025 No Federal Action/No Project Alternative Exxon Mobil Summary of Tug Average Daily Unmitigated Emissions.

Table H.2.NFA/NPA.Un.Ex.2025-9. 2025 No Federal Action/No Project Alternative Exxon Mobil VDU Crude Average Daily Unmitigated Emissions.

Table H.2.NFA/NPA.Un.Ex.2025-10. 2025 No Federal Action/No Project Alternative Exxon Mobil VDU Legs Average Daily Unmitigated Emissions.

Table H.2.NFA/NPA.Un.Ex.2025-11. 2025 No Federal Action/No Project Alternative Exxon Mobil VDU Average Daily Unmitigated Emissions.

Table H.2.NFA/NPA.Un.Ex.2025-12. 2025 No Federal Action/No Project Alternative Exxon Mobil Berth Summary of Average Daily Unmitigated Emissions.



## **No Federal Action/No Project Alternative Maximum Daily Unmitigated Emissions 2025 (Exxon Mobil)**

Table H.2.NFA/NPA.Un.Max.Ex.2025-1. 2025 No Federal Action/No Project Alternative Exxon Mobil Main Engines Maximum Daily Unmitigated Emissions.

Table H.2.NFA/NPA.Un.Max.Ex.2025-2. 2025 No Federal Action/No Project Alternative Exxon Mobil Project Auxiliary Generator Maximum Daily Unmitigated Emissions

Table H.2.NFA/NPA.Un.Max.Ex.2025-3. 2025 No Federal Action/No Project Alternative Exxon Mobil Summary of Maximum Daily Unmitigated Vessel Emissions.

Table H.2.NFA/NPA.Un.Max.Ex.2025-4. 2025 No Federal Action/No Project Alternative Exxon Mobil Boiler Warm-Up Maximum Daily Unmitigated Emissions.

Table H.2.NFA/NPA.Un.Max.Ex.2025-5. 2025 No Federal Action/No Project Alternative Exxon Mobil Summary of Boiler Warm-Up Maximum Unmitigated Emissions.

Table H.2.NFA/NPA.Un.Max.Ex.2025-6. 2025 No Federal Action/No Project Alternative Exxon Mobil Berth Operations Maximum Daily Unmitigated Emissions.

Table H.2.NFA/NPA.Un.Max.Ex.2025-7. 2025 No Federal Action/No Project Alternative Exxon Mobil Summary of Berth Operations Maximum Daily Unmitigated Emissions.

Table H.2.NFA/NPA.Un.Max.Ex.2025-8. 2025 No Federal Action/No Project Alternative Exxon Mobil Tug Main Engines Maximum Daily Unmitigated Emissions.

Table H.2.NFA/NPA.Un.Max.Ex.2025-9. 2025 No Federal Action/No Project Alternative Exxon Mobil Tug Auxiliary Generator Engines Maximum Daily Unmitigated Emissions.

Table H.2.NFA/NPA.Un.Max.Ex.2025-10. 2025 No Federal Action/No Project Alternative Exxon Mobil Summary of Tug Maximum Daily Unmitigated Emissions.

Table H.2.NFA/NPA.Un.Max.Ex.2025-11. 2025 No Federal Action/No Project Alternative Exxon Mobil VDU Crude Maximum Daily Unmitigated Emissions.

Table H.2.NFA/NPA.Un.Max.Ex.2025-12. 2025 No Federal Action/No Project Alternative Exxon Mobil VDU Legs Maximum Daily Unmitigated Emissions.

Table H.2.NFA/NPA.Un.Max.Ex.2025-13. 2025 No Federal Action/No Project Alternative Exxon Mobil VDU Maximum Daily Unmitigated Emissions.

Table H.2.NFA/NPA.Un.Max.Ex.2025-14. 2025 No Federal Action/No Project Alternative Exxon Mobil Berth Summary of Maximum Daily Unmitigated Emissions.

## **No Federal Action/No Project Alternative Average Daily Unmitigated Emissions (BP) 2040**

Table H.2.NFA/NPA.Un.BP.2040-1. 2040 No Federal Action/No Project Alternative BP Main Engines Average Daily Unmitigated Emissions.

Table H.2.NFA/NPA.Un.BP.2040-2. 2040 No Federal Action/No Project Alternative BP Project Auxiliary Generator Average Daily Unmitigated Emissions.

Table H.2.NFA/NPA.Un.BP.2040-3. 2040 No Federal Action/No Project Alternative BP Boiler Warm-Up Average Daily Unmitigated Emissions.

Table H.2.NFA/NPA.Un.BP.2040-4. 2040 No Federal Action/No Project Alternative BP Berth Operations Average Daily Unmitigated Emissions.

Table H.2.NFA/NPA.Un.BP.2040-5. 2040 No Federal Action/No Project Alternative BP Summary of Average Daily Unmitigated Vessel Emissions.

Table H.2.NFA/NPA.Un.BP.2040-6. 2040 No Federal Action/No Project Alternative BP Tug Main Engines Average Daily Unmitigated Emissions.

Table H.2.NFA/NPA.Un.BP.2040-7. 2040 No Federal Action/No Project Alternative BP Tug Auxiliary Generator Engines Average Daily Unmitigated Emissions.

Table H.2.NFA/NPA.Un.BP.2040-8. 2040 No Federal Action/No Project Alternative BP Summary of Tug Average Daily Unmitigated Emissions.

Table H.2.NFA/NPA.Un.BP.2040-9. 2040 No Federal Action/No Project Alternative BP VDU Crude Average Daily Unmitigated Emissions.

Table H.2.NFA/NPA.Un.BP.2040-10. 2040 No Federal Action/No Project Alternative BP VDU Legs Average Daily Unmitigated Emissions.

Table H.2.NFA/NPA.Un.BP.2040-11. 2040 No Federal Action/No Project Alternative BP VDU Average Daily Unmitigated Emissions.

Table H.2.NFA/NPA.Un.BP.2040-12. 2040 No Federal Action/No Project Alternative BP Berth Summary of Average Daily Unmitigated Emissions.

### **No Federal Action/No Project Alternative Maximum Daily Unmitigated Emissions (BP) 2040**

Table H.2.NFA/NPA.Un.Max.BP.2040-1. 2040 No Federal Action/No Project Alternative BP Main Engines Maximum Daily Unmitigated Emissions.

Table H.2.NFA/NPA.Un.Max.BP.2040-2. 2040 No Federal Action/No Project Alternative BP Project Auxiliary Generator Maximum Daily Unmitigated Emissions.

Table H.2.NFA/NPA.Un.Max.BP.2040-3. 2040 No Federal Action/No Project Alternative BP Summary of Maximum Daily Unmitigated Vessel Emissions.

Table H.2.NFA/NPA.Un.Max.BP.2040-4. 2040 No Federal Action/No Project Alternative BP Boiler Warm-Up Maximum Daily Unmitigated Emissions.

Table H.2.NFA/NPA.Un.Max.BP.2040-5. 2040 No Federal Action/No Project Alternative BP Summary of Boiler Warm-Up Maximum Unmitigated Emissions.

Table H.2.NFA/NPA.Un.Max.BP.2040-6. 2040 No Federal Action/No Project Alternative BP Berth Operations Maximum Daily Unmitigated Emissions.

Table H.2.NFA/NPA.Un.Max.BP.2040-7. 2040 No Federal Action/No Project Alternative BP Summary of Berth Operations Maximum Daily Unmitigated Emissions.

Table H.2.NFA/NPA.Un.Max.BP.2040-8. 2040 No Federal Action/No Project Alternative BP Tug Main Engines Maximum Daily Unmitigated Emissions.

Table H.2.NFA/NPA.Un.Max.BP.2040-9. 2040 No Federal Action/No Project Alternative BP Tug Auxiliary Generator Engines Maximum Daily Unmitigated Emissions.

Table H.2.NFA/NPA.Un.Max.BP.2040-10. 2040 No Federal Action/No Project Alternative BP Summary of Tug Maximum Daily Unmitigated Emissions.

Table H.2.NFA/NPA.Un.Max.BP.2040-11. 2040 No Federal Action/No Project Alternative BP VDU Crude Maximum Daily Unmitigated Emissions.

Table H.2.NFA/NPA.Un.Max.BP.2040-12. 2040 No Federal Action/No Project Alternative BP VDU Legs Maximum Daily Unmitigated Emissions.

Table H.2.NFA/NPA.Un.Max.BP.2040-13. 2040 No Federal Action/No Project Alternative BP VDU Maximum Daily Unmitigated Emissions.

Table H.2.NFA/NPA.Un.Max.BP.2040-14. 2040 No Federal Action/No Project Alternative BP Berth Summary of Maximum Daily Unmitigated Emissions.

**No Federal Action/No Project Alternative Average Daily Unmitigated Emissions (Tesoro) 2040**

Table H.2.NFA/NPA.Un.Ts.2040-1. 2040 No Federal Action/No Project Alternative Tesoro Main Engines Average Daily Unmitigated Emissions.

Table H.2.NFA/NPA.Un.Ts.2040-2. 2040 No Federal Action/No Project Alternative Tesoro Project Auxiliary Generator Average Daily Unmitigated Emissions.

Table H.2.NFA/NPA.Un.Ts.2040-3. 2040 No Federal Action/No Project Alternative Tesoro Boiler Warm-Up Average Daily Unmitigated Emissions.

Table H.2.NFA/NPA.Un.Ts.2040-4. 2040 No Federal Action/No Project Alternative Tesoro Berth Operations Average Daily Unmitigated Emissions.

Table H.2.NFA/NPA.Un.Ts.2040-5. 2040 No Federal Action/No Project Alternative Tesoro Summary of Average Daily Unmitigated Vessel Emissions.

Table H.2.NFA/NPA.Un.Ts.2040-6. 2040 No Federal Action/No Project Alternative Tesoro Tug Main Engines Average Daily Unmitigated Emissions.

Table H.2.NFA/NPA.Un.Ts.2040-7. 2040 No Federal Action/No Project Alternative Tesoro Tug Auxiliary Generator Engines Average Daily Unmitigated Emissions.

Table H.2.NFA/NPA.Un.Ts.2040-8. 2040 No Federal Action/No Project Alternative Tesoro Summary of Tug Average Daily Unmitigated Emissions.

Table H.2.NFA/NPA.Un.Ts.2040-9. 2040 No Federal Action/No Project Alternative Tesoro VDU Crude Average Daily Unmitigated Emissions.

Table H.2.NFA/NPA.Un.Ts.2040-10. 2040 No Federal Action/No Project Alternative Tesoro VDU Legs Average Daily Unmitigated Emissions.

Table H.2.NFA/NPA.Un.Ts.2040-11. 2040 No Federal Action/No Project Alternative Tesoro VDU Average Daily Unmitigated Emissions.

Table H.2.NFA/NPA.Un.Ts.2040-12. 2040 No Federal Action/No Project Alternative Tesoro Berth Summary of Average Daily Unmitigated Emissions.

### **No Federal Action/No Project Alternative Maximum Daily Unmitigated Emissions (Tesoro) 2040**

Table H.2.NFA/NPA.Un.Max.Ts.2040-1. 2040 No Federal Action/No Project Alternative Tesoro Main Engines Maximum Daily Unmitigated Emissions.

Table H.2.NFA/NPA.Un.Max.Ts.2040-2. 2040 No Federal Action/No Project Alternative Tesoro Project Auxiliary Generator Maximum Daily Unmitigated Emissions.

Table H.2.NFA/NPA.Un.Max.Ts.2040-3. 2040 No Federal Action/No Project Alternative Tesoro Summary of Maximum Daily Unmitigated Vessel Emissions.

Table H.2.NFA/NPA.Un.Max.Ts.2040-4. 2040 No Federal Action/No Project Alternative Tesoro Boiler Warm-Up Maximum Daily Unmitigated Emissions.

Table H.2.NFA/NPA.Un.Max.Ts.2040-5. 2040 No Federal Action/No Project Alternative Tesoro Summary of Boiler Warm-Up Maximum Unmitigated Emissions.

Table H.2.NFA/NPA.Un.Max.Ts.2040-6. 2040 No Federal Action/No Project Alternative Tesoro Berth Operations Maximum Daily Unmitigated Emissions.

Table H.2.NFA/NPA.Un.Max.Ts.2040-7. 2040 No Federal Action/No Project Alternative Tesoro Summary of Berth Operations Maximum Daily Unmitigated Emissions.

Table H.2.NFA/NPA.Un.Max.Ts.2040-8. 2040 No Federal Action/No Project Alternative Tesoro Tug Main Engines Maximum Daily Unmitigated Emissions.

Table H.2.NFA/NPA.Un.Max.Ts.2040-9. 2040 No Federal Action/No Project Alternative Tesoro Tug Auxiliary Generator Engines Maximum Daily Unmitigated Emissions.

Table H.2.NFA/NPA.Un.Max.Ts.2040-10. 2040 No Federal Action/No Project Alternative Tesoro Summary of Tug Maximum Daily Unmitigated Emissions.

Table H.2.NFA/NPA.Un.Max.Ts.2040-11. 2040 No Federal Action/No Project Alternative Tesoro VDU Crude Maximum Daily Unmitigated Emissions.

Table H.2.NFA/NPA.Un.Max.Ts.2040-12. 2040 No Federal Action/No Project Alternative Tesoro VDU Legs Maximum Daily Unmitigated Emissions.

Table H.2.NFA/NPA.Un.Max.Ts.2040-13. 2040 No Federal Action/No Project Alternative Tesoro VDU Maximum Daily Unmitigated Emissions.

Table H.2.NFA/NPA.Un.Max.Ts.2040-14. 2040 No Federal Action/No Project Alternative Tesoro Berth Summary of Maximum Daily Unmitigated Emissions.

**No Federal Action/No Project Alternative Average Daily Unmitigated Emissions (Exxon Mobil)  
2040**

Table H.2.NFA/NPA.Un.Ex.2040-1. 2040 No Federal Action/No Project Alternative Exxon Mobil Main Engines Average Daily Unmitigated Emissions.

Table H.2.NFA/NPA.Un.Ex.2040-2. 2040 No Federal Action/No Project Alternative Exxon Mobil Project Auxiliary Generator Average Daily Unmitigated Emissions.

Table H.2.NFA/NPA.Un.Ex.2040-3. 2040 No Federal Action/No Project Alternative Exxon Mobil Boiler Warm-Up Average Daily Unmitigated Emissions.

Table H.2.NFA/NPA.Un.Ex.2040-4. 2040 No Federal Action/No Project Alternative Exxon Mobil Berth Operations Average Daily Unmitigated Emissions.

Table H.2.NFA/NPA.Un.Ts.2040-5. 2040 No Federal Action/No Project Alternative Exxon Mobil Summary of Average Daily Unmitigated Vessel Emissions.

Table H.2.NFA/NPA.Un.Ex.2040-6. 2040 No Federal Action/No Project Alternative Exxon Mobil Tug Main Engines Average Daily Unmitigated Emissions.

Table H.2.NFA/NPA.Un.Ex.2040-7. 2040 No Federal Action/No Project Alternative Exxon Mobil Tug Auxiliary Generator Engines Average Daily Unmitigated Emissions.

Table H.2.NFA/NPA.Un.Ex.2040-8. 2040 No Federal Action/No Project Alternative Exxon Mobil Summary of Tug Average Daily Unmitigated Emissions.

Table H.2.NFA/NPA.Un.Ex.2040-9. 2040 No Federal Action/No Project Alternative Exxon Mobil VDU Crude Average Daily Unmitigated Emissions.

Table H.2.NFA/NPA.Un.Ex.2040-10. 2040 No Federal Action/No Project Alternative Exxon Mobil VDU Legs Average Daily Unmitigated Emissions.

Table H.2.NFA/NPA.Un.Ex.2040-11. 2040 No Federal Action/No Project Alternative Exxon Mobil VDU Average Daily Unmitigated Emissions.

Table H.2.NFA/NPA.Un.Ex.2040-12. 2040 No Federal Action/No Project Alternative Exxon Mobil Berth Summary of Average Daily Unmitigated Emissions.

## **No Federal Action/No Project Alternative Maximum Daily Unmitigated Emissions (Exxon Mobil) 2040**

Table H.2.NFA/NPA.Un.Max.Ex.2040-1. 2040 No Federal Action/No Project Alternative Exxon Mobil Main Engines Maximum Daily Unmitigated Emissions.

Table H.2.NFA/NPA.Un.Max.Ex.2040-2. 2040 No Federal Action/No Project Alternative Exxon Mobil Project Auxiliary Generator Maximum Daily Unmitigated Emissions

Table H.2.NFA/NPA.Un.Max.Ex.2040-3. 2040 No Federal Action/No Project Alternative Exxon Mobil Summary of Maximum Daily Unmitigated Vessel Emissions.

Table H.2.NFA/NPA.Un.Max.Ex.2040-4. 2040 No Federal Action/No Project Alternative Exxon Mobil Boiler Warm-Up Maximum Daily Unmitigated Emissions.

Table H.2.NFA/NPA.Un.Max.Ex.2040-5. 2040 No Federal Action/No Project Alternative Exxon Mobil Summary of Boiler Warm-Up Maximum Unmitigated Emissions.

Table H.2.NFA/NPA.Un.Max.Ex.2040-6. 2040 No Federal Action/No Project Alternative Exxon Mobil Berth Operations Maximum Daily Unmitigated Emissions.

Table H.2.NFA/NPA.Un.Max.Ex.2040-7. 2040 No Federal Action/No Project Alternative Exxon Mobil Summary of Berth Operations Maximum Daily Unmitigated Emissions.

Table H.2.NFA/NPA.Un.Max.Ex.2040-8. 2040 No Federal Action/No Project Alternative Exxon Mobil Tug Main Engines Maximum Daily Unmitigated Emissions.

Table H.2.NFA/NPA.Un.Max.Ex.2040-9. 2040 No Federal Action/No Project Alternative Exxon Mobil Tug Auxiliary Generator Engines Maximum Daily Unmitigated Emissions.

Table H.2.NFA/NPA.Un.Max.Ex.2040-10. 2040 No Federal Action/No Project Alternative Exxon Mobil Summary of Tug Maximum Daily Unmitigated Emissions.

Table H.2.NFA/NPA.Un.Max.Ex.2040-11. 2040 No Federal Action/No Project Alternative Exxon Mobil VDU Crude Maximum Daily Unmitigated Emissions.

Table H.2.NFA/NPA.Un.Max.Ex.2040-12. 2040 No Federal Action/No Project Alternative Exxon Mobil VDU Legs Maximum Daily Unmitigated Emissions.

Table H.2.NFA/NPA.Un.Max.Ex.2040-13. 2040 No Federal Action/No Project Alternative Exxon Mobil VDU Maximum Daily Unmitigated Emissions.

Table H.2.NFA/NPA.Un.Max.Ex.2040-14. 2040 No Federal Action/No Project Alternative Exxon Mobil Berth Summary of Maximum Daily Unmitigated Emissions.

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Table H.2.RPA.Un.2010-2. 2010 Reduced Project Alternative Auxiliary Generator Average Daily Unmitigated Emissions

Table H.2.RPA.Un.2010-3. 2010 Reduced Project Alternative Boiler Warm-Up Average Daily Unmitigated Emissions.

Table H.2.RPA.Un.2010-4. 2010 Reduced Project Alternative Berth Operations Average Daily Unmitigated Emissions.

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Table H.2.RPA.Un.2010-9. 2010 Reduced Project Alternative VDU Crude Average Daily Unmitigated Emissions.

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Table H.2.RPA.Un.Max.2010-8. 2010 Reduced Project Alternative Tug Main Engines Maximum Daily Unmitigated Emissions.

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Table H.2.RPA.Un.Max.2010-11. 2010 Reduced Project Alternative VDU Crude Maximum Daily Unmitigated Emissions.

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Table H.2.RPA.Un.Max.Bar.2010-1. 2010 Reduced Project Alternative Main Engines Maximum Daily Unmitigated Emissions from Barge Deliveries.

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### **Reduced Project Alternative Average Daily Unmitigated Emissions 2015**

Table H.2.RPA.Un.2015-1. 2015 Reduced Project Alternative Main Engines Average Daily Unmitigated Emissions.

Table H.2.RPA.Un.2015-2. 2015 Reduced Project Alternative Auxiliary Generator Average Daily Unmitigated Emissions.

Table H.2.RPA.Un.2015-5. 2015 Reduced Project Alternative Summary of Average Daily Unmitigated Vessel Emissions.

Table H.2.RPA.Un.2015-3. 2015 Reduced Project Alternative Boiler Warm-Up Average Daily Unmitigated Emissions.

Table H.2.RPA.Un.2015-4. 2015 Reduced Project Alternative Berth Operations Average Daily Unmitigated Emissions.

Table H.2.RPA.Un.2015-6. 2015 Reduced Project Alternative Tug Main Engines Average Daily Unmitigated Emissions.

Table H.2.RPA.Un.2015-7. 2015 Reduced Project Alternative Tug Auxiliary Generator Engines Average Daily Unmitigated Emissions.

Table H.2.RPA.Un.2015-8. 2015 Reduced Project Alternative Summary of Tug Average Daily Unmitigated Emissions.

Table H.2.RPA.Un.2015-9. 2015 Reduced Project Alternative VDU Crude Average Daily Unmitigated Emissions.

Table H.2.RPA.Un.2015-10. 2015 Reduced Project Alternative VDU Legs Average Daily Unmitigated Emissions.

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### **Reduced Project Alternative Average Daily Unmitigated Emissions (Barges) 2010**

Table H.2.RPA.Un.Bar.2015-1. 2015 Reduced Project Alternative Main Engines Average Daily Unmitigated Emissions from Barge Deliveries for OGV.

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Table H.2.RPA.Un.Bar.2015-3. 2015 Reduced Project Alternative Tug Auxiliary Generator Engines Average Daily Unmitigated Emissions from Barge Deliveries for OGV.

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### **Reduced Project Alternative Maximum Daily Unmitigated Emissions 2015**

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Table H.2.RPA.Un.Max.2015-2. 2015 Reduced Project Alternative Auxiliary Generator Maximum Daily Unmitigated Emissions.

Table H.2.RPA.Un.Max.2015-3. 2015 Reduced Project Alternative Summary of Maximum Daily Unmitigated Vessel Emissions.

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Table H.2.RPA.Un.Max.2015-6. 2015 Reduced Project Alternative Berth Operations Maximum Daily Unmitigated Emissions.

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Table H.2.RPA.Un.Max.2015-8. 2015 Reduced Project Alternative Tug Main Engines Maximum Daily Unmitigated Emissions.

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Table H.2.RPA.Un.Max.2015-10. 2015 Reduced Project Alternative Summary of Tug Maximum Daily Unmitigated Emissions.

Table H.2.RPA.Un.Max.2015-11. 2015 Reduced Project Alternative VDU Crude Maximum Daily Unmitigated Emissions.

Table H.2.RPA.Un.Max.2015-12. 2015 Reduced Project Alternative VDU Legs Maximum Daily Unmitigated Emissions.

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### **Reduced Project Alternative Maximum Daily Unmitigated Emissions (Barges) 2015**

Table H.2.RPA.Un.Max.Bar.2015-1. 2015 Reduced Project Alternative Main Engines Maximum Daily Unmitigated Emissions from Barge Deliveries for OGV.

Table H.2.RPA.Un.Max.Bar.2015-2. 2015 Reduced Project Alternative Tug Main Engines Maximum Daily Unmitigated Emissions from Barge Deliveries for OGV.

Table H.2.RPA.Un.Max.Bar.2015-3. 2015 Reduced Project Alternative Tug Auxiliary Generator Engines Maximum Daily Unmitigated Emissions from Barge Deliveries for OGV.

Table H.2.RPA.Un.Max.Bar.2015-4. 2015 Reduced Project Alternative Summary of Tug Maximum Daily Unmitigated Emissions from Barge Deliveries for OGV.

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### **Reduced Project Alternative Average Daily Unmitigated Emissions 2025**

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Table H.2.RPA.Un.2025-2. 2025 Reduced Project Alternative Auxiliary Generator Average Daily Unmitigated Emissions.

Table H.2.RPA.Un.2025-3. 2025 Reduced Project Alternative Boiler Warm-Up Average Daily Unmitigated Emissions.

Table H.2.RPA.Un.2025-4. 2025 Reduced Project Alternative Berth Operations Average Daily Unmitigated Emissions.

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Table H.2.RPA.Un.2025-6. 2025 Reduced Project Alternative Tug Main Engines Average Daily Unmitigated Emissions.

Table H.2.RPA.Un.2025-7. 2025 Reduced Project Alternative Tug Auxiliary Generator Engines Average Daily Unmitigated Emissions.

Table H.2.RPA.Un.2025-8. 2025 Reduced Project Alternative Summary of Tug Average Daily Unmitigated Emissions.

Table H.2.RPA.Un.2025-9. 2025 Reduced Project Alternative VDU Crude Average Daily Unmitigated Emissions.

Table H.2.RPA.Un.2025-10. 2025 Reduced Project Alternative VDU Legs Average Daily Unmitigated Emissions.

Table H.2.RPA.Un.2025-11. 2025 Reduced Project Alternative VDU Average Daily Unmitigated Emissions.

Table H.2.RPA.Un.2025-12. 2025 Reduced Project Alternative Main Engines Average Daily Unmitigated Emissions (BP).

Table H.2.RPA.Un.2025-13. 2025 Reduced Project Alternative Auxiliary Generator Average Daily Unmitigated Emissions (BP).

Table H.2.RPA.Un.2025-14. 2025 Reduced Project Alternative Boiler Warm-Up Average Daily Unmitigated Emissions (BP).

Table H.2.RPA.Un.2025-15. 2025 Reduced Project Alternative Berth Operations Average Daily Unmitigated Emissions (BP).

Table H.2.RPA.Un.2025-16. 2025 Reduced Project Alternative Summary of Average Daily Unmitigated Vessel Emissions (BP).

Table H.2.RPA.Un.2025-17. 2025 Reduced Project Alternative Tug Main Engines Average Daily Unmitigated Emissions (BP).

Table H.2.RPA.Un.2025-18. 2025 Reduced Project Alternative Tug Auxiliary Generator Engines Average Daily Unmitigated Emissions (BP).

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Table H.2.RPA.Un.2025-23. 2025 Reduced Project Alternative BP Berth Summary.

Table H.2.RPA.Un.2025-24. 2025 Reduced Project Alternative Main Engines Average Daily Unmitigated Emissions (Tesoro).

Table H.2.RPA.Un.2025-25. 2025 Reduced Project Alternative Auxiliary Generator Average Daily Unmitigated Emissions (Tesoro).

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Table H.2.RPA.Un.2025-28. 2025 Reduced Project Alternative Summary of Average Daily Unmitigated Vessel Emissions (Tesoro).

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Table H.2.RPA.Un.2025-30. 2025 Reduced Project Alternative Tug Auxiliary Generator Engines Average Daily Unmitigated Emissions (Tesoro).

Table H.2.RPA.Un.2025-31. 2025 Reduced Project Alternative Summary of Tug Average Daily Unmitigated Emissions (Tesoro).

Table H.2.RPA.Un.2025-32. 2025 Reduced Project Alternative VDU Crude Average Daily Unmitigated Emissions (Tesoro).

Table H.2.RPA.Un.2025-33. 2025 Reduced Project Alternative VDU Legs Average Daily Unmitigated Emissions (Tesoro).

Table H.2.RPA.Un.2025-34. 2025 Reduced Project Alternative VDU Average Daily Unmitigated Emissions (Tesoro).

Table H.2.RPA.Un.2025-35. 2025 Reduced Project Alternative Tesoro Berth Summary.

Table H.2.RPA.Un.2025-36. 2025 Reduced Project Alternative Main Engines Average Daily Unmitigated Emissions (Exxon Mobil).

Table H.2.RPA.Un.2025-37. 2025 Reduced Project Alternative Auxiliary Generator Average Daily Unmitigated Emissions (Exxon Mobil).

Table H.2.RPA.Un.2025-38. 2025 Reduced Project Alternative Boiler Warm-Up Average Daily Unmitigated Emissions (Exxon Mobil).

Table H.2.RPA.Un.2025-39. 2025 Reduced Project Alternative Berth Operations Average Daily Unmitigated Emissions (Exxon Mobil).

Table H.2.RPA.Un.2025-40. 2025 Reduced Project Alternative Summary of Average Daily Unmitigated Vessel Emissions (Exxon Mobil).

Table H.2.RPA.Un.2025-41. 2025 Reduced Project Alternative Tug Main Engines Average Daily Unmitigated Emissions (Exxon Mobil).

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Table H.2.RPA.Un.2025-43. 2025 Reduced Project Alternative Summary of Tug Average Daily Unmitigated Emissions (Exxon Mobil).

Table H.2.RPA.Un.2025-44. 2025 Reduced Project Alternative VDU Crude Average Daily Unmitigated Emissions (Exxon Mobil).

Table H.2.RPA.Un.2025-45. 2025 Reduced Project Alternative VDU Legs Average Daily Unmitigated Emissions (Exxon Mobil).

Table H.2.RPA.Un.2025-46. 2025 Reduced Project Alternative VDU Average Daily Unmitigated Emissions (Exxon Mobil).

Table H.2.RPA.Un.2025-47. 2025 Reduced Project Alternative Exxon Mobil Berth Summary.

Table H.2.RPA.Un.2025-48. 2025 Reduced Project Alternative Overall Berth Summary (BP, Tesoro and Exxon Mobil).

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Table H.2.RPA.Un.Bar.2025-1. 2025 Reduced Project Alternative Main Engines Average Daily Unmitigated Emissions from Barge Deliveries for OGV.

Table H.2.RPA.Un.Bar.2025-2. 2025 Reduced Project Alternative Tug Main Engines Average Daily Unmitigated Emissions from Barge Deliveries for OGV.

Table H.2.RPA.Un.Bar.2025-3. 2025 Reduced Project Alternative Tug Auxiliary Generator Engines Average Daily Unmitigated Emissions from Barge Deliveries for OGV.

Table H.2.RPA.Un.Bar.2025-4. 2025 Reduced Project Alternative Summary of Tug Average Daily Unmitigated Emissions from Barge Deliveries for OGV.

Table H.2.RPA.Un.Bar.2025-5. 2025 Reduced Project Alternative Summary of Average Daily Unmitigated Vessel Emissions from Barge Deliveries for OGV.

### **Reduced Project Alternative Maximum Daily Unmitigated Emissions 2025**

Table H.2.RPA.Un.Max.2025-1. 2025 Reduced Project Alternative Main Engines Maximum Daily Unmitigated Emissions.

Table H.2.RPA.Un.Max.2025-2. 2025 Reduced Project Alternative Auxiliary Generator Maximum Daily Unmitigated Emissions.

Table H.2.RPA.Un.Max.2025-3. 2025 Reduced Project Alternative Summary of Maximum Daily Unmitigated Vessel Emissions.

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Table H.2.RPA.Un.Max.2025-9. 2025 Reduced Project Alternative Tug Auxiliary Generator Engines Maximum Daily Unmitigated Emissions.

Table H.2.RPA.Un.Max.2025-10. 2025 Reduced Project Alternative Summary of Tug Maximum Daily Unmitigated Emissions.

Table H.2.RPA.Un.Max.2025-11. 2025 Reduced Project Alternative VDU Crude Maximum Daily Unmitigated Emissions.

Table H.2.RPA.Un.Max.2025-12. 2025 Reduced Project Alternative VDU Legs Maximum Daily Unmitigated Emissions.

Table H.2.RPA.Un.Max.2025-13. 2025 Reduced Project Alternative VDU Maximum Daily Unmitigated Emissions.

Table H.2.RPA.Un.Max.2025-14. 2025 Reduced Project Alternative Main Engines Maximum Daily Unmitigated Emissions (BP).

Table H.2.RPA.Un.Max.2025-15. 2025 Reduced Project Alternative Auxiliary Generator Maximum Daily Unmitigated Emissions (BP).

Table H.2.RPA.Un.Max.2025-16. 2025 Reduced Project Alternative Summary of Maximum Daily Unmitigated Vessel Emissions (BP).

Table H.2.RPA.Un.Max.2025-17. 2025 Reduced Project Alternative Boiler Warm-Up Maximum Daily Unmitigated Emissions (BP).

Table H.2.RPA.Un.Max.2025-18. 2025 Reduced Project Alternative Summary of Boiler Warm-Up Maximum Unmitigated Emissions (BP).

Table H.2.RPA.Un.Max.2025-19. 2025 Reduced Project Alternative Berth Operations Maximum Daily Unmitigated Emissions (BP).

Table H.2.RPA.Un.Max.2025-20. 2025 Reduced Project Alternative Summary of Berth Operations Maximum Daily Unmitigated Emissions (BP).

Table H.2.RPA.Un.Max.2025-21. 2025 Reduced Project Alternative Tug Main Engines Maximum Daily Unmitigated Emissions (BP).

Table H.2.RPA.Un.Max.2025-22. 2025 Reduced Project Alternative Tug Auxiliary Generator Engines Maximum Daily Unmitigated Emissions (BP).

Table H.2.RPA.Un.Max.2025-23. 2025 Reduced Project Alternative Summary of Tug Maximum Daily Unmitigated Emissions (BP).

Table H.2.RPA.Un.Max.2025-24. 2025 Reduced Project Alternative VDU Crude Maximum Daily Unmitigated Emissions (BP).

Table H.2.RPA.Un.Max.2025-25. 2025 Reduced Project Alternative VDU Legs Maximum Daily Unmitigated Emissions (BP).

Table H.2.RPA.Un.Max.2025-26. 2025 Reduced Project Alternative VDU Maximum Daily Unmitigated Emissions (BP).

Table H.2.RPA.Un.Max.2025-27. 2025 Reduced Project Alternative BP Berth Summary.

Table H.2.RPA.Un.Max.2025-28. 2025 Reduced Project Alternative Main Engines Maximum Daily Unmitigated Emissions (Tesoro).

Table H.2.RPA.Un.Max.2025-29. 2025 Reduced Project Alternative Auxiliary Generator Maximum Daily Unmitigated Emissions (Tesoro).

Table H.2.RPA.Un.Max.2025-30. 2025 Reduced Project Alternative Summary of Maximum Daily Unmitigated Vessel Emissions (Tesoro).

Table H.2.RPA.Un.Max.2025-31. 2025 Reduced Project Alternative Boiler Warm-Up Maximum Daily Unmitigated Emissions (Tesoro).

Table H.2.RPA.Un.Max.2025-32. 2025 Reduced Project Alternative Summary of Boiler Warm-Up Maximum Unmitigated Emissions (Tesoro).

Table H.2.RPA.Un.Max.2025-33. 2025 Reduced Project Alternative Berth Operations Maximum Daily Unmitigated Emissions (Tesoro).

Table H.2.RPA.Un.Max.2025-34. 2025 Reduced Project Alternative Summary of Berth Operations Maximum Daily Unmitigated Emissions (Tesoro).

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Table H.2.RPA.Un.Max.2025-36. 2025 Reduced Project Alternative Tug Auxiliary Generator Engines Maximum Daily Unmitigated Emissions (Tesoro).

Table H.2.RPA.Un.Max.2025-37. 2025 Reduced Project Alternative Summary of Tug Maximum Daily Unmitigated Emissions (Tesoro).

Table H.2.RPA.Un.Max.2025-38. 2025 Reduced Project Alternative VDU Crude Maximum Daily Unmitigated Emissions (Tesoro).

Table H.2.RPA.Un.Max.2025-39. 2025 Reduced Project Alternative VDU Legs Maximum Daily Unmitigated Emissions (Tesoro).

Table H.2.RPA.Un.Max.2025-40. 2025 Reduced Project Alternative VDU Maximum Daily Unmitigated Emissions (Tesoro).



Table H.2.RPA.Un.Max.2025-41. 2025 Reduced Project Alternative Tesoro Berth Summary.

Table H.2.RPA.Un.Max.2025-42. 2025 Reduced Project Alternative Main Engines Maximum Daily Unmitigated Emissions (Exxon Mobil).

Table H.2.RPA.Un.Max.2025-43. 2025 Reduced Project Alternative Auxiliary Generator Maximum Daily Unmitigated Emissions (Exxon Mobil).

Table H.2.RPA.Un.Max.2025-44. 2025 Reduced Project Alternative Summary of Maximum Daily Unmitigated Vessel Emissions (Exxon Mobil).

Table H.2.RPA.Un.Max.2025-45. 2025 Reduced Project Alternative Boiler Warm-Up Maximum Daily Unmitigated Emissions (Exxon Mobil).

Table H.2.RPA.Un.Max.2025-46. 2025 Reduced Project Alternative Summary of Boiler Warm-Up Maximum Unmitigated Emissions (Exxon Mobil).

Table H.2.RPA.Un.Max.2025-47. 2025 Reduced Project Alternative Berth Operations Maximum Daily Unmitigated Emissions (Exxon Mobil).

Table H.2.RPA.Un.Max.2025-48. 2025 Reduced Project Alternative Summary of Berth Operations Maximum Daily Unmitigated Emissions (Exxon Mobil).

Table H.2.RPA.Un.Max.2025-49. 2025 Reduced Project Alternative Tug Main Engines Maximum Daily Unmitigated Emissions (Exxon Mobil).

Table H.2.RPA.Un.Max.2025-50. 2025 Reduced Project Alternative Tug Auxiliary Generator Engines Maximum Daily Unmitigated Emissions (Exxon Mobil).

Table H.2.RPA.Un.Max.2025-51. 2025 Reduced Project Alternative Summary of Tug Maximum Daily Unmitigated Emissions (Exxon Mobil).

Table H.2.RPA.Un.Max.2025-52. 2025 Reduced Project Alternative VDU Crude Maximum Daily Unmitigated Emissions (Exxon Mobil).

Table H.2.RPA.Un.Max.2025-53. 2025 Reduced Project Alternative VDU Legs Maximum Daily Unmitigated Emissions (Exxon Mobil).

Table H.2.RPA.Un.Max.2025-54. 2025 Reduced Project Alternative VDU Maximum Daily Unmitigated Emissions (Exxon Mobil).

Table H.2.RPA.Un.Max.2025-55. 2025 Reduced Project Alternative Exxon Mobil Berth Summary.

### **Reduced Project Alternative Maximum Daily Unmitigated Emissions (Barges) 2025**

Table H.2.RPA.Un.Max.Bar.2025-1. 2025 Reduced Project Alternative Main Engines Maximum Daily Unmitigated Emissions from Barge Deliveries.

Table H.2.RPA.Un.Max.Bar.2025-2. 2025 Reduced Project Alternative Tug Main Engines Maximum Daily Unmitigated Emissions from Barge Deliveries.

Table H.2.RPA.Un.Max.Bar.2025-3. 2025 Reduced Project Alternative Tug Auxiliary Generator Engines Maximum Daily Unmitigated Emissions from Barge Deliveries.

Table H.2.RPA.Un.Max.Bar.2025-4. 2025 Reduced Project Alternative Summary of Tug Maximum Daily Unmitigated Emissions from Barge Deliveries.

Table H.2.RPA.Un.Max.Bar.2025-5. 2025 Reduced Project Alternative Summary of Maximum Daily Unmitigated Vessel Emissions from Barge Deliveries.

### **Reduced Project Alternative Average Daily Unmitigated Emissions 2040**

Table H.2.RPA.Un.2040-1. 2040 Reduced Project Alternative Main Engines Average Daily Unmitigated Emissions.

Table H.2.RPA.Un.2040-2. 2040 Reduced Project Alternative Auxiliary Generator Average Daily Unmitigated Emissions.

Table H.2.RPA.Un.2040-3. 2040 Reduced Project Alternative Boiler Warm-Up Average Daily Unmitigated Emissions.

Table H.2.RPA.Un.2040-4. 2040 Reduced Project Alternative Berth Operations Average Daily Unmitigated Emissions.

Table H.2.RPA.Un.2040-5. 2040 Reduced Project Alternative Summary of Average Daily Unmitigated Vessel Emissions.

Table H.2.RPA.Un.2040-6. 2040 Reduced Project Alternative Tug Main Engines Average Daily Unmitigated Emissions.

Table H.2.RPA.Un.2040-7. 2040 Reduced Project Alternative Tug Auxiliary Generator Engines Average Daily Unmitigated Emissions.

Table H.2.RPA.Un.2040-8. 2040 Reduced Project Alternative Summary of Tug Average Daily Unmitigated Emissions.

Table H.2.RPA.Un.2040-9. 2040 Reduced Project Alternative VDU Crude Average Daily Unmitigated Emissions.

Table H.2.RPA.Un.2040-10. 2040 Reduced Project Alternative VDU Legs Average Daily Unmitigated Emissions.

Table H.2.RPA.Un.2040-11. 2040 Reduced Project Alternative VDU Average Daily Unmitigated Emissions.

Table H.2.RPA.Un.2040-12. 2040 Reduced Project Alternative Main Engines Average Daily Unmitigated Emissions (BP).

Table H.2.RPA.Un.2040-13. 2040 Reduced Project Alternative Auxiliary Generator Average Daily Unmitigated Emissions (BP).

Table H.2.RPA.Un.2040-14. 2040 Reduced Project Alternative Boiler Warm-Up Average Daily Unmitigated Emissions (BP).

Table H.2.RPA.Un.2040-15. 2040 Reduced Project Alternative Berth Operations Average Daily Unmitigated Emissions (BP).

Table H.2.RPA.Un.2040-16. 2040 Reduced Project Alternative Summary of Average Daily Unmitigated Vessel Emissions (BP).

Table H.2.RPA.Un.2040-17. 2040 Reduced Project Alternative Tug Main Engines Average Daily Unmitigated Emissions (BP).

Table H.2.RPA.Un.2040-18. 2040 Reduced Project Alternative Tug Auxiliary Generator Engines Average Daily Unmitigated Emissions (BP).

Table H.2.RPA.Un.2040-19. 2040 Reduced Project Alternative Summary of Tug Average Daily Unmitigated Emissions (BP).

Table H.2.RPA.Un.2040-20. 2040 Reduced Project Alternative VDU Crude Average Daily Unmitigated Emissions (BP).

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Table H.2.RPA.Un.2040-22. 2040 Reduced Project Alternative VDU Average Daily Unmitigated Emissions (BP).

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### **Reduced Project Alternative Maximum Daily Mitigated Emissions 2010**

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### **Reduced Project Alternative Maximum Daily Mitigated Emissions 2015**

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### **Reduced Project Alternative Average Daily Mitigated Emissions 2040**

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### **Reduced Project Alternative Maximum Daily Mitigated Emissions 2040**

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## **Section 2.2: AMP Electricity Consumption**

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### **Proposed Project Average Daily Mitigated Emissions (AMP) 2025**

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### **Proposed Project Average Daily Mitigated Emissions (AMP) 2040**

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## **No Federal Action/No Project Alternative Average Daily Unmitigated Emissions (AMP) 2010**

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Table H.2.NFA/NPA.Un.AMP.2015-2. 2015 No Federal Action/No Project Alternative Berth Operations Maximum Daily Unmitigated Emissions by AMP Electricity Consumption (Exxon Mobil).

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## **No Federal Action/No Project Alternative Average Daily Unmitigated Emissions (AMP) 2040**

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## **Reduced Project Alternative Average Daily Mitigated Emissions (AMP) 2010**

Table H.2.RPA.Mit.AMP.2010-1. 2010 Reduced Project Alternative Berth Operations Average Daily Mitigated Emissions by AMP Electricity Consumption.

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## **Reduced Project Alternative Average Daily Mitigated Emissions (AMP) 2015**

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### **Reduced Project Alternative Average Daily Mitigated Emissions (AMP) 2025**

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### **Reduced Project Alternative Average Daily Mitigated Emissions (AMP) 2040**

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## **Section 3: Greenhouse Gases**

### **Section 3.1: Operational GHG Emissions**

#### **Proposed Project Average Daily Unmitigated Emissions 2010**

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Table H.2.PP.Un.GHG.2010-2. 2010 Proposed Project Auxiliary Generator Average Daily Unmitigated GHG Emissions

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Table H.2.PP.Un.GHG.2010-7. 2010 Proposed Project Tug Auxiliary Generator Engines Average Daily Unmitigated GHG Emissions

Table H.2.PP.Un.GHG.2010-8. 2010 Proposed Project Summary of Tug Average Daily Unmitigated GHG Emissions.

Table H.2.PP.Un.GHG.2010-9. 2010 Proposed Project VDU Crude Average Daily Unmitigated GHG Emissions.

Table H.2.PP.Un.GHG.2010-10. 2010 Proposed Project VDU Legs Average Daily Unmitigated GHG Emissions.

Table H.2.PP.Un.GHG.2010-11. 2010 Proposed Project VDU Average Daily Unmitigated GHG Emissions.

### **Proposed Project Average Daily Unmitigated Emissions 2015**

Table H.2.PP.Un.GHG.2015-1. 2015 Proposed Project Main Engines Average Daily Unmitigated GHG Emissions.

Table H.2.PP.Un.GHG.2015-2. 2015 Proposed Project Auxiliary Generator Average Daily Unmitigated GHG Emissions.

Table H.2.PP.Un.GHG.2015-3. 2015 Proposed Project Boiler Warm-Up Average Daily Unmitigated GHG Emissions.

Table H.2.PP.Un.GHG.2015-4. 2015 Proposed Project Berth Operations Average Daily Unmitigated GHG Emissions.

Table H.2.PP.Un.GHG.2015-5. 2015 Proposed Project Summary of Average Daily Unmitigated Vessel GHG Emissions.



Table H.2.PP.Un.GHG.2015-6. 2015 Proposed Project Tug Main Engines Average Daily Unmitigated GHG Emissions.

Table H.2.PP.Un.GHG.2015-7. 2015 Proposed Project Tug Auxiliary Generator Engines Average Daily Unmitigated GHG Emissions.

Table H.2.PP.Un.GHG.2015-8. 2015 Proposed Project Summary of Tug Average Daily Unmitigated GHG Emissions.

Table H.2.PP.Un.GHG.2015-9. 2015 Proposed Project VDU Crude Average Daily Unmitigated GHG Emissions.

Table H.2.PP.Un.GHG.2015-10. 2015 Proposed Project VDU Legs Average Daily Unmitigated GHG Emissions.

Table H.2.PP.Un.GHG.2015-11. 2015 Proposed Project VDU Average Daily Unmitigated GHG Emissions.

### **Proposed Project Average Daily Unmitigated Emissions 2025**

Table H.2.PP.Un.GHG.2025-1. 2025 Proposed Project Main Engines Average Daily Unmitigated GHG Emissions.

Table H.2.PP.Un.GHG.2025-2. 2025 Proposed Project Auxiliary Generator Average Daily Unmitigated GHG Emissions.

Table H.2.PP.Un.GHG.2025-3. 2025 Proposed Project Boiler Warm-Up Average Daily Unmitigated GHG Emissions.

Table H.2.PP.Un.GHG.2025-4. 2025 Proposed Project Berth Operations Average Daily Unmitigated GHG Emissions.

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Table H.2.PP.Un.GHG.2025-6. 2025 Proposed Project Tug Main Engines Average Daily Unmitigated GHG Emissions.

Table H.2.PP.Un.GHG.2025-7. 2025 Proposed Project Tug Auxiliary Generator Engines Average Daily Unmitigated GHG Emissions.

Table H.2.PP.Un.GHG.2025-8. 2025 Proposed Project Summary of Tug Average Daily Unmitigated GHG Emissions.

Table H.2.PP.Un.GHG.2025-9. 2025 Proposed Project VDU Crude Average Daily Unmitigated GHG Emissions.

Table H.2.PP.Un.GHG.2025-10. 2025 Proposed Project VDU Legs Average Daily Unmitigated GHG Emissions.

Table H.2.PP.Un.GHG.2025-11. 2025 Proposed Project VDU Average Daily Unmitigated GHG Emissions.

### **Proposed Project Average Daily Unmitigated Emissions 2040**

Table H.2.PP.Un.GHG.2040-1. 2040 Proposed Project Main Engines Average Daily Unmitigated GHG Emissions.

Table H.2.PP.Un.GHG.2040-2. 2040 Proposed Project Auxiliary Generator Average Daily Unmitigated GHG Emissions.

Table H.2.PP.Un.GHG.2040-3. 2040 Proposed Project Boiler Warm-Up Average Daily Unmitigated GHG Emissions.

Table H.2.PP.Un.GHG.2040-4. 2040 Proposed Project Berth Operations Average Daily Unmitigated GHG Emissions.

Table H.2.PP.Un.GHG.2040-5. 2040 Proposed Project Summary of Average Daily Unmitigated Vessel GHG Emissions.

Table H.2.PP.Un.GHG.2040-6. 2040 Proposed Project Tug Main Engines Average Daily Unmitigated GHG Emissions.

Table H.2.PP.Un.GHG.2040-7. 2040 Proposed Project Tug Auxiliary Generator Engines Average Daily Unmitigated GHG Emissions.

Table H.2.PP.Un.GHG.2040-8. 2040 Proposed Project Summary of Tug Average Daily Unmitigated GHG Emissions.

Table H.2.PP.Un.GHG.2040-9. 2040 Proposed Project VDU Crude Average Daily Unmitigated GHG Emissions.

Table H.2.PP.Un.GHG.2040-10. 2040 Proposed Project VDU Legs Average Daily Unmitigated GHG Emissions.

Table H.2.PP.Un.GHG.2040-11. 2040 Proposed Project VDU Average Daily Unmitigated GHG Emissions.

### **Proposed Project Average Daily Mitigated Emissions 2010**

Table H.2.PP.Mit.GHG.2010-1. 2010 Proposed Project Main Engines Average Daily Mitigated GHG Emissions.

Table H.2.PP.Mit.GHG.2010-2. 2010 Proposed Project Auxiliary Generator Average Daily Mitigated GHG Emissions.

Table H.2.PP.Mit.GHG.2010-3. 2010 Proposed Project Summary of Average Daily Mitigated Vessel GHG Emissions.

Table H.2.PP.Mit.GHG.2010-4. 2010 Proposed Project Boiler Warm-Up Average Daily Mitigated GHG Emissions.

Table H.2.PP.Mit.GHG.2010-5. 2010 Proposed Project Summary of Boiler Warm-Up Average Daily Mitigated GHG Emissions.

Table H.2.PP.Mit.GHG.2010-6. 2010 Proposed Project Berth Operations Average Daily Mitigated GHG Emissions.

Table H.2.PP.Mit.GHG.2010-7. 2010 Proposed Project Summary of Berth Operations Average Daily Mitigated GHG Emissions.

### **Proposed Project Average Daily Mitigated Emissions 2015**

Table H.2.PP.Mit.GHG.2015-1. 2015 Proposed Project Main Engines Average Daily Mitigated GHG Emissions.

Table H.2.PP.Mit.GHG.2015-2. 2015 Proposed Project Auxiliary Generator Average Daily Mitigated GHG Emissions.

Table H.2.PP.Mit.GHG.2015-3. 2015 Proposed Project Summary of Average Daily Mitigated Vessel GHG Emissions.

Table H.2.PP.Mit.GHG.2015-4. 2015 Proposed Project Boiler Warm-Up Average Daily Mitigated GHG Emissions.

Table H.2.PP.Mit.GHG.2015-5. 2015 Proposed Project Summary of Boiler Warm-Up Average Daily Mitigated GHG Emissions.

Table H.2.PP.Mit.GHG.2015-6. 2015 Proposed Project Berth Operations Average Daily Mitigated GHG Emissions.

Table H.2.PP.Mit.GHG.2015-7. 2015 Proposed Project Summary of Berth Operations Average Daily Mitigated GHG Emissions.

### **Proposed Project Average Daily Mitigated Emissions 2025**

Table H.2.PP.Mit.GHG.2025-1. 2025 Proposed Project Main Engines Average Daily Mitigated GHG Emissions.

Table H.2.PP.Mit.GHG.2025-2. 2025 Proposed Project Auxiliary Generator Average Daily Mitigated GHG Emissions.

Table H.2.PP.Mit.GHG.2025-3. 2025 Proposed Project Summary of Average Daily Mitigated Vessel GHG Emissions.

Table H.2.PP.Mit.GHG.2025-4. 2025 Proposed Project Boiler Warm-Up Average Daily Mitigated GHG Emissions.

Table H.2.PP.Mit.GHG.2025-5. 2025 Proposed Project Summary of Boiler Warm-Up Average Daily Mitigated GHG Emissions.

Table H.2.PP.Mit.GHG.2025-6. 2025 Proposed Project Berth Operations Average Daily Mitigated GHG Emissions.

Table H.2.PP.Mit.GHG.2025-7. 2025 Proposed Project Summary of Berth Operations Average Daily Mitigated GHG Emissions.

### **Proposed Project Average Daily Mitigated Emissions 2040**

Table H.2.PP.Mit.GHG.2040-1. 2040 Proposed Project Main Engines Average Daily Mitigated GHG Emissions.

Table H.2.PP.Mit.GHG.2040-2. 2040 Proposed Project Auxiliary Generator Average Daily Mitigated GHG Emissions.

Table H.2.PP.Mit.GHG.2040-3. 2040 Proposed Project Summary of Average Daily Mitigated Vessel GHG Emissions.

Table H.2.PP.Mit.GHG.2040-4. 2040 Proposed Project Boiler Warm-Up Average Daily Mitigated GHG Emissions.

Table H.2.PP.Mit.GHG.2040-5. 2040 Proposed Project Summary of Boiler Warm-Up Average Daily Mitigated GHG Emissions.

Table H.2.PP.Mit.GHG.2040-6. 2040 Proposed Project Berth Operations Average Daily Mitigated GHG Emissions.

Table H.2.PP.Mit.GHG.2040-7. 2040 Proposed Project Summary of Berth Operations Average Daily Mitigated GHG Emissions.

### **No Federal Action/No Project Alternative Average Daily Unmitigated Emissions 2010 (BP)**

Table H.2.NFA/NPA.BP.GHG.2010-1. 2010 No Federal Action/No Project Alternative Main Engines Average Daily GHG Emissions (BP).

Table H.2.NFA/NPA.BP.GHG.2010-2. 2010 No Federal Action/No Project Alternative Auxiliary Generator Average Daily Unmitigated Emissions (BP).

Table H.2.NFA/NPA.BP.GHG.2010-3. 2010 No Federal Action/No Project Alternative Boiler Warm-Up Average Daily GHG Emissions (BP).

Table H.2.NFA/NPA.BP.GHG.2010-4. 2010 No Federal Action/No Project Alternative Berth Operations Average Daily GHG Emissions (BP).

Table H.2.NFA/NPA.BP.GHG.2010-5. 2010 No Federal Action/No Project Alternative Summary of Berth Operations Average Daily GHG Emissions (BP).

Table H.2.NFA/NPA.BP.GHG.2010-6. 2010 No Federal Action/No Project Alternative Tug Main Engines Average Daily GHG Emissions (BP).

Table H.2.NFA/NPA.BP.GHG.2010-7. 2010 No Federal Action/No Project Alternative Tug Auxiliary Generator Engines Average Daily Unmitigated Emissions (BP)

Table H.2.NFA/NPA.BP.GHG.2010-8. 2010 No Federal Action/No Project Alternative Summary of Tug Average Daily GHG Emissions (BP).

Table H.2.NFA/NPA.BP.GHG.2010-9. 2010 No Federal Action/No Project Alternative VDU Crude Average Daily GHG Emissions (BP).

Table H.2.NFA/NPA.BP.GHG.2010-10. 2010 No Federal Action/No Project Alternative VDU Legs Average Daily GHG Emissions (BP).

Table H.2.NFA/NPA.BP.GHG.2010-11. 2010 No Federal Action/No Project Alternative VDU Average Daily GHG Emissions (BP).

Table H.2.NFA/NPA.BP.GHG.2010-12. 2010 No Federal Action/No Project Alternative BP Berth Summary.

**No Federal Action/No Project Alternative Average Daily Unmitigated Emissions 2010 (Tesoro)**

Table H.2.NFA/NPA.Ts.GHG.2010-1. 2010 No Federal Action/No Project Alternative Main Engines Average Daily GHG Emissions (Tesoro).

Table H.2.NFA/NPA.Ts.GHG.2010-2. 2010 No Federal Action/No Project Alternative Auxiliary Generator Average Daily Unmitigated Emissions (Tesoro).

Table H.2.NFA/NPA.Ts.GHG.2010-3. 2010 No Federal Action/No Project Alternative Boiler Warm-Up Average Daily GHG Emissions (Tesoro).

Table H.2.NFA/NPA.Ts.GHG.2010-4. 2010 No Federal Action/No Project Alternative Berth Operations Average Daily GHG Emissions (Tesoro).

Table H.2.NFA/NPA.Ts.GHG.2010-5. 2010 No Federal Action/No Project Alternative Summary of Berth Operations Average Daily GHG Emissions (Tesoro).

Table H.2.NFA/NPA.Ts.GHG.2010-6. 2010 No Federal Action/No Project Alternative Tug Main Engines Average Daily GHG Emissions (Tesoro).

Table H.2.NFA/NPA.Ts.GHG.2010-7. 2010 No Federal Action/No Project Alternative Tug Auxiliary Generator Engines Average Daily Unmitigated Emissions (Tesoro).

Table H.2.NFA/NPA.Ts.GHG.2010-8. 2010 No Federal Action/No Project Alternative Summary of Tug Average Daily GHG Emissions (Tesoro).

Table H.2.NFA/NPA.Ts.GHG.2010-9. 2010 No Federal Action/No Project Alternative VDU Crude Average Daily GHG Emissions (Tesoro).

Table H.2.NFA/NPA.Ts.GHG.2010-10. 2010 No Federal Action/No Project Alternative VDU Legs Average Daily GHG Emissions (Tesoro).

Table H.2.NFA/NPA.Ts.GHG.2010-11. 2010 No Federal Action/No Project Alternative VDU Average Daily GHG Emissions (Tesoro).

Table H.2.NFA/NPA.Ts.GHG.2010-12. 2010 No Federal Action/No Project Alternative Tesoro Berth Summary.

**No Federal Action/No Project Alternative Average Daily Unmitigated Emissions 2010 (Exxon Mobil)**

Table H.2.NFA/NPA.Ex.GHG.2010-1. 2010 No Federal Action/No Project Alternative Main Engines Average Daily GHG Emissions (Exxon Mobil).

Table H.2.NFA/NPA.Ex.GHG.2010-2. 2010 No Federal Action/No Project Alternative Auxiliary Generator Average Daily Unmitigated Emissions (Exxon Mobil).

Table H.2.NFA/NPA.Ex.GHG.2010-3. 2010 No Federal Action/No Project Alternative Boiler Warm-Up Average Daily GHG Emissions (Exxon Mobil).

Table H.2.NFA/NPA.Ex.GHG.2010-4. 2010 No Federal Action/No Project Alternative Berth Operations Average Daily GHG Emissions (Exxon Mobil).

Table H.2.NFA/NPA.Ex.GHG.2010-5. 2010 No Federal Action/No Project Alternative Summary of Berth Operations Average Daily GHG Emissions (Exxon Mobil).

Table H.2.NFA/NPA.Ex.GHG.2010-6. 2010 No Federal Action/No Project Alternative Tug Main Engines Average Daily GHG Emissions (Exxon Mobil).

Table H.2.NFA/NPA.Ex.GHG.2010-7. 2010 No Federal Action/No Project Alternative Tug Auxiliary Generator Engines Average Daily Unmitigated Emissions (Exxon Mobil).

Table H.2.NFA/NPA.Ex.GHG.2010-8. 2010 No Federal Action/No Project Alternative Summary of Tug Average Daily GHG Emissions (Exxon Mobil).

Table H.2.NFA/NPA.Ex.GHG.2010-9. 2010 No Federal Action/No Project Alternative VDU Crude Average Daily GHG Emissions (Exxon Mobil).

Table H.2.NFA/NPA.Ex.GHG.2010-10. 2010 No Federal Action/No Project Alternative VDU Legs Average Daily GHG Emissions (Exxon Mobil).

Table H.2.NFA/NPA.Ex.GHG.2010-11. 2010 No Federal Action/No Project Alternative VDU Average Daily GHG Emissions (Exxon Mobil).

Table H.2.NFA/NPA.Ex.GHG.2010-12. 2010 No Federal Action/No Project Alternative Exxon Mobil Berth Summary.

## **No Federal Action/No Project Alternative Average Daily Unmitigated Emissions 2015 (BP)**

Table H.2.NFA/NPA.BP.GHG.2015-1. 2015 No Federal Action/No Project Alternative Main Engines Average Daily GHG Emissions (BP).

Table H.2.NFA/NPA.BP.GHG.2015-2. 2015 No Federal Action/No Project Alternative Auxiliary Generator Average Daily Unmitigated Emissions (BP).

Table H.2.NFA/NPA.BP.GHG.2015-3. 2015 No Federal Action/No Project Alternative Boiler Warm-Up Average Daily GHG Emissions (BP).

Table H.2.NFA/NPA.BP.GHG.2015-4. 2015 No Federal Action/No Project Alternative Berth Operations Average Daily GHG Emissions (BP).

Table H.2.NFA/NPA.BP.GHG.2015-5. 2015 No Federal Action/No Project Alternative Summary of Berth Operations Average Daily GHG Emissions (BP).

Table H.2.NFA/NPA.BP.GHG.2015-6. 2015 No Federal Action/No Project Alternative Tug Main Engines Average Daily GHG Emissions (BP).

Table H.2.NFA/NPA.BP.GHG.2015-7. 2015 No Federal Action/No Project Alternative Tug Auxiliary Generator Engines Average Daily Unmitigated Emissions (BP).

Table H.2.NFA/NPA.BP.GHG.2015-8. 2015 No Federal Action/No Project Alternative Summary of Tug Average Daily GHG Emissions (BP).

Table H.2.NFA/NPA.BP.GHG.2015-9. 2015 No Federal Action/No Project Alternative VDU Crude Average Daily GHG Emissions (BP).

Table H.2.NFA/NPA.BP.GHG.2015-10. 2015 No Federal Action/No Project Alternative VDU Legs Average Daily GHG Emissions (BP).

Table H.2.NFA/NPA.BP.GHG.2015-11. 2015 No Federal Action/No Project Alternative VDU Average Daily GHG Emissions (BP).

Table H.2.NFA/NPA.BP.GHG.2015-12. 2015 No Federal Action/No Project Alternative BP Berth Summary.

## **No Federal Action/No Project Alternative Average Daily Unmitigated Emissions 2015 (Tesoro)**

Table H.2.NFA/NPA.Ts.GHG.2015-1. 2015 No Federal Action/No Project Alternative Main Engines Average Daily GHG Emissions (Tesoro).

Table H.2.NFA/NPA.Ts.GHG.2015-2. 2015 No Federal Action/No Project Alternative Auxiliary Generator Average Daily Unmitigated Emissions (Tesoro).

Table H.2.NFA/NPA.Ts.GHG.2015-3. 2015 No Federal Action/No Project Alternative Boiler Warm-Up Average Daily GHG Emissions (Tesoro).

Table H.2.NFA/NPA.Ts.GHG.2015-4. 2015 No Federal Action/No Project Alternative Berth Operations Average Daily GHG Emissions (Tesoro).

Table H.2.NFA/NPA.Ts.GHG.2015-5. 2015 No Federal Action/No Project Alternative Summary of Berth Operations Average Daily GHG Emissions (Tesoro).

Table H.2.NFA/NPA.Ts.GHG.2015-6. 2015 No Federal Action/No Project Alternative Tug Main Engines Average Daily GHG Emissions (Tesoro).

Table H.2.NFA/NPA.Ts.GHG.2015-7. 2015 No Federal Action/No Project Alternative Tug Auxiliary Generator Engines Average Daily Unmitigated Emissions (Tesoro).

Table H.2.NFA/NPA.Ts.GHG.2015-8. 2015 No Federal Action/No Project Alternative Summary of Tug Average Daily GHG Emissions (Tesoro).

Table H.2.NFA/NPA.Ts.GHG.2015-9. 2015 No Federal Action/No Project Alternative VDU Crude Average Daily GHG Emissions (Tesoro).

Table H.2.NFA/NPA.Ts.GHG.2015-10. 2015 No Federal Action/No Project Alternative VDU Legs Average Daily GHG Emissions (Tesoro).

Table H.2.NFA/NPA.Ts.GHG.2015-11. 2015 No Federal Action/No Project Alternative VDU Average Daily GHG Emissions (Tesoro).

**No Federal Action/No Project Alternative Average Daily Unmitigated Emissions 2015 (Exxon Mobil)**

Table H.2.NFA/NPA.Ex.GHG.2015-1. 2015 No Federal Action/No Project Alternative Main Engines Average Daily GHG Emissions (Exxon Mobil).

Table H.2.NFA/NPA.Ex.GHG.2015-2. 2015 No Federal Action/No Project Alternative Auxiliary Generator Average Daily Unmitigated Emissions (Exxon Mobil).

Table H.2.NFA/NPA.Ex.GHG.2015-3. 2015 No Federal Action/No Project Alternative Boiler Warm-Up Average Daily GHG Emissions (Exxon Mobil).

Table H.2.NFA/NPA.Ex.GHG.2015-4. 2015 No Federal Action/No Project Alternative Berth Operations Average Daily GHG Emissions (Exxon Mobil).

Table H.2.NFA/NPA.Ex.GHG.2015-5. 2015 No Federal Action/No Project Alternative Summary of Berth Operations Average Daily GHG Emissions (Exxon Mobil).

Table H.2.NFA/NPA.Ex.GHG.2015-6. 2015 No Federal Action/No Project Alternative Tug Main Engines Average Daily GHG Emissions (Exxon Mobil).

Table H.2.NFA/NPA.Ex.GHG.2015-7. 2015 No Federal Action/No Project Alternative Tug Auxiliary Generator Engines Average Daily Unmitigated Emissions (Exxon Mobil)

Table H.2.NFA/NPA.Ex.GHG.2015-8. 2015 No Federal Action/No Project Alternative Summary of Tug Average Daily GHG Emissions (Exxon Mobil).



Table H.2.NFA/NPA.Ex.GHG.2015-9. 2015 No Federal Action/No Project Alternative VDU Crude Average Daily GHG Emissions (Exxon Mobil).

Table H.2.NFA/NPA.Ex.GHG.2015-10. 2015 No Federal Action/No Project Alternative VDU Legs Average Daily GHG Emissions (Exxon Mobil).

Table H.2.NFA/NPA.Ex.GHG.2015-11. 2015 No Federal Action/No Project Alternative VDU Average Daily GHG Emissions (Exxon Mobil).

Table H.2.NFA/NPA.Ex.GHG.2015-12. 2015 No Federal Action/No Project Alternative Exxon Mobil Berth Summary.

**No Federal Action/No Project Alternative Average Daily Unmitigated Emissions 2025 (BP)**

Table H.2.NFA/NPA.BP.GHG.2025-1. 2025 No Federal Action/No Project Alternative Main Engines Average Daily GHG Emissions (BP).

Table H.2.NFA/NPA.BP.GHG.2025-2. 2025 No Federal Action/No Project Alternative Auxiliary Generator Average Daily Unmitigated Emissions (BP).

Table H.2.NFA/NPA.BP.GHG.2025-3. 2025 No Federal Action/No Project Alternative Boiler Warm-Up Average Daily GHG Emissions (BP).

Table H.2.NFA/NPA.BP.GHG.2025-4. 2025 No Federal Action/No Project Alternative Berth Operations Average Daily GHG Emissions (BP).

Table H.2.NFA/NPA.BP.GHG.2025-5. 2025 No Federal Action/No Project Alternative Summary of Berth Operations Average Daily GHG Emissions (BP).

Table H.2.NFA/NPA.BP.GHG.2025-6. 2025 No Federal Action/No Project Alternative Tug Main Engines Average Daily GHG Emissions (BP).

Table H.2.NFA/NPA.BP.GHG.2025-7. 2025 No Federal Action/No Project Alternative Tug Auxiliary Generator Engines Average Daily Unmitigated Emissions (BP).

Table H.2.NFA/NPA.BP.GHG.2025-8. 2025 No Federal Action/No Project Alternative Summary of Tug Average Daily GHG Emissions (BP).

Table H.2.NFA/NPA.BP.GHG.2025-9. 2025 No Federal Action/No Project Alternative VDU Crude Average Daily GHG Emissions (BP).

Table H.2.NFA/NPA.BP.GHG.2025-10. 2025 No Federal Action/No Project Alternative VDU Legs Average Daily GHG Emissions (BP).

Table H.2.NFA/NPA.BP.GHG.2025-11. 2025 No Federal Action/No Project Alternative VDU Average Daily GHG Emissions (BP).

Table H.2.NFA/NPA.BP.GHG.2025-12. 2025 No Federal Action/No Project Alternative BP Berth Summary.

## **No Federal Action/No Project Alternative Average Daily Unmitigated Emissions 2025 (Tesoro)**

Table H.2.NFA/NPA.Ts.GHG.2025-1. 2025 No Federal Action/No Project Alternative Main Engines Average Daily GHG Emissions (Tesoro).

Table H.2.NFA/NPA.Ts.GHG.2025-2. 2025 No Federal Action/No Project Alternative Auxiliary Generator Average Daily Unmitigated Emissions (Tesoro).

Table H.2.NFA/NPA.Ts.GHG.2025-3. 2025 No Federal Action/No Project Alternative Boiler Warm-Up Average Daily GHG Emissions (Tesoro).

Table H.2.NFA/NPA.Ts.GHG.2025-4. 2025 No Federal Action/No Project Alternative Berth Operations Average Daily GHG Emissions (Tesoro).

Table H.2.NFA/NPA.Ts.GHG.2025-5. 2025 No Federal Action/No Project Alternative Summary of Berth Operations Average Daily GHG Emissions (Tesoro).

Table H.2.NFA/NPA.Ts.GHG.2025-6. 2025 No Federal Action/No Project Alternative Tug Main Engines Average Daily GHG Emissions (Tesoro).

Table H.2.NFA/NPA.Ts.GHG.2025-7. 2025 No Federal Action/No Project Alternative Tug Auxiliary Generator Engines Average Daily Unmitigated Emissions (Tesoro)

Table H.2.NFA/NPA.Ts.GHG.2025-8. 2025 No Federal Action/No Project Alternative Summary of Tug Average Daily GHG Emissions (Tesoro).

Table H.2.NFA/NPA.Ts.GHG.2025-9. 2025 No Federal Action/No Project Alternative VDU Crude Average Daily GHG Emissions (Tesoro).

Table H.2.NFA/NPA.Ts.GHG.2025-10. 2025 No Federal Action/No Project Alternative VDU Legs Average Daily GHG Emissions (Tesoro).

Table H.2.NFA/NPA.Ts.GHG.2025-11. 2025 No Federal Action/No Project Alternative VDU Average Daily GHG Emissions (Tesoro).

Table H.2.NFA/NPA.Ts.GHG.2025-12. 2025 No Federal Action/No Project Alternative Tesoro Berth Summary.

## **No Federal Action/No Project Alternative Average Daily Unmitigated Emissions 2025 (Exxon Mobil)**

Table H.2.NFA/NPA.Ex.GHG.2025-1. 2025 No Federal Action/No Project Alternative Main Engines Average Daily GHG Emissions (Exxon Mobil).

Table H.2.NFA/NPA.Ex.GHG.2025-2. 2025 No Federal Action/No Project Alternative Auxiliary Generator Average Daily Unmitigated Emissions (Exxon Mobil).

Table H.2.NFA/NPA.Ex.GHG.2025-3. 2025 No Federal Action/No Project Alternative Boiler Warm-Up Average Daily GHG Emissions (Exxon Mobil).

Table H.2.NFA/NPA.Ex.GHG.2025-4. 2025 No Federal Action/No Project Alternative Berth Operations Average Daily GHG Emissions (Exxon Mobil).

Table H.2.NFA/NPA.Ex.GHG.2025-5. 2025 No Federal Action/No Project Alternative Summary of Berth Operations Average Daily GHG Emissions (Exxon Mobil).

Table H.2.NFA/NPA.Ex.GHG.2025-6. 2025 No Federal Action/No Project Alternative Tug Main Engines Average Daily GHG Emissions (Exxon Mobil).

Table H.2.NFA/NPA.Ex.GHG.2025-7. 2025 No Federal Action/No Project Alternative Tug Auxiliary Generator Engines Average Daily Unmitigated Emissions (Exxon Mobil).

Table H.2.NFA/NPA.Ex.GHG.2025-8. 2025 No Federal Action/No Project Alternative Summary of Tug Average Daily GHG Emissions (Exxon Mobil).

Table H.2.NFA/NPA.Ex.GHG.2025-9. 2025 No Federal Action/No Project Alternative VDU Crude Average Daily GHG Emissions (Exxon Mobil).

Table H.2.NFA/NPA.Ex.GHG.2025-10. 2025 No Federal Action/No Project Alternative VDU Legs Average Daily GHG Emissions (Exxon Mobil).

Table H.2.NFA/NPA.Ex.GHG.2025-11. 2025 No Federal Action/No Project Alternative VDU Average Daily GHG Emissions (Exxon Mobil).

Table H.2.NFA/NPA.Ex.GHG.2025-12. 2025 No Federal Action/No Project Alternative Exxon Mobil Berth Summary.

### **No Federal Action/No Project Alternative Average Daily Unmitigated Emissions 2040 (BP)**

Table H.2.NFA/NPA.BP.GHG.2040-1. 2040 No Federal Action/No Project Alternative Main Engines Average Daily GHG Emissions (BP).

Table H.2.NFA/NPA.BP.GHG.2040-2. 2040 No Federal Action/No Project Alternative Auxiliary Generator Average Daily Unmitigated Emissions (BP).

Table H.2.NFA/NPA.BP.GHG.2040-3. 2040 No Federal Action/No Project Alternative Boiler Warm-Up Average Daily GHG Emissions (BP).

Table H.2.NFA/NPA.BP.GHG.2040-4. 2040 No Federal Action/No Project Alternative Berth Operations Average Daily GHG Emissions (BP).

Table H.2.NFA/NPA.BP.GHG.2040-5. 2040 No Federal Action/No Project Alternative Summary of Berth Operations Average Daily GHG Emissions (BP).

Table H.2.NFA/NPA.BP.GHG.2040-6. 2040 No Federal Action/No Project Alternative Tug Main Engines Average Daily GHG Emissions (BP).

Table H.2.NFA/NPA.BP.GHG.2040-7. 2040 No Federal Action/No Project Alternative Tug Auxiliary Generator Engines Average Daily Unmitigated Emissions (BP).

Table H.2.NFA/NPA.BP.GHG.2040-8. 2040 No Federal Action/No Project Alternative Summary of Tug Average Daily GHG Emissions (BP).

Table H.2.NFA/NPA.BP.GHG.2040-9. 2040 No Federal Action/No Project Alternative VDU Crude Average Daily GHG Emissions (BP).

Table H.2.NFA/NPA.BP.GHG.2040-10. 2040 No Federal Action/No Project Alternative VDU Legs Average Daily GHG Emissions (BP).

Table H.2.NFA/NPA.BP.GHG.2040-11. 2040 No Federal Action/No Project Alternative VDU Average Daily GHG Emissions (BP).

Table H.2.NFA/NPA.BP.GHG.2040-12. 2040 No Federal Action/No Project Alternative BP Berth Summary.

**No Federal Action/No Project Alternative Average Daily Unmitigated Emissions 2040 (Tesoro)**

Table H.2.NFA/NPA.Ts.GHG.2040-1. 2040 No Federal Action/No Project Alternative Main Engines Average Daily GHG Emissions (Tesoro).

Table H.2.NFA/NPA.Ts.GHG.2040-2. 2040 No Federal Action/No Project Alternative Auxiliary Generator Average Daily Unmitigated Emissions (Tesoro).

Table H.2.NFA/NPA.Ts.GHG.2040-3. 2040 No Federal Action/No Project Alternative Boiler Warm-Up Average Daily GHG Emissions (Tesoro).

Table H.2.NFA/NPA.Ts.GHG.2040-4. 2040 No Federal Action/No Project Alternative Berth Operations Average Daily GHG Emissions (Tesoro).

Table H.2.NFA/NPA.Ts.GHG.2040-5. 2040 No Federal Action/No Project Alternative Summary of Berth Operations Average Daily GHG Emissions (Tesoro).

Table H.2.NFA/NPA.Ts.GHG.2040-6. 2040 No Federal Action/No Project Alternative Tug Main Engines Average Daily GHG Emissions (Tesoro).

Table H.2.NFA/NPA.Ts.GHG.2040-7. 2040 No Federal Action/No Project Alternative Tug Auxiliary Generator Engines Average Daily Unmitigated Emissions (Tesoro).

Table H.2.NFA/NPA.Ts.GHG.2040-8. 2040 No Federal Action/No Project Alternative Summary of Tug Average Daily GHG Emissions (Tesoro).

Table H.2.NFA/NPA.Ts.GHG.2040-9. 2040 No Federal Action/No Project Alternative VDU Crude Average Daily GHG Emissions (Tesoro).

Table H.2.NFA/NPA.Ts.GHG.2040-10. 2040 No Federal Action/No Project Alternative VDU Legs Average Daily GHG Emissions (Tesoro).

Table H.2.NFA/NPA.Ts.GHG.2040-11. 2040 No Federal Action/No Project Alternative VDU Average Daily GHG Emissions (Tesoro).

Table H.2.NFA/NPA.Ts.GHG.2040-12. 2040 No Federal Action/No Project Alternative Tesoro Berth Summary.

**No Federal Action/No Project Alternative Average Daily Unmitigated Emissions 2040 (Exxon Mobil)**

Table H.2.NFA/NPA.Ex.GHG.2040-1. 2040 No Federal Action/No Project Alternative Main Engines Average Daily GHG Emissions (Exxon Mobil).

Table H.2.NFA/NPA.Ex.GHG.2040-2. 2040 No Federal Action/No Project Alternative Auxiliary Generator Average Daily Unmitigated Emissions (Exxon Mobil).

Table H.2.NFA/NPA.Ex.GHG.2040-3. 2040 No Federal Action/No Project Alternative Boiler Warm-Up Average Daily GHG Emissions (Exxon Mobil).

Table H.2.NFA/NPA.Ex.GHG.2040-4. 2040 No Federal Action/No Project Alternative Berth Operations Average Daily GHG Emissions (Exxon Mobil).

Table H.2.NFA/NPA.Ex.GHG.2040-5. 2040 No Federal Action/No Project Alternative Summary of Berth Operations Average Daily GHG Emissions (Exxon Mobil).

Table H.2.NFA/NPA.Ex.GHG.2040-6. 2040 No Federal Action/No Project Alternative Tug Main Engines Average Daily GHG Emissions (Exxon Mobil).

Table H.2.NFA/NPA.Ex.GHG.2040-7. 2040 No Federal Action/No Project Alternative Tug Auxiliary Generator Engines Average Daily Unmitigated Emissions (Exxon Mobil).

Table H.2.NFA/NPA.Ex.GHG.2040-8. 2040 No Federal Action/No Project Alternative Summary of Tug Average Daily GHG Emissions (Exxon Mobil).

Table H.2.NFA/NPA.Ex.GHG.2040-9. 2040 No Federal Action/No Project Alternative VDU Crude Average Daily GHG Emissions (Exxon Mobil).

Table H.2.NFA/NPA.Ex.GHG.2040-10. 2040 No Federal Action/No Project Alternative VDU Legs Average Daily GHG Emissions (Exxon Mobil).

Table H.2.NFA/NPA.Ex.GHG.2040-11. 2040 No Federal Action/No Project Alternative VDU Average Daily GHG Emissions (Exxon Mobil).

Table H.2.NFA/NPA.Ex.GHG.2040-12. 2040 No Federal Action/No Project Alternative Exxon Mobil Berth Summary.

**Reduced Project Alternative Average Daily Unmitigated Emissions 2010**

Table H.2.RPA.Un.GHG.2010-1. 2010 Reduced Project Alternative Main Engines Average Daily Unmitigated GHG Emissions.

Table H.2.RPA.Un.GHG.2010-2. 2010 Reduced Project Alternative Auxiliary Generator Average Daily Unmitigated GHG Emissions.

Table H.2.RPA.Un.GHG.2010-3. 2010 Reduced Project Alternative Boiler Warm-Up Average Daily Unmitigated GHG Emissions.

Table H.2.RPA.Un.GHG.2010-4. 2010 Reduced Project Alternative Berth Operations Average Daily Unmitigated GHG Emissions.

Table H.2.RPA.Un.GHG.2010-5. 2010 Reduced Project Alternative Summary of Average Daily Unmitigated Vessel GHG Emissions.

Table H.2.RPA.Un.GHG.2010-6. 2010 Reduced Project Alternative Tug Main Engines Average Daily Unmitigated GHG Emissions.

Table H.2.RPA.Un.GHG.2010-7. 2010 Reduced Project Alternative Tug Auxiliary Generator Engines Average Daily Unmitigated GHG Emissions.

Table H.2.RPA.Un.GHG.2010-8. 2010 Reduced Project Alternative Summary of Tug Average Daily Unmitigated GHG Emissions.

Table H.2.RPA.Un.GHG.2010-9. 2010 Reduced Project Alternative VDU Crude Average Daily Unmitigated GHG Emissions.

Table H.2.RPA.Un.GHG.2010-10. 2010 Reduced Project Alternative VDU Legs Average Daily Unmitigated GHG Emissions.

Table H.2.RPA.Un.GHG.2010-11. 2010 Reduced Project Alternative VDU Average Daily Unmitigated GHG Emissions.

### **Reduced Project Alternative Average Daily Unmitigated Emissions 2015**

Table H.2.RPA.Un.GHG.2015-1. 2015 Reduced Project Alternative Main Engines Average Daily Unmitigated GHG Emissions.

Table H.2.RPA.Un.GHG.2015-2. 2015 Reduced Project Alternative Auxiliary Generator Average Daily Unmitigated GHG Emissions.

Table H.2.RPA.Un.GHG.2015-3. 2015 Reduced Project Alternative Boiler Warm-Up Average Daily Unmitigated GHG Emissions.

Table H.2.RPA.Un.GHG.2015-4. 2015 Reduced Project Alternative Berth Operations Average Daily Unmitigated GHG Emissions.

Table H.2.RPA.Un.GHG.2015-5. 2015 Reduced Project Alternative Summary of Average Daily Unmitigated Vessel GHG Emissions.

Table H.2.RPA.Un.GHG.2015-6. 2015 Reduced Project Alternative Tug Main Engines Average Daily Unmitigated GHG Emissions.

Table H.2.RPA.Un.GHG.2015-7. 2015 Reduced Project Alternative Tug Auxiliary Generator Engines Average Daily Unmitigated GHG Emissions.

Table H.2.RPA.Un.GHG.2015-8. 2015 Reduced Project Alternative Summary of Tug Average Daily Unmitigated GHG Emissions.

Table H.2.RPA.Un.GHG.2015-9. 2015 Reduced Project Alternative VDU Crude Average Daily Unmitigated GHG Emissions.

Table H.2.RPA.Un.GHG.2015-10. 2015 Reduced Project Alternative VDU Legs Average Daily Unmitigated GHG Emissions.

Table H.2.RPA.Un.GHG.2015-11. 2015 Reduced Project Alternative VDU Average Daily Unmitigated GHG Emissions.

### **Reduced Project Alternative Average Daily Unmitigated Emissions 2025**

Table H.2.RPA.Un.GHG.2025-1. 2025 Reduced Project Alternative Main Engines Average Daily Unmitigated GHG Emissions.

Table H.2.RPA.Un.GHG.2025-2. 2025 Reduced Project Alternative Auxiliary Generator Average Daily Unmitigated GHG Emissions.

Table H.2.RPA.Un.GHG.2025-3. 2025 Reduced Project Alternative Boiler Warm-Up Average Daily Unmitigated GHG Emissions.

Table H.2.RPA.Un.GHG.2025-4. 2025 Reduced Project Alternative Berth Operations Average Daily Unmitigated GHG Emissions.

Table H.2.RPA.Un.GHG.2025-5. 2025 Reduced Project Alternative Summary of Average Daily Unmitigated Vessel GHG Emissions.

Table H.2.RPA.Un.GHG.2025-6. 2025 Reduced Project Alternative Tug Main Engines Average Daily Unmitigated GHG Emissions.

Table H.2.RPA.Un.GHG.2025-7. 2025 Reduced Project Alternative Tug Auxiliary Generator Engines Average Daily Unmitigated GHG Emissions.

Table H.2.RPA.Un.GHG.2025-8. 2025 Reduced Project Alternative Summary of Tug Average Daily Unmitigated GHG Emissions.

Table H.2.RPA.Un.GHG.2025-9. 2025 Reduced Project Alternative VDU Crude Average Daily Unmitigated GHG Emissions.

Table H.2.RPA.Un.GHG.2025-10. 2025 Reduced Project Alternative VDU Legs Average Daily Unmitigated GHG Emissions.

Table H.2.RPA.Un.GHG.2025-11. 2025 Reduced Project Alternative VDU Average Daily Unmitigated GHG Emissions.

Table H.2.RPA.Un.GHG.2025-12. 2025 Reduced Project Alternative Main Engines Average Daily Unmitigated GHG Emissions (BP).

Table H.2.RPA.Un.GHG.2025-13. 2025 Reduced Project Alternative Auxiliary Generator Average Daily Unmitigated GHG Emissions (BP).

Table H.2.RPA.Un.GHG.2025-14. 2025 Reduced Project Alternative Boiler Warm-Up Average Daily Unmitigated GHG Emissions (BP).

Table H.2.RPA.Un.GHG.2025-15. 2025 Reduced Project Alternative Berth Operations Average Daily Unmitigated GHG Emissions (BP).

Table H.2.RPA.Un.GHG.2025-16. 2025 Reduced Project Alternative Summary of Average Daily Unmitigated Vessel GHG Emissions (BP).

Table H.2.RPA.Un.GHG.2025-17. 2025 Reduced Project Alternative Tug Main Engines Average Daily Unmitigated GHG Emissions (BP).

Table H.2.RPA.Un.GHG.2025-18. 2025 Reduced Project Alternative Tug Auxiliary Generator Engines Average Daily Unmitigated GHG Emissions (BP).

Table H.2.RPA.Un.GHG.2025-19. 2025 Reduced Project Alternative Summary of Tug Average Daily Unmitigated GHG Emissions (BP).

Table H.2.RPA.Un.GHG.2025-20. 2025 Reduced Project Alternative VDU Crude Average Daily Unmitigated GHG Emissions (BP).

Table H.2.RPA.Un.GHG.2025-21. 2025 Reduced Project Alternative VDU Legs Average Daily Unmitigated GHG Emissions (BP).

Table H.2.RPA.Un.GHG.2025-22. 2025 Reduced Project Alternative VDU Average Daily Unmitigated GHG Emissions (BP).

Table H.2.RPA.Un.GHG.2025-23. 2025 Reduced Project Alternative BP Berth Summary.

Table H.2.RPA.Un.GHG.2025-24. 2025 Reduced Project Alternative Main Engines Average Daily Unmitigated GHG Emissions (Tesoro).

Table H.2.RPA.Un.GHG.2025-25. 2025 Reduced Project Alternative Auxiliary Generator Average Daily Unmitigated GHG Emissions (Tesoro).

Table H.2.RPA.Un.GHG.2025-26. 2025 Reduced Project Alternative Boiler Warm-Up Average Daily Unmitigated GHG Emissions (Tesoro).

Table H.2.RPA.Un.GHG.2025-27. 2025 Reduced Project Alternative Berth Operations Average Daily Unmitigated GHG Emissions (Tesoro).

Table H.2.RPA.Un.GHG.2025-28. 2025 Reduced Project Alternative Summary of Average Daily Unmitigated Vessel GHG Emissions (Tesoro).

Table H.2.RPA.Un.GHG.2025-29. 2025 Reduced Project Alternative Tug Main Engines Average Daily Unmitigated GHG Emissions (Tesoro).



Table H.2.RPA.Un.GHG.2025-30. 2025 Reduced Project Alternative Tug Auxiliary Generator Engines Average Daily Unmitigated GHG Emissions (Tesoro).

Table H.2.RPA.Un.GHG.2025-31. 2025 Reduced Project Alternative Summary of Tug Average Daily Unmitigated GHG Emissions (Tesoro).

Table H.2.RPA.Un.GHG.2025-32. 2025 Reduced Project Alternative VDU Crude Average Daily Unmitigated GHG Emissions (Tesoro).

Table H.2.RPA.Un.GHG.2025-33. 2025 Reduced Project Alternative VDU Legs Average Daily Unmitigated GHG Emissions (Tesoro).

Table H.2.RPA.Un.GHG.2025-34. 2025 Reduced Project Alternative VDU Average Daily Unmitigated GHG Emissions (Tesoro).

Table H.2.RPA.Un.GHG.2025-35. 2025 Reduced Project Alternative Tesoro Berth Summary.

Table H.2.RPA.Un.GHG.2025-36. 2025 Reduced Project Alternative Main Engines Average Daily Unmitigated GHG Emissions (Exxon Mobil).

Table H.2.RPA.Un.GHG.2025-37. 2025 Reduced Project Alternative Auxiliary Generator Average Daily Unmitigated GHG Emissions (Exxon Mobil).

Table H.2.RPA.Un.GHG.2025-38. 2025 Reduced Project Alternative Boiler Warm-Up Average Daily Unmitigated GHG Emissions (Exxon Mobil).

Table H.2.RPA.Un.GHG.2025-39. 2025 Reduced Project Alternative Berth Operations Average Daily Unmitigated GHG Emissions (Exxon Mobil).

Table H.2.RPA.Un.GHG.2025-40. 2025 Reduced Project Alternative Summary of Average Daily Unmitigated Vessel GHG Emissions (Exxon Mobil).

Table H.2.RPA.Un.GHG.2025-41. 2025 Reduced Project Alternative Tug Main Engines Average Daily Unmitigated GHG Emissions (Exxon Mobil).

Table H.2.RPA.Un.GHG.2025-42. 2025 Reduced Project Alternative Tug Auxiliary Generator Engines Average Daily Unmitigated GHG Emissions (Exxon Mobil).

Table H.2.RPA.Un.GHG.2025-43. 2025 Reduced Project Alternative Summary of Tug Average Daily Unmitigated GHG Emissions (Exxon Mobil).

Table H.2.RPA.Un.GHG.2025-44. 2025 Reduced Project Alternative VDU Crude Average Daily Unmitigated GHG Emissions (Exxon Mobil).

Table H.2.RPA.Un.GHG.2025-45. 2025 Reduced Project Alternative VDU Legs Average Daily Unmitigated GHG Emissions (Exxon Mobil).

Table H.2.RPA.Un.GHG.2025-46. 2025 Reduced Project Alternative VDU Average Daily Unmitigated GHG Emissions (Exxon Mobil).

Table H.2.RPA.Un.GHG.2025-47. 2025 Reduced Project Alternative Exxon Mobil Berth Summary.

Table H.2.RPA.Un.GHG.2025-48. 2025 Reduced Project Alternative Existing Berth Summary (BP, Tesoro and Exxon Mobil).

### **Reduced Project Alternative Average Daily Unmitigated Emissions 2040**

Table H.2.RPA.Un.GHG.2040-1. 2040 Reduced Project Alternative Main Engines Average Daily Unmitigated GHG Emissions.

Table H.2.RPA.Un.GHG.2040-2. 2040 Reduced Project Alternative Auxiliary Generator Average Daily Unmitigated GHG Emissions.

Table H.2.RPA.Un.GHG.2040-3. 2040 Reduced Project Alternative Boiler Warm-Up Average Daily Unmitigated GHG Emissions.

Table H.2.RPA.Un.GHG.2040-4. 2040 Reduced Project Alternative Berth Operations Average Daily Unmitigated GHG Emissions.

Table H.2.RPA.Un.GHG.2040-5. 2040 Reduced Project Alternative Summary of Average Daily Unmitigated Vessel GHG Emissions.

Table H.2.RPA.Un.GHG.2040-6. 2040 Reduced Project Alternative Tug Main Engines Average Daily Unmitigated GHG Emissions.

Table H.2.RPA.Un.GHG.2040-7. 2040 Reduced Project Alternative Tug Auxiliary Generator Engines Average Daily Unmitigated GHG Emissions.

Table H.2.RPA.Un.GHG.2040-8. 2040 Reduced Project Alternative Summary of Tug Average Daily Unmitigated GHG Emissions.

Table H.2.RPA.Un.GHG.2040-9. 2040 Reduced Project Alternative VDU Crude Average Daily Unmitigated GHG Emissions.

Table H.2.RPA.Un.GHG.2040-10. 2040 Reduced Project Alternative VDU Legs Average Daily Unmitigated GHG Emissions.

Table H.2.RPA.Un.GHG.2040-11. 2040 Reduced Project Alternative VDU Average Daily Unmitigated GHG Emissions.

Table H.2.RPA.Un.GHG.2040-12. 2040 Reduced Project Alternative Main Engines Average Daily Unmitigated GHG Emissions (BP).

Table H.2.RPA.Un.GHG.2040-13. 2040 Reduced Project Alternative Auxiliary Generator Average Daily Unmitigated GHG Emissions (BP).

Table H.2.RPA.Un.GHG.2040-14. 2040 Reduced Project Alternative Boiler Warm-Up Average Daily Unmitigated GHG Emissions (BP).

Table H.2.RPA.Un.GHG.2040-15. 2040 Reduced Project Alternative Berth Operations Average Daily Unmitigated GHG Emissions (BP).

Table H.2.RPA.Un.GHG.2040-16. 2040 Reduced Project Alternative Summary of Average Daily Unmitigated Vessel GHG Emissions (BP).

Table H.2.RPA.Un.GHG.2040-17. 2040 Reduced Project Alternative Tug Main Engines Average Daily Unmitigated GHG Emissions (BP).

Table H.2.RPA.Un.GHG.2040-18. 2040 Reduced Project Alternative Tug Auxiliary Generator Engines Average Daily Unmitigated GHG Emissions (BP).

Table H.2.RPA.Un.GHG.2040-19. 2040 Reduced Project Alternative Summary of Tug Average Daily Unmitigated GHG Emissions (BP).

Table H.2.RPA.Un.GHG.2040-20. 2040 Reduced Project Alternative VDU Crude Average Daily Unmitigated GHG Emissions (BP).

Table H.2.RPA.Un.GHG.2040-21. 2040 Reduced Project Alternative VDU Legs Average Daily Unmitigated GHG Emissions (BP).

Table H.2.RPA.Un.GHG.2040-22. 2040 Reduced Project Alternative VDU Average Daily Unmitigated GHG Emissions (BP).

Table H.2.RPA.Un.GHG.2040-23. 2040 Reduced Project Alternative BP Berth Summary.

Table H.2.RPA.Un.GHG.2040-24. 2040 Reduced Project Alternative Main Engines Average Daily Unmitigated GHG Emissions (Tesoro).

Table H.2.RPA.Un.GHG.2040-25. 2040 Reduced Project Alternative Auxiliary Generator Average Daily Unmitigated GHG Emissions (Tesoro).

Table H.2.RPA.Un.GHG.2040-26. 2040 Reduced Project Alternative Boiler Warm-Up Average Daily Unmitigated GHG Emissions (Tesoro).

Table H.2.RPA.Un.GHG.2040-27. 2040 Reduced Project Alternative Berth Operations Average Daily Unmitigated GHG Emissions (Tesoro).

Table H.2.RPA.Un.GHG.2040-28. 2040 Reduced Project Alternative Summary of Average Daily Unmitigated Vessel GHG Emissions (Tesoro).

Table H.2.RPA.Un.GHG.2040-29. 2040 Reduced Project Alternative Tug Main Engines Average Daily Unmitigated GHG Emissions (Tesoro).

Table H.2.RPA.Un.GHG.2040-30. 2040 Reduced Project Alternative Tug Auxiliary Generator Engines Average Daily Unmitigated GHG Emissions (Tesoro).

Table H.2.RPA.Un.GHG.2040-31. 2040 Reduced Project Alternative Summary of Tug Average Daily Unmitigated GHG Emissions (Tesoro).

Table H.2.RPA.Un.GHG.2040-32. 2040 Reduced Project Alternative VDU Crude Average Daily Unmitigated GHG Emissions (Tesoro).

Table H.2.RPA.Un.GHG.2040-33. 2040 Reduced Project Alternative VDU Legs Average Daily Unmitigated GHG Emissions (Tesoro).

Table H.2.RPA.Un.GHG.2040-34. 2040 Reduced Project Alternative VDU Average Daily Unmitigated GHG Emissions (Tesoro).

Table H.2.RPA.Un.GHG.2040-35. 2040 Reduced Project Alternative Tesoro Berth Summary.

Table H.2.RPA.Un.GHG.2040-36. 2040 Reduced Project Alternative Main Engines Average Daily Unmitigated GHG Emissions (Exxon Mobil).

Table H.2.RPA.Un.GHG.2040-37. 2040 Reduced Project Alternative Auxiliary Generator Average Daily Unmitigated GHG Emissions (Exxon Mobil).

Table H.2.RPA.Un.GHG.2040-38. 2040 Reduced Project Alternative Boiler Warm-Up Average Daily Unmitigated GHG Emissions (Exxon Mobil).

Table H.2.RPA.Un.GHG.2040-39. 2040 Reduced Project Alternative Berth Operations Average Daily Unmitigated GHG Emissions (Exxon Mobil).

Table H.2.RPA.Un.GHG.2040-40. 2040 Reduced Project Alternative Summary of Average Daily Unmitigated Vessel GHG Emissions (Exxon Mobil).

Table H.2.RPA.Un.GHG.2040-41. 2040 Reduced Project Alternative Tug Main Engines Average Daily Unmitigated GHG Emissions (Exxon Mobil).

Table H.2.RPA.Un.GHG.2040-42. 2040 Reduced Project Alternative Tug Auxiliary Generator Engines Average Daily Unmitigated GHG Emissions (Exxon Mobil).

Table H.2.RPA.Un.GHG.2040-43. 2040 Reduced Project Alternative Summary of Tug Average Daily Unmitigated GHG Emissions (Exxon Mobil).

Table H.2.RPA.Un.GHG.2040-44. 2040 Reduced Project Alternative VDU Crude Average Daily Unmitigated GHG Emissions (Exxon Mobil).

Table H.2.RPA.Un.GHG.2040-45. 2040 Reduced Project Alternative VDU Legs Average Daily Unmitigated GHG Emissions (Exxon Mobil).

Table H.2.RPA.Un.GHG.2040-46. 2040 Reduced Project Alternative VDU Average Daily Unmitigated GHG Emissions (Exxon Mobil).

Table H.2.RPA.Un.GHG.2040-47. 2040 Reduced Project Alternative Exxon Mobil Berth Summary.

Table H.2.RPA.Un.GHG.2040-48. 2040 Reduced Project Alternative Existing Berth Summary (BP, Tesoro and Exxon Mobil).

## **Reduced Project Alternative Average Daily Mitigated Emissions 2010**

Table H.2.RPA.Mit.GHG.2010-1. 2010 Reduced Project Alternative Main Engines Average Daily Mitigated GHG Emissions.

Table H.2.RPA.Mit.GHG.2010-2. 2010 Reduced Project Alternative Auxiliary Generator Average Daily Mitigated GHG Emissions.

Table H.2.RPA.Mit.GHG.2010-3. 2010 Reduced Project Alternative Summary of Average Daily Mitigated Vessel GHG Emissions.

Table H.2.RPA.Mit.GHG.2010-4. 2010 Reduced Project Alternative Boiler Warm-Up Average Daily Mitigated GHG Emissions.

Table H.2.RPA.Mit.GHG.2010-5. 2010 Reduced Project Alternative Summary of Boiler Warm-Up Average Daily Mitigated GHG Emissions.

Table H.2.RPA.Mit.GHG.2010-6. 2010 Reduced Project Alternative Berth Operations Average Daily Mitigated GHG Emissions.

Table H.2.RPA.Mit.GHG.2010-7. 2010 Reduced Project Alternative Summary of Berth Operations Average Daily Mitigated GHG Emissions.

## **Reduced Project Alternative Average Daily Mitigated Emissions 2015**

Table H.2.RPA.Mit.GHG.2015-1. 2015 Reduced Project Alternative Main Engines Average Daily Mitigated GHG Emissions.

Table H.2.RPA.Mit.GHG.2015-2. 2015 Reduced Project Alternative Auxiliary Generator Average Daily Mitigated GHG Emissions.

Table H.2.RPA.Mit.GHG.2015-3. 2015 Reduced Project Alternative Summary of Average Daily Mitigated Vessel GHG Emissions.

Table H.2.RPA.Mit.GHG.2015-4. 2015 Reduced Project Alternative Boiler Warm-Up Average Daily Mitigated GHG Emissions.

Table H.2.RPA.Mit.GHG.2015-5. 2015 Reduced Project Alternative Summary of Boiler Warm-Up Average Daily Mitigated GHG Emissions.

Table H.2.RPA.Mit.GHG.2015-6. 2015 Reduced Project Alternative Berth Operations Average Daily Mitigated GHG Emissions.

Table H.2.RPA.Mit.GHG.2015-7. 2015 Reduced Project Alternative Summary of Berth Operations Average Daily Mitigated GHG Emissions.

## **Reduced Project Alternative Average Daily Mitigated Emissions 2025**

Table H.2.RPA.Mit.GHG.2025-1. 2025 Reduced Project Alternative Main Engines Average Daily Mitigated GHG Emissions.

Table H.2.RPA.Mit.GHG.2025-2. 2025 Reduced Project Alternative Auxiliary Generator Average Daily Mitigated GHG Emissions.

Table H.2.RPA.Mit.GHG.2025-3. 2025 Reduced Project Alternative Summary of Average Daily Mitigated Vessel GHG Emissions.

Table H.2.RPA.Mit.GHG.2025-4. 2025 Reduced Project Alternative Boiler Warm-Up Average Daily Mitigated GHG Emissions.

Table H.2.RPA.Mit.GHG.2025-5. 2025 Reduced Project Alternative Summary of Boiler Warm-Up Average Daily Mitigated GHG Emissions.

Table H.2.RPA.Mit.GHG.2025-6. 2025 Reduced Project Alternative Berth Operations Average Daily Mitigated GHG Emissions.

Table H.2.RPA.Mit.GHG.2025-7. 2025 Reduced Project Alternative Summary of Berth Operations Average Daily Mitigated GHG Emissions.

### **Reduced Project Alternative Average Daily Mitigated Emissions 2040**

Table H.2.RPA.Mit.GHG.2040-1. 2040 Reduced Project Alternative Main Engines Average Daily Mitigated GHG Emissions.

Table H.2.RPA.Mit.GHG.2040-2. 2040 Reduced Project Alternative Auxiliary Generator Average Daily Mitigated GHG Emissions.

Table H.2.RPA.Mit.GHG.2040-3. 2040 Reduced Project Alternative Summary of Average Daily Mitigated Vessel GHG Emissions.

Table H.2.RPA.Mit.GHG.2040-4. 2040 Reduced Project Alternative Boiler Warm-Up Average Daily Mitigated GHG Emissions.

Table H.2.RPA.Mit.GHG.2040-5. 2040 Reduced Project Alternative Summary of Boiler Warm-Up Average Daily Mitigated GHG Emissions.

Table H.2.RPA.Mit.GHG.2040-6. 2040 Reduced Project Alternative Berth Operations Average Daily Mitigated GHG Emissions.

Table H.2.RPA.Mit.GHG.2040-7. 2040 Reduced Project Alternative Summary of Berth Operations Average Daily Mitigated GHG Emissions.

## **Section 3.2: GHG Emissions from AMP Electricity Consumption**

### **Proposed Project AMP Electricity Consumption (GHG Emissions)**

Table H.2.PP.Mit.AMP.GHG.2010-1. 2010 Proposed Project Berth Operations Average Daily Mitigated GHG Emissions by AMP Electricity Consumption.

Table H.2.PP.Mit.AMP.GHG.2010-2. 2010 Proposed Project Summary of Berth Operations Average Daily Mitigated GHG Emissions by AMP Electricity Consumption.

Table H.2.PP.Mit.AMP.GHG.2015-3. 2015 Proposed Project Berth Operations Average Daily Mitigated GHG Emissions by AMP Electricity Consumption.

Table H.2.PP.Mit.AMP.GHG.2015-4. 2015 Proposed Project Summary of Berth Operations Average Daily Mitigated GHG Emissions by AMP Electricity Consumption.

Table H.2.PP.Mit.AMP.GHG.2025-5. 2025 Proposed Project Berth Operations Average Daily Mitigated GHG Emissions by AMP Electricity Consumption.

Table H.2.PP.Mit.AMP.GHG.2025-6. 2025 Proposed Project Summary of Berth Operations Average Daily Mitigated GHG Emissions by AMP Electricity Consumption.

Table H.2.PP.Mit.AMP.GHG.2040-7. 2040 Proposed Project Berth Operations Average Daily Mitigated GHG Emissions by AMP Electricity Consumption.

Table H.2.PP.Mit.AMP.GHG.2040-8. 2040 Proposed Project Summary of Berth Operations Average Daily Mitigated GHG Emissions by AMP Electricity Consumption.

**No Federal Action/No Project Alternative AMP Electricity Consumption (GHG Emissions)**

Table H.2.NFA/NPA.AMP.GHG.2015-1. 2015 No Federal Action/No Project Alternative Berth Operations Average Daily GHG Emissions by AMP Electricity Consumption (Exxon Mobil).

Table H.2.NFA/NPA.AMP.GHG.2015-2. 2015 No Federal Action/No Project Alternative Summary Berth Operations Average Daily GHG Emissions by AMP Electricity Consumption (Exxon Mobil).

Table H.2.NFA/NPA.AMP.GHG.2025-3. 2025 No Federal Action/No Project Alternative Berth Operations Average Daily GHG Emissions by AMP Electricity Consumption (Exxon Mobil).

Table H.2.NFA/NPA.AMP.GHG.2025-4. 2025 No Federal Action/No Project Alternative Summary Berth Operations Average Daily GHG Emissions by AMP Electricity Consumption (Exxon Mobil).

Table H.2.NFA/NPA.AMP.GHG.2040-5. 2040 No Federal Action/No Project Alternative Berth Operations Average Daily GHG Emissions by AMP Electricity Consumption (Exxon Mobil).

Table H.2.NFA/NPA.AMP.GHG.2040-6. 2040 No Federal Action/No Project Alternative Summary Berth Operations Average Daily GHG Emissions by AMP Electricity Consumption (Exxon Mobil).

**Reduced Project Alternative AMP Electricity Consumption (GHG Emissions)**

Table H.2.RPA.AMP.GHG.2010-1. 2010 Reduced Project Alternative Berth Operations Average Daily Mitigated GHG Emissions by AMP Electricity Consumption.

Table H.2.RPA.AMP.GHG.2010-2. 2010 Reduced Project Alternative Summary of Berth Operations Average Daily Mitigated GHG Emissions by AMP Electricity Consumption.

Table H.2.RPA.AMP.GHG.2015-3. 2015 Reduced Project Alternative Berth Operations Average Daily Mitigated GHG Emissions by AMP Electricity Consumption.

Table H.2.RPA.AMP.GHG.2015-4. 2015 Reduced Project Alternative Summary of Berth Operations Average Daily Mitigated GHG Emissions by AMP Electricity Consumption.

Table H.2.RPA.AMP.GHG.2025-5. 2025 Reduced Project Alternative Berth Operations Average Daily Mitigated GHG Emissions by AMP Electricity Consumption.

Table H.2.RPA.AMP.GHG.2025-6. 2025 Reduced Project Alternative Summary of Berth Operations Average Daily Mitigated GHG Emissions by AMP Electricity Consumption.

Table H.2.RPA.AMP.GHG.2025-7. 2025 Reduced Project Alternative Berth Operations Average Daily Mitigated GHG Emissions by AMP Electricity Consumption (BP).

Table H.2.RPA.AMP.GHG.2025-8. 2025 Reduced Project Alternative Berth Operations Average Daily Mitigated GHG Emissions by AMP Electricity Consumption (Tesoro).

Table H.2.RPA.AMP.GHG.2025-9. 2025 Reduced Project Alternative Berth Operations Average Daily Mitigated GHG Emissions by AMP Electricity Consumption (Exxon Mobil).

Table H.2.RPA.AMP.GHG.2040-10. 2040 Reduced Project Alternative Berth Operations Average Daily Mitigated GHG Emissions by AMP Electricity Consumption.

Table H.2.RPA.AMP.GHG.2040-11. 2040 Reduced Project Alternative Summary of Berth Operations Average Daily Mitigated GHG Emissions by AMP Electricity Consumption.

Table H.2.RPA.AMP.GHG.2040-12. 2040 Reduced Project Alternative Berth Operations Average Daily Mitigated GHG Emissions by AMP Electricity Consumption (BP).

Table H.2.RPA.AMP.GHG.2040-13. 2040 Reduced Project Alternative Berth Operations Average Daily Mitigated GHG Emissions by AMP Electricity Consumption (Tesoro).

Table H.2.RPA.AMP.GHG.2040-14. 2040 Reduced Project Alternative Berth Operations Average Daily Mitigated GHG Emissions by AMP Electricity Consumption (Exxon Mobil).

## **Section 4: Fugitive and Storage Tank Emissions**

Table H.2.Em-1. Summary of Fugitive Emissions.

Table H.2.Em-2. Summary of Storage Tank Emissions.

## **Section 5: Emission Factors**

Table H.2.EF-1. Tug Emission Factors and Fuel Use Factors.

Table H.2.EF-2. OGV Emission Factors and Fuel Use Factors.



## **APPENDIX H.2 - SECTION 1 SUMMARY**

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**Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR**

**Table H.2.PP.Un.Sum.2010-1.**

**2010 Proposed Project Summary of Average Daily Unmitigated Emissions.**

<b>Operation</b>	<b>NO<sub>x</sub> Emissions (lb/yr)</b>	<b>CO Emissions (lb/yr)</b>	<b>ROG Emissions (lb/yr)</b>	<b>PM Emissions (lb/yr)</b>	<b>PM<sub>10</sub> Emissions (lb/yr)</b>	<b>PM<sub>2.5</sub> Emissions (lb/yr)</b>	<b>SO<sub>2</sub> Emissions (lb/yr)</b>
Tanker Cruising and Manuevering	423,427	34,008	16,856	37,952	37,728	34,064	254,371
Tanker Hoteling	175,959	13,846	5,035	5,269	5,058	4,047	42,173
Offloading Emissions	31,587	6,734	829	5,571	4,122	2,735	128,158
Transiting Operations	5,295	498	120	1,665	1,432	647	42,721
Tug Assistance	52,476	8,420	1,635	---	2,172	1,998	26
Tanks	---	---	5,083	---	---	---	---
Vapor Destruction Units	11,631	3,132	626	---	671	---	2,082
Valves, Flanges, Pumps	---	---	1,188	---	---	---	---
<b>TOTAL</b>	<b>700,376</b>	<b>66,638</b>	<b>31,373</b>	<b>50,458</b>	<b>51,183</b>	<b>43,491</b>	<b>469,532</b>

<b>Operation</b>	<b>NO<sub>x</sub> Emissions (lb/day)</b>	<b>CO Emissions (lb/day)</b>	<b>ROG Emissions (lb/day)</b>	<b>PM Emissions (lb/day)</b>	<b>PM<sub>10</sub> Emissions (lb/day)</b>	<b>PM<sub>2.5</sub> Emissions (lb/day)</b>	<b>SO<sub>2</sub> Emissions (lb/day)</b>
Tanker Cruising and Manuevering	1,160	93	46	104	103	93	697
Tanker Hoteling	482	38	14	14	14	11	116
Offloading Emissions	87	18	2	15	11	7	351
Transiting Operations	15	1	0.3	4.6	3.9	1.8	117
Tug Assistance	144	23	4.5	---	6.0	5.5	0.1
Tanks	---	---	13.9	---	---	---	---
Vapor Destruction Units	32	9	2	---	2	---	6
Valves, Flanges, Pumps	---	---	3	---	---	---	---
<b>TOTAL</b>	<b>1,919</b>	<b>183</b>	<b>86</b>	<b>138</b>	<b>140</b>	<b>119</b>	<b>1,286</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Un.Sum.2010-2.

2010 Proposed Project Summary of Maximum Daily Unmitigated Emissions.

Scenario	Operation	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Vessel Arrival/Departure	Cruising and maneuvering	5,187	435	248	468	466	424	2,997
	Boiler Warm-Up	51	5	1	32	28	18	463
	Tug Assistance	514	82	16	---	21	20	0
	Tanks	---	---	86	---	---	---	---
	Vapor Destruction Units	63.4	17.1	3.4	---	3.7	---	19.2
	Valves, Flanges, Pumps	---	---	3.25	---	---	---	---
	<b>TOTAL</b>	<b>5,815</b>	<b>540</b>	<b>357</b>	<b>500</b>	<b>519</b>	<b>461</b>	<b>3,480</b>
Vessel Offloading	Tanker Hoteling	1,919	151	55	53	51	41	422
	Offloading	486	97	21	88	66	44	1,743
	Tanks	---	---	86	---	---	---	---
	Vapor Destruction Units	63.4	17.1	3.4	---	3.7	---	19.2
	Valves, Flanges, Pumps	---	---	3.25	---	---	---	---
	<b>TOTAL</b>	<b>2,469</b>	<b>265</b>	<b>168</b>	<b>141</b>	<b>120</b>	<b>84</b>	<b>2,184</b>
No Vessel/Empty Berth	Vapor Destruction Units	63.4	17.1	3.4	---	3.7	---	19.2
	Tanks	---	---	86	---	---	---	---
	Valves, Flanges, Pumps	---	---	3.25	---	---	---	---
	<b>TOTAL</b>	<b>63</b>	<b>17</b>	<b>93</b>	<b>0</b>	<b>4</b>	<b>0</b>	<b>19</b>

**Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR**

**Table H.2.PP.Un.Sum.2010-3.**

**2010 Proposed Project Summary of Average Daily Unmitigated GHG Emissions.**

<b>Operation</b>	<b>N<sub>2</sub>O Emissions (tons/yr)</b>	<b>CO<sub>2</sub> Emissions (tons/yr)</b>	<b>CH<sub>4</sub> Emissions (tons/yr)</b>	<b>CO<sub>2</sub>e Emissions (tons/yr)</b>
Tanker Cruising and Manuevering	0.05	5346.71	0.71	5,376.10
Tanker Hoteling	0.06	6523.41	0.86	6,559.36
Offloading Emissions	0.16	16092.55	2.22	16,188.33
Transiting Operations	0.03	2592.37	0.36	2,607.80
Tug Assistance	0.0045	452.79	0.0625	455.49
Tanks	---	---	---	---
Vapor Destruction Units	0.02	10,563.92	1.18	10,594.92
Valves, Flanges, Pumps	---	---	---	---
<b>TOTAL</b>	<b>0.3134</b>	<b>41571.75</b>	<b>5.3856</b>	<b>41,781.99</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Un.Sum.2015-1.

2015 Proposed Project Summary of Average Daily Unmitigated Emissions.

Operation	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Tanker Cruising and Manuevering	549,307	44,462	22,657	49,235	48,974	44,303	327,089
Tanker Hoteling	219,574	17,287	6,286	6,416	6,159	4,927	51,307
Offloading Emissions	44,749	9,396	1,357	7,945	5,895	3,910	175,887
Transiting Operations	6,712	646	151	2,498	2,149	838	55,377
Tug Assistance	55,277	10,302	1,951	---	2,379	2,189	32
Tanks	---	---	7,262	---	---	---	---
Vapor Destruction Units	13,826	3,722	744	---	798	---	2,474
Valves, Flanges, Pumps	---	---	1,188	---	---	---	---
<b>TOTAL</b>	<b>889,445</b>	<b>85,814</b>	<b>41,596</b>	<b>66,094</b>	<b>66,353</b>	<b>56,168</b>	<b>612,167</b>

Operation	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Tanker Cruising and Manuevering	1,505	122	62	135	134	121	896
Tanker Hoteling	602	47	17	18	17	13	141
Offloading Emissions	123	26	4	22	16	11	482
Transiting Operations	18	2	0.4	6.8	5.9	2.3	152
Tug Assistance	151	28	5.3	---	6.5	6.0	0.1
Tanks	---	---	19.9	---	---	---	---
Vapor Destruction Units	38	10	2	---	2	---	7
Valves, Flanges, Pumps	---	---	3	---	---	---	---
<b>TOTAL</b>	<b>2,437</b>	<b>235</b>	<b>114</b>	<b>181</b>	<b>182</b>	<b>154</b>	<b>1,677</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Un.Sum.2015-2.

2015 Proposed Project Summary of Maximum Daily Unmitigated Emissions.

Scenario	Operation	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Vessel Arrival/Departure	Cruising and maneuvering	5,187	435	248	468	466	424	2,997
	Boiler Warm-Up	51	5	1	32	28	18	463
	Tug Assistance	442	82	16	---	19	18	0
	Tanks	---	---	86	---	---	---	---
	Vapor Destruction Units Valves, Flanges, Pumps	66	18	4	---	4	---	20
	<b>TOTAL</b>	<b>5,747</b>	<b>540</b>	<b>357</b>	<b>500</b>	<b>517</b>	<b>459</b>	<b>3,481</b>
Vessel Offloading	Tanker Hoteling	1,919	151	55	53	51	41	422
	Offloading	486	97	21	88	66	44	1,743
	Tanks	---	---	86	---	---	---	---
	Vapor Destruction Units	66	18	4	---	4	---	20
	Valves, Flanges, Pumps	---	---	3.25	---	---	---	---
	<b>TOTAL</b>	<b>2,472</b>	<b>266</b>	<b>168</b>	<b>141</b>	<b>121</b>	<b>84</b>	<b>2,184</b>
No Vessel/Empty Berth	Vapor Destruction Units	66	18	4	---	4	---	20
	Tanks	---	---	86	---	---	---	---
	Valves, Flanges, Pumps	---	---	3.25	---	---	---	---
	<b>TOTAL</b>	<b>66</b>	<b>18</b>	<b>93</b>	<b>0</b>	<b>4</b>	<b>0</b>	<b>20</b>

**Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR**

**Table H.2.PP.Un.Sum.2015-3.**

**2015 Proposed Project Summary of Average Daily Unmitigated GHG Emissions.**

<b>Operation</b>	<b>N<sub>2</sub>O Emissions (tons/yr)</b>	<b>CO<sub>2</sub> Emissions (tons/yr)</b>	<b>CH<sub>4</sub> Emissions (tons/yr)</b>	<b>CO<sub>2</sub>e Emissions (tons/yr)</b>
Tanker Cruising and Manuevering	0.06	7,622.25	1.01	7,662.15
Tanker Hoteling	0.08	9,301.50	1.23	9,352.75
Offloading Emissions	0.23	22,947.06	3.16	23,083.64
Transiting Operations	0.04	3,697.44	0.51	3,719.44
Tug Assistance	0.01	515.97	0.07	519.04
Tanks	---	---	---	---
Vapor Destruction Units	0.02	11,495.92	1.29	11,529.66
Valves, Flanges, Pumps	---	---	---	---
<b>TOTAL</b>	<b>0.43</b>	<b>55,580.14</b>	<b>7.26</b>	<b>55,866.68</b>



**Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR**

**Table H.2.PP.Un.Sum.2025-1.**

**2025 Proposed Project Summary of Average Daily Unmitigated Emissions.**

<b>Operation</b>	<b>NO<sub>x</sub> Emissions (lb/yr)</b>	<b>CO Emissions (lb/yr)</b>	<b>ROG Emissions (lb/yr)</b>	<b>PM Emissions (lb/yr)</b>	<b>PM<sub>10</sub> Emissions (lb/yr)</b>	<b>PM<sub>2.5</sub> Emissions (lb/yr)</b>	<b>SO<sub>2</sub> Emissions (lb/yr)</b>
Tanker Cruising and Manuevering	746,109	60,433	30,869	66,901	66,544	60,194	444,181
Tanker Hoteling	299,191	23,554	8,565	8,750	8,400	6,720	69,976
Offloading Emissions	60,667	12,739	1,838	10,771	7,991	5,301	238,514
Transiting Operations	9,108	877	205	3,386	2,912	1,138	75,134
Tug Assistance	62,464	14,011	2,587	---	2,696	2,480	44
Tanks	---	---	9,832	---	---	---	---
Vapor Destruction Units	15,134	4,075	815	---	873	---	2,708
Valves, Flanges, Pumps	---	---	1,188	---	---	---	---
<b>TOTAL</b>	<b>1,192,672</b>	<b>115,689</b>	<b>55,898</b>	<b>89,808</b>	<b>89,416</b>	<b>75,833</b>	<b>830,557</b>

<b>Operation</b>	<b>NO<sub>x</sub> Emissions (lb/day)</b>	<b>CO Emissions (lb/day)</b>	<b>ROG Emissions (lb/day)</b>	<b>PM Emissions (lb/day)</b>	<b>PM<sub>10</sub> Emissions (lb/day)</b>	<b>PM<sub>2.5</sub> Emissions (lb/day)</b>	<b>SO<sub>2</sub> Emissions (lb/day)</b>
Tanker Cruising and Manuevering	2,044	166	85	183	182	165	1,217
Tanker Hoteling	820	65	23	24	23	18	192
Offloading Emissions	166	35	5	30	22	15	653
Transiting Operations	25	2	0.6	9.3	8.0	3.1	206
Tug Assistance	171	38	7.1	---	7.4	6.8	0.1
Tanks	---	---	26.9	---	---	---	---
Vapor Destruction Units	41	11	2	---	2	---	7
Valves, Flanges, Pumps	---	---	3	---	---	---	---
<b>TOTAL</b>	<b>3,268</b>	<b>317</b>	<b>153</b>	<b>246</b>	<b>245</b>	<b>208</b>	<b>2,275</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Un.Sum.2025-2.

2025 Proposed Project Summary of Maximum Daily Unmitigated Emissions.

Scenario	Operation	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Vessel Arrival/Departure	Cruising and maneuvering	5,187	435	248	468	466	429	2,997
	Boiler Warm-Up	51	5	1	32	28	18	463
	Tug Assistance	367	82	15	---	16	15	0
	Tanks	---	---	86	---	---	---	---
	Vapor Destruction Units	66	18	4	---	4	---	20
	Valves, Flanges, Pumps	---	---	3	---	---	---	---
	<b>TOTAL</b>	<b>5,672</b>	<b>540</b>	<b>357</b>	<b>500</b>	<b>514</b>	<b>461</b>	<b>3,481</b>
Vessel Offloading	Tanker Hoteling	1,919	151	55	53	51	41	422
	Offloading	486	97	21	88	66	44	1,743
	Tanks	---	---	86	---	---	---	---
	Vapor Destruction Units	66	18	4	---	4	---	20
		Valves, Flanges, Pumps	---	---	3	---	---	---
	<b>TOTAL</b>	<b>2,472</b>	<b>266</b>	<b>168</b>	<b>141</b>	<b>121</b>	<b>84</b>	<b>2,184</b>
No Vessel/Empty Berth	Vapor Destruction Units	66	18	4	---	4	---	20
	Tanks	---	---	86	---	---	---	---
		Valves, Flanges, Pumps	---	---	3	---	---	---
	<b>TOTAL</b>	<b>66</b>	<b>18</b>	<b>93</b>	<b>0</b>	<b>4</b>	<b>0</b>	<b>20</b>

**Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR**

**Table H.2.PP.Un.Sum.2025-3.**

**2025 Proposed Project Summary of Average Daily Unmitigated GHG Emissions.**

<b>Operation</b>	<b>N<sub>2</sub>O Emissions (tons/yr)</b>	<b>CO<sub>2</sub> Emissions (tons/yr)</b>	<b>CH<sub>4</sub> Emissions (tons/yr)</b>	<b>CO<sub>2</sub>e Emissions (tons/yr)</b>
Tanker Cruising and Manuevering	0.08	9,352.29	1.23	9,403.70
Tanker Hoteling	0.10	11,009.43	1.45	11,070.11
Offloading Emissions	0.30	30,288.81	4.18	30,469.08
Transiting Operations	0.04	4,559.25	0.63	4,586.39
Tug Assistance	0.01	705.51	0.10	709.71
Tanks	---	---	---	---
Vapor Destruction Units	0.02	11,495.92	1.29	11,529.66
Valves, Flanges, Pumps	---	---	---	---
<b>TOTAL</b>	<b>0.55</b>	<b>67,411.22</b>	<b>8.87</b>	<b>67,768.65</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Un.Sum.2040-1.

2040 Proposed Project Summary of Average Daily Unmitigated Emissions.

Operation	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Tanker Cruising and Manuevering	746,109	60,433	30,869	66,901	66,544	60,194	444,181
Tanker Hoteling	299,191	23,554	8,565	8,750	8,400	6,720	69,976
Offloading Emissions	60,667	12,739	1,838	10,771	7,991	5,301	238,514
Transiting Operations	9,108	877	205	3,386	2,912	1,138	75,134
Tug Assistance	56,078	14,011	2,587	---	2,460	2,263	44
Tanks	---	---	9,832	---	---	---	---
Vapor Destruction Units	15,134	4,075	815	---	873	---	2,708
Valves, Flanges, Pumps	---	---	1,188	---	---	---	---
<b>TOTAL</b>	<b>1,186,286</b>	<b>115,689</b>	<b>55,898</b>	<b>89,808</b>	<b>89,181</b>	<b>75,616</b>	<b>830,557</b>

Operation	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Tanker Cruising and Manuevering	2,044	166	85	183	182	165	1,217
Tanker Hoteling	820	65	23	24	23	18	192
Offloading Emissions	166	35	5	30	22	15	653
Transiting Operations	25	2	0.6	9.3	8.0	3.1	206
Tug Assistance	154	38	7.1	---	6.7	6.2	0.1
Tanks	---	---	26.9	---	---	---	---
Vapor Destruction Units	41	11	2	---	2	---	7
Valves, Flanges, Pumps	---	---	3	---	---	---	---
<b>TOTAL</b>	<b>3,250</b>	<b>317</b>	<b>153</b>	<b>246</b>	<b>244</b>	<b>207</b>	<b>2,275</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Un.Sum.2040-2.

2040 Proposed Project Summary of Maximum Daily Unmitigated Emissions.

Scenario	Operation	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Vessel Arrival/Departure	Cruising and maneuvering	5,187	435	248	468	466	424	2,997
	Boiler Warm-Up	51	5	1	32	28	18	463
	Tug Assistance	330	82	15	---	14	13	0
	Tanks	---	---	86	---	---	---	---
	Vapor Destruction Units	66	18	4	---	4	---	20
	Valves, Flanges, Pumps	---	---	3	---	---	---	---
	<b>TOTAL</b>	<b>5,635</b>	<b>540</b>	<b>357</b>	<b>500</b>	<b>512</b>	<b>455</b>	<b>3,481</b>
Vessel Offloading	Tanker Hoteling	1,919	151	55	53	51	41	422
	Offloading	486	97	21	88	66	44	1,743
	Tanks	---	---	86	---	---	---	---
	Vapor Destruction Units	66	18	4	---	4	---	20
		Valves, Flanges, Pumps	---	---	3	---	---	---
	<b>TOTAL</b>	<b>2,472</b>	<b>266</b>	<b>168</b>	<b>141</b>	<b>121</b>	<b>84</b>	<b>2,184</b>
No Vessel/Empty Berth	Vapor Destruction Units	66	18	4	---	4	---	20
	Tanks	---	---	86	---	---	---	---
		Valves, Flanges, Pumps	---	---	3	---	---	---
	<b>TOTAL</b>	<b>66</b>	<b>18</b>	<b>93</b>	<b>0</b>	<b>4</b>	<b>0</b>	<b>20</b>

**Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR**

**Table H.2.PP.Un.Sum.2040-3.**

**2040 Proposed Project Summary of Average Daily Unmitigated GHG Emissions.**

<b>Operation</b>	<b>N<sub>2</sub>O Emissions (tons/yr)</b>	<b>CO<sub>2</sub> Emissions (tons/yr)</b>	<b>CH<sub>4</sub> Emissions (tons/yr)</b>	<b>CO<sub>2</sub>e Emissions (tons/yr)</b>
Tanker Cruising and Manuevering	0.08	9,352.29	1.23	9,403.70
Tanker Hoteling	0.10	11,009.43	1.45	11,070.11
Offloading Emissions	0.30	30,288.81	4.18	30,469.08
Transiting Operations	0.04	4,559.25	0.63	4,586.39
Tug Assistance	0.01	705.51	0.10	709.71
Tanks	---	---	---	---
Vapor Destruction Units	0.02	11,495.92	1.29	11,529.66
Valves, Flanges, Pumps	---	---	---	---
<b>TOTAL</b>	<b>0.55</b>	<b>67,411.22</b>	<b>8.87</b>	<b>67,768.65</b>

**Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR**

**Table H.2.PP.Mit.Sum.2010-1.**

**2010 Proposed Project Summary of Average Daily Mitigated Emissions.**

<b>Operation</b>	<b>NO<sub>x</sub> Emissions (lb/yr)</b>	<b>CO Emissions (lb/yr)</b>	<b>ROG Emissions (lb/yr)</b>	<b>PM Emissions (lb/yr)</b>	<b>PM<sub>10</sub> Emissions (lb/yr)</b>	<b>PM<sub>2.5</sub> Emissions (lb/yr)</b>	<b>SO<sub>2</sub> Emissions (lb/yr)</b>
Tanker Cruising and Manuevering	326,886	29,445	17,281	6,878	6,830	6,145	27,511
Tanker Hoteling	174,919	13,843	5,034	3,775	3,624	2,899	12,761
Offloading Emissions	29,046	6,762	774	4,476	3,133	2,095	42,088
Transiting Operations	2,245	532	53	352	246	165	7,787
Tug Assistance	52,476	8,420	1,635	---	2,172	1,998	26
Tanks	---	---	5,083	---	---	---	---
Vapor Destruction Units	11,631	3,132	626	---	671	---	2,082
Valves, Flanges, Pumps	---	---	1,188	---	---	---	---
<b>TOTAL</b>	<b>597,204</b>	<b>62,132</b>	<b>31,675</b>	<b>15,482</b>	<b>16,677</b>	<b>13,303</b>	<b>92,255</b>

<b>Operation</b>	<b>NO<sub>x</sub> Emissions (lb/day)</b>	<b>CO Emissions (lb/day)</b>	<b>ROG Emissions (lb/day)</b>	<b>PM Emissions (lb/day)</b>	<b>PM<sub>10</sub> Emissions (lb/day)</b>	<b>PM<sub>2.5</sub> Emissions (lb/day)</b>	<b>SO<sub>2</sub> Emissions (lb/day)</b>
Tanker Cruising and Manuevering	896	81	47	19	19	17	75
Tanker Hoteling	479	38	14	10	10	8	35
Offloading Emissions	80	19	2	12	9	6	115
Transiting Operations	6	1	0.1	1.0	0.7	0.5	21
Tug Assistance	144	23	4.5	---	6.0	5.5	0.1
Tanks	---	---	13.9	---	---	---	---
Vapor Destruction Units	32	9	2	---	2	---	6
Valves, Flanges, Pumps	---	---	3	---	---	---	---
<b>TOTAL</b>	<b>1,636</b>	<b>170</b>	<b>87</b>	<b>42</b>	<b>46</b>	<b>36</b>	<b>253</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Mit.Sum.2010-2.

2010 Proposed Project Summary of Maximum Mitigated Daily Emissions.

Scenario	Operation	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Vessel Arrival/Departure	Tanker Cruising and Manuevering	3,850	350	211	81	81	73	317
	Tanker Hoteling	---	---	---	---	---	---	---
	Offloading Emissions	---	---	---	---	---	---	---
	Transiting Operations	28	6	1	4	3	2	84
	Tug Assistance	513.6	82.4	16.0	---	21.3	19.6	0.3
	Tanks	---	---	85.9	---	---	---	---
	Vapor Destruction Units	63.4	17.1	3.4	---	3.7	---	19.2
	Valves, Flanges, Pumps	---	---	3.3	---	---	---	---
	<b>TOTAL</b>	<b>4,455</b>	<b>455</b>	<b>321</b>	<b>85</b>	<b>108</b>	<b>94</b>	<b>421</b>
Vessel Offloading	Tanker Cruising and Manuevering	---	---	---	---	---	---	---
	Tanker Hoteling	1,911	151	55	41	40	32	135
	Offloading Emissions	467	97	21	65	45	30	592
	Transiting Operations	---	---	---	---	---	---	---
	Tug Assistance	---	---	---	---	---	---	---
	Tanks	---	---	85.9	---	---	---	---
	Vapor Destruction Units	63.4	17.1	3.4	---	3.7	---	19.2
	Valves, Flanges, Pumps	---	---	3.25	---	---	---	---
	<b>TOTAL</b>	<b>2,441</b>	<b>266</b>	<b>168</b>	<b>106</b>	<b>88</b>	<b>62</b>	<b>747</b>
No Vessel/Empty Berth	Tanker Cruising and Manuevering	---	---	---	---	---	---	---
	Tanker Hoteling	---	---	---	---	---	---	---
	Offloading Emissions	---	---	---	---	---	---	---
	Transiting Operations	---	---	---	---	---	---	---
	Tug Assistance	---	---	---	---	---	---	---
	Tanks	---	---	85.9	---	---	---	---
	Vapor Destruction Units	63	17	3	---	3.7	---	19
	Valves, Flanges, Pumps	---	---	3.25	---	---	---	---
	<b>TOTAL</b>	<b>63</b>	<b>17</b>	<b>93</b>	<b>0</b>	<b>4</b>	<b>0</b>	<b>19</b>



**Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR**

**Table H.2.PP.Mit.Sum.2010-3.**

**2010 Proposed Project Summary of Average Daily Mitigated GHG Emissions.**

<b>Operation</b>	<b>N<sub>2</sub>O Emissions (tons/yr)</b>	<b>CO<sub>2</sub> Emissions (tons/yr)</b>	<b>CH<sub>4</sub> Emissions (tons/yr)</b>	<b>CO<sub>2</sub>e Emissions (tons/yr)</b>
Tanker Cruising and Manuevering	0.04	4,410.46	0.58	4,435.01
Tanker Hoteling	0.06	6,232.85	0.86	6,269.95
Offloading Emissions	0.16	16,031.55	2.21	16,126.97
Transiting Operations	0.02	2,453.49	0.34	2,468.09
Tug Assistance	0.004	452.79	0.06	455.49
Tanks	---	---	---	---
Vapor Destruction Units	0.02	10,563.92	1.18	10,594.92
Valves, Flanges, Pumps	---	---	---	---
Emissions from AMPed off-site Elec. Generation	---	---	---	---
<b>TOTAL</b>	<b>0.31</b>	<b>40,145.05</b>	<b>5.24</b>	<b>40,350.4</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Mit.Sum.2015-1.

2015 Proposed Project Summary of Average Daily Mitigated Emissions.

Operation	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Tanker Cruising and Manuevering	411,244	35,793	18,918	7,998	7,942	7,144	27,338
Tanker Hoteling	185,600	14,688	5,341	4,006	3,846	3,076	12,793
Offloading Emissions	41,646	9,431	1,301	6,243	4,370	2,922	55,723
Transiting Operations	2,790	640	82	423	296	198	6,485
Tug Assistance	55,277	10,302	1,951	---	2,379	2,189	32
Tanks	---	---	7,262	---	---	---	---
Vapor Destruction Units	13,826	3,722	744	---	798	---	2,474
Valves, Flanges, Pumps	---	---	1,188	---	---	---	---
<b>TOTAL</b>	<b>710,384</b>	<b>74,576</b>	<b>36,788</b>	<b>18,670</b>	<b>19,630</b>	<b>15,530</b>	<b>104,846</b>

Operation	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Tanker Cruising and Manuevering	1,127	98	52	22	22	20	75
Tanker Hoteling	508	40	15	11	11	8	35
Offloading Emissions	114	26	4	17	12	8	153
Transiting Operations	8	2	0.2	1.2	0.8	0.5	18
Tug Assistance	151	28	5.3	---	6.5	6.0	0.1
Tanks	---	---	19.9	---	---	---	---
Vapor Destruction Units	38	10	2	---	2	---	7
Valves, Flanges, Pumps	---	---	3	---	---	---	---
<b>TOTAL</b>	<b>1,946</b>	<b>204</b>	<b>101</b>	<b>51</b>	<b>54</b>	<b>43</b>	<b>287</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Mit.Sum.2015-2.

2015 Proposed Project Summary of Maximum Daily Mitigated Emissions.

Scenario	Operation	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Vessel Arrival/Departure	Tanker Cruising and Manuevering	3,850	350	211	76	75	68	246
	Tanker Hoteling	---	---	---	---	---	---	---
	Offloading Emissions	---	---	---	---	---	---	---
	Transiting Operations	28	6	1	4	3	2	58
	Tug Assistance	442	82	16	---	19	18	0
	Tanks	---	---	85.9	---	---	---	---
	Vapor Destruction Units	66.5	17.9	3.6	---	3.8	---	19.7
	Valves, Flanges, Pumps	---	---	3.25	---	---	---	---
	<b>TOTAL</b>	<b>4,386</b>	<b>456</b>	<b>321</b>	<b>79</b>	<b>101</b>	<b>87</b>	<b>325</b>
Vessel Offloading	Tanker Cruising and Manuevering	---	---	---	---	---	---	---
	Tanker Hoteling	1,625	129	47	35	34	27	111
	Offloading Emissions	463	97	20	64	45	30	563
	Transiting Operations	---	---	---	---	---	---	---
	Tug Assistance	---	---	---	---	---	---	---
	Tanks	---	---	85.9	---	---	---	---
	Vapor Destruction Units	66.5	17.9	3.6	---	3.8	---	19.7
	Valves, Flanges, Pumps	---	---	3.25	---	---	---	---
	<b>TOTAL</b>	<b>2,154</b>	<b>243</b>	<b>160</b>	<b>99</b>	<b>82</b>	<b>57</b>	<b>693</b>
No Vessel/Empty Berth	Tanker Cruising and Manuevering	---	---	---	---	---	---	---
	Tanker Hoteling	---	---	---	---	---	---	---
	Offloading Emissions	---	---	---	---	---	---	---
	Transiting Operations	---	---	---	---	---	---	---
	Tug Assistance	---	---	---	---	---	---	---
	Tanks	---	---	85.9	---	---	---	---
	Vapor Destruction Units	66.5	17.9	3.6	---	3.8	---	19.7
	Valves, Flanges, Pumps	---	---	3.25	---	---	---	---
	<b>TOTAL</b>	<b>66</b>	<b>18</b>	<b>93</b>	<b>0</b>	<b>4</b>	<b>0</b>	<b>20</b>

**Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR**

**Table H.2.PP.Mit.Sum.2015-3.**

**2015 Proposed Project Summary of Average Daily Mitigated GHG Emissions.**

<b>Operation</b>	<b>N<sub>2</sub>O Emissions (tons/yr)</b>	<b>CO<sub>2</sub> Emissions (tons/yr)</b>	<b>CH<sub>4</sub> Emissions (tons/yr)</b>	<b>CO<sub>2</sub>e Emissions (tons/yr)</b>
Tanker Cruising and Maneuvering	0.05	5,372.30	0.74	5,404.29
Tanker Hoteling	0.06	6,865.90	0.91	6,903.75
Offloading Emissions	0.22	22,265.73	3.07	22,398.25
Transiting Operations	0.003	320.22	0.04	322.13
Tug Assistance	0.01	515.97	0.07	519.04
Tanks	---	---	---	---
Vapor Destruction Units	0.02	11,495.92	1.29	11,529.66
Valves, Flanges, Pumps	---	---	---	---
Emissions from AMPed off-site Elec. Generation	0.03	3,825.41	0.02	3,835.66
<b>TOTAL</b>	<b>0.40</b>	<b>50,661.46</b>	<b>6.13</b>	<b>50,912.77</b>

**Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR**

**Table H.2.PP.Mit.Sum.2025-1.**

**2025 Proposed Project Summary of Average Daily Mitigated Emissions.**

<b>Operation</b>	<b>NO<sub>x</sub> Emissions (lb/yr)</b>	<b>CO Emissions (lb/yr)</b>	<b>ROG Emissions (lb/yr)</b>	<b>PM Emissions (lb/yr)</b>	<b>PM<sub>10</sub> Emissions (lb/yr)</b>	<b>PM<sub>2.5</sub> Emissions (lb/yr)</b>	<b>SO<sub>2</sub> Emissions (lb/yr)</b>
Tanker Cruising and Manuevering	558,836	48,679	25,800	10,302	10,226	9,187	28,632
Tanker Hoteling	178,514	14,127	5,137	3,853	3,699	2,959	11,822
Offloading Emissions	56,455	12,788	1,762	8,465	5,926	3,962	72,746
Transiting Operations	3,793	870	111	576	403	270	5,685
Tug Assistance	62,464	14,011	2,587	---	2,696	2,480	44
Tanks	---	---	9,832	---	---	---	---
Vapor Destruction Units	15,134	4,075	815	---	873	---	2,708
Valves, Flanges, Pumps	---	---	1,188	---	---	---	---
<b>TOTAL</b>	<b>875,196</b>	<b>94,550</b>	<b>47,231</b>	<b>23,196</b>	<b>23,822</b>	<b>18,858</b>	<b>121,637</b>

<b>Operation</b>	<b>NO<sub>x</sub> Emissions (lb/day)</b>	<b>CO Emissions (lb/day)</b>	<b>ROG Emissions (lb/day)</b>	<b>PM Emissions (lb/day)</b>	<b>PM<sub>10</sub> Emissions (lb/day)</b>	<b>PM<sub>2.5</sub> Emissions (lb/day)</b>	<b>SO<sub>2</sub> Emissions (lb/day)</b>
Tanker Cruising and Manuevering	1,531	133	71	28	28	25	78
Tanker Hoteling	489	39	14	11	10	8	32
Offloading Emissions	155	35	5	23	16	11	199
Transiting Operations	10	2	0.3	1.6	1.1	0.7	16
Tug Assistance	171	38	7.1	---	7.4	6.8	0.1
Tanks	---	---	26.9	---	---	---	---
Vapor Destruction Units	41	11	2	---	2	---	7
Valves, Flanges, Pumps	---	---	3	---	---	---	---
<b>TOTAL</b>	<b>2,398</b>	<b>259</b>	<b>129</b>	<b>64</b>	<b>65</b>	<b>52</b>	<b>333</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Mit.Sum.2025-2.

2025 Proposed Project Summary of Maximum Daily Mitigated Emissions.

Scenario	Operation	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Vessel Arrival/Departure	Tanker Cruising and Manuevering	3,850	350	211	71	71	64	190
	Tanker Hoteling	---	---	---	---	---	---	---
	Offloading Emissions	---	---	---	---	---	---	---
	Transiting Operations	28	6	1	4	3	2	38
	Tug Assistance	367	82	15	---	16	15	0
	Tanks	---	---	86	---	---	---	---
	Vapor Destruction Units	66	18	4	---	4	---	20
	Valves, Flanges, Pumps	---	---	3	---	---	---	---
	<b>TOTAL</b>	<b>4,312</b>	<b>456</b>	<b>321</b>	<b>75</b>	<b>93</b>	<b>81</b>	<b>248</b>
Vessel Offloading	Tanker Cruising and Manuevering	---	---	---	---	---	---	---
	Tanker Hoteling	1,147	91	33	25	24	19	76
	Offloading Emissions	467	97	21	65	45	30	553
	Transiting Operations	---	---	---	---	---	---	---
	Tug Assistance	---	---	---	---	---	---	---
	Tanks	---	---	86	---	---	---	---
	Vapor Destruction Units	66	18	4	---	4	---	20
	Valves, Flanges, Pumps	---	---	3	---	---	---	---
	<b>TOTAL</b>	<b>1,680</b>	<b>206</b>	<b>146</b>	<b>89</b>	<b>73</b>	<b>49</b>	<b>649</b>
No Vessel/Empty Berth	Tanker Cruising and Manuevering	---	---	---	---	---	---	---
	Tanker Hoteling	---	---	---	---	---	---	---
	Offloading Emissions	---	---	---	---	---	---	---
	Transiting Operations	---	---	---	---	---	---	---
	Tug Assistance	---	---	---	---	---	---	---
	Tanks	---	---	86	---	---	---	---
	Vapor Destruction Units	66	18	4	---	4	---	20
	Valves, Flanges, Pumps	---	---	3	---	---	---	---
	<b>TOTAL</b>	<b>66</b>	<b>18</b>	<b>93</b>	<b>0</b>	<b>4</b>	<b>0</b>	<b>20</b>

**Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR**

**Table H.2.PP.Mit.Sum.2025-3.**

**2025 Proposed Project Summary of Average Daily Mitigated GHG Emissions.**

<b>Operation</b>	<b>N<sub>2</sub>O Emissions (tons/yr)</b>	<b>CO<sub>2</sub> Emissions (tons/yr)</b>	<b>CH<sub>4</sub> Emissions (tons/yr)</b>	<b>CO<sub>2</sub>e Emissions (tons/yr)</b>
Tanker Cruising and Manuevering	0.07	7,298.39	1.01	7,341.84
Tanker Hoteling	0.06	6,605.66	0.87	6,642.07
Offloading Emissions	0.30	30,170.29	4.16	30,349.86
Transiting Operations	0.004	435.54	0.06	438.13
Tug Assistance	0.01	705.51	0.10	709.71
Tanks	---	---	---	---
Vapor Destruction Units	0.02	11,495.92	1.29	11,529.66
Valves, Flanges, Pumps	---	---	---	---
Emissions from AMPed off-site				
Elec. Generation	0.03	3,680.41	0.02	3,690.27
<b>TOTAL</b>	<b>0.49</b>	<b>60,391.73</b>	<b>7.50</b>	<b>60,701.55</b>

**Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR**

**Table H.2.PP.Mit.Sum.2040-1.**

**2040 Proposed Project Summary of Average Daily Mitigated Emissions.**

<b>Operation</b>	<b>NO<sub>x</sub> Emissions (lb/yr)</b>	<b>CO Emissions (lb/yr)</b>	<b>ROG Emissions (lb/yr)</b>	<b>PM Emissions (lb/yr)</b>	<b>PM<sub>10</sub> Emissions (lb/yr)</b>	<b>PM<sub>2.5</sub> Emissions (lb/yr)</b>	<b>SO<sub>2</sub> Emissions (lb/yr)</b>
Tanker Cruising and Manuevering	558,836	48,679	25,800	10,302	10,226	9,187	28,632
Tanker Hoteling	89,257	7,063	2,569	1,926	1,849	1,479	5,911
Offloading Emissions	56,455	12,788	1,762	8,465	5,926	3,962	72,746
Transiting Operations	3,793	870	111	576	403	270	5,685
Tug Assistance	56,078	14,011	2,587	---	2,460	2,263	44
Tanks	---	---	9,832	---	---	---	---
Vapor Destruction Units	15,134	4,075	815	---	873	---	2,708
Valves, Flanges, Pumps	---	---	1,188	---	---	---	---
<b>TOTAL</b>	<b>779,553</b>	<b>87,486</b>	<b>44,663</b>	<b>21,270</b>	<b>21,737</b>	<b>17,162</b>	<b>115,726</b>

<b>Operation</b>	<b>NO<sub>x</sub> Emissions (lb/day)</b>	<b>CO Emissions (lb/day)</b>	<b>ROG Emissions (lb/day)</b>	<b>PM Emissions (lb/day)</b>	<b>PM<sub>10</sub> Emissions (lb/day)</b>	<b>PM<sub>2.5</sub> Emissions (lb/day)</b>	<b>SO<sub>2</sub> Emissions (lb/day)</b>
Tanker Cruising and Manuevering	1,531	133	71	28	28	25	78
Tanker Hoteling	245	19	7	5	5	4	16
Offloading Emissions	155	35	5	23	16	11	199
Transiting Operations	10	2	0.3	1.6	1.1	0.7	16
Tug Assistance	154	38	7.1	---	6.7	6.2	0.1
Tanks	---	---	26.9	---	---	---	---
Vapor Destruction Units	41	11	2	---	2	---	7
Valves, Flanges, Pumps	---	---	3	---	---	---	---
<b>TOTAL</b>	<b>2,136</b>	<b>240</b>	<b>122</b>	<b>58</b>	<b>60</b>	<b>47</b>	<b>317</b>



Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Mit.Sum.2040-2.

2040 Proposed Project Summary of Maximum Daily Mitigated Emissions.

Scenario	Operation	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Vessel Arrival/Departure	Tanker Cruising and Manuevering	3,850	350	211	71	71	64	190
	Tanker Hoteling	---	---	---	---	---	---	---
	Offloading Emissions	---	---	---	---	---	---	---
	Transiting Operations	28	6	1	4	3	2	38
	Tug Assistance	330	82	15	---	14	13	0
	Tanks	---	---	86	---	---	---	---
	Vapor Destruction Units	66	18	4	---	4	---	20
	Valves, Flanges, Pumps	---	---	3	---	---	---	---
	<b>TOTAL</b>	<b>4,274</b>	<b>456</b>	<b>321</b>	<b>75</b>	<b>92</b>	<b>79</b>	<b>248</b>
Vessel Offloading	Tanker Cruising and Manuevering	---	---	---	---	---	---	---
	Tanker Hoteling	573	45	16	12	12	10	38
	Offloading Emissions	467	97	21	65	45	30	553
	Transiting Operations	---	---	---	---	---	---	---
	Tug Assistance	---	---	---	---	---	---	---
	Tanks	---	---	86	---	---	---	---
	Vapor Destruction Units	66	18	4	---	4	---	20
	Valves, Flanges, Pumps	---	---	3	---	---	---	---
	<b>TOTAL</b>	<b>1,107</b>	<b>161</b>	<b>130</b>	<b>77</b>	<b>61</b>	<b>40</b>	<b>611</b>
No Vessel/Empty Berth	Tanker Cruising and Manuevering	---	---	---	---	---	---	---
	Tanker Hoteling	---	---	---	---	---	---	---
	Offloading Emissions	---	---	---	---	---	---	---
	Transiting Operations	---	---	---	---	---	---	---
	Tug Assistance	---	---	---	---	---	---	---
	Tanks	---	---	86	---	---	---	---
	Vapor Destruction Units	66	18	4	---	4	---	20
	Valves, Flanges, Pumps	---	---	3	---	---	---	---
	<b>TOTAL</b>	<b>66</b>	<b>18</b>	<b>93</b>	<b>0</b>	<b>4</b>	<b>0</b>	<b>20</b>

**Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR**

**Table H.2.PP.Mit.Sum.2040-3.**

**2040 Proposed Project Summary of Average Daily Mitigated GHG Emissions.**

<b>Operation</b>	<b>N<sub>2</sub>O Emissions (tons/yr)</b>	<b>CO<sub>2</sub> Emissions (tons/yr)</b>	<b>CH<sub>4</sub> Emissions (tons/yr)</b>	<b>CO<sub>2</sub>e Emissions (tons/yr)</b>
Tanker Cruising and Manuevering	0.07	7,298.39	1.01	7,341.84
Tanker Hoteling	0.03	3,302.83	0.44	3,321.03
Offloading Emissions	0.30	30,170.29	4.16	30,349.86
Transiting Operations	0.004	435.54	0.06	438.13
Tug Assistance	0.01	705.51	0.10	709.71
Tanks	---	---	---	---
Vapor Destruction Units	0.02	11,495.92	1.29	11,529.66
Valves, Flanges, Pumps	---	---	---	---
Emissions from AMPed off-site				
Elec. Generation	0.02	1,840.21	0.01	1,845.14
<b>TOTAL</b>	<b>0.45</b>	<b>55,248.69</b>	<b>7.05</b>	<b>55,535.38</b>

Table H.2.NFA/NPA.Un.Sum.2010-1.  
2010 No Federal Action/No Project Alternative Summary of Average Daily Unmitigated Emissions.

Operation	BP (lb/yr)	Tesoro (lb/yr)	Exxon (lb/yr)	Total (lb/yr)
<b>Tanker Cruising and Maneuvering</b>				
NO <sub>x</sub>	58,997	143,510	229,319	431,826
CO	4,532	11,721	17,601	33,854
ROG	1,882	4,867	7,281	14,030
PM	5,282	2,540	20,620	28,442
PM <sub>10</sub>	5,231	2,515	20,400	28,147
PM <sub>2.5</sub>	4,667	2,244	18,133	25,044
SO <sub>2</sub>	37,414	7,167	146,887	191,469
<b>Tanker Hoteling</b>				
NO <sub>x</sub>	39,635	96,925	130,042	266,601
CO	2,966	7,670	9,731	20,367
ROG	1,078	2,789	3,539	7,406
PM	4,044	1,945	13,270	19,259
PM <sub>10</sub>	3,883	1,868	12,739	18,489
PM <sub>2.5</sub>	3,106	1,494	10,191	14,791
SO <sub>2</sub>	33,164	6,353	108,810	148,327
<b>Offloading Emissions</b>				
NO <sub>x</sub>	7,216	10,646	10,339	28,201
CO	763	2,223	1,093	4,079
ROG	157	470	226	853
PM	4,538	1,472	6,502	12,511
PM <sub>10</sub>	3,903	1,030	5,592	10,524
PM <sub>2.5</sub>	2,541	689	3,641	6,871
SO <sub>2</sub>	65,379	12,525	93,677	171,581
<b>Transiting Operations</b>				
NO <sub>x</sub>	1,161	1,221	2,170	4,552
CO	105	305	196	606
ROG	27	17	50	94
PM	243	202	454	899
PM <sub>10</sub>	209	141	390	741
PM <sub>2.5</sub>	136	95	254	485
SO <sub>2</sub>	8,979	1,720	16,786	27,486
<b>Tug Assistance</b>				
NO <sub>x</sub>	9,930	25,682	42,803	78,415
CO	1,593	4,121	6,868	12,582
ROG	309	800	1,334	2,444
PM	---	---	---	0
PM <sub>10</sub>	411	1,063	1,772	3,246
PM <sub>2.5</sub>	378	978	1,630	2,986
SO <sub>2</sub>	5	13	21	39
<b>Tanks</b>				
NO <sub>x</sub>	---	---	---	0
CO	---	---	---	0
ROG	3,152	3,152	3,152	9,455
PM	---	---	---	0
PM <sub>10</sub>	---	---	---	0
PM <sub>2.5</sub>	---	---	---	0
SO <sub>2</sub>	---	---	---	0
<b>Vapor Destruction Units</b>				
NO <sub>x</sub>	10,531	11,201	11,057	32,789
CO	2,835	3,016	2,977	8,828
ROG	567	603	595	1,766
PM	---	---	---	0
PM <sub>10</sub>	608	646	638	1,892
PM <sub>2.5</sub>	---	---	---	0
SO <sub>2</sub>	1,885	2,004	1,979	5,868
<b>Valves, Flanges, Pumps</b>				
NO <sub>x</sub>	---	---	---	0
CO	---	---	---	0
ROG	1,188	1,188	1,188	3,564
PM	---	---	---	0
PM <sub>10</sub>	---	---	---	0
PM <sub>2.5</sub>	---	---	---	0
SO <sub>2</sub>	---	---	---	0

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.NFA/NPA.Un.Sum.2010-2.  
 2010 No Federal Action/No Project Alternative Summary of Average Daily Unmitigated GHG Emissions.

Operation	BP (lb/yr)	Tesoro (lb/yr)	Exxon (lb/yr)	Total (lb/yr)
<b>Tanker Cruising and Maneuvering</b>				
N <sub>2</sub> O	0.01	0.02	0.03	0.06
CO <sub>2</sub>	762.12	1,971.00	2,991.39	5,724.51
CH <sub>4</sub>	0.11	0.27	0.41	0.79
CO <sub>2</sub> e	766.66	1,982.74	3,009.20	5,758.60
<b>Tanker Hoteling</b>				
N <sub>2</sub> O	0.01	0.03	0.04	0.09
CO <sub>2</sub>	1,394.47	3,606.39	4,711.05	9,711.91
CH <sub>4</sub>	0.18	0.48	0.62	1.28
CO <sub>2</sub> e	1,402.16	3,626.28	4,737.02	9,765.46
<b>Offloading Emissions</b>				
N <sub>2</sub> O	0.03	0.08	0.04	0.16
CO <sub>2</sub>	3,178.52	8,220.31	4,338.17	15,736.99
CH <sub>4</sub>	0.44	1.13	0.60	2.17
CO <sub>2</sub> e	3,197.44	8,269.23	4,363.99	15,830.66
<b>Transiting Operations</b>				
N <sub>2</sub> O	0.00	0.00	0.00	0.00
CO <sub>2</sub>	59.12	152.88	104.59	316.59
CH <sub>4</sub>	0.01	0.02	0.01	0.04
CO <sub>2</sub> e	59.47	153.79	105.21	318.47
<b>Tug Assistance</b>				
N <sub>2</sub> O	0.00	0.00	0.00	0.01
CO <sub>2</sub>	101.79	263.25	438.75	803.79
CH <sub>4</sub>	0.01	0.04	0.06	0.11
CO <sub>2</sub> e	102.40	264.82	441.36	808.58
<b>Tanks</b>				
N <sub>2</sub> O	---	---	---	---
CO <sub>2</sub>	---	---	---	---
CH <sub>4</sub>	---	---	---	---
CO <sub>2</sub> e	---	---	---	---
<b>Vapor Destruction Units</b>				
N <sub>2</sub> O	0.02	0.02	0.02	0.05
CO <sub>2</sub>	8,722.23	9,276.95	9,879.91	27,879.09
CH <sub>4</sub>	0.98	1.04	1.10	3.12
CO <sub>2</sub> e	8,747.83	9,304.18	9,908.91	27,960.91
<b>Valves, Flanges, Pumps</b>				
N <sub>2</sub> O	---	---	---	---
CO <sub>2</sub>	---	---	---	---
CH <sub>4</sub>	---	---	---	---
CO <sub>2</sub> e	---	---	---	---

Table H.2.NFA/NPA.Un.Sum.2015-3.  
2015 No Federal Action/No Project Alternative Summary of Average Daily Unmitigated Emissions.

Operation	BP (lb/yr)	Tesoro (lb/yr)	Exxon (lb/yr)	Total (lb/yr)
<b>Tanker Cruising and Maneuvering</b>				
NO <sub>x</sub>	69,169	166,472	251,967	487,608
CO	5,313	13,596	20,558	39,468
ROG	2,206	5,646	8,504	16,356
PM	6,193	2,946	4,478	13,617
PM <sub>10</sub>	6,133	2,918	4,430	13,481
PM <sub>2.5</sub>	5,471	2,603	3,938	12,012
SO <sub>2</sub>	43,865	8,314	12,708	64,888
<b>Tanker Hoteling</b>				
NO <sub>x</sub>	46,468	112,433	122,079	280,980
CO	3,477	8,898	9,661	22,036
ROG	1,264	3,235	3,513	8,013
PM	4,742	2,257	2,450	9,449
PM <sub>10</sub>	4,552	2,166	2,352	9,071
PM <sub>2.5</sub>	3,642	1,733	1,882	7,257
SO <sub>2</sub>	38,882	7,370	8,002	54,253
<b>Offloading Emissions</b>				
NO <sub>x</sub>	8,460	12,349	6,889	27,699
CO	894	2,579	1,439	4,912
ROG	185	545	304	1,033
PM	5,320	1,707	952	7,980
PM <sub>10</sub>	4,575	1,195	667	6,437
PM <sub>2.5</sub>	2,979	799	446	4,224
SO <sub>2</sub>	76,652	14,529	8,105	99,285
<b>Transiting Operations</b>				
NO <sub>x</sub>	1,361	1,417	976	3,753
CO	123	354	244	721
ROG	31	20	14	65
PM	285	234	162	681
PM <sub>10</sub>	245	164	113	522
PM <sub>2.5</sub>	159	110	76	345
SO <sub>2</sub>	10,528	1,995	1,375	13,898
<b>Tug Assistance</b>				
NO <sub>x</sub>	10,024	25,649	43,043	78,715
CO	1,868	4,780	8,022	14,670
ROG	354	905	1,519	2,779
PM	---	---	---	0
PM <sub>10</sub>	431	1,104	1,852	3,387
PM <sub>2.5</sub>	397	1,015	1,704	3,116
SO <sub>2</sub>	6	15	25	46
<b>Tanks</b>				
NO <sub>x</sub>	---	---	---	0
CO	---	---	---	0
ROG	3,660	3,660	3,660	10,980
PM	---	---	---	0
PM <sub>10</sub>	---	---	---	0
PM <sub>2.5</sub>	---	---	---	0
SO <sub>2</sub>	---	---	---	0
<b>Vapor Destruction Units</b>				
NO <sub>x</sub>	10,604	11,376	11,216	33,195
CO	2,855	3,063	3,020	8,937
ROG	571	613	604	1,787
PM	---	---	---	0
PM <sub>10</sub>	612	656	647	1,915
PM <sub>2.5</sub>	---	---	---	0
SO <sub>2</sub>	1,898	2,036	2,007	5,941
<b>Valves, Flanges, Pumps</b>				
NO <sub>x</sub>	---	---	---	0
CO	---	---	---	0
ROG	1,188	1,188	1,188	3,564
PM	---	---	---	0
PM <sub>10</sub>	---	---	---	0
PM <sub>2.5</sub>	---	---	---	0
SO <sub>2</sub>	---	---	---	0

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Table H.2.NFA/NPA.Un.Sum.2015-4.

2015 No Federal Action/No Project Alternative Summary of Average Daily Unmitigated GHG Emissions.

Operation	BP (lb/yr)	Tesoro (lb/yr)	Exxon (lb/yr)	Total (lb/yr)
<b>Tanker Cruising and Maneuvering</b>				
N <sub>2</sub> O	0.01	0.02	0.03	0.07
CO <sub>2</sub>	893.52	2,286.37	3,493.94	6,673.83
CH <sub>4</sub>	0.12	0.32	0.48	0.92
CO <sub>2</sub> e	898.84	2,299.98	3,514.74	6,713.56
<b>Tanker Hoteling</b>				
N <sub>2</sub> O	0.01	0.04	0.04	0.09
CO <sub>2</sub>	1,634.90	4,183.41	4,677.13	10,495.44
CH <sub>4</sub>	0.22	0.55	0.62	1.38
CO <sub>2</sub> e	1,643.91	4,206.48	4,702.92	10,553.31
<b>Offloading Emissions</b>				
N <sub>2</sub> O	0.04	0.01	0.05	0.10
CO <sub>2</sub>	3,726.54	1,362.22	5,066.98	10,155.74
CH <sub>4</sub>	0.51	0.19	0.70	1.40
CO <sub>2</sub> e	3,748.72	1,370.33	5,097.14	10,216.19
<b>Transiting Operations</b>				
N <sub>2</sub> O	0.00	0.00	0.00	0.00
CO <sub>2</sub>	69.31	177.35	122.16	368.81
CH <sub>4</sub>	0.01	0.02	0.02	0.05
CO <sub>2</sub> e	69.72	178.40	122.89	371.01
<b>Tug Assistance</b>				
N <sub>2</sub> O	0.00	0.00	0.01	0.01
CO <sub>2</sub>	119.34	305.37	512.46	937.17
CH <sub>4</sub>	0.02	0.04	0.07	0.13
CO <sub>2</sub> e	120.05	307.19	515.51	942.75
<b>Tanks</b>				
N <sub>2</sub> O	---	---	---	---
CO <sub>2</sub>	---	---	---	---
CH <sub>4</sub>	---	---	---	---
CO <sub>2</sub> e	---	---	---	---
<b>Vapor Destruction Units</b>				
N <sub>2</sub> O	0.02	0.02	0.02	0.05
CO <sub>2</sub>	8,782.52	9,421.66	10,133.15	28,337.34
CH <sub>4</sub>	0.98	1.05	1.13	3.17
CO <sub>2</sub> e	8,808.30	9,449.31	10,162.89	28,420.50
<b>Valves, Flanges, Pumps</b>				
N <sub>2</sub> O	---	---	---	---
CO <sub>2</sub>	---	---	---	---
CH <sub>4</sub>	---	---	---	---
CO <sub>2</sub> e	---	---	---	---

Table H.2.NFA/NPA.Un.Sum.2025-5.  
2025 No Federal Action/No Project Alternative Summary of Average Daily Unmitigated Emissions.

Operation	BP (lb/yr)	Tesoro (lb/yr)	Exxon (lb/yr)	Total (lb/yr)
<b>Tanker Cruising and Maneuvering</b>				
NO <sub>x</sub>	65,058	166,472	251,967	483,497
CO	5,313	13,596	20,558	39,468
ROG	2,206	5,646	8,504	16,356
PM	1,151	2,946	4,478	8,575
PM <sub>10</sub>	1,140	2,918	4,430	8,488
PM <sub>2.5</sub>	1,017	2,603	3,938	7,558
SO <sub>2</sub>	3,249	8,314	12,708	24,272
<b>Tanker Hoteling</b>				
NO <sub>x</sub>	43,939	112,433	43,087	199,459
CO	3,477	8,898	3,410	15,785
ROG	1,264	3,235	1,240	5,740
PM	882	2,257	865	4,004
PM <sub>10</sub>	847	2,166	830	3,843
PM <sub>2.5</sub>	677	1,733	664	3,075
SO <sub>2</sub>	2,880	7,370	2,824	13,074
<b>Offloading Emissions</b>				
NO <sub>x</sub>	4,826	12,349	6,889	24,065
CO	1,008	2,579	1,439	5,025
ROG	213	545	304	1,062
PM	667	1,707	952	3,327
PM <sub>10</sub>	467	1,195	667	2,329
PM <sub>2.5</sub>	312	799	446	1,557
SO <sub>2</sub>	5,678	14,529	8,105	28,311
<b>Transiting Operations</b>				
NO <sub>x</sub>	554	1,417	976	2,946
CO	138	354	244	737
ROG	8	20	14	41
PM	92	234	162	488
PM <sub>10</sub>	64	164	113	341
PM <sub>2.5</sub>	43	110	76	228
SO <sub>2</sub>	780	1,995	1,375	4,150
<b>Tug Assistance</b>				
NO <sub>x</sub>	8,329	21,311	35,764	65,403
CO	1,868	4,780	8,022	14,670
ROG	345	882	1,481	2,708
PM	---	---	---	0
PM <sub>10</sub>	359	920	1,544	2,823
PM <sub>2.5</sub>	331	846	1,420	2,597
SO <sub>2</sub>	6	15	25	46
<b>Tanks</b>				
NO <sub>x</sub>	---	---	---	0
CO	---	---	---	0
ROG	3,660	3,660	3,660	10,980
PM	---	---	---	0
PM <sub>10</sub>	---	---	---	0
PM <sub>2.5</sub>	---	---	---	0
SO <sub>2</sub>	---	---	---	0
<b>Vapor Destruction Units</b>				
NO <sub>x</sub>	10,604	11,376	11,216	33,195
CO	2,855	3,063	3,020	8,937
ROG	571	613	604	1,787
PM	---	---	---	0
PM <sub>10</sub>	612	656	647	1,915
PM <sub>2.5</sub>	---	---	---	0
SO <sub>2</sub>	1,898	2,036	2,007	5,941
<b>Valves, Flanges, Pumps</b>				
NO <sub>x</sub>	---	---	---	0
CO	---	---	---	0
ROG	1,188	1,188	1,188	3,564
PM	---	---	---	0
PM <sub>10</sub>	---	---	---	0
PM <sub>2.5</sub>	---	---	---	0
SO <sub>2</sub>	---	---	---	0

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Table H.2.NFA/NPA.Un.Sum.2025-6.  
 2025 No Federal Action/No Project Alternative Summary of Average Daily Unmitigated GHG Emissions.

Operation	BP (lb/yr)	Tesoro (lb/yr)	Exxon (lb/yr)	Total (lb/yr)
<b>Tanker Cruising and Maneuvering</b>				
N <sub>2</sub> O	0.01	0.02	0.03	0.07
CO <sub>2</sub>	893.52	2,286.37	3,493.94	6,673.83
CH <sub>4</sub>	0.12	0.32	0.48	0.92
CO <sub>2</sub> e	898.84	2,299.98	3,514.74	6,713.56
<b>Tanker Hoteling</b>				
N <sub>2</sub> O	0.01	0.04	0.01	0.07
CO <sub>2</sub>	1,634.90	4,183.41	1,650.75	7,469.06
CH <sub>4</sub>	0.22	0.55	0.22	0.98
CO <sub>2</sub> e	1,643.91	4,206.48	1,659.85	7,510.24
<b>Offloading Emissions</b>				
N <sub>2</sub> O	0.04	0.09	0.05	0.18
CO <sub>2</sub>	3,726.54	9,535.56	5,066.98	18,329.08
CH <sub>4</sub>	0.51	1.31	0.70	2.53
CO <sub>2</sub> e	3,748.72	9,592.31	5,097.14	18,438.17
<b>Transiting Operations</b>				
N <sub>2</sub> O	0.00	0.00	0.00	0.00
CO <sub>2</sub>	69.31	177.35	122.16	368.81
CH <sub>4</sub>	0.01	0.02	0.02	0.05
CO <sub>2</sub> e	69.72	178.40	122.89	371.01
<b>Tug Assistance</b>				
N <sub>2</sub> O	0.00	0.00	0.01	0.01
CO <sub>2</sub>	119.34	305.37	512.46	937.17
CH <sub>4</sub>	0.02	0.04	0.07	0.13
CO <sub>2</sub> e	120.05	307.19	515.51	942.75
<b>Tanks</b>				
N <sub>2</sub> O	---	---	---	---
CO <sub>2</sub>	---	---	---	---
CH <sub>4</sub>	---	---	---	---
CO <sub>2</sub> e	---	---	---	---
<b>Vapor Destruction Units</b>				
N <sub>2</sub> O	0.02	0.02	0.02	0.05
CO <sub>2</sub>	8,782.52	9,421.66	10,133.15	28,337.34
CH <sub>4</sub>	0.98	1.05	1.13	3.17
CO <sub>2</sub> e	8,808.30	9,449.31	10,162.89	28,420.50
<b>Valves, Flanges, Pumps</b>				
N <sub>2</sub> O	---	---	---	---
CO <sub>2</sub>	---	---	---	---
CH <sub>4</sub>	---	---	---	---
CO <sub>2</sub> e	---	---	---	---



Table H.2.NFA/NPA.Un.Sum.2040-7.  
2040 No Federal Action/No Project Alternative Summary of Average Daily Unmitigated Emissions.

Operation	BP (lb/yr)	Tesoro (lb/yr)	Exxon (lb/yr)	Total (lb/yr)
<b>Tanker Cruising and Maneuvering</b>				
NO <sub>x</sub>	65,058	166,472	251,967	483,497
CO	5,313	13,596	20,558	39,468
ROG	2,206	5,646	8,504	16,356
PM	1,151	2,946	4,478	8,575
PM <sub>10</sub>	1,140	2,918	4,430	8,488
PM <sub>2.5</sub>	1,017	2,603	3,938	7,558
SO <sub>2</sub>	3,249	8,314	12,708	24,272
<b>Tanker Hoteling</b>				
NO <sub>x</sub>	43,939	112,433	43,087	199,459
CO	3,477	8,898	3,410	15,785
ROG	1,264	3,235	1,240	5,740
PM	882	2,257	865	4,004
PM <sub>10</sub>	847	2,166	830	3,843
PM <sub>2.5</sub>	677	1,733	664	3,075
SO <sub>2</sub>	2,880	7,370	2,824	13,074
<b>Offloading Emissions</b>				
NO <sub>x</sub>	4,826	12,349	6,889	24,065
CO	1,008	2,579	1,439	5,025
ROG	213	545	304	1,062
PM	667	1,707	952	3,327
PM <sub>10</sub>	467	1,195	667	2,329
PM <sub>2.5</sub>	312	799	446	1,557
SO <sub>2</sub>	5,678	14,529	8,105	28,311
<b>Transiting Operations</b>				
NO <sub>x</sub>	554	1,417	976	2,946
CO	138	354	244	737
ROG	8	20	14	41
PM	92	234	162	488
PM <sub>10</sub>	64	164	113	341
PM <sub>2.5</sub>	43	110	76	228
SO <sub>2</sub>	780	1,995	1,375	4,150
<b>Tug Assistance</b>				
NO <sub>x</sub>	7,477	19,132	32,107	58,716
CO	1,868	4,780	8,022	14,670
ROG	345	882	1,481	2,708
PM	---	---	---	0
PM <sub>10</sub>	328	839	1,409	2,576
PM <sub>2.5</sub>	302	772	1,296	2,370
SO <sub>2</sub>	6	15	25	46
<b>Tanks</b>				
NO <sub>x</sub>	---	---	---	0
CO	---	---	---	0
ROG	3,660	3,660	3,660	10,980
PM	---	---	---	0
PM <sub>10</sub>	---	---	---	0
PM <sub>2.5</sub>	---	---	---	0
SO <sub>2</sub>	---	---	---	0
<b>Vapor Destruction Units</b>				
NO <sub>x</sub>	10,604	11,376	11,216	33,195
CO	2,855	3,063	3,020	8,937
ROG	571	613	604	1,787
PM	---	---	---	0
PM <sub>10</sub>	612	656	647	1,915
PM <sub>2.5</sub>	---	---	---	0
SO <sub>2</sub>	1,898	2,036	2,007	5,941
<b>Valves, Flanges, Pumps</b>				
NO <sub>x</sub>	---	---	---	0
CO	---	---	---	0
ROG	1,188	1,188	1,188	3,564
PM	---	---	---	0
PM <sub>10</sub>	---	---	---	0
PM <sub>2.5</sub>	---	---	---	0
SO <sub>2</sub>	---	---	---	0

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.NFA/NPA.Un.Sum.2040-8.

2040 No Federal Action/No Project Alternative Summary of Average Daily Unmitigated GHG Emissions.

Operation	BP (lb/yr)	Tesoro (lb/yr)	Exxon (lb/yr)	Total (lb/yr)
<b>Tanker Cruising and Maneuvering</b>				
N <sub>2</sub> O	0.01	0.02	0.03	0.07
CO <sub>2</sub>	893.52	2,286.37	3,493.94	6,673.83
CH <sub>4</sub>	0.12	0.32	0.48	0.92
CO <sub>2</sub> e	898.84	2,299.98	3,514.74	6,713.56
<b>Tanker Hoteling</b>				
N <sub>2</sub> O	0.01	0.04	0.01	0.07
CO <sub>2</sub>	1,634.90	4,183.41	1,650.75	7,469.06
CH <sub>4</sub>	0.22	0.55	0.22	0.98
CO <sub>2</sub> e	1,643.91	4,206.48	1,659.85	7,510.24
<b>Offloading Emissions</b>				
N <sub>2</sub> O	0.04	0.09	0.05	0.18
CO <sub>2</sub>	3,726.54	9,535.56	5,066.98	18,329.08
CH <sub>4</sub>	0.51	1.31	0.70	2.53
CO <sub>2</sub> e	3,748.72	9,592.31	5,097.14	18,438.17
<b>Transiting Operations</b>				
N <sub>2</sub> O	0.00	0.00	0.00	0.00
CO <sub>2</sub>	69.31	177.35	122.16	368.81
CH <sub>4</sub>	0.01	0.02	0.02	0.05
CO <sub>2</sub> e	69.72	178.40	122.89	371.01
<b>Tug Assistance</b>				
N <sub>2</sub> O	0.00	0.00	0.01	0.01
CO <sub>2</sub>	119.34	305.37	512.46	937.17
CH <sub>4</sub>	0.02	0.04	0.07	0.13
CO <sub>2</sub> e	120.05	307.19	515.51	942.75
<b>Tanks</b>				
N <sub>2</sub> O	---	---	---	---
CO <sub>2</sub>	---	---	---	---
CH <sub>4</sub>	---	---	---	---
CO <sub>2</sub> e	---	---	---	---
<b>Vapor Destruction Units</b>				
N <sub>2</sub> O	0.02	0.02	0.02	0.05
CO <sub>2</sub>	8,782.52	9,421.66	10,133.15	28,337.34
CH <sub>4</sub>	0.98	1.05	1.13	3.17
CO <sub>2</sub> e	8,808.30	9,449.31	10,162.89	28,420.50
<b>Valves, Flanges, Pumps</b>				
N <sub>2</sub> O	---	---	---	---
CO <sub>2</sub>	---	---	---	---
CH <sub>4</sub>	---	---	---	---
CO <sub>2</sub> e	---	---	---	---

**Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR**

**Table H.2.RPA.Un.Sum.2010-1.**

**2010 Reduced Project Alternative Summary of Average Daily Unmitigated Emissions.**

<b>Operation</b>	<b>NO<sub>x</sub> Emissions (lb/yr)</b>	<b>CO Emissions (lb/yr)</b>	<b>ROG Emissions (lb/yr)</b>	<b>PM Emissions (lb/yr)</b>	<b>PM<sub>10</sub> Emissions (lb/yr)</b>	<b>PM<sub>2.5</sub> Emissions (lb/yr)</b>	<b>SO<sub>2</sub> Emissions (lb/yr)</b>
Tanker Cruising and Manuevering	423,427	34,008	16,856	37,952	37,728	34,064	254,371
Tanker Hoteling	175,959	13,846	5,035	5,269	5,058	4,047	42,173
Offloading Emissions	31,587	6,734	829	5,571	4,122	2,735	128,158
Transiting Operations	5,295	498	120	1,665	1,432	647	42,721
Tug Assistance	52,476	8,420	1,635	---	2,172	1,998	26
Tanks	---	---	5,083	---	---	---	---
Vapor Destruction Units	11,631	3,132	626	---	671	---	2,082
Valves, Flanges, Pumps	---	---	1,188	---	---	---	---
<b>TOTAL</b>	<b>700,376</b>	<b>66,638</b>	<b>31,373</b>	<b>50,458</b>	<b>51,183</b>	<b>43,491</b>	<b>469,532</b>

<b>Operation</b>	<b>NO<sub>x</sub> Emissions (lb/day)</b>	<b>CO Emissions (lb/day)</b>	<b>ROG Emissions (lb/day)</b>	<b>PM Emissions (lb/day)</b>	<b>PM<sub>10</sub> Emissions (lb/day)</b>	<b>PM<sub>2.5</sub> Emissions (lb/day)</b>	<b>SO<sub>2</sub> Emissions (lb/day)</b>
Tanker Cruising and Manuevering	1,160	93	46	104	103	93	697
Tanker Hoteling	482	38	14	14	14	11	116
Offloading Emissions	87	18	2	15	11	7	351
Transiting Operations	15	1	0.3	4.6	3.9	1.8	117
Tug Assistance	144	23	4.5	---	6.0	5.5	0.1
Tanks	---	---	13.9	---	---	---	---
Vapor Destruction Units	32	9	2	---	2	---	6
Valves, Flanges, Pumps	---	---	3	---	---	---	---
<b>TOTAL</b>	<b>1,919</b>	<b>183</b>	<b>86</b>	<b>138</b>	<b>140</b>	<b>119</b>	<b>1,286</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Un.Sum.2010-2.

2010 Reduced Project Alternative Summary of Maximum Daily Unmitigated Emission.

Scenario	Operation	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Vessel Arrival/Departure	Cruising and maneuvering	5,187	435	248	468	466	424	2,997
	Boiler Warm-Up	51	5	1	32	28	18	463
	Tug Assistance	514	82	16	---	21	20	0
	Tanks	---	---	86	---	---	---	---
	Vapor Destruction Units Valves, Flanges, Pumps	63.4 ---	17.1 ---	3.4 3.25	---	3.7 ---	---	19.2 ---
	<b>TOTAL</b>	<b>5,815</b>	<b>540</b>	<b>357</b>	<b>500</b>	<b>519</b>	<b>461</b>	<b>3,480</b>
Vessel Offloading	Tanker Hoteling	1,919	151	55	53	51	41	422
	Offloading	486	97	21	88	66	44	1,743
	Tanks	---	---	86	---	---	---	---
	Vapor Destruction Units	63.4	17.1	3.4	---	3.7	---	19.2
	Valves, Flanges, Pumps	---	---	3.25	---	---	---	---
	<b>TOTAL</b>	<b>2,469</b>	<b>265</b>	<b>168</b>	<b>141</b>	<b>120</b>	<b>84</b>	<b>2,184</b>
No Vessel/Empty Berth	Vapor Destruction Units	63.4	17.1	3.4	---	3.7	---	19.2
	Tanks	---	---	86	---	---	---	---
	Valves, Flanges, Pumps	---	---	3.25	---	---	---	---
	<b>TOTAL</b>	<b>63</b>	<b>17</b>	<b>93</b>	<b>0</b>	<b>4</b>	<b>0</b>	<b>19</b>

**Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR**

**Table H.2.RPA.Un.Sum.2010-3.**

**2010 Reduced Project Alternative Summary of Average Daily Unmitigated GHG Emissions.**

<b>Operation</b>	<b>N<sub>2</sub>O Emissions (tons/yr)</b>	<b>CO<sub>2</sub> Emissions (tons/yr)</b>	<b>CH<sub>4</sub> Emissions (tons/yr)</b>	<b>CO<sub>2</sub>e Emissions (tons/yr)</b>
Tanker Cruising and Manuevering	0.05	5,346.71	0.71	5,376.10
Tanker Hoteling	0.06	6,523.41	0.86	6,559.36
Offloading Emissions	0.16	16,092.55	2.22	16,188.33
Transiting Operations	0.03	2,592.37	0.36	2,607.80
Tug Assistance	0.004	452.79	0.06	455.49
Tanks	---	---	---	---
Vapor Destruction Units	0.02	10,563.92	1.18	10,594.92
Valves, Flanges, Pumps	---	---	---	---
<b>TOTAL</b>	<b>0.31</b>	<b>41,571.75</b>	<b>5.39</b>	<b>41,781.99</b>

**Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR**

**Table H.2.RPA.Un.Sum.2015-1.**

**2015 Reduced Project Alternative Summary of Average Daily Unmitigated Emissions.**

<b>Operation</b>	<b>NO<sub>x</sub> Emissions (lb/yr)</b>	<b>CO Emissions (lb/yr)</b>	<b>ROG Emissions (lb/yr)</b>	<b>PM Emissions (lb/yr)</b>	<b>PM<sub>10</sub> Emissions (lb/yr)</b>	<b>PM<sub>2.5</sub> Emissions (lb/yr)</b>	<b>SO<sub>2</sub> Emissions (lb/yr)</b>
Tanker Cruising and Manuevering	492,911	39,943	20,435	44,200	43,966	39,774	293,308
Tanker Hoteling	197,492	15,548	5,654	5,768	5,537	4,430	46,126
Offloading Emissions	40,337	8,470	1,223	7,162	5,313	3,525	158,496
Transiting Operations	6,037	581	136	2,250	1,935	754	49,821
Tug Assistance	49,529	9,231	1,748	---	2,131	1,961	29
Tanks	---	---	6,536	---	---	---	---
Vapor Destruction Units	13,444	3,619	724	---	776	---	2,406
Valves, Flanges, Pumps	---	---	1,188	---	---	---	---
<b>TOTAL</b>	<b>799,749</b>	<b>77,393</b>	<b>37,644</b>	<b>59,380</b>	<b>59,658</b>	<b>50,443</b>	<b>550,186</b>

<b>Operation</b>	<b>NO<sub>x</sub> Emissions (lb/day)</b>	<b>CO Emissions (lb/day)</b>	<b>ROG Emissions (lb/day)</b>	<b>PM Emissions (lb/day)</b>	<b>PM<sub>10</sub> Emissions (lb/day)</b>	<b>PM<sub>2.5</sub> Emissions (lb/day)</b>	<b>SO<sub>2</sub> Emissions (lb/day)</b>
Tanker Cruising and Manuevering	1,350	109	56	121	120	109	804
Tanker Hoteling	541	43	15	16	15	12	126
Offloading Emissions	111	23	3	20	15	10	434
Transiting Operations	17	2	0.4	6.2	5.3	2.1	136
Tug Assistance	136	25	4.8	---	5.8	5.4	0.1
Tanks	---	---	17.9	---	---	---	---
Vapor Destruction Units	37	10	2	---	2	---	7
Valves, Flanges, Pumps	---	---	3	---	---	---	---
<b>TOTAL</b>	<b>2,191</b>	<b>212</b>	<b>103</b>	<b>163</b>	<b>163</b>	<b>138</b>	<b>1,507</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Un.Sum.2015-2.

2015 Reduced Project Alternative Summary of Maximum Daily Unmitigated Emissions.

Scenario	Operation	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Vessel Arrival/Departure	Cruising and maneuvering	5,187	435	248	468	466	424	2,997
	Boiler Warm-Up	51	5	1	32	28	18	463
	Tug Assistance	442	82	16	---	19	18	0
	Tanks	---	---	86	---	---	---	---
	Vapor Destruction Units Valves, Flanges, Pumps	66	18	4	---	4	---	20
	<b>TOTAL</b>	<b>5,747</b>	<b>540</b>	<b>357</b>	<b>500</b>	<b>517</b>	<b>459</b>	<b>3,481</b>
Vessel Offloading	Tanker Hoteling	1,919	151	55	53	51	41	422
	Offloading	486	97	21	88	66	44	1,743
	Tanks	---	---	86	---	---	---	---
	Vapor Destruction Units	66	18	4	---	4	---	20
	Valves, Flanges, Pumps	---	---	3.25	---	---	---	---
	<b>TOTAL</b>	<b>2,472</b>	<b>266</b>	<b>168</b>	<b>141</b>	<b>121</b>	<b>84</b>	<b>2,184</b>
No Vessel/Empty Berth	Vapor Destruction Units	66	18	4	---	4	---	20
	Tanks	---	---	86	---	---	---	---
	Valves, Flanges, Pumps	---	---	3.25	---	---	---	---
	<b>TOTAL</b>	<b>66</b>	<b>18</b>	<b>93</b>	<b>0</b>	<b>4</b>	<b>0</b>	<b>20</b>

**Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR**

**Table H.2.RPA.Un.Sum.2015-3.**

**2015 Reduced Project Alternative Summary of Average Daily Unmitigated GHG Emissions.**

<b>Operation</b>	<b>N<sub>2</sub>O Emissions (tons/yr)</b>	<b>CO<sub>2</sub> Emissions (tons/yr)</b>	<b>CH<sub>4</sub> Emissions (tons/yr)</b>	<b>CO<sub>2</sub>e Emissions (tons/yr)</b>
Tanker Cruising and Manuevering	0.05	6,176.06	0.81	6,210.01
Tanker Hoteling	0.06	7,264.24	0.96	7,304.28
Offloading Emissions	0.20	20,123.13	2.77	20,242.90
Transiting Operations	0.03	3,023.20	0.42	3,041.20
Tug Assistance	0.00	463.32	0.06	466.08
Tanks	---	---	---	---
Vapor Destruction Units	0.02	11,495.92	1.29	11,529.66
Valves, Flanges, Pumps	---	---	---	---
<b>TOTAL</b>	<b>0.37</b>	<b>48,545.88</b>	<b>6.31</b>	<b>48,794.13</b>



Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Un.Sum.2025-1.

2025 Reduced Project Alternative Summary of Average Daily Unmitigated Emissions.

Operation	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Tanker Cruising and Manuevering	492,911	39,943	20,435	44,200	43,966	39,774	293,308
Tanker Hoteling	197,492	15,548	5,654	5,768	5,537	4,430	46,126
Offloading Emissions	40,337	8,470	1,223	7,162	5,313	3,525	158,496
Transiting Operations	6,037	581	136	2,250	1,935	754	49,821
Tug Assistance	41,153	9,231	1,704	---	1,776	1,634	29
Tanks	---	---	6,536	---	---	---	---
Vapor Destruction Units	13,444	3,619	724	---	776	---	2,406
Valves, Flanges, Pumps	---	---	1,188	---	---	---	---
Exxon - Existing Terminal	273,965	29,201	13,477	5,030	6,543	5,100	21,476
BP - Existing Terminal	106,986	12,176	7,701	2,211	2,885	1,885	11,858
Tesoro - Existing Terminal	254,096	26,533	12,398	5,568	6,380	4,748	27,118
<b>TOTAL</b>	<b>1,426,419</b>	<b>145,304</b>	<b>71,175</b>	<b>72,188</b>	<b>75,111</b>	<b>61,850</b>	<b>610,638</b>

Operation	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Tanker Cruising and Manuevering	1,350	109	56	121	120	109	804
Tanker Hoteling	541	43	15	16	15	12	126
Offloading Emissions	111	23	3	20	15	10	434
Transiting Operations	17	2	0.4	6.2	5.3	2.1	136
Tug Assistance	113	25	4.7	---	4.9	4.5	0.1
Tanks	---	---	17.9	---	---	---	---
Vapor Destruction Units	37	10	2	---	2	---	7
Valves, Flanges, Pumps	---	---	3	---	---	---	---
Exxon - Existing Terminal	751	80	37	14	18	14	59
BP - Existing Terminal	293	33	21	6	8	5	32
Tesoro - Existing Terminal	696	73	34	15	17	13	74
<b>TOTAL</b>	<b>3,908</b>	<b>398</b>	<b>195</b>	<b>198</b>	<b>206</b>	<b>169</b>	<b>1,673</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Un.Sum.2025-2.

2025 Reduced Project Alternative Summary of Maximum Daily Unmitigated Emission.

Scenario	Operation	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Vessel Arrival/Departure	Cruising and maneuvering	5,187	435	248	468	466	424	2,997
	Boiler Warm-Up	51	5	1	32	28	18	463
	Tug Assistance	367	82	15	---	16	15	0
	Tanks	---	---	86	---	---	---	---
	Vapor Destruction Units	66	18	4	---	4	---	20
	Valves, Flanges, Pumps	---	---	3	---	---	---	---
	Exxon - Existing Terminal	1,982	204	159	32	44	37	101
	BP - Existing Terminal	2,214	226	167	37	49	41	126
	Tesoro - Existing Terminal	2,189	221	166	37	48	40	126
	<b>TOTAL</b>	<b>12,057</b>	<b>1,192</b>	<b>848</b>	<b>606</b>	<b>654</b>	<b>575</b>	<b>3,834</b>
Vessel Offloading	Tanker Hoteling	1,919	151	55	53	51	41	422
	Offloading	486	97	21	88	66	44	1,743
	Tanks	---	---	86	---	---	---	---
	Vapor Destruction Units	66	18	4	---	4	---	20
	Valves, Flanges, Pumps	---	---	3	---	---	---	---
		Exxon - Existing Terminal	368	43	100	13	13	8
	BP - Existing Terminal	1,444	143	130	47	43	30	259
	Tesoro - Existing Terminal	1,444	143	130	47	43	30	259
	<b>TOTAL</b>	<b>5,727</b>	<b>594</b>	<b>529</b>	<b>248</b>	<b>219</b>	<b>153</b>	<b>2,783</b>
No Vessel/Empty Berth	Vapor Destruction Units	66	18	4	---	4	---	20
	Tanks	---	---	86	---	---	---	---
	Valves, Flanges, Pumps	---	---	3	---	---	---	---
	Exxon - Existing Terminal	35	9	91	0	2	0	6
	BP - Existing Terminal	42	11	91	0	2	0	8
	Tesoro - Existing Terminal	42	11	91	0	2	0	8
	<b>TOTAL</b>	<b>186</b>	<b>50</b>	<b>367</b>	<b>0</b>	<b>11</b>	<b>0</b>	<b>41</b>

**Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR**

**Table H.2.RPA.Un.Sum.2025-3.**

**2025 Reduced Project Alternative Summary of Average Daily Unmitigated GHG Emissions.**

<b>Operation</b>	<b>N<sub>2</sub>O Emissions (tons/yr)</b>	<b>CO<sub>2</sub> Emissions (tons/yr)</b>	<b>CH<sub>4</sub> Emissions (tons/yr)</b>	<b>CO<sub>2</sub>e Emissions (tons/yr)</b>
Tanker Cruising and Manuevering	0.05	6,176.06	0.81	6,210.01
Tanker Hoteling	0.06	7,264.24	0.96	7,304.28
Offloading Emissions	0.20	20,123.13	2.77	20,242.90
Transiting Operations	0.03	3,023.20	0.42	3,041.20
Tug Assistance	0.00	463.32	0.06	466.08
Tanks	---	---	---	---
Vapor Destruction Units	0.02	11,495.92	1.29	11,529.66
Valves, Flanges, Pumps	---	---	---	---
BP (Existing Terminal)	0.07	13,815.09	1.67	13,870.51
Tesoro (Existing Terminal)	0.07	22,079.75	2.79	22,159.22
Exxon (Existing Terminal)	0.10	17,557.55	2.18	17,634.07
<b>TOTAL</b>	<b>0.61</b>	<b>101,998.27</b>	<b>12.94</b>	<b>102,457.93</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Un.Sum.2040-1.

2040 Reduced Project Alternative Summary of Average Daily Unmitigated Emissions.

Operation	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Tanker Cruising	460,181	36,164	15,693	40,440	40,282	36,604	275,411
Tanker Maneuvering	32,730	3,779	4,742	3,761	3,684	3,170	17,896
Tanker Hoteling	197,492	15,548	5,654	5,768	5,537	4,430	46,126
Offloading Emissions	40,337	8,470	1,223	7,162	5,313	3,525	158,496
Transiting Operations	6,037	581	136	2,250	1,935	754	49,821
Tug Assistance	36,945	9,231	1,704	---	1,621	1,491	29
Tanks	---	---	6,536	---	---	---	---
Vapor Destruction Units	13,444	3,619	724	---	776	---	2,406
Valves, Flanges, Pumps	---	---	1,188	---	---	---	---
Exxon - Existing Terminal	310,031	33,150	15,220	5,780	7,311	5,750	24,408
BP - Existing Terminal	120,562	13,577	8,580	2,538	3,197	2,138	13,347
Tesoro - Existing Terminal	288,023	30,035	13,965	6,386	7,160	5,380	30,840
<b>TOTAL</b>	<b>1,505,781</b>	<b>154,155</b>	<b>75,365</b>	<b>74,084</b>	<b>76,816</b>	<b>63,241</b>	<b>618,781</b>

Operation	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Tanker Cruising	1,261	99	43	111	110	100	755
Tanker Maneuvering	90	10	13	10	10	9	49
Tanker Hoteling	541	43	15	16	15	12	126
Offloading Emissions	111	23	3	20	15	10	434
Transiting Operations	17	2	0.4	6.2	5.3	2.1	136
Tug Assistance	101	25	4.7	---	4.4	4.1	0.1
Tanks	---	---	17.9	---	---	---	---
Vapor Destruction Units	37	10	2	---	2	---	7
Valves, Flanges, Pumps	---	---	3	---	---	---	---
Exxon - Existing Terminal	849	91	42	16	20	16	67
BP - Existing Terminal	330	37	24	7	9	6	37
Tesoro - Existing Terminal	789	82	38	17	20	15	84
<b>TOTAL</b>	<b>4,125</b>	<b>422</b>	<b>206</b>	<b>203</b>	<b>210</b>	<b>173</b>	<b>1,695</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Un.Sum.2040-2.

2040 Reduced Project Alternative Summary of Maximum Daily Unmitigated Emission.

Scenario	Operation	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Vessel Arrival/Departure	Cruising and maneuvering	5,187	435	248	468	466	424	2,997
	Boiler Warm-Up	51	5	1	32	28	18	463
	Tug Assistance	330	82	15	---	14	13	0
	Tanks	---	---	86	---	---	---	---
	Vapor Destruction Units Valves, Flanges, Pumps	66 ---	18 ---	4 3	---	4 ---	---	20 ---
	Exxon - Existing Terminal	1,957	204	159	32	43	36	101
	BP - Existing Terminal	2,189	226	167	37	48	40	126
	Tesoro - Existing Terminal	2,189	226	167	37	48	40	126
	<b>TOTAL</b>	<b>11,969</b>	<b>1,198</b>	<b>849</b>	<b>606</b>	<b>651</b>	<b>572</b>	<b>3,834</b>
Vessel Offloading	Tanker Hoteling	1,919	151	55	53	51	41	422
	Offloading	486	97	21	88	66	44	1,743
	Tanks	---	---	86	---	---	---	---
	Vapor Destruction Units	66	18	4	---	4	---	20
	Valves, Flanges, Pumps	---	---	3	---	---	---	---
	Exxon - Existing Terminal	368	43	100	13	13	8	81
	BP - Existing Terminal	1,444	143	130	47	43	30	259
	Tesoro - Existing Terminal	1,444	143	130	47	43	30	259
	<b>TOTAL</b>	<b>5,727</b>	<b>594</b>	<b>529</b>	<b>248</b>	<b>219</b>	<b>153</b>	<b>2,783</b>
No Vessel/Empty Berth	Vapor Destruction Units	66	18	4	---	4	---	20
	Tanks	---	---	86	---	---	---	---
	Valves, Flanges, Pumps	---	---	3	---	---	---	---
	Exxon - Existing Terminal	35	9	91	0	2	0	6
	BP - Existing Terminal	42	11	91	0	2	0	8
	Tesoro - Existing Terminal	42	11	91	0	2	0	8
	<b>TOTAL</b>	<b>186</b>	<b>50</b>	<b>367</b>	<b>0</b>	<b>11</b>	<b>0</b>	<b>41</b>

**Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR**

**Table H.2.RPA.Un.Sum.2040-3.**

**2040 Reduced Project Alternative Summary of Average Daily Unmitigated GHG Emissions.**

<b>Operation</b>	<b>N<sub>2</sub>O Emissions (tons/yr)</b>	<b>CO<sub>2</sub> Emissions (tons/yr)</b>	<b>CH<sub>4</sub> Emissions (tons/yr)</b>	<b>CO<sub>2</sub>e Emissions (tons/yr)</b>
Tanker Cruising and Manuevering	0.05	6,176.06	0.81	6,210.01
Tanker Hoteling	0.06	7,264.24	0.96	7,304.28
Offloading Emissions	0.20	20,123.13	2.77	20,242.90
Transiting Operations	0.03	3,023.20	0.42	3,041.20
Tug Assistance	0.00	463.32	0.06	466.08
Tanks	---	---	---	---
Vapor Destruction Units	0.02	11,495.92	1.29	11,529.66
Valves, Flanges, Pumps	---	---	---	---
BP (Existing Terminal)	0.07	14,621.40	1.78	14,681.38
Tesoro (Existing Terminal)	0.16	24,095.52	3.06	24,209.20
Exxon (Existing Terminal)	0.11	18,927.25	2.36	19,011.52
<b>TOTAL</b>	<b>0.72</b>	<b>106,190.05</b>	<b>13.51</b>	<b>106,696.22</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Mit.Sum.2010-1.

2010 Reduced Project Alternative Summary of Average Daily Mitigated Emissions.

Operation	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Tanker Cruising and Manuevering	318,819	27,471	14,035	6,589	6,541	5,879	27,511
Tanker Hoteling	174,919	13,843	5,034	3,775	3,624	2,899	12,761
Offloading Emissions	29,046	6,762	774	4,476	3,133	2,095	42,088
Transiting Operations	2,245	532	53	352	246	165	7,787
Tug Assistance	52,476	8,420	1,635	---	2,172	1,998	26
Tanks	---	---	5,083	---	---	---	---
Vapor Destruction Units	11,631	3,132	626	---	671	---	6
Valves, Flanges, Pumps	---	---	1,188	---	---	---	---
<b>TOTAL</b>	<b>589,136</b>	<b>60,159</b>	<b>28,428</b>	<b>15,193</b>	<b>16,388</b>	<b>13,037</b>	<b>90,179</b>

Operation	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Tanker Cruising and Manuevering	873	75	38	18	18	16	75
Tanker Hoteling	479	38	14	10	10	8	35
Offloading Emissions	80	19	2	12	9	6	115
Transiting Operations	6	1	0.1	1.0	0.7	0.5	21
Tug Assistance	144	23	4.5	---	6.0	5.5	0.1
Tanks	---	---	13.9	---	---	---	---
Vapor Destruction Units	32	9	2	---	2	---	0
Valves, Flanges, Pumps	---	---	3	---	---	---	---
<b>TOTAL</b>	<b>1,614</b>	<b>165</b>	<b>78</b>	<b>42</b>	<b>45</b>	<b>36</b>	<b>247</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Mit.Sum.2010-2.

2010 Reduced Project Alternative Summary of Maximum Mitigated Daily Emissions.

Scenario	Operation	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Vessel Arrival/Departure	Tanker Cruising and Manuevering	3,850	350	211	81	81	73	317
	Tanker Hoteling	---	---	---	---	---	---	---
	Offloading Emissions	---	---	---	---	---	---	---
	Transiting Operations	28	6	1	4	3	2	84
	Tug Assistance	513.6	82.4	16.0	---	21.3	19.6	0.3
	Tanks	---	---	85.9	---	---	---	---
	Vapor Destruction Units	63.4	17.1	3.4	---	3.7	---	19.2
	Valves, Flanges, Pumps	---	---	3.3	---	---	---	---
	<b>TOTAL</b>	<b>4,455</b>	<b>455</b>	<b>321</b>	<b>85</b>	<b>108</b>	<b>94</b>	<b>421</b>
Vessel Offloading	Tanker Cruising and Manuevering	---	---	---	---	---	---	---
	Tanker Hoteling	1,911	151	55	41	40	32	135
	Offloading Emissions	467	97	21	65	45	30	592
	Transiting Operations	---	---	---	---	---	---	---
	Tug Assistance	---	---	---	---	---	---	---
	Tanks	---	---	85.9	---	---	---	---
	Vapor Destruction Units	63.4	17.1	3.4	---	3.7	---	19.2
	Valves, Flanges, Pumps	---	---	3.25	---	---	---	---
	<b>TOTAL</b>	<b>2,441</b>	<b>266</b>	<b>168</b>	<b>106</b>	<b>88</b>	<b>62</b>	<b>747</b>
No Vessel/Empty Berth	Tanker Cruising and Manuevering	---	---	---	---	---	---	---
	Tanker Hoteling	---	---	---	---	---	---	---
	Offloading Emissions	---	---	---	---	---	---	---
	Transiting Operations	---	---	---	---	---	---	---
	Tug Assistance	---	---	---	---	---	---	---
	Tanks	---	---	85.9	---	---	---	---
	Vapor Destruction Units	63	17	3	---	3.7	---	19
	Valves, Flanges, Pumps	---	---	3.25	---	---	---	---
	<b>TOTAL</b>	<b>63</b>	<b>17</b>	<b>93</b>	<b>0</b>	<b>4</b>	<b>0</b>	<b>19</b>



**Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR**

**Table H.2.RPA.Mit.Sum.2010-3.**

**2010 Reduced Project Alternative Summary of Average Daily Mitigated GHG Emissions.**

<b>Operation</b>	<b>N<sub>2</sub>O Emissions (tons/yr)</b>	<b>CO<sub>2</sub> Emissions (tons/yr)</b>	<b>CH<sub>4</sub> Emissions (tons/yr)</b>	<b>CO<sub>2</sub>e Emissions (tons/yr)</b>
Tanker Cruising and Manuevering	0.04	4,410.46	0.58	4,435.01
Tanker Hoteling	0.06	6,232.85	0.86	6,269.95
Offloading Emissions	0.16	16,031.55	2.21	16,126.97
Transiting Operations	0.02	2,453.49	0.34	2,468.09
Tug Assistance	0.004	452.79	0.06	455.49
Tanks	---	---	---	---
Vapor Destruction Units	0.02	10,563.92	1.18	10,594.92
Valves, Flanges, Pumps	---	---	---	---
Emissions from AMPed off-site Elec. Generation	---	---	---	---
<b>TOTAL</b>	<b>0.31</b>	<b>40,145.05</b>	<b>5.24</b>	<b>40,350.4</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Mit.Sum.2015-1.

2015 Reduced Project Alternative Summary of Average Daily Mitigated Emissions.

Operation	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Tanker Cruising and Manuevering	369,112	32,172	17,083	7,182	7,132	6,416	24,514
Tanker Hoteling	166,936	13,211	4,804	3,603	3,459	2,767	11,506
Offloading Emissions	37,547	8,503	1,174	5,629	3,940	2,635	50,231
Transiting Operations	2,518	577	74	382	267	179	5,852
Tug Assistance	49,529	9,231	1,748	---	2,131	1,961	29
Tanks	---	---	6,536	---	---	---	---
Vapor Destruction Units	13,444	3,619	724	---	776	---	2,406
Valves, Flanges, Pumps	---	---	1,188	---	---	---	---
<b>TOTAL</b>	<b>639,084</b>	<b>67,313</b>	<b>33,330</b>	<b>16,796</b>	<b>17,705</b>	<b>13,958</b>	<b>94,538</b>

Operation	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Tanker Cruising and Manuevering	1,011	88	47	20	20	18	67
Tanker Hoteling	457	36	13	10	9	8	32
Offloading Emissions	103	23	3	15	11	7	138
Transiting Operations	7	2	0.2	1.0	0.7	0.5	16
Tug Assistance	136	25	4.8	---	5.8	5.4	0.1
Tanks	---	---	17.9	---	---	---	---
Vapor Destruction Units	37	10	2	---	2	---	7
Valves, Flanges, Pumps	---	---	3	---	---	---	---
<b>TOTAL</b>	<b>1,751</b>	<b>184</b>	<b>91</b>	<b>46</b>	<b>49</b>	<b>38</b>	<b>259</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Mit.Sum.2015-2.

2015 Reduced Project Alternative Summary of Maximum Mitigated Daily Emissions.

Scenario	Operation	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Vessel Arrival/Departure	Tanker Cruising and Manuevering	3,850	350	211	76	75	68	246
	Tanker Hoteling	---	---	---	---	---	---	---
	Offloading Emissions	---	---	---	---	---	---	---
	Transiting Operations	14	3	1	2	1	1	42
	Tug Assistance	442	82	16	---	19	18	0
	Tanks	---	---	85.9	---	---	---	---
	Vapor Destruction Units	66.5	17.9	3.6	---	3.8	---	19.7
	Valves, Flanges, Pumps	---	---	3.25	---	---	---	---
	<b>TOTAL</b>	<b>4,373</b>	<b>453</b>	<b>320</b>	<b>78</b>	<b>99</b>	<b>86</b>	<b>309</b>
Vessel Offloading	Tanker Cruising and Manuevering	---	---	---	---	---	---	---
	Tanker Hoteling	1,584	125	46	34	33	26	108
	Offloading Emissions	453	95	20	63	44	29	551
	Transiting Operations	---	---	---	---	---	---	---
	Tug Assistance	---	---	---	---	---	---	---
	Tanks	---	---	85.9	---	---	---	---
	Vapor Destruction Units	66.5	17.9	3.6	---	3.8	---	19.7
	Valves, Flanges, Pumps	---	---	3.25	---	---	---	---
	<b>TOTAL</b>	<b>2,104</b>	<b>238</b>	<b>158</b>	<b>97</b>	<b>81</b>	<b>56</b>	<b>679</b>
No Vessel/Empty Berth	Tanker Cruising and Manuevering	---	---	---	---	---	---	---
	Tanker Hoteling	---	---	---	---	---	---	---
	Offloading Emissions	---	---	---	---	---	---	---
	Transiting Operations	---	---	---	---	---	---	---
	Tug Assistance	---	---	---	---	---	---	---
	Tanks	---	---	85.9	---	---	---	---
	Vapor Destruction Units	66.5	17.9	3.6	---	3.8	---	19.7
	Valves, Flanges, Pumps	---	---	3.25	---	---	---	---
	<b>TOTAL</b>	<b>66</b>	<b>18</b>	<b>93</b>	<b>0</b>	<b>4</b>	<b>0</b>	<b>20</b>

**Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR**

**Table H.2.RPA.Mit.Sum.2015-3.**

**2015 Reduced Project Alternative Summary of Average Daily Mitigated GHG Emissions.**

<b>Operation</b>	<b>N<sub>2</sub>O Emissions (tons/yr)</b>	<b>CO<sub>2</sub> Emissions (tons/yr)</b>	<b>CH<sub>4</sub> Emissions (tons/yr)</b>	<b>CO<sub>2</sub>e Emissions (tons/yr)</b>
Tanker Cruising and Manuevering	0.05	4,817.72	0.66	4,846.40
Tanker Hoteling	0.05	6,174.61	0.81	6,208.64
Offloading Emissions	0.20	20,044.12	2.76	20,163.42
Transiting Operations	0.003	288.97	0.04	290.69
Tug Assistance	0.00	463.32	0.06	466.08
Tanks	---	---	---	---
Vapor Destruction Units	0.02	11,495.92	1.29	11,529.66
Valves, Flanges, Pumps	---	---	---	---
Emissions from AMPed off-site Elec. Generation	0.03	3,440.25	0.02	3,449.46
<b>TOTAL</b>	<b>0.36</b>	<b>46,724.90</b>	<b>5.65</b>	<b>46,954.35</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Mit.Sum.2025-1.

2025 Reduced Project Alternative Summary of Average Daily Mitigated Emissions.

Operation	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Tanker Cruising and Maneuvering	369,112	32,172	17,083	6,805	6,755	6,069	18,900
Tanker Hoteling	117,837	9,325	3,391	2,543	2,442	1,953	7,803
Offloading Emissions	37,547	8,503	1,174	5,629	3,940	2,635	48,368
Transiting Operations	2,689	620	76	410	287	192	4,052
Tug Assistance	41,153	9,231	1,704	---	1,776	1,634	29
Tanks	---	---	6,536	---	---	---	---
Vapor Destruction Units	13,444	3,619	724	---	776	---	2,406
Valves, Flanges, Pumps	---	---	1,188	---	---	---	---
Exxon - Existing Terminal	273,965	29,201	13,477	5,030	6,543	5,100	21,476
BP - Existing Terminal	106,986	12,176	7,701	2,211	2,885	1,885	11,858
Tesoro - Existing Terminal	254,096	26,533	12,398	5,568	6,380	4,748	27,118
Emissions from AMPed off-site Elec. Generation	6,230	1,083	54	217	217	217	650
<b>TOTAL</b>	<b>1,216,828</b>	<b>131,380</b>	<b>65,451</b>	<b>28,195</b>	<b>31,783</b>	<b>24,217</b>	<b>142,010</b>

Operation	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Tanker Cruising and Maneuvering	1,011	88	47	19	19	17	52
Tanker Hoteling	323	26	9	7	7	5	21
Offloading Emissions	103	23	3	15	11	7	133
Transiting Operations	7	2	0.2	1.1	0.8	0.5	11
Tug Assistance	113	25	4.7	---	4.9	4.5	0.1
Tanks	---	---	17.9	---	---	---	---
Vapor Destruction Units	37	10	2	---	2	---	7
Valves, Flanges, Pumps	---	---	3	---	---	---	---
Exxon - Existing Terminal	751	80	37	14	18	14	59
BP - Existing Terminal	293	33	21	6	8	5	32
Tesoro - Existing Terminal	696	73	34	15	17	13	74
Emissions from AMPed off-site Elec. Generation	17	3	0	1	1	1	2
<b>TOTAL</b>	<b>3,351</b>	<b>360</b>	<b>179</b>	<b>77</b>	<b>87</b>	<b>66</b>	<b>389</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Mit.Sum.2025-2.  
2025 Reduced Project Alternative Summary of Maximum Mitigated Daily Emissions.

Scenario	Operation	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Vessel Arrival/Departure	Tanker Cruising and Manuevering	3,850	350	211	71	71	64	190
	Tanker Hoteling	---	---	---	---	---	---	---
	Offloading Emissions	---	---	---	---	---	---	---
	Transiting Operations	28	6	1	4	3	2	38
	Tug Assistance	367	82	15	---	16	15	0
	Tanks	---	---	86	---	---	---	---
	Vapor Destruction Units Valves, Flanges, Pumps	66 ---	18 ---	4 3	---	4 ---	---	20 ---
	Exxon - Existing Terminal	1,982	204	159	32	44	37	101
	BP - Existing Terminal	2,214	226	167	37	49	41	126
	Tesoro - Existing Terminal	2,189	221	166	37	48	40	126
	<b>TOTAL</b>	<b>10,697</b>	<b>1,108</b>	<b>812</b>	<b>181</b>	<b>234</b>	<b>199</b>	<b>601</b>
Vessel Offloading	Tanker Cruising and Manuevering	---	---	---	---	---	---	---
	Tanker Hoteling	1,147	91	33	25	24	19	76
	Offloading Emissions	467	97	21	65	45	30	553
	Transiting Operations	---	---	---	---	---	---	---
	Tug Assistance	---	---	---	---	---	---	---
	Tanks	---	---	86	---	---	---	---
	Vapor Destruction Units Valves, Flanges, Pumps	66 ---	18 ---	4 3	---	4 ---	---	20 ---
	Exxon - Existing Terminal	368	43	100	13	13	8	81
	BP - Existing Terminal	1,444	143	130	47	43	30	259
	Tesoro - Existing Terminal	1,444	143	130	47	43	30	259
	Emissions from AMPed off-site Elec. Generation	54.08	9.41	0.47	1.88	1.88	1.88	5.64
	<b>TOTAL</b>	<b>4,935</b>	<b>534</b>	<b>507</b>	<b>197</b>	<b>171</b>	<b>118</b>	<b>1,247</b>
No Vessel/Empty Berth	Tanker Cruising and Manuevering	---	---	---	---	---	---	---
	Tanker Hoteling	---	---	---	---	---	---	---
	Offloading Emissions	---	---	---	---	---	---	---
	Transiting Operations	---	---	---	---	---	---	---
	Tug Assistance	---	---	---	---	---	---	---
	Tanks	---	---	86	---	---	---	---
	Vapor Destruction Units Valves, Flanges, Pumps	66 ---	18 ---	4 3	---	4 ---	---	20 ---
	Exxon - Existing Terminal	35	9	91	0	2	0	6
	BP - Existing Terminal	42	11	91	0	2	0	8
	Tesoro - Existing Terminal	42	11	91	0	2	0	8
	<b>TOTAL</b>	<b>186</b>	<b>50</b>	<b>367</b>	<b>0</b>	<b>11</b>	<b>0</b>	<b>41</b>

**Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR**

**Table H.2.RPA.Mit.Sum.2025-3.**

**2025 Reduced Project Alternative Summary of Average Daily Mitigated GHG Emissions.**

<b>Operation</b>	<b>N<sub>2</sub>O Emissions (tons/yr)</b>	<b>CO<sub>2</sub> Emissions (tons/yr)</b>	<b>CH<sub>4</sub> Emissions (tons/yr)</b>	<b>CO<sub>2</sub>e Emissions (tons/yr)</b>
Tanker Cruising and Manuevering	0.05	4,817.72	0.66	4,846.40
Tanker Hoteling	0.04	4,358.55	0.57	4,382.57
Offloading Emissions	0.20	20,044.12	2.76	20,163.42
Transiting Operations	0.003	288.97	0.04	290.69
Tug Assistance	0.00	463.32	0.06	466.08
Tanks	---	---	---	---
Vapor Destruction Units	0.02	11,495.92	1.29	11,529.66
Valves, Flanges, Pumps	---	---	---	---
BP (Existing Terminal)	0.07	13,815.09	1.67	13,870.51
Tesoro (Existing Terminal)	0.07	22,079.75	2.79	22,159.22
Exxon (Existing Terminal)	0.10	17,557.55	2.18	17,634.07
Emissions from AMPed off-site Elec. Generation	0.05	5,691.72	0.03	5,706.96
<b>TOTAL</b>	<b>0.59</b>	<b>100,612.70</b>	<b>12.05</b>	<b>101,049.58</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Mit.Sum.2040-1.

2040 Reduced Project Alternative Summary of Average Daily Mitigated Emissions.

Operation	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Tanker Cruising	338,253	28,393	12,341	6,073	6,038	5,453	17,464
Tanker Maneuvering	30,859	3,779	4,742	732	717	616	1,436
Tanker Hoteling	58,918	4,663	1,695	1,272	1,221	977	3,902
Offloading Emissions	37,547	8,503	1,174	5,629	3,940	2,635	48,368
Transiting Operations	2,689	620	76	410	287	192	4,052
Tug Assistance	36,945	9,231	1,704	---	1,621	1,491	29
Tanks	---	---	6,536	---	---	---	---
Vapor Destruction Units	13,444	3,619	724	---	776	---	2,406
Valves, Flanges, Pumps	---	---	1,188	---	---	---	---
Exxon - Existing Terminal	310,031	33,150	15,220	5,780	7,311	5,750	24,408
BP - Existing Terminal	120,562	13,577	8,580	2,538	3,197	2,138	13,347
Tesoro - Existing Terminal	288,023	30,035	13,965	6,386	7,160	5,380	30,840
Emissions from AMPed off-site Elec. Generation	4,089	711	36	142	142	142	427
<b>TOTAL</b>	<b>1,237,271</b>	<b>135,569</b>	<b>67,946</b>	<b>28,820</b>	<b>32,267</b>	<b>24,631</b>	<b>146,252</b>

Operation	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Tanker Cruising	927	78	34	17	17	15	48
Tanker Maneuvering	85	10	13	2	2	2	4
Tanker Hoteling	161	13	5	3	3	3	11
Offloading Emissions	103	23	3	15	11	7	133
Transiting Operations	7	2	0.2	1.1	0.8	0.5	11
Tug Assistance	101	25	4.7	---	4.4	4.1	0.1
Tanks	---	---	17.9	---	---	---	---
Vapor Destruction Units	37	10	2	---	2	---	7
Valves, Flanges, Pumps	---	---	3	---	---	---	---
Exxon - Existing Terminal	849	91	42	16	20	16	67
BP - Existing Terminal	330	37	24	7	9	6	37
Tesoro - Existing Terminal	789	82	38	17	20	15	84
Emissions from AMPed off-site Elec. Generation	11	2	0	0	0	0	1
<b>TOTAL</b>	<b>3,401</b>	<b>371</b>	<b>186</b>	<b>79</b>	<b>88</b>	<b>67</b>	<b>401</b>



Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Mit.Sum.2040-2.  
2040 Reduced Project Alternative Summary of Maximum Mitigated Daily Emissions.

Scenario	Operation	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Vessel Arrival/Departure	Tanker Cruising and Manuevering	3,850	350	211	71	71	64	190
	Tanker Hoteling	---	---	---	---	---	---	---
	Offloading Emissions	---	---	---	---	---	---	---
	Transiting Operations	28	6	1	4	3	2	38
	Tug Assistance	330	82	15	---	14	13	0
	Tanks	---	---	86	---	---	---	---
	Vapor Destruction Units Valves, Flanges, Pumps	66 ---	18 ---	4 3	---	4 ---	---	20 ---
	Exxon - Existing Terminal	1,957	204	159	32	43	36	101
	BP - Existing Terminal	2,189	226	167	37	48	40	126
	Tesoro - Existing Terminal	2,189	226	167	37	48	40	126
	<b>TOTAL</b>	<b>10,609</b>	<b>1,114</b>	<b>813</b>	<b>181</b>	<b>231</b>	<b>197</b>	<b>601</b>
Vessel Offloading	Tanker Cruising and Manuevering	---	---	---	---	---	---	---
	Tanker Hoteling	573	45	16	12	12	10	38
	Offloading Emissions	467	97	21	65	45	30	553
	Transiting Operations	---	---	---	---	---	---	---
	Tug Assistance	---	---	---	---	---	---	---
	Tanks	---	---	86	---	---	---	---
	Vapor Destruction Units Valves, Flanges, Pumps	66 ---	18 ---	4 3	---	4 ---	---	20 ---
	Exxon - Existing Terminal	368	43	100	13	13	8	81
	BP - Existing Terminal	1,444	143	130	47	43	30	259
	Tesoro - Existing Terminal	1,444	143	130	47	43	30	259
	Emissions from AMPed off-site Elec. Generation	33	6	0	1	1	1	3
	<b>TOTAL</b>	<b>4,395</b>	<b>494</b>	<b>490</b>	<b>185</b>	<b>160</b>	<b>110</b>	<b>1,213</b>
No Vessel/Empty Berth	Tanker Cruising and Manuevering	---	---	---	---	---	---	---
	Tanker Hoteling	---	---	---	---	---	---	---
	Offloading Emissions	---	---	---	---	---	---	---
	Transiting Operations	---	---	---	---	---	---	---
	Tug Assistance	---	---	---	---	---	---	---
	Tanks	---	---	86	---	---	---	---
	Vapor Destruction Units Valves, Flanges, Pumps	66 ---	18 ---	4 3	---	4 ---	---	20 ---
	Exxon - Existing Terminal	35	9	91	0	2	0	6
	BP - Existing Terminal	42	11	91	0	2	0	8
	Tesoro - Existing Terminal	42	11	91	0	2	0	8
	<b>TOTAL</b>	<b>186</b>	<b>50</b>	<b>367</b>	<b>0</b>	<b>11</b>	<b>0</b>	<b>41</b>

**Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR**

**Table H.2.RPA.Mit.Sum.2040-3.**

**2040 Reduced Project Alternative Summary of Average Daily Mitigated GHG Emissions.**

<b>Operation</b>	<b>N<sub>2</sub>O Emissions (tons/yr)</b>	<b>CO<sub>2</sub> Emissions (tons/yr)</b>	<b>CH<sub>4</sub> Emissions (tons/yr)</b>	<b>CO<sub>2</sub>e Emissions (tons/yr)</b>
Tanker Cruising and Manuevering	0.05	4,817.72	0.66	4,846.40
Tanker Hoteling	0.02	2,179.27	0.29	2,191.28
Offloading Emissions	0.20	20,044.12	2.76	20,163.42
Transiting Operations	0.003	288.97	0.04	290.69
Tug Assistance	0.00	463.32	0.06	466.08
Tanks	---	---	---	---
Vapor Destruction Units	0.02	11,495.92	1.29	11,529.66
Valves, Flanges, Pumps	---	---	---	---
BP (Existing Terminal)	0.07	14,621.40	1.78	14,681.38
Tesoro (Existing Terminal)	0.16	24,095.52	3.06	24,209.20
Exxon (Existing Terminal)	0.11	18,927.25	2.36	19,011.52
Emissions from AMPed off-site Elec. Generation	0.03	4,155.95	0.02	4,167.08
<b>TOTAL</b>	<b>0.67</b>	<b>101,089.43</b>	<b>12.32</b>	<b>101,556.71</b>

## **APPENDIX H.2 - SECTION 2 OPERATIONS**

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**APPENDIX H.2 - SECTION 2.1**  
**OPERATIONAL EMISSIONS**

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Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Un.2010-1. 2010 Proposed Project Main Engines Average Daily Unmitigated Emissions.

Ship	Direction	Mode	Distance (nautical miles)	Ship speed (knots)	Activity (hours)	Maximum Speed (knots)	Load Factor	MCR (kW)	Energy (kW-hr)	Fuel Type	Shipcalls (vessels/ yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)		
VLCC	North In	Cruising - CW to VSR	22	15.54	1.42	16.9	0.777	25,400	27,957	HFO	26	36,225	2,802	1,201	3,122	3,122	2,872	21,014		
		Cruising - VSR to PZ	21	12	1.75	16.9	0.358	25,400	15,913	HFO	26	20,619	1,595	683	1,777	1,777	1,635	11,961		
		Cruising - PZ to Pilot	4.7	7	0.67	16.9	0.071	25,400	1,212	HFO	26	2,223	342	246	234	234	215	911		
	North Out	Maneuvering - Pilot to Berth	3	1.00	16.9	0.006	25,400	142	HFO	26	2,966	509	1,303	432	432	432	398	107		
		Maneuvering - Berth to Pilot	5	1.00	16.9	0.026	25,400	658	HFO	26	2,558	509	606	328	328	302	494			
		Cruising - Pilot to PZ	3.8	7	0.54	16.9	0.071	25,400	980	HFO	26	1,798	276	199	189	189	174	736		
		Cruising - PZ to VSR	21	12	1.75	16.9	0.358	25,400	15,913	HFO	26	20,619	1,595	683	1,777	1,777	1,635	11,961		
		Cruising - VSR to CW	22	15.54	1.42	16.9	0.777	25,400	27,957	HFO	26	36,225	2,802	1,201	3,122	3,122	2,872	21,014		
		AFRAMAX	South In	Cruising - CW to VSR	23	14.7	1.56	16.1	0.761	12,477	14,859	HFO	32	23,696	1,833	786	2,042	2,042	1,879	13,746
AFRAMAX	South In	Cruising - VSR to PZ	11	12	0.92	16.1	0.414	12,477	4,736	HFO	32	7,552	584	250	651	651	599	4,381		
		Cruising - PZ to Pilot	4.7	7	0.67	16.1	0.082	12,477	689	HFO	32	1,450	207	138	148	148	136	637		
		Maneuvering - Pilot to Berth	3	1.00	16.1	0.006	12,477	81	HFO	32	1,945	308	733	283	283	260	75			
	South Out	Maneuvering - Berth to Pilot	5	1.00	16.1	0.030	12,477	374	HFO	32	1,738	308	341	222	222	204	346			
		Cruising - Pilot to PZ	3.5	7	0.50	16.1	0.082	12,477	513	HFO	32	1,080	154	103	110	110	101	474		
		Cruising - PZ to VSR	12.5	12	1.04	16.1	0.414	12,477	5,382	HFO	32	8,582	664	284	740	740	680	4,978		
		Cruising - VSR to CW	24.5	14.7	1.67	16.1	0.761	12,477	15,828	HFO	32	25,242	1,952	837	2,176	2,176	2,001	14,643		
		PANAMAX	South In	Cruising - CW to VSR	23	14.7	1.56	15.8	0.805	10,300	12,979	HFO	26	16,816	1,301	557	1,449	1,449	1,333	9,755
		PANAMAX	South In	Cruising - VSR to PZ	11	12	0.92	15.8	0.438	10,300	4,136	HFO	26	5,360	415	178	462	462	425	3,109
Cruising - PZ to Pilot	4.7			7	0.67	15.8	0.087	10,300	601	HFO	26	779	60	26	67	67	62	452		
Maneuvering - Pilot to Berth	3			1.00	15.8	0.007	10,300	71	HFO	26	91	7	3	8	8	7	53			
South Out	Maneuvering - Berth to Pilot		5	1.00	15.8	0.032	10,300	326	HFO	26	423	33	14	36	36	34	245			
	Cruising - Pilot to PZ		3.5	7	0.50	15.8	0.087	10,300	448	HFO	26	580	45	19	50	50	46	337		
	Cruising - PZ to VSR		12.5	12	1.04	15.8	0.438	10,300	4,700	HFO	26	6,090	471	202	525	525	483	3,533		
	Cruising - VSR to CW		24.5	14.7	1.67	15.8	0.805	10,300	13,825	HFO	26	17,913	1,386	594	1,544	1,544	1,420	10,392		
	SUEZMAX		North In	Cruising - CW to VSR	22	15.54	1.42	17	0.764	16,000	17,302	HFO	45	38,801	3,001	1,286	3,344	3,344	3,077	22,509
	SUEZMAX		North In	Cruising - VSR to PZ	21	12	1.75	17	0.352	16,000	9,848	HFO	45	22,085	1,708	732	1,903	1,903	1,751	12,812
Cruising - PZ to Pilot		4.7		7	0.67	17	0.070	16,000	750	HFO	45	1,682	130	56	145	145	133	976		
Maneuvering - Pilot to Berth		3		1.00	17	0.005	16,000	88	HFO	45	197	15	7	17	17	16	114			
North Out		Maneuvering - Berth to Pilot	5	1.00	17	0.025	16,000	407	HFO	45	913	71	30	79	79	72	530			
		Cruising - Pilot to PZ	3.8	7	0.54	17	0.070	16,000	606	HFO	45	1,360	105	45	117	117	108	789		
		Cruising - PZ to VSR	21	12	1.75	17	0.352	16,000	9,848	HFO	45	22,085	1,708	732	1,903	1,903	1,751	12,812		
		Cruising - VSR to CW	22	15.54	1.42	17	0.764	16,000	17,302	HFO	45	38,801	3,001	1,286	3,344	3,344	3,077	22,509		
		<b>TOTAL</b>											<b>368,494</b>	<b>29,897</b>	<b>15,361</b>	<b>32,347</b>	<b>32,347</b>	<b>29,759</b>	<b>208,406</b>	

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Un.2010-2. 2010 Proposed Project Auxiliary Generator Average Daily Unmitigated Emissions.

Ship	Direction	Mode	Activity (hours)	MCR (kW)	Load Factor	Energy (kW-hr)	Fuel Type	Shipcalls (vessels/yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
VLCC	North In	Cruising	3.84	3,600	0.278	3,840	HFO	26.0	4,041	302	110	412	396	317	3,381
		Maneuvering	2.00	3,600	0.278	2,002	HFO	26.0	2,106	158	57	215	206	165	1,762
	North Out	Maneuvering	1.50	3,600	0.278	1,501	HFO	26.0	1,580	118	43	161	155	124	1,322
		Cruising	3.71	3,600	0.278	3,712	HFO	26.0	3,906	292	106	399	383	306	3,268
AFRAMAX	South In	Cruising	3.15	3,600	0.278	3,155	HFO	32.0	4,087	306	111	417	400	320	3,419
		Maneuvering	2.00	3,600	0.278	2,002	HFO	32.0	2,592	194	71	265	254	203	2,169
	South Out	Maneuvering	1.50	3,600	0.278	1,501	HFO	32.0	1,944	145	53	198	190	152	1,627
		Cruising	3.21	3,600	0.278	3,211	HFO	32.0	4,159	311	113	424	407	326	3,480
PANAMAX	South In	Cruising	3.15	3,600	0.278	3,155	HFO	26	3,320	248	90	339	325	260	2,778
		Maneuvering	2.00	3,600	0.278	2,002	HFO	26	2,106	158	57	215	206	165	1,762
	South Out	Maneuvering	1.5	3,600	0.278	1,501	HFO	26	1,580	118	43	161	155	124	1,322
		Cruising	3.21	3,600	0.278	3,211	HFO	26	3,379	253	92	345	331	265	2,827
SUEZMAX	North In	Cruising	3.84	3,600	0.278	3,840	HFO	45	6,994	523	190	714	685	548	5,852
		Maneuvering	2.00	3,600	0.278	2,002	HFO	45	3,646	273	99	372	357	286	3,050
	North Out	Maneuvering	1.5	3,600	0.278	1,501	HFO	45	2,734	205	74	279	268	214	2,288
		Cruising	3.71	3,600	0.278	3,712	HFO	45	6,760	506	184	690	662	530	5,656
<b>TOTAL</b>									<b>54,934</b>	<b>4,111</b>	<b>1,495</b>	<b>5,605</b>	<b>5,381</b>	<b>4,305</b>	<b>45,965</b>



Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Un.2010-3. 2010 Proposed Project Boiler Warm-Up Average Daily Unmitigated Emissions.

Shipcalls (vessels/yr)	Vessel Size	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
32.0	Aframax	HFO	2.70	107.96	30.0%	3	50,000	1,353	122	31	283	243	159	10,470
26.0	VLCC	HFO	2.70	84.93	30.0%	3	90,000	1,330	141	29	836	719	182	12,046
26.0	Panamax	HFO	2.70	63.30	30.0%	3	35,000	451	41	10	94	81	53	3,491
45.0	Suezmax	HFO	2.70	87.54	30.0%	3	70,000	2,160	195	50	452	389	253	16,714
<b>TOTAL</b>								<b>5,295</b>	<b>498</b>	<b>120</b>	<b>1,665</b>	<b>1,432</b>	<b>647</b>	<b>42,721</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Un.2010-4. 2010 Proposed Project Berth Operations Average Daily Unmitigated Emissions.

Auxiliary Generator Pre-Pumpin

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
32.0	Aframax	700,000	HFO	2.70	3,600	27.8%	2.5	3,240	242	88	331	317	254	2,711
26.0	VLCC	2,000,000	HFO	2.70	3,600	27.8%	2.5	2,633	197	72	269	258	206	2,203
26.0	Panamax	350,000	HFO	2.70	3,600	27.8%	2.5	2,633	197	72	269	258	206	2,203
45.0	Suezmax	1,000,000	HFO	2.70	3,600	27.8%	2.5	4,557	341	124	465	446	357	3,813
<b>TOTAL</b>								<b>13,063</b>	<b>978</b>	<b>355</b>	<b>1,333</b>	<b>1,280</b>	<b>1,024</b>	<b>10,930</b>

Boiler Pre-Pumpin

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
32.0	Aframax	700,000	HFO	2.70	107.96	30.0%	2.5	50,000	1,128	102	26	236	203	132	8,725
26.0	VLCC	2,000,000	HFO	2.70	84.93	30.0%	2.5	90,000	1,108	117	24	697	599	390	10,038
26.0	Panamax	350,000	HFO	2.70	63.30	30.0%	2.5	35,000	376	34	9	79	68	44	2,910
45.0	Suezmax	1,000,000	HFO	2.70	87.54	30.0%	2.5	70,000	1,800	162	41	377	324	211	13,928
<b>TOTAL</b>									<b>4,412</b>	<b>415</b>	<b>100</b>	<b>1,388</b>	<b>1,194</b>	<b>777</b>	<b>35,601</b>

Auxiliary Generator Pumpin

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
32.0	Aframax	700,000	MDO	0.52	3,600	55.6%	15.0	36,769	2,910	1,058	794	762	609	6,266
26.0	VLCC	2,000,000	MDO	0.52	3,600	55.6%	23.2	46,251	3,660	1,331	998	958	767	7,882
26.0	Panamax	350,000	MDO	0.52	3,600	55.6%	11.0	21,908	1,734	630	473	454	363	3,734
45.0	Suezmax	1,000,000	MDO	0.52	3,600	55.6%	15.3	52,741	4,174	1,518	1,138	1,093	874	8,988
<b>TOTAL</b>								<b>157,670</b>	<b>12,478</b>	<b>4,537</b>	<b>3,403</b>	<b>3,267</b>	<b>2,613</b>	<b>26,871</b>

Boiler Pumpin

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Inerting Fuel Consumption Savings (lb/1000 bbl offloaded)	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
32.0	Aframax	700,000	MDO	0.52	102.17	28.06	15.0	5,880	1,470	83	973	681	455	21,532
26.0	VLCC	2,000,000	MDO	0.52	80.38	28.06	23.2	11,536	2,409	509	1,595	1,116	746	35,286
26.0	Panamax	350,000	MDO	0.52	59.91	28.06	11.0	1,027	257	14	170	119	80	3,759
45.0	Suezmax	1,000,000	MDO	0.52	82.85	28.06	15.3	8,733	2,183	123	1,445	1,012	676	31,979
<b>TOTAL</b>								<b>27,175</b>	<b>6,319</b>	<b>729</b>	<b>4,183</b>	<b>2,928</b>	<b>1,958</b>	<b>92,558</b>

Auxiliary Generator Post-Pumpin

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
32.0	Aframax	700,000	HFO	2.70	3,600	27.8%	1.0	1,296	97	35	132	127	102	1,085
26.0	VLCC	2,000,000	HFO	2.70	3,600	27.8%	1.0	1,053	79	29	107	103	83	881
26.0	Panamax	350,000	HFO	2.70	3,600	27.8%	1.0	1,053	79	29	107	103	83	881
45.0	Suezmax	1,000,000	HFO	2.70	3,600	27.8%	1.0	1,823	136	50	186	179	143	1,525
<b>TOTAL</b>								<b>5,225</b>	<b>391</b>	<b>142</b>	<b>533</b>	<b>512</b>	<b>409</b>	<b>4,372</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Un.2010-5. 2010 Proposed Project Summary of Average Daily Unmitigated Vessel Emissions.

Mode	Equipment	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Cruising	Main Engines	357,663	28,137	12,325	30,942	30,942	28,466	206,442
Cruising	Aux Generator	36,645	2,742	997	3,739	3,590	2,872	30,662
Maneuvering	Main Engines	10,831	1,760	3,037	1,405	1,405	1,293	1,964
Maneuvering	Aux Generator	18,288	1,369	498	1,866	1,792	1,433	15,303
Boiler Warm-up	Boiler	5,295	498	120	1,665	1,432	647	42,721
Berth Operations	Boiler	31,587	6,734	829	5,571	4,122	2,735	128,158
Berth Operations	Aux Generator	175,959	13,846	5,035	5,269	5,058	4,047	42,173
Propulsion	TOTAL	423,427	34,008	16,856	37,952	37,728	34,064	254,371
Non-Propulsion	TOTAL	212,841	21,079	5,984	12,505	10,612	7,429	213,053
<b>Total Emissions</b>		<b>636,268</b>	<b>55,086</b>	<b>22,840</b>	<b>50,458</b>	<b>48,340</b>	<b>41,493</b>	<b>467,424</b>

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Cruising	Main Engines	979.9	77.1	33.8	84.8	84.8	78.0	565.6
Cruising	Aux Generator	100.4	7.5	2.7	10.2	9.8	7.9	84.0
Maneuvering	Main Engines	29.7	4.8	8.3	3.8	3.8	3.5	5.4
Maneuvering	Aux Generator	50.1	3.7	1.4	5.1	4.9	3.9	41.9
Boiler Warm-up	Boiler	14.5	1.4	0.3	4.6	3.9	1.8	117.0
Berth Operations	Boiler	86.5	18.4	2.3	15.3	11.3	7.5	351.1
Berth Operations	Aux Generator	482.1	37.9	13.8	14.4	13.9	11.1	115.5
Propulsion	TOTAL	1,160.1	93.2	46.2	104.0	103.4	93.3	696.9
Non-Propulsion	TOTAL	583.1	57.7	16.4	34.3	29.1	20.4	583.7
<b>Total Emissions</b>		<b>1,743</b>	<b>151</b>	<b>63</b>	<b>138</b>	<b>132</b>	<b>114</b>	<b>1,281</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Un.2010-6. 2010 Proposed Project Tug Main Engines Average Daily Unmitigated Emissions.

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Shipcalls (vessels/yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
VLCC	Maneuvering - Pilot to Berth	1.00	4	4,800	0.50	MGO	26.0	8,075	1,285	254	330	303	4
	Maneuvering - Berth to Pilot	1.00	2	4,800	0.50	MGO	26.0	4,037	643	127	165	152	2
AFRAMAX	Maneuvering - Pilot to Berth	1.00	2	4,800	0.50	MGO	32.0	4,969	791	156	203	187	3
	Maneuvering - Berth to Pilc	1.00	2	4,800	0.50	MGO	32.0	4,969	791	156	203	187	3
PANAMAX	Maneuvering - Pilot to Berth	1.00	2	4,800	0.50	MGO	26.0	4,037	643	127	165	152	2
	Maneuvering - Berth to Pilot	1.00	2	4,800	0.50	MGO	26.0	4,037	643	127	165	152	2
SUEZMAX	Maneuvering - Pilot to Berth	1.00	3	4,800	0.50	MGO	45.0	10,482	1,668	330	428	394	5
	Maneuvering - Berth to Pilc	1.00	2	4,800	0.50	MGO	45.0	6,988	1,112	220	285	263	4
<b>TOTAL</b>								<b>47,595</b>	<b>7,575</b>	<b>1,499</b>	<b>1,944</b>	<b>1,789</b>	<b>24</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Un.2010-7. 2010 Proposed Project Tug Auxiliary Generator Engines Average Daily Unmit Emissions

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Shipcalls (vessels/yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
VLCC	Maneuvering - Pilot to Berth	1.00	4	300	1.00	MGO	26.0	828	143	23	39	36	0
	Maneuvering - Berth to Pilot	1.00	2	300	1.00	MGO	26.0	414	72	12	19	18	0
AFRAMAX	Maneuvering - Pilot to Berth	1.00	2	300	1.00	MGO	32.0	510	88	14	24	22	0
	Maneuvering - Berth to Pilot	1.00	2	300	1.00	MGO	32.0	510	88	14	24	22	0
PANAMAX	Maneuvering - Pilot to Berth	1.00	2	300	1.00	MGO	26.0	414	72	12	19	18	0
	Maneuvering - Berth to Pilot	1.00	2	300	1.00	MGO	26.0	414	72	12	19	18	0
SUEZMAX	Maneuvering - Pilot to Berth	1.00	3	300	1.00	MGO	45.0	1,075	186	30	50	46	0
	Maneuvering - Berth to Pilot	1.00	2	300	1.00	MGO	45.0	717	124	20	33	31	0
<b>TOTAL</b>								<b>4,881</b>	<b>846</b>	<b>137</b>	<b>228</b>	<b>210</b>	<b>2</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Un.2010-8. 2010 Proposed Project Summary of Tug Average Daily Unmitigated Emissions.

Mode	Equipment	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Tug Assist	Main Engines	47,595	7,575	1,499	1,944	1,789	24
Tug Assist	Aux Generator	4,881	846	137	228	210	2
<b>TOTAL</b>		<b>52,476</b>	<b>8,420</b>	<b>1,635</b>	<b>2,172</b>	<b>1,998</b>	<b>26</b>

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Tug Assist	Main Engines	130	20.8	4.1	5.3	4.9	0.1
Tug Assist	Aux Generator	13	2.3	0.4	0.6	0.6	0.0
<b>TOTAL</b>		<b>144</b>	<b>23.1</b>	<b>4.5</b>	<b>6.0</b>	<b>5.5</b>	<b>0.1</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Un.2010-9. 2010 Proposed Project VDU Crude Average Daily Unmitigated Emissions.

	Annual Vessel Calls	crude vapors from tanks(scf/call)	annual gas usage (mmscf/yr)	mw crude vapors	destruction efficiency
Aframax	32	224000	7.2	50	98%
VLCC	26	596,313	15.5	50	98%
Panamax	26	116,667	3.0	50	98%
Suezmax	45	333,333	15.0	50	98%
<b>TOTAL</b>	<b>129</b>		<b>40.7</b>		

<b>Assumed Distribution based on tank storage volume:</b>	
Site 1	12.5%
Site 2	87.5%

Annual Average (lb/yr)

	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene
EF (lb/MMSCF)	130	35	7	7.5	0.38%	9.90%	0.017	0.0004	0.0003	0.0043	0.0027	0.731	0.0366	0.0272	0.0095
Aframax	465.9	125.4	25.1	26.9	0.10	2.48	0.1	0.001	0.001	0.015	0.010	2.6	0.1	0.1	0.0
VLCC	1007.8	271.3	54.3	58.1	0.21	5.37	0.1	0.003	0.002	0.033	0.021	5.7	0.3	0.2	0.1
Panamax	197.2	53.1	10.6	11.4	0.0	0.2	0.0	0.0	0.0	0.0	0.0	1.1	0.1	0.0	0.0
Suezmax	975.0	262.5	52.5	56.2	0.0	0.7	0.1	0.0	0.0	0.0	0.0	5.5	0.3	0.2	0.1
<b>TOTAL</b>	<b>2645.9</b>	<b>712.3</b>	<b>142.5</b>	<b>152.6</b>	<b>0.3</b>	<b>8.7</b>	<b>0.3</b>	<b>0.0</b>	<b>0.0</b>	<b>0.1</b>	<b>0.1</b>	<b>14.9</b>	<b>0.7</b>	<b>0.6</b>	<b>0.2</b>

Assumed a ratio of 500/1000 based on the corresponding Btu values with respect to natural gas combustion emission factors.

Annual Average (lb/yr)

	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene	SO <sub>x</sub>
Site 1	331	89.0	17.81	19.1	0.042	1.09	0.043	0.0010	0.0008	0.0109	0.0069	1.86	0.093	0.069	0.024	59
Site 2	2315	623	124.7	133.6	0.29	7.65	0.303	0.0071	0.0053	0.077	0.048	13.0	0.65	0.48	0.169	414

142.47

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Un.2010-10. 2010 Proposed Project VDU Legs Average Daily Unmitigated Emissions.

	tanks	crude vapors from tanks on legs(scf/yr)	annual gas usage (mmscf/yr)	mw crude vapors	destruction efficiency
Site 1	2	8640000	17.3	50	98%
Site 2	14	8640000	121.0	50	98%
<b>TOTAL</b>	<b>16</b>		<b>138.2</b>		

<b>48</b>	<b>hr/event</b>
<b>6</b>	<b>events/yr</b>
<b>500</b>	<b>ft3/min</b>

		Annual Average (lb/yr)													
	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene
EF (lb/MMSCF)	130	35	7	7.5	0.38%	9.90%	0.017	0.0004	0.0003	0.0043	0.0027	0.731	0.0366	0.0272	0.0095
<b>TOTAL</b>	<b>8985.6</b>	<b>2419.2</b>	<b>483.8</b>	<b>518.4</b>	<b>1.8</b>	<b>47.9</b>	<b>1.2</b>	<b>0.0</b>	<b>0.0</b>	<b>0.3</b>	<b>0.2</b>	<b>50.5</b>	<b>2.5</b>	<b>1.9</b>	<b>0.7</b>

Assumed a ratio of 500/1000 based on the corresponding Btu values with respect to natural gas combustion emission factors.

		Annual Average (lb/yr)														
	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene	
Site 1	1123.2	302.4	60.5	64.8	0.23	5.99	0.15	0.003	0.003	0.037	0.02	6.32	0.32	0.24	0.08	201
Site 2	7862.4	2116.8	423.4	453.6	1.61	41.91	1.03	0.024	0.018	0.260	0.16	44.21	2.21	1.65	0.57	1407





Table H.2.PP.Un.Bar.2010-1. 2010 Proposed Project Main Engines Average Daily Unmitigated Emissions from Barge Fuel Deliveries for OGV.

Ship	Direction	Mode	Distance (nautical miles)	Ship speed (knots)	Activity (hours)	Maximum Speed (knots)	Load Factor	MCR (kW)	Energy (kW-hr)	Fuel Type	Shipcalls (vessels/ yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Barge	North In	Volpak to Berth 408	5	3	1.67	3	0.50	4,800	4,000.00	MGO	6.0	872	73	33	48	48	48	54
Barge	North Out	Volpak to Berth 408	5	3	1.67	3.0	0.50	4,800	4,000.00	MGO	6.0	872	73	33	48	48	48	54
TOTAL												1,744	145	66	95	95	95	107

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Table H.2.PP.Un.Bar.2010-2. 2010 Proposed Project Tug Main Engines Average Daily Unmitigated Emissions from Barge Fuel Deliveries for OGV.

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Shipcalls (vessels/yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Barge	Maneuvering - Pilot to Berth	1.00	1	4,800	0.50	MGO	6.0	523	44	20	29	26	32
	Maneuvering - Berth to Pilot	1.00	1	4,800	0.50	MGO	6.0	523	44	20	29	26	32
<b>TOTAL</b>								<b>1,047</b>	<b>87</b>	<b>40</b>	<b>57</b>	<b>53</b>	<b>64</b>

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Table H.2.PP.Un.Bar.2010-3. 2010 Proposed Project Tug Auxiliary Generator Engines Average Daily Unmitigated Emissions from Barge Fuel Deliveries for OGV.

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Shipcalls (vessels/yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Barge	Maneuvering - Pilot to Berth	1.00	1	300	1.00	MGO	6.0	50	8	1	2	2	4
	Maneuvering - Berth to Pilot	1.00	1	300	1.00	MGO	6.0	50	8	1	2	2	4
<b>TOTAL</b>								<b>99</b>	<b>17</b>	<b>3</b>	<b>4</b>	<b>4</b>	<b>8</b>

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Table H.2.PP.Un.Bar.2010-4. 2010 Proposed Project Summary of Tug Average Daily Unmitigated Emissions from Barge Fuel Deliveries for OGV.

Mode	Equipment	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Tug Assist	Main Engines	1,047	87	40	57	53	64
Tug Assist	Aux Generator	99	17	3	4	4	8
<b>TOTAL</b>		<b>1,146</b>	<b>104</b>	<b>42</b>	<b>61</b>	<b>56</b>	<b>72</b>

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Tug Assist	Main Engines	3	0.2	0.1	0.2	0.1	0.2
Tug Assist	Aux Generator	0.27	0.05	0.01	0.01	0.01	0.02
<b>TOTAL</b>		<b>3</b>	<b>0.3</b>	<b>0.1</b>	<b>0.2</b>	<b>0.2</b>	<b>0.2</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Un.Bar.2010-5. 2010 Proposed Project Summary of Average Daily Unmitigated Vessel Emissions from Barge Fuel Deliveries for OGV.

Operation	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Barge	1,744	145	66	95	95	107
Tug Assistance	1,146	104	42	61	56	72
<b>TOTAL</b>	<b>2,890</b>	<b>249</b>	<b>108</b>	<b>156</b>	<b>151</b>	<b>179</b>

Operation	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Barge	4.78	0.40	0.18	0.26	0.26	0.29
Tug Assistance	3.14	0.29	0.12	0.17	0.15	0.20
<b>TOTAL</b>	<b>7.92</b>	<b>0.68</b>	<b>0.30</b>	<b>0.43</b>	<b>0.41</b>	<b>0.49</b>

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Table H.2.PP.Un.Max.2010-1. 2010 Proposed Project Main Engines Maximum Daily Unmitigated Emissions.

Ship	Direction	Mode	Distance (nautical miles)	Ship speed (knots)	Activity (hours)	Maximum Speed (knots)	Load Factor	MCR (kW)	Energy (kW-hr)	Fuel Type	Maximum Daily Shipcalls (vessels/day)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)	
VLCC	North In	Cruising - CW to VSR	22	15.54	1.42	16.9	0.777	25,400	27,957	HFO	1.0	1,393	108	46	120	120	110	808	
		Cruising - VSR to PZ	21	12	1.75	16.9	0.358	25,400	15,913	HFO	1.0	793	61	26	68	68	63	460	
		Cruising - PZ to Pilot	4.7	7	0.67	16.9	0.071	25,400	1,212	HFO	1.0	86	13	9	9	9	8	35	
	North Out	Maneuvering - Pilot to Berth	3	3	1.00	16.9	0.006	25,400	142	HFO	1.0	114	20	50	17	17	15	4	4
		Maneuvering - Berth to Pilot	5	5	1.00	16.9	0.026	25,400	658	HFO	1.0	98	20	23	13	13	12	19	19
		Cruising - Pilot to PZ	3.8	7	0.54	16.9	0.071	25,400	980	HFO	1.0	69	11	8	7	7	7	7	28
		Cruising - PZ to VSR	21	12	1.75	16.9	0.358	25,400	15,913	HFO	1.0	793	61	26	68	68	63	460	
		Cruising - VSR to CW	22	15.54	1.42	16.9	0.777	25,400	27,957	HFO	1.0	1,393	108	46	120	120	110	808	
		<b>TOTAL</b>											<b>4,740</b>	<b>401</b>	<b>235</b>	<b>422</b>	<b>422</b>	<b>389</b>	<b>2,623</b>
AFRAMAX	South In	Cruising - CW to VSR	23	14.7	1.56	16.1	0.761	12,477	14,859	HFO	1.0	741	57	25	64	64	59	430	
		Cruising - VSR to PZ	11	12	0.92	16.1	0.414	12,477	4,736	HFO	1.0	236	18	8	20	20	19	137	
		Cruising - PZ to Pilot	4.7	7	0.67	16.1	0.082	12,477	689	HFO	1.0	45	6	4	5	5	4	20	
	South Out	Maneuvering - Pilot to Berth	3	3	1.00	16.1	0.006	12,477	81	HFO	1.0	61	10	23	9	9	8	2	2
		Maneuvering - Berth to Pilot	5	5	1.00	16.1	0.030	12,477	374	HFO	1.0	54	10	11	7	7	6	11	11
		Cruising - Pilot to PZ	3.5	7	0.50	16.1	0.082	12,477	513	HFO	1.0	34	5	3	3	3	3	15	
		Cruising - PZ to VSR	12.5	12	1.04	16.1	0.414	12,477	5,382	HFO	1.0	268	21	9	23	23	21	156	
		Cruising - VSR to CW	24.5	14.7	1.67	16.1	0.761	12,477	15,828	HFO	1.0	789	61	26	68	68	63	458	
		<b>TOTAL</b>											<b>2,228</b>	<b>188</b>	<b>108</b>	<b>199</b>	<b>199</b>	<b>183</b>	<b>1,228</b>
PANAMAX	South In	Cruising - CW to VSR	23	14.7	1.56	15.8	0.805	10,300	12,979	HFO	1.0	647	50	21	56	56	51	375	
		Cruising - VSR to PZ	11	12	0.92	15.8	0.438	10,300	4,136	HFO	1.0	206	16	7	18	18	16	120	
		Cruising - PZ to Pilot	4.7	7	0.67	15.8	0.087	10,300	601	HFO	1.0	30	2	1	3	3	2	17	
	South Out	Maneuvering - Pilot to Berth	3	3	1.00	15.8	0.007	10,300	71	HFO	1.0	4	0.3	0.1	0.3	0.3	0.3	2	2
		Maneuvering - Berth to Pilot	5	5	1.00	15.8	0.032	10,300	326	HFO	1.0	16	1	1	1	1	1	9	9
		Cruising - Pilot to PZ	3.5	7	0.50	15.8	0.087	10,300	448	HFO	1.0	22	2	1	2	2	2	13	
		Cruising - PZ to VSR	12.5	12	1.04	15.8	0.438	10,300	4,700	HFO	1.0	234	18	8	20	20	19	136	
		Cruising - VSR to CW	24.5	14.7	1.67	15.8	0.805	10,300	13,825	HFO	1.0	689	53	23	59	59	55	400	
		<b>TOTAL</b>											<b>1,848</b>	<b>143</b>	<b>61</b>	<b>159</b>	<b>159</b>	<b>147</b>	<b>1,072</b>
SUEZMAX	North In	Cruising - CW to VSR	22	15.54	1.42	17	0.764	16,000	17,302	HFO	1.0	862	67	29	74	74	68	500	
		Cruising - VSR to PZ	21	12	1.75	17	0.352	16,000	9,848	HFO	1.0	491	38	16	42	42	39	285	
		Cruising - PZ to Pilot	4.7	7	0.67	17	0.070	16,000	750	HFO	1.0	37	3	1	3	3	3	22	
	North Out	Maneuvering - Pilot to Berth	3	3	1.00	17	0.005	16,000	88	HFO	1.0	4	0.3	0.1	0	0.4	0.3	3	3
		Maneuvering - Berth to Pilot	5	5	1.00	17	0.025	16,000	407	HFO	1.0	20	2	1	2	2	2	12	
		Cruising - Pilot to PZ	3.8	7	0.54	17	0.070	16,000	606	HFO	1.0	30	2	1	3	3	2	18	
		Cruising - PZ to VSR	21	12	1.75	17	0.352	16,000	9,848	HFO	1.0	491	38	16	42	42	39	285	
		Cruising - VSR to CW	22	15.54	1.42	17	0.764	16,000	17,302	HFO	1.0	862	67	29	74	74	68	500	
		<b>TOTAL</b>											<b>2,798</b>	<b>216</b>	<b>93</b>	<b>241</b>	<b>241</b>	<b>222</b>	<b>1,623</b>
<b>MAXIMUM</b>												<b>4,740</b>	<b>401</b>	<b>235</b>	<b>422</b>	<b>422</b>	<b>389</b>	<b>2,623</b>	

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Table H.2.PP.Un.Max.2010-2. 2010 Proposed Project Auxiliary Generator Maximum Daily Unmitigated Emissions.

Ship	Direction	Mode	Activity (hours)	MCR (kW)	Load Factor	Energy (kW-hr)	Fuel Type	Maximum Daily Shipcalls (vessels/day)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
VLCC	North In	Cruising	3.84	3,600	0.278	3,840	HFO	1.0	155	12	4	16	15	12	130
		Maneuvering	2.00	3,600	0.278	2,002	HFO	1.0	81	6	2	8	8	6	68
	North Out	Maneuvering	1.50	3,600	0.278	1,501	HFO	1.0	61	5	2	6	6	5	51
		Cruising	3.71	3,600	0.278	3,712	HFO	1.0	150	11	4	15	15	12	126
<b>TOTAL</b>								<b>447</b>	<b>33</b>	<b>12</b>	<b>46</b>	<b>44</b>	<b>35</b>	<b>374</b>	
AFRAMAX	South In	Cruising	3.15	3,600	0.278	3,155	HFO	1.0	128	10	3	13	13	10	107
		Maneuvering	2.00	3,600	0.278	2,002	HFO	1.0	81	6	2	8	8	6	68
	South Out	Maneuvering	1.50	3,600	0.278	1,501	HFO	1.0	61	5	2	6	6	5	51
		Cruising	3.21	3,600	0.278	3,211	HFO	1.0	130	10	4	13	13	10	109
<b>TOTAL</b>								<b>399</b>	<b>30</b>	<b>11</b>	<b>41</b>	<b>39</b>	<b>31</b>	<b>334</b>	
PANAMAX	South In	Cruising	3.15	3,600	0.278	3,155	HFO	1.0	128	10	3	13	13	10	107
		Maneuvering	2.00	3,600	0.278	2,002	HFO	1.0	81	6	2	8	8	6	68
	South Out	Maneuvering	1.5	3,600	0.278	1,501	HFO	1.0	61	5	2	6	6	5	51
		Cruising	3.21	3,600	0.278	3,211	HFO	1.0	130	10	4	13	13	10	109
<b>TOTAL</b>								<b>399</b>	<b>30</b>	<b>11</b>	<b>41</b>	<b>39</b>	<b>31</b>	<b>334</b>	
SUEZMAX	North In	Cruising	3.84	3,600	0.278	3,840	HFO	1.0	155	12	4	16	15	12	130
		Maneuvering	2.00	3,600	0.278	2,002	HFO	1.0	81	6	2	8	8	6	68
	North Out	Maneuvering	1.5	3,600	0.278	1,501	HFO	1.0	61	5	2	6	6	5	51
		Cruising	3.71	3,600	0.278	3,712	HFO	1.0	150	11	4	15	15	12	126
<b>TOTAL</b>								<b>447</b>	<b>33</b>	<b>12</b>	<b>46</b>	<b>44</b>	<b>35</b>	<b>374</b>	
<b>MAXIMUM</b>								<b>447</b>	<b>33</b>	<b>12</b>	<b>46</b>	<b>44</b>	<b>35</b>	<b>374</b>	



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Table H.2.PP.Un.Max.2010-3. 2010 Proposed Project Summary of Maximum Daily Unmitigated Vessel Emissions.

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Cruising	Main Engines	4,527	362	162	393	393	362	2,600
Cruising	Aux Generator	306	23	8	31	30	24	256
Maneuvering	Main Engines	212	39	73	29	29	27	23
Maneuvering	Aux Generator	142	11	4	14	14	11	119
<b>Maneuvering</b>	<b>TOTAL</b>	<b>354</b>	<b>50</b>	<b>77</b>	<b>44</b>	<b>43</b>	<b>38</b>	<b>142</b>
<b>Cruising and Maneuvering</b>	<b>TOTAL</b>	<b>5,187</b>	<b>435</b>	<b>248</b>	<b>468</b>	<b>466</b>	<b>424</b>	<b>2,997</b>

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Table H.2.PP.Un.Max.2010-4. 2010 Proposed Project Boiler Warm-Up Maximum Daily Unmitigated Emissions.

Shipcalls (vessels/day)	Vessel Size	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	HFO	2.70	107.96	30%	3	50,000	42	4	1	9	8	5	327
1.0	VLCC	HFO	2.70	84.93	30%	3	90,000	51	5	1	32	28	18	463
1.0	Panamax	HFO	2.70	63.30	30%	3	35,000	17	2	0.4	4	3	2	134
1.0	Suezmax	HFO	2.70	87.54	30%	3	70,000	48	4	1	10	9	6	371

**MAXIMUM      51                      5                      1                      32                      28                      18                      463**

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Table H.2.PP.Un.Max.2010-5. 2010 Proposed Project Summary of Boiler Warm-Up Maximum Unmitigated Emissions.

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Boiler Warm-up	Boiler	51	5	1	32	28	18	463

Table H.2.PP.Un.Max.2010-6. 2010 Proposed Project Berth Operations Maximum Daily Unmitigated Emissions.

Auxiliary Generator Pre-Pumpin

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	700,000	HFO	2.70	3,600	27.8%	2.5	101	8	3	10	10	8	85
1.0	VLCC	2,000,000	HFO	2.70	3,600	27.8%	2.5	101	8	3	10	10	8	85
1.0	Panamax	350,000	HFO	2.70	3,600	27.8%	2.5	101	8	3	10	10	8	85
1.0	Suezmax	1,000,000	HFO	2.70	3,600	27.8%	2.5	101	8	3	10	10	8	85
MAXIMUM								101	8	3	10	10	8	85

Boiler Pre-Pumping

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	700,000	HFO	2.70	107.96	30.0%	2.5	50,000	35	3	1	7	6	4	273
1.0	VLCC	2,000,000	HFO	2.70	84.93	30.0%	2.5	90,000	43	5	1	27	23	15	386
1.0	Panamax	350,000	HFO	2.70	63.30	30.0%	2.5	35,000	14	1	0	3	3	2	112
1.0	Suezmax	1,000,000	HFO	2.70	87.54	30.0%	2.5	70,000	40	4	1	8	7	5	310
MAXIMUM									43	5	1	27	23	15	386

Auxiliary Generator Pumpin

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	700,000	MDO	0.52	3,600	55.6%	15.0	1,149	91	33	25	24	19	196
1.0	VLCC	2,000,000	MDO	0.52	3,600	55.6%	23.2	1,777	141	51	38	37	29	303
1.0	Panamax	350,000	MDO	0.52	3,600	55.6%	11.0	843	67	24	18	17	14	144
1.0	Suezmax	1,000,000	MDO	0.52	3,600	55.6%	15.3	1,172	93	34	25	24	19	200
MAXIMUM								1,777	141	51	38	37	29	303

Boiler Pumping

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Inerting Fuel Consumption Savings (lb/1000 bbl offloaded)	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	700,000	MDO	0.52	102.17	28.06	15.0	184	46	3	30	21	14	673
1.0	VLCC	2,000,000	MDO	0.52	80.38	28.06	23.2	444	93	20	61	43	29	1,357
1.0	Panamax	350,000	MDO	0.52	59.91	28.06	11.0	39	10	1	7	5	3	145
1.0	Suezmax	1,000,000	MDO	0.52	82.85	28.06	15.3	194	49	3	32	22	15	711
MAXIMUM								444	93	20	61	43	29	1,357

Auxiliary Generator Post-Pumpin

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	700,000	HFO	2.70	3,600	27.8%	1.0	41	3	1	4	4	3	34
1.0	VLCC	2,000,000	HFO	2.70	3,600	27.8%	1.0	41	3	1	4	4	3	34
1.0	Panamax	350,000	HFO	2.70	3,600	27.8%	1.0	41	3	1	4	4	3	34
1.0	Suezmax	1,000,000	HFO	2.70	3,600	27.8%	1.0	41	3	1	4	4	3	34
MAXIMUM								41	3	1	4	4	3	34

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**Table H.2.PP.Un.Max.2010-7. 2010 Proposed Project Summary of Berth Operations Maximum Daily Unmitigated Emissions.**

<b>Mode</b>	<b>Equipment</b>	<b>NO<sub>x</sub> Emissions (lb/day)</b>	<b>CO Emissions (lb/day)</b>	<b>ROG Emissions (lb/day)</b>	<b>PM Emissions (lb/day)</b>	<b>PM<sub>10</sub> Emissions (lb/day)</b>	<b>PM<sub>2.5</sub> Emissions (lb/day)</b>	<b>SO<sub>2</sub> Emissions (lb/day)</b>
Berth Operations	Boiler	486	97	21	88	66	44	1,743
Berth Operations	Aux Generator	1,919	151	55	53	51	41	422

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Table H.2.PP.Un.Max.2010-8. 2010 Proposed Project Tug Main Engines Maximum Daily Unmitigated Emissions.

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Shipcalls (vessels/day)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
VLCC	Maneuvering - Pilot to Berth	1.00	4	4,800	0.50	MGO	1.0	311	49	10	13	12	0
	Maneuvering - Berth to Pilot	1.00	2	4,800	0.50	MGO	1.0	155	25	5	6	6	0
							<b>TOTAL</b>	<b>466</b>	<b>74</b>	<b>15</b>	<b>19</b>	<b>18</b>	<b>0</b>
AFRAMAX	Maneuvering - Pilot to Berth	1.00	2	4,800	0.50	MGO	1.0	155	25	5	6	6	0
	Maneuvering - Berth to Pilc	1.00	2	4,800	0.50	MGO	1.0	155	25	5	6	6	0
							<b>TOTAL</b>	<b>311</b>	<b>49</b>	<b>10</b>	<b>13</b>	<b>12</b>	<b>0</b>
PANAMAX	Maneuvering - Pilot to Berth	1.00	2	4,800	0.50	MGO	1.0	155	25	5	6	6	0
	Maneuvering - Berth to Pilot	1.00	2	4,800	0.50	MGO	1.0	155	25	5	6	6	0
							<b>TOTAL</b>	<b>311</b>	<b>49</b>	<b>10</b>	<b>13</b>	<b>12</b>	<b>0</b>
SUEZMAX	Maneuvering - Pilot to Berth	1.00	3	4,800	0.50	MGO	1.0	233	37	7	10	9	0
	Maneuvering - Berth to Pilc	1.00	2	4,800	0.50	MGO	1.0	155	25	5	6	6	0
							<b>TOTAL</b>	<b>388</b>	<b>62</b>	<b>12</b>	<b>16</b>	<b>15</b>	<b>0</b>
							<b>MAXIMUM</b>	<b>466</b>	<b>74</b>	<b>15</b>	<b>19</b>	<b>18</b>	<b>0</b>

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Table H.2.PP.Un.Max.2010-9. 2010 Proposed Project Tug Auxiliary Generator Engines Maximum Daily Unmit Emissions.

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Shipcalls (vessels/day)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
VLCC	Maneuvering - Pilot to Berth	1.00	4	300	1.00	MGO	1.0	32	6	1	1	1	0
	Maneuvering - Berth to Pilot	1.00	2	300	1.00	MGO	1.0	16	3	0	1	1	0
							<b>TOTAL</b>	<b>48</b>	<b>8</b>	<b>1</b>	<b>2</b>	<b>2</b>	<b>0</b>
AFRAMAX	Maneuvering - Pilot to Berth	1.00	2	300	1.00	MGO	1.0	16	3	0	1	1	0
	Maneuvering - Berth to Pilot	1.00	2	300	1.00	MGO	1.0	16	3	0	1	1	0
							<b>TOTAL</b>	<b>32</b>	<b>6</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>0</b>
PANAMAX	Maneuvering - Pilot to Berth	1.00	2	300	1.00	MGO	1.0	16	3	0	1	1	0
	Maneuvering - Berth to Pilot	1.00	2	300	1.00	MGO	1.0	16	3	0	1	1	0
							<b>TOTAL</b>	<b>32</b>	<b>6</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>0</b>
SUEZMAX	Maneuvering - Pilot to Berth	1.00	3	300	1.00	MGO	1.0	24	4	1	1	1	0
	Maneuvering - Berth to Pilot	1.00	2	300	1.00	MGO	1.0	16	3	0	1	1	0
							<b>TOTAL</b>	<b>40</b>	<b>7</b>	<b>1</b>	<b>2</b>	<b>2</b>	<b>0</b>
							<b>MAXIMUM</b>	<b>48</b>	<b>8</b>	<b>1</b>	<b>2</b>	<b>2</b>	<b>0</b>

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Table H.2.PP.Un.Max.2010-10. 2010 Proposed Project Summary of Tug Maximum Daily Unmitigated Emissions.

Mode	Equipment	Maximum Daily NO <sub>x</sub> Emissions (lb/day)	Maximum Daily CO Emissions (lb/day)	Maximum Daily ROG Emissions (lb/day)	Maximum Daily PM <sub>10</sub> Emissions (lb/day)	Maximum Daily PM <sub>2.5</sub> Emissions (lb/day)	Maximum Daily SO <sub>2</sub> Emissions (lb/day)
Tug Assist	Main Engines	466	74	15	19	18	0
Tug Assist	Aux Generator	48	8	1	2	2	0
<b>TOTAL</b>		<b>514</b>	<b>82</b>	<b>16</b>	<b>21</b>	<b>20</b>	<b>0</b>



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Table H.2.PP.Un.Max.2010-11. 2010 Proposed Project VDU Crude Maximum Daily Unmitigated Emissions.

	Maximum Daily Vessel Calls	crude vapors from tanks(scf/call)	daily gas usage (mmscf/day)	mw crude vapors	destruction efficiency
Aframax	1	224000	0.2	50	98%
VLCC	1	596,313	0.6	50	98%
Panamax	1	116,667	0.1	50	98%
Suezmax	1	333,333	0.3	50	98%
<b>TOTAL</b>	<b>4</b>		<b>1.3</b>		

<b>Assumed Distribution based on tank storage volume:</b>	
<b>Site 1</b>	<b>12.5%</b>
<b>Site 2</b>	<b>87.5%</b>

Maximum Daily Emissions (lb/day)

	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene
EF (lb/MMSCF)	130	35	7	7.5	0.38%	9.90%	0.017	0.0004	0.0003	0.0043	0.0027	0.731	0.0366	0.0272	0.0095
Aframax	14.6	3.9	0.8	0.8	0.00	0.08	0.0	0.000	0.000	0.000	0.000	0.1	0.0	0.0	0.0
VLCC	38.8	10.4	2.1	2.2	0.01	0.21	0.0	0.000	0.000	0.001	0.001	0.2	0.0	0.0	0.0
Panamax	7.6	2.0	0.4	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Suezmax	21.7	5.8	1.2	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0
<b>MAXIMUM</b>	<b>38.8</b>	<b>10.4</b>	<b>2.1</b>	<b>2.2</b>	<b>0.0</b>	<b>0.2</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.2</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>

Assumed a ratio of 500/1000 based on the corresponding Btu values with respect to natural gas combustion emission factors.

Maximum Daily Emissions (lb/day)

	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene	SO <sub>x</sub>
Site 1	5	1.3	0.26	0.3	0.001	0.03	0.001	0.0000	0.0000	0.0002	0.0001	0.03	0.001	0.001	0.000	2
Site 2	34	9	1.8	2.0	0.01	0.18	0.004	0.0001	0.0001	0.001	0.001	0.2	0.01	0.01	0.002	13

2.09

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Table H.2.PP.Un.Max.2010-12. 2010 Proposed Project VDU Legs Maximum Daily Unmitigated Emissions.

	tanks	crude vapors from tanks on legs(scfd/day)	daily gas usage (mmscf/day)	mw crude vapors	destruction efficiency
Site 1	2	23671.23	0.05	50	98%
Site 2	14	23671.23	0.3	50	98%
TOTAL	16		0.4		

48	hr/event
6	events/yr
500	ft3/min

Maximum Daily Emissions (lb/day)															
	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene
EF (lb/MMSCF)	130	35	7	7.5	0.38%	9.90%	0.017	0.0004	0.0003	0.0043	0.0027	0.731	0.0366	0.0272	0.0095
<b>TOTAL</b>	<b>24.6</b>	<b>6.6</b>	<b>1.3</b>	<b>1.4</b>	<b>0.0</b>	<b>0.1</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.1</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>

Assumed a ratio of 500/1000 based on the corresponding Btu values with respect to natural gas combustion emission factors.

Maximum Daily Emissions (lb/day)																
	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene	SO <sub>x</sub>
Site 1	3.1	0.8	0.2	0.2	0.00	0.02	0.00	0.000	0.000	0.000	0.00	0.02	0.00	0.00	0.00	1
Site 2	21.5	5.8	1.2	1.2	0.00	0.11	0.00	0.000	0.000	0.001	0.00	0.12	0.01	0.00	0.00	4



Table H.2.PP.Un.Max.Bar.2010-1. 2010 Proposed Project Main Engines Maximum Daily Unmitigated Emissions from Barge Fuel Deliveries for OGV.

Ship	Direction	Mode	Distance (nautical miles)	Ship speed (knots)	Activity (hours)	Maximum Speed (knots)	Load Factor	MCR (kW)	Energy (kW-hr)	Fuel Type	Shipcalls (vessels/ yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Barge	North In	Volpak to Berth 408	5	3	1.67	3	1.00	4,800	8,000.00	MGO	1.0	291	24	11	16	16	16	18
Barge	North Out	Volpak to Berth 408	5	3	1.67	3.0	1.00	4,800	8,000.00	MGO	1.0	291	24	11	16	16	16	18
TOTAL												581	48	22	32	32	32	36

Table H.2.PP.Un.Max.Bar.2010-2. 2010 Proposed Project Tug Main Engines Maximum Daily Unmitigated Emissions from Barge Fuel Deliveries for OGV.

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Shipcalls (vessels/day)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Barge	Maneuvering - Pilot to Berth	1.00	1	4,800	0.50	MGO	1.0	87	7	3	5	4	5
	Maneuvering - Berth to Pilot	1.00	1	4,800	0.50	MGO	1.0	87	7	3	5	4	5
<b>TOTAL</b>								<b>174</b>	<b>15</b>	<b>7</b>	<b>10</b>	<b>9</b>	<b>11</b>
<b>MAXIMUM</b>								<b>174</b>	<b>15</b>	<b>7</b>	<b>10</b>	<b>9</b>	<b>11</b>

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Table H.2.PP.Un.Max.Bar.2010-3. 2010 Proposed Project Tug Auxiliary Generator Engines Maximum Daily Unmitigated Emissions from Barge Fuel Deliveries for OGV.

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Shipcalls (vessels/day)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Barge	Maneuvering - Pilot to Berth	1.00	1	300	1.00	MGO	1.0	8	1	0	0	0	1
	Maneuvering - Berth to Pilot	1.00	1	300	1.00	MGO	1.0	8	1	0	0	0	1
<b>TOTAL</b>								<b>17</b>	<b>3</b>	<b>0</b>	<b>1</b>	<b>1</b>	<b>1</b>
<b>MAXIMUM</b>								<b>17</b>	<b>3</b>	<b>0</b>	<b>1</b>	<b>1</b>	<b>1</b>

Table H.2.PP.Un.Max.Bar.2010-4. 2010 Proposed Project Summary of Tug Maximum Daily Unmitigated Emissions from Barge Fuel Deliveries for OGV.

Mode	Equipment	Maximum Daily NO <sub>x</sub> Emissions (lb/day)	Maximum Daily CO Emissions (lb/day)	Maximum Daily ROG Emissions (lb/day)	Maximum Daily PM <sub>10</sub> Emissions (lb/day)	Maximum Daily PM <sub>2.5</sub> Emissions (lb/day)	Maximum Daily SO <sub>2</sub> Emissions (lb/day)
Tug Assist	Main Engines	174	15	7	10	9	11
Tug Assist	Aux Generator	17	3	0	1	1	1
<b>TOTAL</b>		<b>191</b>	<b>17</b>	<b>7</b>	<b>10</b>	<b>9</b>	<b>12</b>

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Table H.2.PP.Un.Max.Bar.2010-5. 2010 Proposed Project Summary of Maximum Daily Unmitigated Vessel Emissions from Barge Fuel Deliveries for OGV.

Operation	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Barge	581	48	22	32	32	36
Tug Assistance	191	17	7	10	9	12
<b>TOTAL</b>	<b>772</b>	<b>66</b>	<b>29</b>	<b>42</b>	<b>41</b>	<b>48</b>

Operation	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Barge	1.59	0.13	0.06	0.09	0.09	0.10
Tug Assistance	0.52	0.05	0.02	0.03	0.03	0.03
<b>TOTAL</b>	<b>2.12</b>	<b>0.18</b>	<b>0.08</b>	<b>0.11</b>	<b>0.11</b>	<b>0.13</b>



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Table H.2.PP.Un.2015-1. 2015 Proposed Project Main Engines Average Daily Unmitigated Emissions.

Ship	Direction	Mode	Distance (nautical miles)	Ship speed (knots)	Activity (hours)	Maximum Speed (knots)	Load Factor	MCR (kW)	Energy (kW-hr)	Fuel Type	Shipcalls (vessels/yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)	
VLCC	North In	Cruising - CW to VSR	22	15.54	1.42	16.9	0.777	25,400	27,957	HFO	51.0	71,056	5,496	2,355	6,124	6,124	5,634	41,220	
		Cruising - VSR to PZ	21	12	1.75	16.9	0.358	25,400	15,913	HFO	51.0	40,444	3,128	1,341	3,486	3,486	3,207	23,462	
		Cruising - PZ to Pilot	4.7	7	0.67	16.9	0.071	25,400	1,212	HFO	51.0	4,361	671	482	458	458	421	1,787	
	North Out	Maneuvering - Pilot to Berth		3	1.00	16.9	0.006	25,400	142	HFO	51.0	5,818	999	2,557	848	848	780	209	
		Maneuvering - Berth to Pilot		5	1.00	16.9	0.026	25,400	658	HFO	51.0	5,017	999	1,189	643	643	592	970	
		Cruising - Pilot to PZ		3.8	7	0.54	16.9	0.071	25,400	980	HFO	51.0	3,526	542	390	370	370	341	1,445
		Cruising - PZ to VSR		21	12	1.75	16.9	0.358	25,400	15,913	HFO	51.0	40,444	3,128	1,341	3,486	3,486	3,207	23,462
		Cruising - VSR to CW		22	15.54	1.42	16.9	0.777	25,400	27,957	HFO	51.0	71,056	5,496	2,355	6,124	6,124	5,634	41,220
AFRAMAX	South In	Cruising - CW to VSR	23	14.7	1.56	16.1	0.761	12,477	14,859	HFO	24.0	17,772	1,375	589	1,532	1,532	1,409	10,310	
		Cruising - VSR to PZ	11	12	0.92	16.1	0.414	12,477	4,736	HFO	24.0	5,664	438	188	488	488	449	3,286	
		Cruising - PZ to Pilot	4.7	7	0.67	16.1	0.082	12,477	689	HFO	24.0	1,088	155	104	111	111	102	478	
	South Out	Maneuvering - Pilot to Berth		3	1.00	16.1	0.006	12,477	81	HFO	24.0	1,459	231	550	212	212	195	56	
		Maneuvering - Berth to Pilot		5	1.00	16.1	0.030	12,477	374	HFO	24.0	1,303	231	256	167	167	153	259	
		Cruising - Pilot to PZ		3.5	7	0.50	16.1	0.082	12,477	513	HFO	24.0	810	115	77	83	83	76	356
		Cruising - PZ to VSR		12.5	12	1.04	16.1	0.414	12,477	5,382	HFO	24.0	6,436	498	213	555	555	510	3,734
		Cruising - VSR to CW		24.5	14.7	1.67	16.1	0.761	12,477	15,828	HFO	24.0	18,931	1,464	628	1,632	1,632	1,501	10,982
PANAMAX	South In	Cruising - CW to VSR	23	14.7	1.56	15.8	0.805	10,300	12,979	HFO	12	7,761	600	257	669	669	615	4,502	
		Cruising - VSR to PZ	11	12	0.92	15.8	0.438	10,300	4,136	HFO	12	2,474	191	82	213	213	196	1,435	
		Cruising - PZ to Pilot	4.7	7	0.67	15.8	0.087	10,300	601	HFO	12	360	28	12	31	31	29	209	
	South Out	Maneuvering - Pilot to Berth		3	1.00	15.8	0.007	10,300	71	HFO	12	42	3	1	4	4	3	24	
		Maneuvering - Berth to Pilot		5	1.00	15.8	0.032	10,300	326	HFO	12	195	15	6	17	17	15	113	
		Cruising - Pilot to PZ		3.5	7	0.50	15.8	0.087	10,300	448	HFO	12	268	21	9	23	23	21	155
		Cruising - PZ to VSR		12.5	12	1.04	15.8	0.438	10,300	4,700	HFO	12	2,811	217	93	242	242	223	1,631
		Cruising - VSR to CW		24.5	14.7	1.67	15.8	0.805	10,300	13,825	HFO	12	8,268	639	274	713	713	656	4,796
SUEZMAX	North In	Cruising - CW to VSR	22	15.54	1.42	17	0.764	16,000	17,302	HFO	60	51,735	4,002	1,715	4,459	4,459	4,102	30,012	
		Cruising - VSR to PZ	21	12	1.75	17	0.352	16,000	9,848	HFO	60	29,447	2,278	976	2,538	2,538	2,335	17,082	
		Cruising - PZ to Pilot	4.7	7	0.67	17	0.070	16,000	750	HFO	60	2,243	173	74	193	193	178	1,301	
	North Out	Maneuvering - Pilot to Berth		3	1.00	17	0.005	16,000	88	HFO	60	263	20	9	23	23	21	153	
		Maneuvering - Berth to Pilot		5	1.00	17	0.025	16,000	407	HFO	60	1,217	94	40	105	105	97	706	
		Cruising - Pilot to PZ		3.8	7	0.54	17	0.070	16,000	606	HFO	60	1,813	140	60	156	156	144	1,052
		Cruising - PZ to VSR		21	12	1.75	17	0.352	16,000	9,848	HFO	60	29,447	2,278	976	2,538	2,538	2,335	17,082
		Cruising - VSR to CW		22	15.54	1.42	17	0.764	16,000	17,302	HFO	60	51,735	4,002	1,715	4,459	4,459	4,102	30,012
<b>TOTAL</b>												<b>485,264</b>	<b>39,669</b>	<b>20,914</b>	<b>42,700</b>	<b>42,700</b>	<b>39,284</b>	<b>273,502</b>	

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Un.2015-2. 2015 Proposed Project Auxiliary Generator Average Daily Unmit Emissions

Ship	Direction	Mode	Activity (hours)	MCR (kW)	Load Factor	Energy (kW-hr)	Fuel Type	Shipcalls (vessels/yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
VLCC	North In	Cruising	3.84	3,600	0.278	3,840	HFO	51.0	7,927	593	216	809	776	621	6,633
		Maneuvering	2.00	3,600	0.278	2,002	HFO	51.0	4,132	309	112	422	405	324	3,457
	North Out	Maneuvering	1.50	3,600	0.278	1,501	HFO	51.0	3,099	232	84	316	304	243	2,593
		Cruising	3.71	3,600	0.278	3,712	HFO	51.0	7,661	573	208	782	750	600	6,410
AFRAMAX	South In	Cruising	3.15	3,600	0.278	3,155	HFO	24.0	3,065	229	83	313	300	240	2,565
		Maneuvering	2.00	3,600	0.278	2,002	HFO	24.0	1,944	145	53	198	190	152	1,627
	South Out	Maneuvering	1.50	3,600	0.278	1,501	HFO	24.0	1,458	109	40	149	143	114	1,220
		Cruising	3.21	3,600	0.278	3,211	HFO	24.0	3,119	233	85	318	306	244	2,610
PANAMAX	South In	Cruising	3.15	3,600	0.278	3,155	HFO	12	1,532	115	42	156	150	120	1,282
		Maneuvering	2.00	3,600	0.278	2,002	HFO	12	972	73	26	99	95	76	813
	South Out	Maneuvering	1.5	3,600	0.278	1,501	HFO	12	729	55	20	74	71	57	610
		Cruising	3.21	3,600	0.278	3,211	HFO	12	1,559	117	42	159	153	122	1,305
SUEZMAX	North In	Cruising	3.84	3,600	0.278	3,840	HFO	60	9,326	698	254	952	914	731	7,803
		Maneuvering	2.00	3,600	0.278	2,002	HFO	60	4,861	364	132	496	476	381	4,067
	North Out	Maneuvering	1.5	3,600	0.278	1,501	HFO	60	3,646	273	99	372	357	286	3,050
		Cruising	3.71	3,600	0.278	3,712	HFO	60	9,013	674	245	920	883	706	7,542
<b>TOTAL</b>									<b>64,043</b>	<b>4,792</b>	<b>1,743</b>	<b>6,535</b>	<b>6,274</b>	<b>5,019</b>	<b>53,587</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Un.2015-3. 2015 Proposed Project Boiler Warm-Up Average Daily Unmitigated Emissions.

Shipcalls (vessels/yr)	Vessel Size	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
24.0	Aframax	HFO	2.70	107.96	30%	3	50,000	1,015	92	23	212	183	119	7,852
51.0	VLCC	HFO	2.70	84.93	30%	3	90,000	2,608	276	57	1,640	1,410	358	23,628
12.0	Panamax	HFO	2.70	63.30	30%	3	35,000	208	19	5	44	37	24	1,611
60.0	Suezmax	HFO	2.70	87.54	30%	3	70,000	2,881	260	66	603	518	337	22,285
<b>TOTAL</b>								<b>6,712</b>	<b>646</b>	<b>151</b>	<b>2,498</b>	<b>2,149</b>	<b>838</b>	<b>55,377</b>

Table H.2.PP.Un.2015-4. 2015 Proposed Project Berth Operations Average Daily Unmitigated Emissions.

Auxiliary Generator Pre-Pumpin

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bb/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
24.0	Aframax	700,000	HFO	2.70	3,600	27.8%	2.5	2,430	182	66	248	238	190	2,034
51.0	VLCC	2,000,000	HFO	2.70	3,600	27.8%	2.5	5,165	386	141	527	506	405	4,321
12.0	Panamax	350,000	HFO	2.70	3,600	27.8%	2.5	1,215	91	33	124	119	95	1,017
60.0	Suezmax	1,000,000	HFO	2.70	3,600	27.8%	2.5	6,076	455	165	620	595	476	5,084
<b>TOTAL</b>								<b>14,886</b>	<b>1,114</b>	<b>405</b>	<b>1,519</b>	<b>1,458</b>	<b>1,167</b>	<b>12,456</b>

Boiler Pre-Pumping

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bb/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
24.0	Aframax	700,000	HFO	2.70	107.96	30.0%	2.5	50,000	846	76	19	177	152	99	6,544
51.0	VLCC	2,000,000	HFO	2.70	84.93	30.0%	2.5	90,000	2,173	230	47	1,367	1,175	765	19,690
12.0	Panamax	350,000	HFO	2.70	63.30	30.0%	2.5	35,000	174	16	4	36	31	20	1,343
60.0	Suezmax	1,000,000	HFO	2.70	87.54	30.0%	2.5	70,000	2,400	217	55	502	432	281	18,571
<b>TOTAL</b>									<b>5,593</b>	<b>538</b>	<b>126</b>	<b>2,082</b>	<b>1,791</b>	<b>1,166</b>	<b>46,148</b>

Auxiliary Generator Pumpin

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bb/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
24.0	Aframax	700,000	MDO	0.52	3,600	55.6%	15.0	27,577	2,182	794	595	571	457	4,700
51.0	VLCC	2,000,000	MDO	0.52	3,600	55.6%	23.2	90,724	7,180	2,611	1,958	1,880	1,504	15,461
12.0	Panamax	350,000	MDO	0.52	3,600	55.6%	11.0	10,112	800	291	218	210	168	1,723
60.0	Suezmax	1,000,000	MDO	0.52	3,600	55.6%	15.3	70,322	5,565	2,024	1,518	1,457	1,166	11,984
<b>TOTAL</b>								<b>198,734</b>	<b>15,727</b>	<b>5,719</b>	<b>4,289</b>	<b>4,118</b>	<b>3,294</b>	<b>33,869</b>

Boiler Pumping

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bb/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Inerting Fuel Consumption Savings (lb/1000 bbl offloaded)	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
24.0	Aframax	700,000	MDO	0.52	102.17	28.06	15.0	4,410	1,102	62	730	511	342	16,149
51.0	VLCC	2,000,000	MDO	0.52	80.38	28.06	23.2	22,628	4,725	998	3,128	2,190	1,464	69,216
12.0	Panamax	350,000	MDO	0.52	59.91	28.06	11.0	474	118	7	78	55	37	1,735
60.0	Suezmax	1,000,000	MDO	0.52	82.85	28.06	15.3	11,644	2,911	164	1,927	1,349	902	42,639
<b>TOTAL</b>								<b>39,156</b>	<b>8,857</b>	<b>1,231</b>	<b>5,863</b>	<b>4,104</b>	<b>2,744</b>	<b>129,739</b>

Auxiliary Generator Post-Pumpin

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bb/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
24.0	Aframax	700,000	HFO	2.70	3,600	27.8%	1.0	972	73	26	99	95	76	813
51.0	VLCC	2,000,000	HFO	2.70	3,600	27.8%	1.0	2,066	155	56	211	202	162	1,729
12.0	Panamax	350,000	HFO	2.70	3,600	27.8%	1.0	486	36	13	50	48	38	407
60.0	Suezmax	1,000,000	HFO	2.70	3,600	27.8%	1.0	2,430	182	66	248	238	190	2,034
<b>TOTAL</b>								<b>5,954</b>	<b>446</b>	<b>162</b>	<b>608</b>	<b>583</b>	<b>467</b>	<b>4,982</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Un.2015-5. 2015 Proposed Project Summary of Average Daily Unmitigated Vessel Emissions.

Mode	Equipment	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Cruising	Main Engines	469,949	37,076	16,307	40,682	40,682	37,428	271,011
Cruising	Aux Generator	43,202	3,233	1,176	4,408	4,232	3,386	36,149
Maneuvering	Main Engines	15,315	2,593	4,608	2,018	2,018	1,856	2,491
Maneuvering	Aux Generator	20,840	1,559	567	2,127	2,041	1,633	17,438
Boiler Warm-up	Boiler	6,712	646	151	2,498	2,149	838	55,377
Berth Operations	Boiler	44,749	9,396	1,357	7,945	5,895	3,910	175,887
Berth Operations	Aux Generator	219,574	17,287	6,286	6,416	6,159	4,927	51,307
Propulsion	TOTAL	549,307	44,462	22,657	49,235	48,974	44,303	327,089
Non-Propulsion	TOTAL	271,035	27,328	7,794	16,859	14,203	9,676	282,571
<b>Total Emissions</b>		<b>820,342</b>	<b>71,790</b>	<b>30,451</b>	<b>66,094</b>	<b>63,176</b>	<b>53,979</b>	<b>609,660</b>

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Cruising	Main Engines	1,287.5	101.6	44.7	111.5	111.5	102.5	742.5
Cruising	Aux Generator	118.4	8.9	3.2	12.1	11.6	9.3	99.0
Maneuvering	Main Engines	42.0	7.1	12.6	5.5	5.5	5.1	6.8
Maneuvering	Aux Generator	57.1	4.3	1.6	5.8	5.6	4.5	47.8
Boiler Warm-up	Boiler	18.4	1.8	0.4	6.8	5.9	2.3	151.7
Berth Operations	Boiler	122.6	25.7	3.7	21.8	16.2	10.7	481.9
Berth Operations	Aux Generator	601.6	47.4	17.2	17.6	16.9	13.5	140.6
Propulsion	TOTAL	1,505.0	121.8	62.1	134.9	134.2	121.4	896.1
Non-Propulsion	TOTAL	742.6	74.9	21.4	46.2	38.9	26.5	774.2
<b>Total Emissions</b>		<b>2,248</b>	<b>197</b>	<b>83</b>	<b>181</b>	<b>173</b>	<b>148</b>	<b>1,670</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Un.2015-6. 2015 Proposed Project Tug Main Engines Average Daily Unmitigated Emissions.

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Shipcalls (vessels/yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
VLCC	Maneuvering - Pilot to Berth	1.00	4	4,800	0.50	MGO	51.0	13,534	2,521	485	580	533	8
	Maneuvering - Berth to Pilot	1.00	2	4,800	0.50	MGO	51.0	6,767	1,260	243	290	267	4
AFRAMAX	Maneuvering - Pilot to Berth	1.00	2	4,800	0.50	MGO	24.0	3,184	593	114	136	125	2
	Maneuvering - Berth to Pilc	1.00	2	4,800	0.50	MGO	24.0	3,184	593	114	136	125	2
PANAMAX	Maneuvering - Pilot to Berth	1.00	2	4,800	0.50	MGO	12.0	1,592	297	57	68	63	1
	Maneuvering - Berth to Pilot	1.00	2	4,800	0.50	MGO	12.0	1,592	297	57	68	63	1
SUEZMAX	Maneuvering - Pilot to Berth	1.00	3	4,800	0.50	MGO	60.0	11,942	2,224	428	511	471	7
	Maneuvering - Berth to Pilc	1.00	2	4,800	0.50	MGO	60.0	7,961	1,483	285	341	314	5
<b>TOTAL</b>								<b>49,758</b>	<b>9,268</b>	<b>1,784</b>	<b>2,131</b>	<b>1,961</b>	<b>30</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Un.2015-7. 2015 Proposed Project Tug Auxiliary Generator Engines Average Daily Unmit Emissions

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Shipcalls (vessels/yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
VLCC	Maneuvering - Pilot to Berth	1.00	4	300	1.00	MGO	51.0	1,501	281	45	67	62	1
	Maneuvering - Berth to Pilot	1.00	2	300	1.00	MGO	51.0	751	141	23	34	31	0
AFRAMAX	Maneuvering - Pilot to Berth	1.00	2	300	1.00	MGO	24.0	353	66	11	16	15	0
	Maneuvering - Berth to Pilot	1.00	2	300	1.00	MGO	24.0	353	66	11	16	15	0
PANAMAX	Maneuvering - Pilot to Berth	1.00	2	300	1.00	MGO	12.0	177	33	5	8	7	0
	Maneuvering - Berth to Pilot	1.00	2	300	1.00	MGO	12.0	177	33	5	8	7	0
SUEZMAX	Maneuvering - Pilot to Berth	1.00	3	300	1.00	MGO	60.0	1,325	248	40	59	55	1
	Maneuvering - Berth to Pilot	1.00	2	300	1.00	MGO	60.0	883	166	27	40	36	0
<b>TOTAL</b>								<b>5,520</b>	<b>1,035</b>	<b>167</b>	<b>248</b>	<b>228</b>	<b>2</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Un.2015-8. 2015 Proposed Project Summary of Tug Average Daily Unmitigated Emissions.

Mode	Equipment	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Tug Assist	Main Engines	49,758	9,268	1,784	2,131	1,961	30
Tug Assist	Aux Generator	5,520	1,035	167	248	228	2
<b>TOTAL</b>		<b>55,277</b>	<b>10,302</b>	<b>1,951</b>	<b>2,379</b>	<b>2,189</b>	<b>32</b>

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Tug Assist	Main Engines	136	25.4	4.9	5.8	5.4	0.1
Tug Assist	Aux Generator	15	2.8	0.5	0.7	0.6	0.0
<b>TOTAL</b>		<b>151</b>	<b>28.2</b>	<b>5.3</b>	<b>6.5</b>	<b>6.0</b>	<b>0.1</b>



Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Un.2015-9. 2015 Proposed Project VDU Crude Average Daily Unmitigated Emissions.

	Annual Vessel Calls	crude vapors from tanks(scft/call)	annual gas usage (mmscf/yr)	mw crude vapors	destruction efficiency
Aframax	24	224000	5.4	50	98%
VLCC	51	596,313	30.4	50	98%
Panamax	12	116,667	1.4	50	98%
Suezmax	60	333,333	20.0	50	98%
<b>TOTAL</b>	<b>147</b>		<b>57.2</b>		

Assumed Distribution based on tank storage volume:  
 Site 1 12.5%  
 Site 2 87.5%

Annual Average (lb/yr)

	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene
EF (lb/MMSCF)	130	35	7	7.5	0.38%	9.90%	0.017	0.0004	0.0003	0.0043	0.0027	0.731	0.0366	0.0272	0.0095
Aframax	349.4	94.1	18.8	20.2	0.07	1.86	0.0	0.001	0.001	0.012	0.007	2.0	0.1	0.1	0.0
VLCC	1976.8	532.2	106.4	114.0	0.40	10.54	0.3	0.006	0.005	0.065	0.041	11.1	0.6	0.4	0.1
Panamax	91.0	24.5	4.9	5.3	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0
Suezmax	1300.0	350.0	70.0	75.0	0.0	1.0	0.2	0.0	0.0	0.0	0.0	7.3	0.4	0.3	0.1
<b>TOTAL</b>	<b>3717.2</b>	<b>1000.8</b>	<b>200.2</b>	<b>214.5</b>	<b>0.5</b>	<b>13.5</b>	<b>0.5</b>	<b>0.0</b>	<b>0.0</b>	<b>0.1</b>	<b>0.1</b>	<b>20.9</b>	<b>1.0</b>	<b>0.8</b>	<b>0.3</b>

Assumed a ratio of 500/1000 based on the corresponding Btu values with respect to natural gas combustion emission factors.

Annual Average (lb/yr)

	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene	SO <sub>x</sub>
Site 1	465	125.1	25.02	26.8	0.065	1.68	0.061	0.0014	0.0011	0.0154	0.0097	2.61	0.131	0.097	0.034	83
Site 2	3253	876	175.1	187.6	0.45	11.78	0.425	0.0100	0.0075	0.108	0.068	18.3	0.92	0.68	0.238	582

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Table H.2.PP.Un.2015-10. 2015 Proposed Project VDU Legs Average Daily Unmitigated Emissions.

	tanks	crude vapors from tanks on legs(scf/yr)	annual gas usage (mmscf/yr)	mw crude vapors	destruction efficiency
Site 1	4	8640000	34.6	50	98%
Site 2	14	8640000	121.0	50	98%
<b>TOTAL</b>	<b>18</b>		<b>155.5</b>		

<b>48</b>	<b>hr/event</b>
<b>6</b>	<b>events/yr</b>
<b>500</b>	<b>ft3/min</b>

		Annual Average (lb/yr)													
	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene
EF (lb/MMSCF)	130	35	7	7.5	0.38%	9.90%	0.017	0.0004	0.0003	0.0043	0.0027	0.731	0.0366	0.0272	0.0095
<b>TOTAL</b>	<b>10108.8</b>	<b>2721.6</b>	<b>544.3</b>	<b>583.2</b>	<b>2.1</b>	<b>53.9</b>	<b>1.3</b>	<b>0.0</b>	<b>0.0</b>	<b>0.3</b>	<b>0.2</b>	<b>56.8</b>	<b>2.8</b>	<b>2.1</b>	<b>0.7</b>

Assumed a ratio of 500/1000 based on the corresponding Btu values with respect to natural gas combustion emission factors.

		Annual Average (lb/yr)														
	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene	SO <sub>x</sub>
Site 1	2246.4	604.8	121.0	129.6	0.46	11.98	0.29	0.007	0.005	0.074	0.05	12.63	0.63	0.47	0.16	402
Site 2	7862.4	2116.8	423.4	453.6	1.61	41.91	1.03	0.024	0.018	0.260	0.16	44.21	2.21	1.65	0.57	1407



Table H.2.PP.Un.Bar.2015-1. 2015 Proposed Project Main Engines Average Daily Unmitigated Emissions from Barge Fuel Deliveries for OGV.

Ship	Direction	Mode	Distance (nautical miles)	Ship speed (knots)	Activity (hours)	Maximum Speed (knots)	Load Factor	MCR (kW)	Energy (kW-hr)	Fuel Type	Shipcalls (vessels/ yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Barge	North In	Volpak to Berth 408	5	3	1.67	3	0.50	4,800	4,000.00	MGO	8.0	1,163	97	44	63	63	63	71
Barge	North Out	Volpak to Berth 408	5	3	1.67	3.0	0.50	4,800	4,000.00	MGO	8.0	1,163	97	44	63	63	63	71
TOTAL												2,326	194	88	127	127	127	143

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Table H.2.PP.Un.Bar.2015-2. 2015 Proposed Project Tug Main Engines Average Daily Unmitigated Emissions from Barge Fuel Deliveries for OGV.

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Shipcalls (vessels/yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Barge	Maneuvering - Pilot to Berth	1.00	1	4,800	0.50	MGO	8.0	698	58	26	38	35	43
	Maneuvering - Berth to Pilot	1.00	1	4,800	0.50	MGO	8.0	698	58	26	38	35	43
TOTAL								1,396	116	53	76	70	86

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Table H.2.PP.Un.Bar.2015-3. 2015 Proposed Project Tug Auxiliary Generator Engines Average Daily Unmitigated Emissions from Barge Fuel Deliveries for OGV.

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Shipcalls (vessels/yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Barge	Maneuvering - Pilot to Berth	1.00	1	300	1.00	MGO	8.0	66	11	2	3	2	5
	Maneuvering - Berth to Pilot	1.00	1	300	1.00	MGO	8.0	66	11	2	3	2	5
<b>TOTAL</b>								<b>132</b>	<b>22</b>	<b>4</b>	<b>5</b>	<b>5</b>	<b>11</b>

**Table H.2.PP.Un.Bar.2015-4. 2015 Proposed Project Summary of Tug Average Daily Unmitigated Emissions from Barge Fuel Deliveries for OGV.**

<b>Mode</b>	<b>Equipment</b>	<b>NO<sub>x</sub> Emissions (lb/yr)</b>	<b>CO Emissions (lb/yr)</b>	<b>ROG Emissions (lb/yr)</b>	<b>PM<sub>10</sub> Emissions (lb/yr)</b>	<b>PM<sub>2.5</sub> Emissions (lb/yr)</b>	<b>SO<sub>2</sub> Emissions (lb/yr)</b>
Tug Assist	Main Engines	1,396	116	53	76	70	86
Tug Assist	Aux Generator	132	22	4	5	5	11
<b>TOTAL</b>		<b>1,528</b>	<b>139</b>	<b>56</b>	<b>81</b>	<b>75</b>	<b>96</b>

<b>Mode</b>	<b>Equipment</b>	<b>NO<sub>x</sub> Emissions (lb/day)</b>	<b>CO Emissions (lb/day)</b>	<b>ROG Emissions (lb/day)</b>	<b>PM<sub>10</sub> Emissions (lb/day)</b>	<b>PM<sub>2.5</sub> Emissions (lb/day)</b>	<b>SO<sub>2</sub> Emissions (lb/day)</b>
Tug Assist	Main Engines	4	0.3	0.1	0.2	0.2	0.2
Tug Assist	Aux Generator	0.36	0.06	0.01	0.01	0.01	0.03
<b>TOTAL</b>		<b>4</b>	<b>0.4</b>	<b>0.2</b>	<b>0.2</b>	<b>0.2</b>	<b>0.3</b>

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Table H.2.PP.Un.Bar.2015-5. 2015 Proposed Project Summary of Average Daily Unmitigated Vessel Emissions from Barge Fuel Deliveries for OGV.

Operation	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Barge	2,326	194	88	127	127	143
Tug Assistance	1,528	139	56	81	75	96
<b>TOTAL</b>	<b>3,854</b>	<b>333</b>	<b>145</b>	<b>208</b>	<b>202</b>	<b>239</b>

Operation	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Barge	6.37	0.53	0.24	0.35	0.35	0.39
Tug Assistance	4.19	0.38	0.15	0.22	0.21	0.26
<b>TOTAL</b>	<b>10.56</b>	<b>0.91</b>	<b>0.40</b>	<b>0.57</b>	<b>0.55</b>	<b>0.65</b>



Table H.2.PP.Un.Max.2015-1. 2015 Proposed Project Main Engines Maximum Daily Unmitigated Emissions.

Ship	Direction	Mode	Distance (nautical miles)	Ship speed (knots)	Activity (hours)	Maximum Speed (knots)	Load Factor	MCR (kW)	Energy (kW-hr)	Fuel Type	Maximum Daily Shipcalls (vessels/day)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
VLCC	North In	Cruising - CW to VSR	22	15.54	1.42	16.9	0.777	25,400	27,957	HFO	1.0	1,393	108	46	120	120	110	808
		Cruising - VSR to PZ	21	12	1.75	16.9	0.358	25,400	15,913	HFO	1.0	793	61	26	68	68	63	460
	North Out	Cruising - PZ to Pilot	4.7	7	0.67	16.9	0.071	25,400	1,212	HFO	1.0	86	13	9	9	8	8	35
		Maneuvering - Pilot to Berth		3	1.00	16.9	0.006	25,400	142	HFO	1.0	114	20	50	17	17	15	4
		Maneuvering - Berth to Pilot		5	1.00	16.9	0.026	25,400	658	HFO	1.0	98	20	23	13	13	12	19
		Cruising - Pilot to PZ	3.8	7	0.54	16.9	0.071	25,400	980	HFO	1.0	69	11	8	7	7	7	28
		Cruising - PZ to VSR	21	12	1.75	16.9	0.358	25,400	15,913	HFO	1.0	793	61	26	68	68	63	460
		Cruising - VSR to CW	22	15.54	1.42	16.9	0.777	25,400	27,957	HFO	1.0	1,393	108	46	120	120	110	808
<b>TOTAL</b>											<b>4,740</b>	<b>401</b>	<b>235</b>	<b>422</b>	<b>422</b>	<b>389</b>	<b>2,623</b>	
AFRAMAX	South In	Cruising - CW to VSR	23	14.7	1.56	16.1	0.761	12,477	14,859	HFO	1.0	741	57	25	64	64	59	430
		Cruising - VSR to PZ	11	12	0.92	16.1	0.414	12,477	4,736	HFO	1.0	236	18	8	20	20	19	137
	South Out	Cruising - PZ to Pilot	4.7	7	0.67	16.1	0.082	12,477	689	HFO	1.0	45	6	4	5	5	4	20
		Maneuvering - Pilot to Berth		3	1.00	16.1	0.006	12,477	81	HFO	1.0	61	10	23	9	9	8	2
		Maneuvering - Berth to Pilot		5	1.00	16.1	0.030	12,477	374	HFO	1.0	54	10	11	7	7	6	11
		Cruising - Pilot to PZ	3.5	7	0.50	16.1	0.082	12,477	513	HFO	1.0	34	5	3	3	3	3	15
		Cruising - PZ to VSR	12.5	12	1.04	16.1	0.414	12,477	5,382	HFO	1.0	268	21	9	23	23	21	156
		Cruising - VSR to CW	24.5	14.7	1.67	16.1	0.761	12,477	15,828	HFO	1.0	789	61	26	68	68	63	458
<b>TOTAL</b>											<b>2,228</b>	<b>188</b>	<b>108</b>	<b>199</b>	<b>199</b>	<b>183</b>	<b>1,228</b>	
PANAMAX	South In	Cruising - CW to VSR	23	14.7	1.56	15.8	0.805	10,300	12,979	HFO	1.0	647	50	21	56	56	51	375
		Cruising - VSR to PZ	11	12	0.92	15.8	0.438	10,300	4,136	HFO	1.0	206	16	7	18	18	16	120
	South Out	Cruising - PZ to Pilot	4.7	7	0.67	15.8	0.087	10,300	601	HFO	1.0	30	2	1	3	3	2	17
		Maneuvering - Pilot to Berth		3	1.00	15.8	0.007	10,300	71	HFO	1.0	4	0.3	0.1	0.3	0.3	0.3	2
		Maneuvering - Berth to Pilot		5	1.00	15.8	0.032	10,300	326	HFO	1.0	16	1	1	1	1	1	9
		Cruising - Pilot to PZ	3.5	7	0.50	15.8	0.087	10,300	448	HFO	1.0	22	2	1	2	2	2	13
		Cruising - PZ to VSR	12.5	12	1.04	15.8	0.438	10,300	4,700	HFO	1.0	234	18	8	20	20	19	136
		Cruising - VSR to CW	24.5	14.7	1.67	15.8	0.805	10,300	13,825	HFO	1.0	689	53	23	59	59	55	400
<b>TOTAL</b>											<b>1,848</b>	<b>143</b>	<b>61</b>	<b>159</b>	<b>159</b>	<b>147</b>	<b>1,072</b>	
SUEZMAX	North In	Cruising - CW to VSR	22	15.54	1.42	17	0.764	16,000	17,302	HFO	1.0	862	67	29	74	74	68	500
		Cruising - VSR to PZ	21	12	1.75	17	0.352	16,000	9,848	HFO	1.0	491	38	16	42	42	39	285
	North Out	Cruising - PZ to Pilot	4.7	7	0.67	17	0.070	16,000	750	HFO	1.0	37	3	1	3	3	3	22
		Maneuvering - Pilot to Berth		3	1.00	17	0.005	16,000	88	HFO	1.0	4	0.3	0.1	0	0.4	0.3	3
		Maneuvering - Berth to Pilot		5	1.00	17	0.025	16,000	407	HFO	1.0	20	2	1	2	2	2	12
		Cruising - Pilot to PZ	3.8	7	0.54	17	0.070	16,000	606	HFO	1.0	30	2	1	3	3	2	18
		Cruising - PZ to VSR	21	12	1.75	17	0.352	16,000	9,848	HFO	1.0	491	38	16	42	42	39	285
		Cruising - VSR to CW	22	15.54	1.42	17	0.764	16,000	17,302	HFO	1.0	862	67	29	74	74	68	500
<b>TOTAL</b>											<b>2,798</b>	<b>216</b>	<b>93</b>	<b>241</b>	<b>241</b>	<b>222</b>	<b>1,623</b>	
<b>MAXIMUM</b>											<b>4,740</b>	<b>401</b>	<b>235</b>	<b>422</b>	<b>422</b>	<b>389</b>	<b>2,623</b>	

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Table H.2.PP.Un.Max.2015-2. 2015 Proposed Project Auxiliary Generator Maximum Daily Unmitigated Emissions.

Ship	Direction	Mode	Activity (hours)	MCR (kW)	Load Factor	Energy (kW-hr)	Fuel Type	Maximum Daily Shipcalls (vessels/day)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
VLCC	North In	Cruising	3.84	3,600	0.278	3,840	HFO	1.0	155	12	4	16	15	12	130
		Maneuvering	2.00	3,600	0.278	2,002	HFO	1.0	81	6	2	8	8	6	68
	North Out	Maneuvering	1.50	3,600	0.278	1,501	HFO	1.0	61	5	2	6	6	5	51
		Cruising	3.71	3,600	0.278	3,712	HFO	1.0	150	11	4	15	15	12	126
<b>TOTAL</b>								<b>4.0</b>	<b>447</b>	<b>33</b>	<b>12</b>	<b>46</b>	<b>44</b>	<b>35</b>	<b>374</b>
AFRAMAX	South In	Cruising	3.15	3,600	0.278	3,155	HFO	1.0	128	10	3	13	13	10	107
		Maneuvering	2.00	3,600	0.278	2,002	HFO	1.0	81	6	2	8	8	6	68
	South Out	Maneuvering	1.50	3,600	0.278	1,501	HFO	1.0	61	5	2	6	6	5	51
		Cruising	3.21	3,600	0.278	3,211	HFO	1.0	130	10	4	13	13	10	109
<b>TOTAL</b>								<b>4.0</b>	<b>399</b>	<b>30</b>	<b>11</b>	<b>41</b>	<b>39</b>	<b>31</b>	<b>334</b>
PANAMAX	South In	Cruising	3.15	3,600	0.278	3,155	HFO	1.0	128	10	3	13	13	10	107
		Maneuvering	2.00	3,600	0.278	2,002	HFO	1.0	81	6	2	8	8	6	68
	South Out	Maneuvering	1.5	3,600	0.278	1,501	HFO	1.0	61	5	2	6	6	5	51
		Cruising	3.21	3,600	0.278	3,211	HFO	1.0	130	10	4	13	13	10	109
<b>TOTAL</b>								<b>4.0</b>	<b>399</b>	<b>30</b>	<b>11</b>	<b>41</b>	<b>39</b>	<b>31</b>	<b>334</b>
SUEZMAX	North In	Cruising	3.84	3,600	0.278	3,840	HFO	1.0	155	12	4	16	15	12	130
		Maneuvering	2.00	3,600	0.278	2,002	HFO	1.0	81	6	2	8	8	6	68
	North Out	Maneuvering	1.5	3,600	0.278	1,501	HFO	1.0	61	5	2	6	6	5	51
		Cruising	3.71	3,600	0.278	3,712	HFO	1.0	150	11	4	15	15	12	126
<b>TOTAL</b>								<b>4.0</b>	<b>447</b>	<b>33</b>	<b>12</b>	<b>46</b>	<b>44</b>	<b>35</b>	<b>374</b>
<b>MAXIMUM</b>									<b>447</b>	<b>33</b>	<b>12</b>	<b>46</b>	<b>44</b>	<b>35</b>	<b>374</b>

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Table H.2.PP.Un.Max.2015-3. 2015 Proposed Project Summary of Maximum Daily Unmitigated Vessel Emissions.

<b>Mode</b>	<b>Equipment</b>	<b>NO<sub>x</sub> Emissions (lb/day)</b>	<b>CO Emissions (lb/day)</b>	<b>ROG Emissions (lb/day)</b>	<b>PM Emissions (lb/day)</b>	<b>PM<sub>10</sub> Emissions (lb/day)</b>	<b>PM<sub>2.5</sub> Emissions (lb/day)</b>	<b>SO<sub>2</sub> Emissions (lb/day)</b>
Cruising	Main Engines	4,527	362	162	393	393	362	2,600
Cruising	Aux Generator	306	23	8	31	30	24	256
Maneuvering	Main Engines	212	39	73	29	29	27	23
Maneuvering	Aux Generator	142	11	4	14	14	11	119
<b>Cruising and Maneuvering</b>	<b>TOTAL</b>	<b>5,187</b>	<b>435</b>	<b>248</b>	<b>468</b>	<b>466</b>	<b>424</b>	<b>2,997</b>

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Table H.2.PP.Un.Max.2015-4. 2015 Proposed Project Boiler Warm-Up Maximum Daily Unmitigated Emissions.

Shipcalls (vessels/day)	Vessel Size	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	HFO	2.70	107.96	30%	3	50,000	42	4	1	9	8	5	327
1.0	VLCC	HFO	2.70	84.93	30%	3	90,000	51	5	1	32	28	18	463
1.0	Panamax	HFO	2.70	63.30	30%	3	35,000	17	2	0.4	4	3	2	134
1.0	Suezmax	HFO	2.70	87.54	30%	3	70,000	48	4	1	10	9	6	371
<b>MAXIMUM</b>								<b>51</b>	<b>5</b>	<b>1</b>	<b>32</b>	<b>28</b>	<b>18</b>	<b>463</b>

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Table H.2.PP.Un.Max.2015-5. 2015 Proposed Project Summary of Boiler Warm-Up Maximum Unmitigated Emissions.

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Boiler Warm-up	Boiler	51	5	1	32	28	18	463

Table H.2.PP.Un.Max.2015-6. 2015 Proposed Project Berth Operations Maximum Daily Unmitigated Emissions.

Scenario: 500,000 bbl/day

Auxiliary Generator Pre-Pumpin

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	700,000	HFO	2.70	3,600	27.8%	2.5	101	8	3	10	10	8	85
1.0	VLCC	2,000,000	HFO	2.70	3,600	27.8%	2.5	101	8	3	10	10	8	85
1.0	Panamax	350,000	HFO	2.70	3,600	27.8%	2.5	101	8	3	10	10	8	85
1.0	Suezmax	1,000,000	HFO	2.70	3,600	27.8%	2.5	101	8	3	10	10	8	85
<b>MAXIMUM</b>								<b>101</b>	<b>8</b>	<b>3</b>	<b>10</b>	<b>10</b>	<b>8</b>	<b>85</b>

Boiler Pre-Pumping

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	700,000	HFO	2.70	107.96	30.0%	2.5	50,000	35	3	1	7	6	4	273
1.0	VLCC	2,000,000	HFO	2.70	84.93	30.0%	2.5	90,000	43	5	1	27	23	15	386
1.0	Panamax	350,000	HFO	2.70	63.30	30.0%	2.5	35,000	14	1	0	3	3	2	112
1.0	Suezmax	1,000,000	HFO	2.70	87.54	30.0%	2.5	70,000	40	4	1	8	7	5	310
<b>MAXIMUM</b>									<b>43</b>	<b>5</b>	<b>1</b>	<b>27</b>	<b>23</b>	<b>15</b>	<b>386</b>

Auxiliary Generator Pumpin

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	700,000	MDO	0.52	3,600	55.6%	15.0	1,149	91	33	25	24	19	196
1.0	VLCC	2,000,000	MDO	0.52	3,600	55.6%	23.2	1,777	141	51	38	37	29	303
1.0	Panamax	350,000	MDO	0.52	3,600	55.6%	11.0	843	67	24	18	17	14	144
1.0	Suezmax	1,000,000	MDO	0.52	3,600	55.6%	15.3	1,172	93	34	25	24	19	200
<b>MAXIMUM</b>								<b>1,777</b>	<b>141</b>	<b>51</b>	<b>38</b>	<b>37</b>	<b>29</b>	<b>303</b>

Boiler Pumping

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Inerting Fuel Consumption Savings (lb/1000 bbl offloaded)	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	700,000	MDO	0.52	102.17	28.06	15.0	184	46	3	30	21	14	673
1.0	VLCC	2,000,000	MDO	0.52	80.38	28.06	23.2	444	93	20	61	43	29	1,357
1.0	Panamax	350,000	MDO	0.52	59.91	28.06	11.0	39	10	1	7	5	3	145
1.0	Suezmax	1,000,000	MDO	0.52	82.85	28.06	15.3	194	49	3	32	22	15	711
<b>MAXIMUM</b>								<b>444</b>	<b>93</b>	<b>20</b>	<b>61</b>	<b>43</b>	<b>29</b>	<b>1,357</b>

Auxiliary Generator Post-Pumpin

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	700,000	HFO	2.70	3,600	27.8%	1.0	41	3	1	4	4	3	34
1.0	VLCC	2,000,000	HFO	2.70	3,600	27.8%	1.0	41	3	1	4	4	3	34
1.0	Panamax	350,000	HFO	2.70	3,600	27.8%	1.0	41	3	1	4	4	3	34
1.0	Suezmax	1,000,000	HFO	2.70	3,600	27.8%	1.0	41	3	1	4	4	3	34
<b>MAXIMUM</b>								<b>41</b>	<b>3</b>	<b>1</b>	<b>4</b>	<b>4</b>	<b>3</b>	<b>34</b>

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Table H.2.PP.Un.Max.2015-7. 2015 Proposed Project Summary of Berth Operations Maximum Daily Unmitigated Emissions.

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Berth Operations	Boiler	486	97	21	88	66	44	1,743
Berth Operations	Aux Generator	1,919	151	55	53	51	41	422

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Table H.2.PP.Un.Max.2015-8. 2015 Proposed Project Tug Main Engines Maximum Daily Unmitigated Emissions.

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Shipcalls (vessels/day)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
VLCC	Maneuvering - Pilot to Berth	1.00	4	4,800	0.50	MGO	1.0	265	49	10	11	10	0
	Maneuvering - Berth to Pilot	1.00	2	4,800	0.50	MGO	1.0	133	25	5	6	5	0
							<b>TOTAL</b>	<b>398</b>	<b>74</b>	<b>14</b>	<b>17</b>	<b>16</b>	<b>0</b>
AFRAMAX	Maneuvering - Pilot to Berth	1.00	2	4,800	0.50	MGO	1.0	133	25	5	6	5	0
	Maneuvering - Berth to Pilot	1.00	2	4,800	0.50	MGO	1.0	133	25	5	6	5	0
							<b>TOTAL</b>	<b>265</b>	<b>49</b>	<b>10</b>	<b>11</b>	<b>10</b>	<b>0</b>
PANAMAX	Maneuvering - Pilot to Berth	1.00	2	4,800	0.50	MGO	1.0	133	25	5	6	5	0
	Maneuvering - Berth to Pilot	1.00	2	4,800	0.50	MGO	1.0	133	25	5	6	5	0
							<b>TOTAL</b>	<b>265</b>	<b>49</b>	<b>10</b>	<b>11</b>	<b>10</b>	<b>0</b>
SUEZMAX	Maneuvering - Pilot to Berth	1.00	3	4,800	0.50	MGO	1.0	199	37	7	9	8	0
	Maneuvering - Berth to Pilot	1.00	2	4,800	0.50	MGO	1.0	133	25	5	6	5	0
							<b>TOTAL</b>	<b>332</b>	<b>62</b>	<b>12</b>	<b>14</b>	<b>13</b>	<b>0</b>
							<b>MAXIMUM</b>	<b>398</b>	<b>74</b>	<b>14</b>	<b>17</b>	<b>16</b>	<b>0</b>



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Table H.2.PP.Un.Max.2015-9. 2015 Proposed Project Tug Auxiliary Generator Engines Maximum Daily Unmit Emissions

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Shipcalls (vessels/day)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
VLCC	Maneuvering - Pilot to Berth	1.00	4	300	1.00	MGO	1.0	29	6	1	1	1	0
	Maneuvering - Berth to Pilot	1.00	2	300	1.00	MGO	1.0	15	3	0	1	1	0
AFRAMAX	Maneuvering - Pilot to Berth	1.00	2	300	1.00	MGO	1.0	15	3	0	1	1	0
	Maneuvering - Berth to Pilc	1.00	2	300	1.00	MGO	1.0	15	3	0	1	1	0
PANAMAX	Maneuvering - Pilot to Berth	1.00	2	300	1.00	MGO	1.0	15	3	0	1	1	0
	Maneuvering - Berth to Pilot	1.00	2	300	1.00	MGO	1.0	15	3	0	1	1	0
SUEZMAX	Maneuvering - Pilot to Berth	1.00	3	300	1.00	MGO	1.0	22	4	1	1	1	0
	Maneuvering - Berth to Pilc	1.00	2	300	1.00	MGO	1.0	15	3	0	1	1	0
<b>TOTAL</b>								<b>37</b>	<b>7</b>	<b>1</b>	<b>2</b>	<b>2</b>	<b>0</b>
<b>MAXIMUM</b>								<b>44</b>	<b>8</b>	<b>1</b>	<b>2</b>	<b>2</b>	<b>0</b>

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Table H.2.PP.Un.Max.2015-10. 2015 Proposed Project Summary of Tug Maximum Daily Unmitigated Emissions.

Mode	Equipment	Maximum Daily NO <sub>x</sub> Emissions (lb/day)	Maximum Daily CO Emissions (lb/day)	Maximum Daily ROG Emissions (lb/day)	Maximum Daily PM <sub>10</sub> Emissions (lb/day)	Maximum Daily PM <sub>2.5</sub> Emissions (lb/day)	Maximum Daily SO <sub>2</sub> Emissions (lb/day)
Tug Assist	Main Engines	398	74	14	17	16	0
Tug Assist	Aux Generator	44	8	1	2	2	0
<b>TOTAL</b>		<b>442</b>	<b>82</b>	<b>16</b>	<b>19</b>	<b>18</b>	<b>0</b>

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Table H.2.PP.Un.Max.2015-11. 2015 Proposed Project VDU Crude Maximum Daily Unmitigated Emissions.

	Maximum Daily Vessel Calls	crude vapors from tanks(scf/call)	daily gas usage (mmscf/day)	mw crude vapors	destruction efficiency
Aframax	1	224000	0.2	50	98%
VLCC	1	596,313	0.6	50	98%
Panamax	1	116,667	0.1	50	98%
Suezmax	1	333,333	0.3	50	98%
<b>TOTAL</b>	<b>4</b>		<b>1.3</b>		

<b>Assumed Distribution based on tank storage volume:</b>	
<b>Site 1</b>	<b>12.5%</b>
<b>Site 2</b>	<b>87.5%</b>

Maximum Daily Emissions (lb/day)

	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene
EF (lb/MMSCF)	130	35	7	7.5	0.38%	9.90%	0.017	0.0004	0.0003	0.0043	0.0027	0.731	0.0366	0.0272	0.0095
Aframax	14.6	3.9	0.8	0.8	0.00	0.08	0.0	0.000	0.000	0.000	0.000	0.1	0.0	0.0	0.0
VLCC	38.8	10.4	2.1	2.2	0.01	0.21	0.0	0.000	0.000	0.001	0.001	0.2	0.0	0.0	0.0
Panamax	7.6	2.0	0.4	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Suezmax	21.7	5.8	1.2	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0
<b>MAXIMUM</b>	<b>38.8</b>	<b>10.4</b>	<b>2.1</b>	<b>2.2</b>	<b>0.0</b>	<b>0.2</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.2</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>

Assumed a ratio of 500/1000 based on the corresponding Btu values with respect to natural gas combustion emission factors.

Maximum Daily Emissions (lb/day)

	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene	SO <sub>x</sub>
Site 1	5	1.3	0.26	0.3	0.001	0.03	0.001	0.0000	0.0000	0.0002	0.0001	0.03	0.001	0.001	0.000	2
Site 2	34	9	1.8	2.0	0.01	0.18	0.004	0.0001	0.0001	0.001	0.001	0.2	0.01	0.01	0.002	13

2.09

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Table H.2.PP.Un.Max.2015-12. 2015 Proposed Project VDU Legs Maximum Daily Unmitigated Emissions.

	tanks	crude vapors from tanks on legs(scfd/day)	daily gas usage (mmscf/day)	mw crude vapors	destruction efficiency
Site 1	4	23671.23	0.09	50	98%
Site 2	14	23671.23	0.3	50	98%
<b>TOTAL</b>	<b>18</b>		<b>0.4</b>		

<b>48</b>	<b>hr/event</b>
<b>6</b>	<b>events/yr</b>
<b>500</b>	<b>ft3/min</b>

Maximum Daily Emissions (lb/day)															
	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene
EF (lb/MMSCF)	130	35	7	7.5	0.38%	9.90%	0.017	0.0004	0.0003	0.0043	0.0027	0.731	0.0366	0.0272	0.0095
<b>TOTAL</b>	<b>27.7</b>	<b>7.5</b>	<b>1.5</b>	<b>1.6</b>	<b>0.0</b>	<b>0.1</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.2</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>

Assumed a ratio of 500/1000 based on the corresponding Btu values with respect to natural gas combustion emission factors.

Maximum Daily Emissions (lb/day)																
	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene	SO <sub>x</sub>
Site 1	6.2	1.7	0.3	0.4	0.00	0.03	0.00	0.000	0.000	0.000	0.00	0.03	0.00	0.00	0.00	1
Site 2	21.5	5.8	1.2	1.2	0.00	0.11	0.00	0.000	0.000	0.001	0.00	0.12	0.01	0.00	0.00	4



Table H.2.PP.Un.Max.Bar.2015-1. 2015 Proposed Project Main Engines Maximum Daily Unmitigated Emissions from Barge Fuel Deliveries for OGV.

Ship	Direction	Mode	Distance (nautical miles)	Ship speed (knots)	Activity (hours)	Maximum Speed (knots)	Load Factor	MCR (kW)	Energy (kW-hr)	Fuel Type	Shipcalls (vessels/ yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Barge	North In	Volpak to Berth 408	5	3	1.67	3	1.00	4,800	8,000.00	MGO	1.0	291	24	11	16	16	16	18
Barge	North Out	Volpak to Berth 408	5	3	1.67	3.0	1.00	4,800	8,000.00	MGO	1.0	291	24	11	16	16	16	18
TOTAL												581	48	22	32	32	32	36

Table H.2.PP.Un.Max.Bar.2015-2. 2015 Proposed Project Tug Main Engines Maximum Daily Unmitigated Emissions from Barge Fuel Deliveries for OGV.

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Shipcalls (vessels/day)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Barge	Maneuvering - Pilot to Berth	1.00	1	4,800	0.50	MGO	1.0	87	7	3	5	4	5
	Maneuvering - Berth to Pilot	1.00	1	4,800	0.50	MGO	1.0	87	7	3	5	4	5
							<b>TOTAL</b>	<b>174</b>	<b>15</b>	<b>7</b>	<b>10</b>	<b>9</b>	<b>11</b>

MAXIMUM      174      15      7      10      9      11

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Table H.2.PP.Un.Max.Bar.2015-3. 2015 Proposed Project Tug Auxiliary Generator Engines Maximum Daily Unmitigated Emissions from Barge Fuel Deliveries for OGV.

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Shipcalls (vessels/day)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Barge	Maneuvering - Pilot to Berth	1.00	1	300	1.00	MGO	1.0	8	1	0	0	0	1
	Maneuvering - Berth to Pilot	1.00	1	300	1.00	MGO	1.0	8	1	0	0	0	1
							<b>TOTAL</b>	<b>17</b>	<b>3</b>	<b>0</b>	<b>1</b>	<b>1</b>	<b>1</b>
<b>MAXIMUM</b>								<b>17</b>	<b>3</b>	<b>0</b>	<b>1</b>	<b>1</b>	<b>1</b>



Table H.2.PP.Un.Max.Bar.2015-4. 2015 Proposed Project Summary of Tug Maximum Daily Unmitigated Emissions from Barge Fuel Deliveries for OGV.

Mode	Equipment	Maximum Daily NO <sub>x</sub> Emissions (lb/day)	Maximum Daily CO Emissions (lb/day)	Maximum Daily ROG Emissions (lb/day)	Maximum Daily PM <sub>10</sub> Emissions (lb/day)	Maximum Daily PM <sub>2.5</sub> Emissions (lb/day)	Maximum Daily SO <sub>2</sub> Emissions (lb/day)
Tug Assist	Main Engines	174	15	7	10	9	11
Tug Assist	Aux Generator	17	3	0	1	1	1
<b>TOTAL</b>		<b>191</b>	<b>17</b>	<b>7</b>	<b>10</b>	<b>9</b>	<b>12</b>

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Table H.2.PP.Un.Max.Bar.2015-5. 2015 Proposed Project Summary of Maximum Daily Unmitigated Vessel Emissions from Barge Fuel Deliveries for OGV.

Operation	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Barge	581	48	22	32	32	36
Tug Assistance	191	17	7	10	9	12
<b>TOTAL</b>	<b>772</b>	<b>66</b>	<b>29</b>	<b>42</b>	<b>41</b>	<b>48</b>

Operation	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Barge	1.59	0.13	0.06	0.09	0.09	0.10
Tug Assistance	0.52	0.05	0.02	0.03	0.03	0.03
<b>TOTAL</b>	<b>2.12</b>	<b>0.18</b>	<b>0.08</b>	<b>0.11</b>	<b>0.11</b>	<b>0.13</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Un.2025-1. 2025 Proposed Project Main Engines Average Daily Unmitigated Emissions.

Ship	Direction	Mode	Distance (nautical miles)	Ship speed (knots)	Activity (hours)	Maximum Speed (knots)	Load Factor	MCR (kW)	Energy (kW-hr)	Fuel Type	Shipcalls (vessels/yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)		
VLCC	North In	Cruising - CW to VSR	22	15.54	1.42	16.9	0.777	25,400	27,957	HFO	69.0	96,135	7,436	3,187	8,286	8,286	7,623	55,769		
		Cruising - VSR to PZ	21	12	1.75	16.9	0.358	25,400	15,913	HFO	69.0	54,719	4,232	1,814	4,716	4,716	4,339	31,743		
		Cruising - PZ to Pilot	4.7	7	0.67	16.9	0.071	25,400	1,212	HFO	69.0	5,900	907	652	620	620	570	2,417		
	North Out	Maneuvering - Pilot to Berth			3	1.00	16.9	0.006	25,400	142	HFO	69.0	7,872	1,352	3,459	1,147	1,147	1,055	283	
		Maneuvering - Berth to Pilot			5	1.00	16.9	0.026	25,400	658	HFO	69.0	6,788	1,352	1,608	870	870	801	1,312	
		Cruising - Pilot to PZ			3.8	7	0.54	16.9	0.071	25,400	980	HFO	69.0	4,770	734	527	501	501	461	1,955
		Cruising - PZ to VSR			21	12	1.75	16.9	0.358	25,400	15,913	HFO	69.0	54,719	4,232	1,814	4,716	4,716	4,339	31,743
		Cruising - VSR to CW			22	15.54	1.42	16.9	0.777	25,400	27,957	HFO	69.0	96,135	7,436	3,187	8,286	8,286	7,623	55,769
AFRAMAX	South In	Cruising - CW to VSR	23	14.7	1.56	16.1	0.761	12,477	14,859	HFO	36.0	26,658	2,062	884	2,298	2,298	2,114	15,465		
		Cruising - VSR to PZ	11	12	0.92	16.1	0.414	12,477	4,736	HFO	36.0	8,496	657	282	732	732	674	4,929		
		Cruising - PZ to Pilot	4.7	7	0.67	16.1	0.082	12,477	689	HFO	36.0	1,631	233	155	166	166	153	717		
	South Out	Maneuvering - Pilot to Berth			3	1.00	16.1	0.006	12,477	81	HFO	36.0	2,188	346	824	318	318	293	84	
		Maneuvering - Berth to Pilot			5	1.00	16.1	0.030	12,477	374	HFO	36.0	1,955	346	383	250	250	230	389	
		Cruising - Pilot to PZ			3.5	7	0.50	16.1	0.082	12,477	513	HFO	36.0	1,215	173	116	124	124	114	534
		Cruising - PZ to VSR			12.5	12	1.04	16.1	0.414	12,477	5,382	HFO	36.0	9,655	747	320	832	832	766	5,601
		Cruising - VSR to CW			24.5	14.7	1.67	16.1	0.761	12,477	15,828	HFO	36.0	28,397	2,196	941	2,447	2,447	2,252	16,473
PANAMAX	South In	Cruising - CW to VSR	23	14.7	1.56	15.8	0.805	10,300	12,979	HFO	18	11,642	900	386	1,003	1,003	923	6,754		
		Cruising - VSR to PZ	11	12	0.92	15.8	0.438	10,300	4,136	HFO	18	3,710	287	123	320	320	294	2,152		
		Cruising - PZ to Pilot	4.7	7	0.67	15.8	0.087	10,300	601	HFO	18	539	42	18	46	46	43	313		
	South Out	Maneuvering - Pilot to Berth			3	1.00	15.8	0.007	10,300	71	HFO	18	63	5	2	5	5	5	37	
		Maneuvering - Berth to Pilot			5	1.00	15.8	0.032	10,300	326	HFO	18	293	23	10	25	25	23	170	
		Cruising - Pilot to PZ			3.5	7	0.50	15.8	0.087	10,300	448	HFO	18	402	31	13	35	35	32	233
		Cruising - PZ to VSR			12.5	12	1.04	15.8	0.438	10,300	4,700	HFO	18	4,216	326	140	363	363	334	2,446
		Cruising - VSR to CW			24.5	14.7	1.67	15.8	0.805	10,300	13,825	HFO	18	12,401	959	411	1,069	1,069	983	7,194
SUEZMAX	North In	Cruising - CW to VSR	22	15.54	1.42	17	0.764	16,000	17,302	HFO	78	67,255	5,202	2,229	5,797	5,797	5,333	39,015		
		Cruising - VSR to PZ	21	12	1.75	17	0.352	16,000	9,848	HFO	78	38,281	2,961	1,269	3,299	3,299	3,035	22,207		
		Cruising - PZ to Pilot	4.7	7	0.67	17	0.070	16,000	750	HFO	78	2,915	225	97	251	251	231	1,691		
	North Out	Maneuvering - Pilot to Berth			3	1.00	17	0.005	16,000	88	HFO	78	342	26	11	29	29	27	198	
		Maneuvering - Berth to Pilot			5	1.00	17	0.025	16,000	407	HFO	78	1,582	122	52	136	136	125	918	
		Cruising - Pilot to PZ			3.8	7	0.54	17	0.070	16,000	606	HFO	78	2,357	182	78	203	203	187	1,367
		Cruising - PZ to VSR			21	12	1.75	17	0.352	16,000	9,848	HFO	78	38,281	2,961	1,269	3,299	3,299	3,035	22,207
		Cruising - VSR to CW			22	15.54	1.42	17	0.764	16,000	17,302	HFO	78	67,255	5,202	2,229	5,797	5,797	5,333	39,015
<b>TOTAL</b>												<b>658,769</b>	<b>53,898</b>	<b>28,492</b>	<b>57,988</b>	<b>57,988</b>	<b>53,349</b>	<b>371,101</b>		

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Un.2025-2. 2025 Proposed Project Auxiliary Generator Average Daily Unmit Emissions

Ship	Direction	Mode	Activity (hours)	MCR (kW)	Load Factor	Energy (kW-hr)	Fuel Type	Shipcalls (vessels/yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
VLCC	North In	Cruising	3.84	3,600	0.278	3,840	HFO	69.0	10,724	803	292	1,094	1,051	840	8,974
		Maneuvering	2.00	3,600	0.278	2,002	HFO	69.0	5,590	418	152	570	548	438	4,677
	North Out	Maneuvering	1.50	3,600	0.278	1,501	HFO	69.0	4,192	314	114	428	411	329	3,508
		Cruising	3.71	3,600	0.278	3,712	HFO	69.0	10,365	776	282	1,058	1,015	812	8,673
AFRAMAX	South In	Cruising	3.15	3,600	0.278	3,155	HFO	36.0	4,597	344	125	469	450	360	3,847
		Maneuvering	2.00	3,600	0.278	2,002	HFO	36.0	2,916	218	79	298	286	229	2,440
	South Out	Maneuvering	1.50	3,600	0.278	1,501	HFO	36.0	2,187	164	60	223	214	171	1,830
		Cruising	3.21	3,600	0.278	3,211	HFO	36.0	4,678	350	127	477	458	367	3,915
PANAMAX	South In	Cruising	3.15	3,600	0.278	3,155	HFO	18	2,299	172	63	235	225	180	1,923
		Maneuvering	2.00	3,600	0.278	2,002	HFO	18	1,458	109	40	149	143	114	1,220
	South Out	Maneuvering	1.5	3,600	0.278	1,501	HFO	18	1,094	82	30	112	107	86	915
		Cruising	3.21	3,600	0.278	3,211	HFO	18	2,339	175	64	239	229	183	1,957
SUEZMAX	North In	Cruising	3.84	3,600	0.278	3,840	HFO	78	12,123	907	330	1,237	1,188	950	10,144
		Maneuvering	2.00	3,600	0.278	2,002	HFO	78	6,319	473	172	645	619	495	5,287
	North Out	Maneuvering	1.5	3,600	0.278	1,501	HFO	78	4,739	355	129	484	464	371	3,965
		Cruising	3.71	3,600	0.278	3,712	HFO	78	11,717	877	319	1,196	1,148	918	9,804
<b>TOTAL</b>									<b>87,339</b>	<b>6,536</b>	<b>2,377</b>	<b>8,912</b>	<b>8,556</b>	<b>6,845</b>	<b>73,080</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Un.2025-3. 2025 Proposed Project Boiler Warm-Up Average Daily Unmitigated Emissions.

Shipcalls (vessels/yr)	Vessel Size	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
36.0	Aframax	HFO	2.70	107.96	30%	3	50,000	1,522	137	35	318	274	178	11,778
69.0	VLCC	HFO	2.70	84.93	30%	3	90,000	3,528	373	77	2,219	1,908	484	31,968
18.0	Panamax	HFO	2.70	63.30	30%	3	35,000	312	28	7	65	56	37	2,417
78.0	Suezmax	HFO	2.70	87.54	30%	3	70,000	3,745	338	86	783	674	439	28,971
<b>TOTAL</b>								<b>9,108</b>	<b>877</b>	<b>205</b>	<b>3,386</b>	<b>2,912</b>	<b>1,138</b>	<b>75,134</b>

Table H.2.PP.Un.2025-4. 2025 Proposed Project Berth Operations Average Daily Unmitigated Emissions.

Auxiliary Generator Pre-Pumpin

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
36.0	Aframax	700,000	HFO	2.70	3,600	27.8%	2.5	3,646	273	99	372	357	286	3,050
69.0	VLCC	2,000,000	HFO	2.70	3,600	27.8%	2.5	6,987	523	190	713	684	548	5,846
18.0	Panamax	350,000	HFO	2.70	3,600	27.8%	2.5	1,823	136	50	186	179	143	1,525
78.0	Suezmax	1,000,000	HFO	2.70	3,600	27.8%	2.5	7,899	591	215	806	774	619	6,609
<b>TOTAL</b>								<b>20,354</b>	<b>1,523</b>	<b>554</b>	<b>2,077</b>	<b>1,994</b>	<b>1,595</b>	<b>17,031</b>

Boiler Pre-Pumping

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
36.0	Aframax	700,000	HFO	2.70	107.96	30.0%	2.5	50,000	1,269	115	29	265	228	149	9,815
69.0	VLCC	2,000,000	HFO	2.70	84.93	30.0%	2.5	90,000	2,940	311	64	1,849	1,590	1,035	26,640
18.0	Panamax	350,000	HFO	2.70	63.30	30.0%	2.5	35,000	260	24	6	54	47	30	2,014
78.0	Suezmax	1,000,000	HFO	2.70	87.54	30.0%	2.5	70,000	3,121	282	72	653	561	366	24,142
<b>TOTAL</b>									<b>7,590</b>	<b>730</b>	<b>171</b>	<b>2,822</b>	<b>2,427</b>	<b>1,580</b>	<b>62,612</b>

Auxiliary Generator Pumpin

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
36.0	Aframax	700,000	MDO	0.52	3,600	55.6%	15.0	41,366	3,274	1,190	893	857	686	7,050
69.0	VLCC	2,000,000	MDO	0.52	3,600	55.6%	23.2	122,744	9,714	3,532	2,649	2,543	2,035	20,918
18.0	Panamax	350,000	MDO	0.52	3,600	55.6%	11.0	15,167	1,200	436	327	314	251	2,585
78.0	Suezmax	1,000,000	MDO	0.52	3,600	55.6%	15.3	91,418	7,235	2,631	1,973	1,894	1,515	15,580
<b>TOTAL</b>								<b>270,695</b>	<b>21,422</b>	<b>7,790</b>	<b>5,842</b>	<b>5,609</b>	<b>4,487</b>	<b>46,133</b>

Boiler Pumping

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Inerting Fuel Consumption Savings (lb/1000 bbl offloaded)	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
36.0	Aframax	700,000	MDO	0.52	102.17	28.06	15.0	6,615	1,654	93	1,095	766	512	24,224
69.0	VLCC	2,000,000	MDO	0.52	80.38	28.06	23.2	30,615	6,393	1,351	4,232	2,962	1,981	93,645
18.0	Panamax	350,000	MDO	0.52	59.91	28.06	11.0	711	178	10	118	82	55	2,603
78.0	Suezmax	1,000,000	MDO	0.52	82.85	28.06	15.3	15,137	3,784	213	2,505	1,754	1,173	55,431
<b>TOTAL</b>								<b>53,077</b>	<b>12,009</b>	<b>1,667</b>	<b>7,949</b>	<b>5,565</b>	<b>3,721</b>	<b>175,902</b>

Auxiliary Generator Post-Pumpin

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
36.0	Aframax	700,000	HFO	2.70	3,600	27.8%	1.0	1,458	109	40	149	143	114	1,220
69.0	VLCC	2,000,000	HFO	2.70	3,600	27.8%	1.0	2,795	209	76	285	274	219	2,339
18.0	Panamax	350,000	HFO	2.70	3,600	27.8%	1.0	729	55	20	74	71	57	610
78.0	Suezmax	1,000,000	HFO	2.70	3,600	27.8%	1.0	3,159	236	86	322	309	248	2,644
<b>TOTAL</b>								<b>8,142</b>	<b>609</b>	<b>222</b>	<b>831</b>	<b>798</b>	<b>638</b>	<b>6,812</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Un.2025-5. 2025 Proposed Project Summary of Average Daily Unmitigated Vessel Emissic

Mode	Equipment	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Cruising	Main Engines	637,686	50,325	22,141	55,207	55,207	50,790	367,709
Cruising	Aux Generator	58,844	4,403	1,601	6,004	5,764	4,611	49,236
Maneuvering	Main Engines	21,083	3,573	6,351	2,782	2,782	2,559	3,391
Maneuvering	Aux Generator	28,496	2,132	775	2,908	2,791	2,233	23,844
Boiler Warm-up	Boiler	9,108	877	205	3,386	2,912	1,138	75,134
Berth Operations	Boiler	60,667	12,739	1,838	10,771	7,991	5,301	238,514
Berth Operations	Aux Generator	299,191	23,554	8,565	8,750	8,400	6,720	69,976
Propulsion	TOTAL	746,109	60,433	30,869	66,901	66,544	60,194	444,181
Non-Propulsion	TOTAL	368,966	37,170	10,608	22,907	19,303	13,159	383,625
<b>Total Emissions</b>		<b>1,115,075</b>	<b>97,603</b>	<b>41,477</b>	<b>89,808</b>	<b>85,847</b>	<b>73,353</b>	<b>827,805</b>

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Cruising	Main Engines	1,747.1	137.9	60.7	151.3	151.3	139.2	1,007.4
Cruising	Aux Generator	161.2	12.1	4.4	16.5	15.8	12.6	134.9
Maneuvering	Main Engines	57.8	9.8	17.4	7.6	7.6	7.0	9.3
Maneuvering	Aux Generator	78.1	5.8	2.1	8.0	7.6	6.1	65.3
Boiler Warm-up	Boiler	25.0	2.4	0.6	9.3	8.0	3.1	205.8
Berth Operations	Boiler	166.2	34.9	5.0	29.5	21.9	14.5	653.5
Berth Operations	Aux Generator	819.7	64.5	23.5	24.0	23.0	18.4	191.7
Propulsion	TOTAL	2,044.1	165.6	84.6	183.3	182.3	164.9	1,216.9
Non-Propulsion	TOTAL	1,010.9	101.8	29.1	62.8	52.9	36.1	1,051.0
<b>Total Emissions</b>		<b>3,055</b>	<b>267</b>	<b>114</b>	<b>246</b>	<b>235</b>	<b>201</b>	<b>2,268</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Un.2025-6. 2025 Proposed Project Tug Main Engines Average Daily Unmitigated Emissions.

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Shipcalls (vessels/yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
VLCC	Maneuvering - Pilot to Berth	1.00	4	4,800	0.50	MGO	69.0	15,192	3,410	638	657	604	11
	Maneuvering - Berth to Pilot	1.00	2	4,800	0.50	MGO	69.0	7,596	1,705	319	328	302	5
AFRAMAX	Maneuvering - Pilot to Berth	1.00	2	4,800	0.50	MGO	36.0	3,963	890	167	171	158	3
	Maneuvering - Berth to Pilc	1.00	2	4,800	0.50	MGO	36.0	3,963	890	167	171	158	3
PANAMAX	Maneuvering - Pilot to Berth	1.00	2	4,800	0.50	MGO	18.0	1,982	445	83	86	79	1
	Maneuvering - Berth to Pilot	1.00	2	4,800	0.50	MGO	18.0	1,982	445	83	86	79	1
SUEZMAX	Maneuvering - Pilot to Berth	1.00	3	4,800	0.50	MGO	78.0	12,880	2,891	541	557	512	9
	Maneuvering - Berth to Pilc	1.00	2	4,800	0.50	MGO	78.0	8,587	1,928	361	371	341	6
<b>TOTAL</b>								<b>56,145</b>	<b>12,604</b>	<b>2,359</b>	<b>2,426</b>	<b>2,232</b>	<b>40</b>



Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Un.2025-7. 2025 Proposed Project Tug Auxiliary Generator Engines Average Daily Unmit Emissions

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Shipcalls (vessels/yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
VLCC	Maneuvering - Pilot to Berth	1.00	4	300	1.00	MGO	69.0	1,710	381	62	73	67	1
	Maneuvering - Berth to Pilot	1.00	2	300	1.00	MGO	69.0	855	190	31	36	34	0
AFRAMAX	Maneuvering - Pilot to Berth	1.00	2	300	1.00	MGO	36.0	446	99	16	19	18	0
	Maneuvering - Berth to Pilot	1.00	2	300	1.00	MGO	36.0	446	99	16	19	18	0
PANAMAX	Maneuvering - Pilot to Berth	1.00	2	300	1.00	MGO	18.0	223	50	8	10	9	0
	Maneuvering - Berth to Pilot	1.00	2	300	1.00	MGO	18.0	223	50	8	10	9	0
SUEZMAX	Maneuvering - Pilot to Berth	1.00	3	300	1.00	MGO	78.0	1,450	323	52	62	57	1
	Maneuvering - Berth to Pilot	1.00	2	300	1.00	MGO	78.0	966	215	35	41	38	1

**TOTAL      6,319      1,407      227      270      248      3**

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Table H.2.PP.Un.2025-8. 2025 Proposed Project Summary of Tug Average Daily Unmitigated Emissions.

Mode	Equipment	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Tug Assist	Main Engines	56,145	12,604	2,359	2,426	2,232	40
Tug Assist	Aux Generator	6,319	1,407	227	270	248	3
<b>TOTAL</b>		<b>62,464</b>	<b>14,011</b>	<b>2,587</b>	<b>2,696</b>	<b>2,480</b>	<b>44</b>

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Tug Assist	Main Engines	154	34.5	6.5	6.6	6.1	0.1
Tug Assist	Aux Generator	17	3.9	0.6	0.7	0.7	0.0
<b>TOTAL</b>		<b>171</b>	<b>38.4</b>	<b>7.1</b>	<b>7.4</b>	<b>6.8</b>	<b>0.1</b>

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Table H.2.2.1-Unmitigated-2025-9. Proposed Project VDU Crude Average Daily Unmitigated Emissions.

	Annual Vessel Calls	crude vapors from tanks(scft/call)	annual gas usage (mmscf/yr)	mw crude vapors	destruction efficiency
Aframax	36	224000	8.1	50	98%
VLCC	69	596,313	41.1	50	98%
Panamax	18	116,667	2.1	50	98%
Suezmax	78	333,333	26.0	50	98%
<b>TOTAL</b>	<b>201</b>		<b>77.3</b>		

<b>Assumed Distribution based on tank storage volume:</b>	
<b>Site 1</b>	<b>12.5%</b>
<b>Site 2</b>	<b>87.5%</b>

Annual Average (lb/yr)

	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene
EF (lb/MMSCF)	130	35	7	7.5	0.38%	9.90%	0.017	0.0004	0.0003	0.0043	0.0027	0.731	0.0366	0.0272	0.0095
Aframax	524.2	141.1	28.2	30.2	0.11	2.79	0.1	0.002	0.001	0.017	0.011	2.9	0.1	0.1	0.0
VLCC	2674.5	720.0	144.0	154.3	0.55	14.26	0.3	0.008	0.006	0.088	0.056	15.0	0.8	0.6	0.2
Panamax	136.5	36.8	7.4	7.9	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.8	0.0	0.0	0.0
Suezmax	1690.0	455.0	91.0	97.5	0.0	1.3	0.2	0.0	0.0	0.1	0.0	9.5	0.5	0.4	0.1
<b>TOTAL</b>	<b>5025.1</b>	<b>1352.9</b>	<b>270.6</b>	<b>289.9</b>	<b>0.7</b>	<b>18.4</b>	<b>0.7</b>	<b>0.0</b>	<b>0.0</b>	<b>0.2</b>	<b>0.1</b>	<b>28.3</b>	<b>1.4</b>	<b>1.1</b>	<b>0.4</b>

Assumed a ratio of 500/1000 based on the corresponding Btu values with respect to natural gas combustion emission factors.

Annual Average (lb/yr)

	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene	SO <sub>x</sub>
Site 1	628	169.1	33.82	36.2	0.088	2.31	0.082	0.0019	0.0014	0.0208	0.0130	3.53	0.177	0.131	0.046	112
Site 2	4397	1184	236.8	253.7	0.62	16.14	0.575	0.0135	0.0101	0.145	0.091	24.7	1.24	0.92	0.321	787

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Table H.2.2.1-Unmitigated-2025-10. Proposed Project VDU Legs Crude Average Daily Unmitigated Emissions.

	tanks	crude vapors from tanks on legs(scf/yr)	annual gas usage (mmscf/yr)	mw crude vapors	destruction efficiency
Site 1	4	8640000	34.6	50	98%
Site 2	14	8640000	121.0	50	98%
<b>TOTAL</b>	<b>18</b>		<b>155.5</b>		

<b>48</b>	<b>hr/event</b>
<b>6</b>	<b>events/yr</b>
<b>500</b>	<b>ft3/min</b>

		Annual Average (lb/yr)													
	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene
EF (lb/MMSCF)	130	35	7	7.5	0.38%	9.90%	0.017	0.0004	0.0003	0.0043	0.0027	0.731	0.0366	0.0272	0.0095
<b>TOTAL</b>	<b>10108.8</b>	<b>2721.6</b>	<b>544.3</b>	<b>583.2</b>	<b>2.1</b>	<b>53.9</b>	<b>1.3</b>	<b>0.0</b>	<b>0.0</b>	<b>0.3</b>	<b>0.2</b>	<b>56.8</b>	<b>2.8</b>	<b>2.1</b>	<b>0.7</b>

Assumed a ratio of 500/1000 based on the corresponding Btu values with respect to natural gas combustion emission factors.

		Annual Average (lb/yr)														
	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene	SO <sub>x</sub>
Site 1	2246.4	604.8	121.0	129.6	0.46	11.98	0.29	0.007	0.005	0.074	0.05	12.63	0.63	0.47	0.16	402
Site 2	7862.4	2116.8	423.4	453.6	1.61	41.91	1.03	0.024	0.018	0.260	0.16	44.21	2.21	1.65	0.57	1407



Table H.2.PP.Un.Bar.2025-1. 2025 Proposed Project Main Engines Average Daily Unmitigated Emissions from Barge Fuel Deliveries for OGV.

Ship	Direction	Mode	Distance (nautical miles)	Ship speed (knots)	Activity (hours)	Maximum Speed (knots)	Load Factor	MCR (kW)	Energy (kW-hr)	Fuel Type	Shipcalls (vessels/ yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Barge	North In	Volpak to Berth 408	5	3	1.67	3	0.50	4,800	4,000.00	MGO	12.0	1,744	145	66	95	95	95	107
Barge	North Out	Volpak to Berth 408	5	3	1.67	3.0	0.50	4,800	4,000.00	MGO	12.0	1,744	145	66	95	95	95	107
TOTAL												3,489	291	132	190	190	190	214

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Table H.2.PP.Un.Bar.2025-2. 2025 Proposed Project Tug Main Engines Average Daily Unmitigated Emissions from Barge Fuel Deliveries for OGV.

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Shipcalls (vessels/yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Barge	Maneuvering - Pilot to Berth	1.00	1	4,800	0.50	MGO	12.0	1,047	87	40	57	53	64
	Maneuvering - Berth to Pilot	1.00	1	4,800	0.50	MGO	12.0	1,047	87	40	57	53	64
TOTAL								2,093	174	79	114	105	128

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Table H.2.PP.Un.Bar.2025-3. 2025 Proposed Project Tug Auxiliary Generator Engines Average Daily Unmitigated Emissions from Barge Fuel Deliveries for OGV.

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Shipcalls (vessels/yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Barge	Maneuvering - Pilot to Berth	1.00	1	300	1.00	MGO	12.0	99	17	3	4	4	8
	Maneuvering - Berth to Pilot	1.00	1	300	1.00	MGO	12.0	99	17	3	4	4	8
<b>TOTAL</b>								<b>198</b>	<b>34</b>	<b>5</b>	<b>8</b>	<b>7</b>	<b>16</b>



Table H.2.PP.Un.Bar.2025-4. 2025 Proposed Project Summary of Tug Average Daily Unmitigated Emissions from Barge Fuel Deliveries for OGV.

Mode	Equipment	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Tug Assist	Main Engines	2,093	174	79	114	105	128
Tug Assist	Aux Generator	198	34	5	8	7	16
<b>TOTAL</b>		<b>2,292</b>	<b>208</b>	<b>85</b>	<b>122</b>	<b>112</b>	<b>145</b>

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Tug Assist	Main Engines	6	0.5	0.2	0.3	0.3	0.4
Tug Assist	Aux Generator	0.54	0.09	0.01	0.02	0.02	0.04
<b>TOTAL</b>		<b>6</b>	<b>0.6</b>	<b>0.2</b>	<b>0.3</b>	<b>0.3</b>	<b>0.4</b>

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Table H.2.PP.Un.Bar.2025-5. 2025 Proposed Project Summary of Average Daily Unmitigated Vessel Emissions from Barge Fuel Deliveries for OGV.

Operation	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Barge	3,489	291	132	190	190	214
Tug Assistance	2,292	208	85	122	112	145
<b>TOTAL</b>	<b>5,781</b>	<b>499</b>	<b>217</b>	<b>312</b>	<b>303</b>	<b>359</b>

Operation	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Barge	9.56	0.80	0.36	0.52	0.52	0.59
Tug Assistance	6.28	0.57	0.23	0.33	0.31	0.40
<b>TOTAL</b>	<b>15.84</b>	<b>1.37</b>	<b>0.59</b>	<b>0.86</b>	<b>0.83</b>	<b>0.98</b>

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Table H.2.PP.Un.Max.2025-1. 2025 Proposed Project Main Engines Maximum Daily Unmitigated Emissions.

Ship	Direction	Mode	Distance (nautical miles)	Ship speed (knots)	Activity (hours)	Maximum Speed (knots)	Load Factor	MCR (kW)	Energy (kW-hr)	Fuel Type	Maximum Daily Shipcalls (vessels/day)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)		
VLCC	North In	Cruising - CW to VSR	22	15.54	1.42	16.9	0.777	25,400	27,957	HFO	1.0	1,393	108	46	120	120	110	808		
		Cruising - VSR to PZ	21	12	1.75	16.9	0.358	25,400	15,913	HFO	1.0	793	61	26	68	68	63	460		
		Cruising - PZ to Pilot	4.7	7	0.67	16.9	0.071	25,400	1,212	HFO	1.0	86	13	9	9	9	8	35		
	North Out	Maneuvering - Pilot to Berth			3	1.00	16.9	0.006	25,400	142	HFO	1.0	114	20	50	17	17	15	4	
		Maneuvering - Berth to Pilot			5	1.00	16.9	0.026	25,400	658	HFO	1.0	98	20	23	13	13	12	19	
		Cruising - Pilot to PZ			3.8	7	0.54	16.9	0.071	25,400	980	HFO	1.0	69	11	8	7	7	28	
		Cruising - PZ to VSR			21	12	1.75	16.9	0.358	25,400	15,913	HFO	1.0	793	61	26	68	68	63	460
		Cruising - VSR to CW			22	15.54	1.42	16.9	0.777	25,400	27,957	HFO	1.0	1,393	108	46	120	120	110	808
		<b>TOTAL</b>											<b>4,740</b>	<b>401</b>	<b>235</b>	<b>422</b>	<b>422</b>	<b>389</b>	<b>2,623</b>	
AFRAMAX	South In	Cruising - CW to VSR	23	14.7	1.56	16.1	0.761	12,477	14,859	HFO	1.0	741	57	25	64	64	59	430		
		Cruising - VSR to PZ	11	12	0.92	16.1	0.414	12,477	4,736	HFO	1.0	236	18	8	20	20	19	137		
		Cruising - PZ to Pilot	4.7	7	0.67	16.1	0.082	12,477	689	HFO	1.0	45	6	4	5	5	4	20		
	South Out	Maneuvering - Pilot to Berth			3	1.00	16.1	0.006	12,477	81	HFO	1.0	61	10	23	9	9	8	2	
		Maneuvering - Berth to Pilot			5	1.00	16.1	0.030	12,477	374	HFO	1.0	54	10	11	7	7	6	11	
		Cruising - Pilot to PZ			3.5	7	0.50	16.1	0.082	12,477	513	HFO	1.0	34	5	3	3	3	15	
		Cruising - PZ to VSR			12.5	12	1.04	16.1	0.414	12,477	5,382	HFO	1.0	268	21	9	23	23	21	156
		Cruising - VSR to CW			24.5	14.7	1.67	16.1	0.761	12,477	15,828	HFO	1.0	789	61	26	68	68	63	458
		<b>TOTAL</b>											<b>2,228</b>	<b>188</b>	<b>108</b>	<b>199</b>	<b>199</b>	<b>183</b>	<b>1,228</b>	
PANAMAX	South In	Cruising - CW to VSR	23	14.7	1.56	15.8	0.805	10,300	12,979	HFO	1.0	647	50	21	56	56	51	375		
		Cruising - VSR to PZ	11	12	0.92	15.8	0.438	10,300	4,136	HFO	1.0	206	16	7	18	18	16	120		
		Cruising - PZ to Pilot	4.7	7	0.67	15.8	0.087	10,300	601	HFO	1.0	30	2	1	3	3	2	17		
	South Out	Maneuvering - Pilot to Berth			3	1.00	15.8	0.007	10,300	71	HFO	1.0	4	0.3	0.1	0.3	0.3	0.3	2	
		Maneuvering - Berth to Pilot			5	1.00	15.8	0.032	10,300	326	HFO	1.0	16	1	1	1	1	1	9	
		Cruising - Pilot to PZ			3.5	7	0.50	15.8	0.087	10,300	448	HFO	1.0	22	2	1	2	2	2	13
		Cruising - PZ to VSR			12.5	12	1.04	15.8	0.438	10,300	4,700	HFO	1.0	234	18	8	20	20	19	136
		Cruising - VSR to CW			24.5	14.7	1.67	15.8	0.805	10,300	13,825	HFO	1.0	689	53	23	59	59	55	400
		<b>TOTAL</b>											<b>1,848</b>	<b>143</b>	<b>61</b>	<b>159</b>	<b>159</b>	<b>147</b>	<b>1,072</b>	
SUEZMAX	North In	Cruising - CW to VSR	22	15.54	1.42	17	0.764	16,000	17,302	HFO	1.0	862	67	29	74	74	68	500		
		Cruising - VSR to PZ	21	12	1.75	17	0.352	16,000	9,848	HFO	1.0	491	38	16	42	42	39	285		
		Cruising - PZ to Pilot	4.7	7	0.67	17	0.070	16,000	750	HFO	1.0	37	3	1	3	3	3	22		
	North Out	Maneuvering - Pilot to Berth			3	1.00	17	0.005	16,000	88	HFO	1.0	4	0.3	0.1	0	0.4	0.3	3	
		Maneuvering - Berth to Pilot			5	1.00	17	0.025	16,000	407	HFO	1.0	20	2	1	2	2	2	12	
		Cruising - Pilot to PZ			3.8	7	0.54	17	0.070	16,000	606	HFO	1.0	30	2	1	3	3	2	18
		Cruising - PZ to VSR			21	12	1.75	17	0.352	16,000	9,848	HFO	1.0	491	38	16	42	42	39	285
		Cruising - VSR to CW			22	15.54	1.42	17	0.764	16,000	17,302	HFO	1.0	862	67	29	74	74	68	500
		<b>TOTAL</b>											<b>2,798</b>	<b>216</b>	<b>93</b>	<b>241</b>	<b>241</b>	<b>222</b>	<b>1,623</b>	
<b>MAXIMUM</b>												<b>4,740</b>	<b>401</b>	<b>235</b>	<b>422</b>	<b>422</b>	<b>389</b>	<b>2,623</b>		

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Table H.2.PP.Un.Max.2025-2. 2025 Proposed Project Auxiliary Generator Maximum Daily Unmitigated Emissions.

Ship	Direction	Mode	Activity (hours)	MCR (kW)	Load Factor	Energy (kW-hr)	Fuel Type	Maximum Daily Shipcalls (vessels/day)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
VLCC	North In	Cruising	3.84	3,600	0.278	3,840	HFO	1.0	155	12	4	16	15	14	130
		Maneuvering	2.00	3,600	0.278	2,002	HFO	1.0	81	6	2	8	8	7	68
	North Out	Maneuvering	1.50	3,600	0.278	1,501	HFO	1.0	61	5	2	6	6	5	51
		Cruising	3.71	3,600	0.278	3,712	HFO	1.0	150	11	4	15	15	14	126
<b>TOTAL</b>								<b>447</b>	<b>33</b>	<b>12</b>	<b>46</b>	<b>44</b>	<b>40</b>	<b>374</b>	
AFRAMAX	South In	Cruising	3.15	3,600	0.278	3,155	HFO	1.0	128	10	3	13	13	12	107
		Maneuvering	2.00	3,600	0.278	2,002	HFO	1.0	81	6	2	8	8	7	68
	South Out	Maneuvering	1.50	3,600	0.278	1,501	HFO	1.0	61	5	2	6	6	5	51
		Cruising	3.21	3,600	0.278	3,211	HFO	1.0	130	10	4	13	13	12	109
<b>TOTAL</b>								<b>399</b>	<b>30</b>	<b>11</b>	<b>41</b>	<b>39</b>	<b>36</b>	<b>334</b>	
PANAMAX	South In	Cruising	3.15	3,600	0.278	3,155	HFO	1.0	128	10	3	13	13	12	107
		Maneuvering	2.00	3,600	0.278	2,002	HFO	1.0	81	6	2	8	8	7	68
	South Out	Maneuvering	1.5	3,600	0.278	1,501	HFO	1.0	61	5	2	6	6	5	51
		Cruising	3.21	3,600	0.278	3,211	HFO	1.0	130	10	4	13	13	12	109
<b>TOTAL</b>								<b>399</b>	<b>30</b>	<b>11</b>	<b>41</b>	<b>39</b>	<b>36</b>	<b>334</b>	
SUEZMAX	North In	Cruising	3.84	3,600	0.278	3,840	HFO	1.0	155	12	4	16	15	14	130
		Maneuvering	2.00	3,600	0.278	2,002	HFO	1.0	81	6	2	8	8	7	68
	North Out	Maneuvering	1.5	3,600	0.278	1,501	HFO	1.0	61	5	2	6	6	5	51
		Cruising	3.71	3,600	0.278	3,712	HFO	1.0	150	11	4	15	15	14	126
<b>TOTAL</b>								<b>447</b>	<b>33</b>	<b>12</b>	<b>46</b>	<b>44</b>	<b>40</b>	<b>374</b>	
<b>MAXIMUM</b>								<b>447</b>	<b>33</b>	<b>12</b>	<b>46</b>	<b>44</b>	<b>40</b>	<b>374</b>	

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Un.Max.2025-3. 2025 Proposed Project Summary of Maximum Daily Unmitigated Vessel Emissions.

<b>Mode</b>	<b>Equipment</b>	<b>NO<sub>x</sub> Emissions (lb/day)</b>	<b>CO Emissions (lb/day)</b>	<b>ROG Emissions (lb/day)</b>	<b>PM Emissions (lb/day)</b>	<b>PM<sub>10</sub> Emissions (lb/day)</b>	<b>PM<sub>2.5</sub> Emissions (lb/day)</b>	<b>SO<sub>2</sub> Emissions (lb/day)</b>
Cruising	Main Engines	4,527	362	162	393	393	362	2,600
Cruising	Aux Generator	306	23	8	31	30	28	256
Maneuvering	Main Engines	212	39	73	29	29	27	23
Maneuvering	Aux Generator	142	11	4	14	14	13	119
<b>Cruising and Maneuvering</b>	<b>TOTAL</b>	<b>5,187</b>	<b>435</b>	<b>248</b>	<b>468</b>	<b>466</b>	<b>429</b>	<b>2,997</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Un.Max.2025-4. 2025 Proposed Project Boiler Warm-Up Maximum Daily Unmitigated Emissions.

Shipcalls (vessels/day)	Vessel Size	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	HFO	2.70	107.96	30%	3	50,000	42	4	1	9	8	5	327
1.0	VLCC	HFO	2.70	84.93	30%	3	90,000	51	5	1	32	28	18	463
1.0	Panamax	HFO	2.70	63.30	30%	3	35,000	17	2	0.4	4	3	2	134
1.0	Suezmax	HFO	2.70	87.54	30%	3	70,000	48	4	1	10	9	6	371

**MAXIMUM      51                      5                      1                      32                      28                      18                      463**

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Un.Max.2025-5. 2025 Proposed Project Summary of Boiler Warm-Up Maximum Unmitigated Emissions.

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Boiler Warm-up	Boiler	51	5	1	32	28	18	463

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Un.Max.2025-6. 2025 Proposed Project Berth Operations Maximum Daily Unmitigated Emissions.

Auxiliary Generator Pre-Pumpin

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	700,000	HFO	2.70	3,600	27.8%	2.5	101	8	3	10	10	8	85
1.0	VLCC	2,000,000	HFO	2.70	3,600	27.8%	2.5	101	8	3	10	10	8	85
1.0	Panamax	350,000	HFO	2.70	3,600	27.8%	2.5	101	8	3	10	10	8	85
1.0	Suezmax	1,000,000	HFO	2.70	3,600	27.8%	2.5	101	8	3	10	10	8	85
MAXIMUM								101	8	3	10	10	8	85

Boiler Pre-Pumpin

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	700,000	HFO	2.70	107.96	30.0%	2.5	50,000	35	3	1	7	6	4	273
1.0	VLCC	2,000,000	HFO	2.70	84.93	30.0%	2.5	90,000	43	5	1	27	23	15	386
1.0	Panamax	350,000	HFO	2.70	63.30	30.0%	2.5	35,000	14	1	0	3	3	2	112
1.0	Suezmax	1,000,000	HFO	2.70	87.54	30.0%	2.5	70,000	40	4	1	8	7	5	310
MAXIMUM									43	5	1	27	23	15	386

Auxiliary Generator Pumpin

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	700,000	MDO	0.52	3,600	55.6%	15.0	1,149	91	33	25	24	19	196
1.0	VLCC	2,000,000	MDO	0.52	3,600	55.6%	23.2	1,777	141	51	38	37	29	303
1.0	Panamax	350,000	MDO	0.52	3,600	55.6%	11.0	843	67	24	18	17	14	144
1.0	Suezmax	1,000,000	MDO	0.52	3,600	55.6%	15.3	1,172	93	34	25	24	19	200
MAXIMUM								1,777	141	51	38	37	29	303

Boiler Pumpin

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Inerting Fuel Consumption Savings (lb/1000 bbl offloaded)	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	700,000	MDO	0.52	102.17	28.06	15.0	184	46	3	30	21	14	673
1.0	VLCC	2,000,000	MDO	0.52	80.38	28.06	23.2	444	93	20	61	43	29	1,357
1.0	Panamax	350,000	MDO	0.52	59.91	28.06	11.0	39	10	1	7	5	3	145
1.0	Suezmax	1,000,000	MDO	0.52	82.85	28.06	15.3	194	49	3	32	22	15	711
MAXIMUM								444	93	20	61	43	29	1,357

Auxiliary Generator Post-Pumpin

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	700,000	HFO	2.70	3,600	27.8%	1.0	41	3	1	4	4	3	34
1.0	VLCC	2,000,000	HFO	2.70	3,600	27.8%	1.0	41	3	1	4	4	3	34
1.0	Panamax	350,000	HFO	2.70	3,600	27.8%	1.0	41	3	1	4	4	3	34
1.0	Suezmax	1,000,000	HFO	2.70	3,600	27.8%	1.0	41	3	1	4	4	3	34
MAXIMUM								41	3	1	4	4	3	34



**Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR**

**Table H.2.PP.Un.Max.2025-7. 2025 Proposed Project Summary of Berth Operations Maximum Daily Unmitigated Emissions.**

<b>Mode</b>	<b>Equipment</b>	<b>NO<sub>x</sub> Emissions (lb/day)</b>	<b>CO Emissions (lb/day)</b>	<b>ROG Emissions (lb/day)</b>	<b>PM Emissions (lb/day)</b>	<b>PM<sub>10</sub> Emissions (lb/day)</b>	<b>PM<sub>2.5</sub> Emissions (lb/day)</b>	<b>SO<sub>2</sub> Emissions (lb/day)</b>
Berth Operations	Boiler	486	97	21	88	66	44	1,743
Berth Operations	Aux Generator	1,919	151	55	53	51	41	422

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Un.Max.2025-8. 2025 Proposed Project Tug Main Engines Maximum Daily Unmitigated Emissions.

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Shipcalls (vessels/day)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
VLCC	Maneuvering - Pilot to Berth	1.00	4	4,800	0.50	MGO	1.0	220	49	9	10	9	0
	Maneuvering - Berth to Pilot	1.00	2	4,800	0.50	MGO	1.0	110	25	5	5	4	0
							<b>TOTAL</b>	<b>330</b>	<b>74</b>	<b>14</b>	<b>14</b>	<b>13</b>	<b>0</b>
AFRAMAX	Maneuvering - Pilot to Berth	1.00	2	4,800	0.50	MGO	1.0	110	25	5	5	4	0
	Maneuvering - Berth to Pilc	1.00	2	4,800	0.50	MGO	1.0	110	25	5	5	4	0
							<b>TOTAL</b>	<b>220</b>	<b>49</b>	<b>9</b>	<b>10</b>	<b>9</b>	<b>0</b>
PANAMAX	Maneuvering - Pilot to Berth	1.00	2	4,800	0.50	MGO	1.0	110	25	5	5	4	0
	Maneuvering - Berth to Pilot	1.00	2	4,800	0.50	MGO	1.0	110	25	5	5	4	0
							<b>TOTAL</b>	<b>220</b>	<b>49</b>	<b>9</b>	<b>10</b>	<b>9</b>	<b>0</b>
SUEZMAX	Maneuvering - Pilot to Berth	1.00	3	4,800	0.50	MGO	1.0	165	37	7	7	7	0
	Maneuvering - Berth to Pilc	1.00	2	4,800	0.50	MGO	1.0	110	25	5	5	4	0
							<b>TOTAL</b>	<b>275</b>	<b>62</b>	<b>12</b>	<b>12</b>	<b>11</b>	<b>0</b>
							<b>MAXIMUM</b>	<b>330</b>	<b>74</b>	<b>14</b>	<b>14</b>	<b>13</b>	<b>0</b>

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Table H.2.PP.Un.Max.2025-9. 2025 Proposed Project Tug Auxiliary Generator Engines Maximum Daily Unmit Emissions

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Shipcalls (vessels/day)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
VLCC	Maneuvering - Pilot to Berth	1.00	4	300	1.00	MGO	1.0	25	6	1	1	1	0
	Maneuvering - Berth to Pilot	1.00	2	300	1.00	MGO	1.0	12	3	0	1	0	0
							<b>TOTAL</b>	<b>37</b>	<b>8</b>	<b>1</b>	<b>2</b>	<b>1</b>	<b>0</b>
AFRAMAX	Maneuvering - Pilot to Berth	1.00	2	300	1.00	MGO	1.0	12	3	0	1	0	0
	Maneuvering - Berth to Pilot	1.00	2	300	1.00	MGO	1.0	12	3	0	1	0	0
							<b>TOTAL</b>	<b>25</b>	<b>6</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>0</b>
PANAMAX	Maneuvering - Pilot to Berth	1.00	2	300	1.00	MGO	1.0	12	3	0	1	0	0
	Maneuvering - Berth to Pilot	1.00	2	300	1.00	MGO	1.0	12	3	0	1	0	0
							<b>TOTAL</b>	<b>25</b>	<b>6</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>0</b>
SUEZMAX	Maneuvering - Pilot to Berth	1.00	3	300	1.00	MGO	1.0	19	4	1	1	1	0
	Maneuvering - Berth to Pilot	1.00	2	300	1.00	MGO	1.0	12	3	0	1	0	0
							<b>TOTAL</b>	<b>31</b>	<b>7</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>0</b>
							<b>MAXIMUM</b>	<b>37</b>	<b>8</b>	<b>1</b>	<b>2</b>	<b>1</b>	<b>0</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Un.Max.2025-10. 2025 Proposed Project Summary of Tug Maximum Daily Unmitigated Emissions.

<b>Mode</b>	<b>Equipment</b>	<b>Maximum Daily NO<sub>x</sub> Emissions (lb/day)</b>	<b>Maximum Daily CO Emissions (lb/day)</b>	<b>Maximum Daily ROG Emissions (lb/day)</b>	<b>Maximum Daily PM<sub>10</sub> Emissions (lb/day)</b>	<b>Maximum Daily PM<sub>2.5</sub> Emissions (lb/day)</b>	<b>Maximum Daily SO<sub>2</sub> Emissions (lb/day)</b>
Tug Assist	Main Engines	330	74	14	14	13	0
Tug Assist	Aux Generator	37	8	1	2	1	0
<b>TOTAL</b>		<b>367</b>	<b>82</b>	<b>15</b>	<b>16</b>	<b>15</b>	<b>0</b>

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Table H.2.PP.Un.Max.2025-11. 2025 Proposed Project VDU Crude Maximum Daily Unmitigated Emissions.

	Maximum Daily Vessel Calls	crude vapors from tanks(scfc/call)	daily gas usage (mmscf/day)	mw crude vapors	destruction efficiency
Aframax	1	224000	0.2	50	98%
VLCC	1	596,313	0.6	50	98%
Panamax	1	116,667	0.1	50	98%
Suezmax	1	333,333	0.3	50	98%
<b>TOTAL</b>	<b>4</b>		<b>1.3</b>		

Assumed Distribution based on tank storage volume:	
Site 1	12.5%
Site 2	87.5%

Maximum Daily Emissions (lb/day)

	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene
EF (lb/MMSCF)	130	35	7	7.5	0.38%	9.90%	0.017	0.0004	0.0003	0.0043	0.0027	0.731	0.0366	0.0272	0.0095
Aframax	14.6	3.9	0.8	0.8	0.00	0.08	0.0	0.000	0.000	0.000	0.000	0.1	0.0	0.0	0.0
VLCC	38.8	10.4	2.1	2.2	0.01	0.21	0.0	0.000	0.000	0.001	0.001	0.2	0.0	0.0	0.0
Panamax	7.6	2.0	0.4	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Suezmax	21.7	5.8	1.2	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0
<b>MAXIMUM</b>	<b>38.8</b>	<b>10.4</b>	<b>2.1</b>	<b>2.2</b>	<b>0.0</b>	<b>0.2</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.2</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>

Assumed a ratio of 500/1000 based on the corresponding Btu values with respect to natural gas combustion emission factors.

Maximum Daily Emissions (lb/day)

	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene	SO <sub>x</sub>
Site 1	5	1.3	0.26	0.3	0.001	0.03	0.001	0.0000	0.0000	0.0002	0.0001	0.03	0.001	0.001	0.000	2
Site 2	34	9	1.8	2.0	0.01	0.18	0.004	0.0001	0.0001	0.001	0.001	0.2	0.01	0.01	0.002	13

2.09

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Table H.2.PP.Un.Max.2025-12. 2025 Proposed Project VDU Legs Maximum Daily Unmitigated Emissions.

	tanks	crude vapors from tanks on legs(scfd/day)	daily gas usage (mmscf/day)	mw crude vapors	destruction efficiency
Site 1	4	23671.23	0.09	50	98%
Site 2	14	23671.23	0.3	50	98%
<b>TOTAL</b>	<b>18</b>		<b>0.4</b>		

<b>48</b>	<b>hr/event</b>
<b>6</b>	<b>events/yr</b>
<b>500</b>	<b>ft3/min</b>

Maximum Daily Emissions (lb/day)															
	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene
EF (lb/MMSCF)	130	35	7	7.5	0.38%	9.90%	0.017	0.0004	0.0003	0.0043	0.0027	0.731	0.0366	0.0272	0.0095
<b>TOTAL</b>	<b>27.7</b>	<b>7.5</b>	<b>1.5</b>	<b>1.6</b>	<b>0.0</b>	<b>0.1</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.2</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>

Assumed a ratio of 500/1000 based on the corresponding Btu values with respect to natural gas combustion emission factors.

Maximum Daily Emissions (lb/day)																
	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene	SO <sub>x</sub>
Site 1	6.2	1.7	0.3	0.4	0.00	0.03	0.00	0.000	0.000	0.000	0.00	0.03	0.00	0.00	0.00	1
Site 2	21.5	5.8	1.2	1.2	0.00	0.11	0.00	0.000	0.000	0.001	0.00	0.12	0.01	0.00	0.00	4



Table H.2.PP.Un.Max.Bar.2025-1. 2025 Proposed Project Main Engines Maximum Daily Unmitigated Emissions from Barge Fuel Deliveries for OGV.

Ship	Direction	Mode	Distance (nautical miles)	Ship speed (knots)	Activity (hours)	Maximum Speed (knots)	Load Factor	MCR (kW)	Energy (kW-hr)	Fuel Type	Shipcalls (vessels/ yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Barge	North In	Volpak to Berth 408	5	3	1.67	3	1.00	4,800	8,000.00	MGO	1.0	291	24	11	16	16	16	18
Barge	North Out	Volpak to Berth 408	5	3	1.67	3.0	1.00	4,800	8,000.00	MGO	1.0	291	24	11	16	16	16	18
<b>TOTAL</b>												<b>581</b>	<b>48</b>	<b>22</b>	<b>32</b>	<b>32</b>	<b>32</b>	<b>36</b>



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Table H.2.PP.Un.Max.Bar.2025-2. 2025 Proposed Project Tug Main Engines Maximum Daily Unmitigated Emissions from Barge Fuel Deliveries for OGV.

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Shipcalls (vessels/day)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Barge	Maneuvering - Pilot to Berth	1.00	1	4,800	0.50	MGO	1.0	87	7	3	5	4	5
	Maneuvering - Berth to Pilot	1.00	1	4,800	0.50	MGO	1.0	87	7	3	5	4	5
							<b>TOTAL</b>	<b>174</b>	<b>15</b>	<b>7</b>	<b>10</b>	<b>9</b>	<b>11</b>
							<b>MAXIMUM</b>	<b>174</b>	<b>15</b>	<b>7</b>	<b>10</b>	<b>9</b>	<b>11</b>

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Table H.2.PP.Un.Max.Bar.2025-3. 2025 Proposed Project Tug Auxiliary Generator Engines Maximum Daily Unmitigated Emissions from Barge Fuel Deliveries for OGV.

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Shipcalls (vessels/day)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Barge	Maneuvering - Pilot to Berth	1.00	1	300	1.00	MGO	1.0	8	1	0	0	0	1
	Maneuvering - Berth to Pilot	1.00	1	300	1.00	MGO	1.0	8	1	0	0	0	1
							<b>TOTAL</b>	<b>17</b>	<b>3</b>	<b>0</b>	<b>1</b>	<b>1</b>	<b>1</b>
<b>MAXIMUM</b>								<b>17</b>	<b>3</b>	<b>0</b>	<b>1</b>	<b>1</b>	<b>1</b>

Table H.2.PP.Un.Max.Bar.2025-4. 2025 Proposed Project Summary of Tug Maximum Daily Unmitigated Emissions from Barge Fuel Deliveries for OGV.

Mode	Equipment	Maximum Daily NO <sub>x</sub> Emissions (lb/day)	Maximum Daily CO Emissions (lb/day)	Maximum Daily ROG Emissions (lb/day)	Maximum Daily PM <sub>10</sub> Emissions (lb/day)	Maximum Daily PM <sub>2.5</sub> Emissions (lb/day)	Maximum Daily SO <sub>2</sub> Emissions (lb/day)
Tug Assist	Main Engines	174	15	7	10	9	11
Tug Assist	Aux Generator	17	3	0	1	1	1
<b>TOTAL</b>		<b>191</b>	<b>17</b>	<b>7</b>	<b>10</b>	<b>9</b>	<b>12</b>

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Table H.2.PP.Un.Max.Bar.2025-5. 2025 Proposed Project Summary of Maximum Daily Unmitigated Vessel Emissions from Barge Fuel Deliveries for OGV.

Operation	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Barge	581	48	22	32	32	36
Tug Assistance	191	17	7	10	9	12
<b>TOTAL</b>	<b>772</b>	<b>66</b>	<b>29</b>	<b>42</b>	<b>41</b>	<b>48</b>

Operation	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Barge	1.59	0.13	0.06	0.09	0.09	0.10
Tug Assistance	0.52	0.05	0.02	0.03	0.03	0.03
<b>TOTAL</b>	<b>2.12</b>	<b>0.18</b>	<b>0.08</b>	<b>0.11</b>	<b>0.11</b>	<b>0.13</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Un.2040-1. 2040 Proposed Project Main Engines Average Daily Unmitigated Emissions.

Ship	Direction	Mode	Distance (nautical miles)	Ship speed (knots)	Activity (hours)	Maximum Speed (knots)	Load Factor	MCR (kW)	Energy (kW-hr)	Fuel Type	Shipcalls (vessels/yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)		
VLCC	North In	Cruising - CW to VSR	22	15.54	1.42	16.9	0.777	25,400	27,957	HFO	69.0	96,135	7,436	3,187	8,286	8,286	7,623	55,769		
		Cruising - VSR to PZ	21	12	1.75	16.9	0.358	25,400	15,913	HFO	69.0	54,719	4,232	1,814	4,716	4,716	4,339	31,743		
		Cruising - PZ to Pilot	4.7	7	0.67	16.9	0.071	25,400	1,212	HFO	69.0	5,900	907	652	620	620	570	2,417		
	North Out	Maneuvering - Pilot to Berth			3	1.00	16.9	0.006	25,400	142	HFO	69.0	7,872	1,352	3,459	1,147	1,147	1,055	283	
		Maneuvering - Berth to Pilot			5	1.00	16.9	0.026	25,400	658	HFO	69.0	6,788	1,352	1,608	870	870	801	1,312	
		Cruising - Pilot to PZ			3.8	7	0.54	16.9	0.071	25,400	980	HFO	69.0	4,770	734	527	501	501	461	1,955
		Cruising - PZ to VSR			21	12	1.75	16.9	0.358	25,400	15,913	HFO	69.0	54,719	4,232	1,814	4,716	4,716	4,339	31,743
		Cruising - VSR to CW			22	15.54	1.42	16.9	0.777	25,400	27,957	HFO	69.0	96,135	7,436	3,187	8,286	8,286	7,623	55,769
AFRAMAX	South In	Cruising - CW to VSR	23	14.7	1.56	16.1	0.761	12,477	14,859	HFO	36.0	26,658	2,062	884	2,298	2,298	2,114	15,465		
		Cruising - VSR to PZ	11	12	0.92	16.1	0.414	12,477	4,736	HFO	36.0	8,496	657	282	732	732	674	4,929		
		Cruising - PZ to Pilot	4.7	7	0.67	16.1	0.082	12,477	689	HFO	36.0	1,631	233	155	166	166	153	717		
	South Out	Maneuvering - Pilot to Berth			3	1.00	16.1	0.006	12,477	81	HFO	36.0	2,188	346	824	318	318	293	84	
		Maneuvering - Berth to Pilot			5	1.00	16.1	0.030	12,477	374	HFO	36.0	1,955	346	383	250	250	230	389	
		Cruising - Pilot to PZ			3.5	7	0.50	16.1	0.082	12,477	513	HFO	36.0	1,215	173	116	124	124	114	534
		Cruising - PZ to VSR			12.5	12	1.04	16.1	0.414	12,477	5,382	HFO	36.0	9,655	747	320	832	832	766	5,601
		Cruising - VSR to CW			24.5	14.7	1.67	16.1	0.761	12,477	15,828	HFO	36.0	28,397	2,196	941	2,447	2,447	2,252	16,473
PANAMAX	South In	Cruising - CW to VSR	23	14.7	1.56	15.8	0.805	10,300	12,979	HFO	18	11,642	900	386	1,003	1,003	923	6,754		
		Cruising - VSR to PZ	11	12	0.92	15.8	0.438	10,300	4,136	HFO	18	3,710	287	123	320	320	294	2,152		
		Cruising - PZ to Pilot	4.7	7	0.67	15.8	0.087	10,300	601	HFO	18	539	42	18	46	46	43	313		
	South Out	Maneuvering - Pilot to Berth			3	1.00	15.8	0.007	10,300	71	HFO	18	63	5	2	5	5	5	37	
		Maneuvering - Berth to Pilot			5	1.00	15.8	0.032	10,300	326	HFO	18	293	23	10	25	25	23	170	
		Cruising - Pilot to PZ			3.5	7	0.50	15.8	0.087	10,300	448	HFO	18	402	31	13	35	35	32	233
		Cruising - PZ to VSR			12.5	12	1.04	15.8	0.438	10,300	4,700	HFO	18	4,216	326	140	363	363	334	2,446
		Cruising - VSR to CW			24.5	14.7	1.67	15.8	0.805	10,300	13,825	HFO	18	12,401	959	411	1,069	1,069	983	7,194
SUEZMAX	North In	Cruising - CW to VSR	22	15.54	1.42	17	0.764	16,000	17,302	HFO	78	67,255	5,202	2,229	5,797	5,797	5,333	39,015		
		Cruising - VSR to PZ	21	12	1.75	17	0.352	16,000	9,848	HFO	78	38,281	2,961	1,269	3,299	3,299	3,035	22,207		
		Cruising - PZ to Pilot	4.7	7	0.67	17	0.070	16,000	750	HFO	78	2,915	225	97	251	251	231	1,691		
	North Out	Maneuvering - Pilot to Berth			3	1.00	17	0.005	16,000	88	HFO	78	342	26	11	29	29	27	198	
		Maneuvering - Berth to Pilot			5	1.00	17	0.025	16,000	407	HFO	78	1,582	122	52	136	136	125	918	
		Cruising - Pilot to PZ			3.8	7	0.54	17	0.070	16,000	606	HFO	78	2,357	182	78	203	203	187	1,367
		Cruising - PZ to VSR			21	12	1.75	17	0.352	16,000	9,848	HFO	78	38,281	2,961	1,269	3,299	3,299	3,035	22,207
		Cruising - VSR to CW			22	15.54	1.42	17	0.764	16,000	17,302	HFO	78	67,255	5,202	2,229	5,797	5,797	5,333	39,015
<b>TOTAL</b>												<b>658,769</b>	<b>53,898</b>	<b>28,492</b>	<b>57,988</b>	<b>57,988</b>	<b>53,349</b>	<b>371,101</b>		

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Table H.2.PP.Un.2040-2. 2040 Proposed Project Auxiliary Generator Average Daily Unmitigated Emissions.

Ship	Direction	Mode	Activity (hours)	MCR (kW)	Load Factor	Energy (kW-hr)	Fuel Type	Shipcalls (vessels/yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
VLCC	North In	Cruising	3.84	3,600	0.278	3,840	HFO	69.0	10,724	803	292	1,094	1,051	840	8,974
		Maneuvering	2.00	3,600	0.278	2,002	HFO	69.0	5,590	418	152	570	548	438	4,677
	North Out	Maneuvering	1.50	3,600	0.278	1,501	HFO	69.0	4,192	314	114	428	411	329	3,508
		Cruising	3.71	3,600	0.278	3,712	HFO	69.0	10,365	776	282	1,058	1,015	812	8,673
AFRAMAX	South In	Cruising	3.15	3,600	0.278	3,155	HFO	36.0	4,597	344	125	469	450	360	3,847
		Maneuvering	2.00	3,600	0.278	2,002	HFO	36.0	2,916	218	79	298	286	229	2,440
	South Out	Maneuvering	1.50	3,600	0.278	1,501	HFO	36.0	2,187	164	60	223	214	171	1,830
		Cruising	3.21	3,600	0.278	3,211	HFO	36.0	4,678	350	127	477	458	367	3,915
PANAMAX	South In	Cruising	3.15	3,600	0.278	3,155	HFO	18	2,299	172	63	235	225	180	1,923
		Maneuvering	2.00	3,600	0.278	2,002	HFO	18	1,458	109	40	149	143	114	1,220
	South Out	Maneuvering	1.5	3,600	0.278	1,501	HFO	18	1,094	82	30	112	107	86	915
		Cruising	3.21	3,600	0.278	3,211	HFO	18	2,339	175	64	239	229	183	1,957
SUEZMAX	North In	Cruising	3.84	3,600	0.278	3,840	HFO	78	12,123	907	330	1,237	1,188	950	10,144
		Maneuvering	2.00	3,600	0.278	2,002	HFO	78	6,319	473	172	645	619	495	5,287
	North Out	Maneuvering	1.5	3,600	0.278	1,501	HFO	78	4,739	355	129	484	464	371	3,965
		Cruising	3.71	3,600	0.278	3,712	HFO	78	11,717	877	319	1,196	1,148	918	9,804
<b>TOTAL</b>									<b>87,339</b>	<b>6,536</b>	<b>2,377</b>	<b>8,912</b>	<b>8,556</b>	<b>6,845</b>	<b>73,080</b>

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Table H.2.PP.Un.2040-3. 2040 Proposed Project Boiler Warm-Up Average Daily Unmitigated Emissions.

Shipcalls (vessels/yr)	Vessel Size	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
36.0	Aframax	HFO	2.70	107.96	30%	3	50,000	1,522	137	35	318	274	178	11,778
69.0	VLCC	HFO	2.70	84.93	30%	3	90,000	3,528	373	77	2,219	1,908	484	31,968
18.0	Panamax	HFO	2.70	63.30	30%	3	35,000	312	28	7	65	56	37	2,417
78.0	Suezmax	HFO	2.70	87.54	30%	3	70,000	3,745	338	86	783	674	439	28,971
<b>TOTAL</b>								<b>9,108</b>	<b>877</b>	<b>205</b>	<b>3,386</b>	<b>2,912</b>	<b>1,138</b>	<b>75,134</b>

Table H.2.PP.Un.2040-4. 2040 Proposed Project Berth Operations Average Daily Unmitigated Emissions.

Auxiliary Generator Pre-Pumpin

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
36.0	Aframax	700,000	HFO	2.70	3,600	27.8%	2.5	3,646	273	99	372	357	286	3,050
69.0	VLCC	2,000,000	HFO	2.70	3,600	27.8%	2.5	6,987	523	190	713	684	548	5,846
18.0	Panamax	350,000	HFO	2.70	3,600	27.8%	2.5	1,823	136	50	186	179	143	1,525
78.0	Suezmax	1,000,000	HFO	2.70	3,600	27.8%	2.5	7,899	591	215	806	774	619	6,609
TOTAL								20,354	1,523	554	2,077	1,994	1,595	17,031

Boiler Pre-Pumping

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
36.0	Aframax	700,000	HFO	2.70	107.96	30.0%	2.5	50,000	1,269	115	29	265	228	149	9,815
69.0	VLCC	2,000,000	HFO	2.70	84.93	30.0%	2.5	90,000	2,940	311	64	1,849	1,590	1,035	26,640
18.0	Panamax	350,000	HFO	2.70	63.30	30.0%	2.5	35,000	260	24	6	54	47	30	2,014
78.0	Suezmax	1,000,000	HFO	2.70	87.54	30.0%	2.5	70,000	3,121	282	72	653	561	366	24,142
TOTAL									7,590	730	171	2,822	2,427	1,580	62,612

Auxiliary Generator Pumpin

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
36.0	Aframax	700,000	MDO	0.52	3,600	55.6%	15.0	41,366	3,274	1,190	893	857	686	7,050
69.0	VLCC	2,000,000	MDO	0.52	3,600	55.6%	23.2	122,744	9,714	3,532	2,649	2,543	2,035	20,918
18.0	Panamax	350,000	MDO	0.52	3,600	55.6%	11.0	15,167	1,200	436	327	314	251	2,585
78.0	Suezmax	1,000,000	MDO	0.52	3,600	55.6%	15.3	91,418	7,235	2,631	1,973	1,894	1,515	15,580
TOTAL								270,695	21,422	7,790	5,842	5,609	4,487	46,133

Boiler Pumping

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Inerting Fuel Consumption Savings (lb/1000 bbl offloaded)	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
36.0	Aframax	700,000	MDO	0.52	102.17	28.06	15.0	6,615	1,654	93	1,095	766	512	24,224
69.0	VLCC	2,000,000	MDO	0.52	80.38	28.06	23.2	30,615	6,393	1,351	4,232	2,962	1,981	93,645
18.0	Panamax	350,000	MDO	0.52	59.91	28.06	11.0	711	178	10	118	82	55	2,603
78.0	Suezmax	1,000,000	MDO	0.52	82.85	28.06	15.3	15,137	3,784	213	2,505	1,754	1,173	55,431
TOTAL								53,077	12,009	1,667	7,949	5,565	3,721	175,902

Auxiliary Generator Post-Pumpin

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
36.0	Aframax	700,000	HFO	2.70	3,600	27.8%	1.0	1,458	109	40	149	143	114	1,220
69.0	VLCC	2,000,000	HFO	2.70	3,600	27.8%	1.0	2,795	209	76	285	274	219	2,339
18.0	Panamax	350,000	HFO	2.70	3,600	27.8%	1.0	729	55	20	74	71	57	610
78.0	Suezmax	1,000,000	HFO	2.70	3,600	27.8%	1.0	3,159	236	86	322	309	248	2,644
TOTAL								8,142	609	222	831	798	638	6,812



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Table H.2.PP.Un.2040-5. 2040 Proposed Project Summary of Average Daily Unmitigated Vessel Emissions.

Mode	Equipment	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Cruising	Main Engines	637,686	50,325	22,141	55,207	55,207	50,790	367,709
Cruising	Aux Generator	58,844	4,403	1,601	6,004	5,764	4,611	49,236
Maneuvering	Main Engines	21,083	3,573	6,351	2,782	2,782	2,559	3,391
Maneuvering	Aux Generator	28,496	2,132	775	2,908	2,791	2,233	23,844
Boiler Warm-up	Boiler	9,108	877	205	3,386	2,912	1,138	75,134
Berth Operations	Boiler	60,667	12,739	1,838	10,771	7,991	5,301	238,514
Berth Operations	Aux Generator	299,191	23,554	8,565	8,750	8,400	6,720	69,976
Propulsion	TOTAL	746,109	60,433	30,869	66,901	66,544	60,194	444,181
Non-Propulsion	TOTAL	368,966	37,170	10,608	22,907	19,303	13,159	383,625
<b>Total Emissions</b>		<b>1,115,075</b>	<b>97,603</b>	<b>41,477</b>	<b>89,808</b>	<b>85,847</b>	<b>73,353</b>	<b>827,805</b>

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Cruising	Main Engines	1,747.1	137.9	60.7	151.3	151.3	139.2	1,007.4
Cruising	Aux Generator	161.2	12.1	4.4	16.5	15.8	12.6	134.9
Maneuvering	Main Engines	57.8	9.8	17.4	7.6	7.6	7.0	9.3
Maneuvering	Aux Generator	78.1	5.8	2.1	8.0	7.6	6.1	65.3
Boiler Warm-up	Boiler	25.0	2.4	0.6	9.3	8.0	3.1	205.8
Berth Operations	Boiler	166.2	34.9	5.0	29.5	21.9	14.5	653.5
Berth Operations	Aux Generator	819.7	64.5	23.5	24.0	23.0	18.4	191.7
Propulsion	TOTAL	2,044.1	165.6	84.6	183.3	182.3	164.9	1,216.9
Non-Propulsion	TOTAL	1,010.9	101.8	29.1	62.8	52.9	36.1	1,051.0
<b>Total Emissions</b>		<b>3,055</b>	<b>267</b>	<b>114</b>	<b>246</b>	<b>235</b>	<b>201</b>	<b>2,268</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Un.2040-6. 2040 Proposed Project Tug Main Engines Average Daily Unmitigated Emissions.

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Shipcalls (vessels/yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
VLCC	Maneuvering - Pilot to Berth	1.00	4	4,800	0.50	MGO	69.0	13,624	3,410	638	602	554	11
	Maneuvering - Berth to Pilot	1.00	2	4,800	0.50	MGO	69.0	6,812	1,705	319	301	277	5
AFRAMAX	Maneuvering - Pilot to Berth	1.00	2	4,800	0.50	MGO	36.0	3,554	890	167	157	144	3
	Maneuvering - Berth to Pilc	1.00	2	4,800	0.50	MGO	36.0	3,554	890	167	157	144	3
PANAMAX	Maneuvering - Pilot to Berth	1.00	2	4,800	0.50	MGO	18.0	1,777	445	83	79	72	1
	Maneuvering - Berth to Pilot	1.00	2	4,800	0.50	MGO	18.0	1,777	445	83	79	72	1
SUEZMAX	Maneuvering - Pilot to Berth	1.00	3	4,800	0.50	MGO	78.0	11,551	2,891	541	510	469	9
	Maneuvering - Berth to Pilc	1.00	2	4,800	0.50	MGO	78.0	7,700	1,928	361	340	313	6
<b>TOTAL</b>								<b>50,348</b>	<b>12,604</b>	<b>2,359</b>	<b>2,224</b>	<b>2,046</b>	<b>40</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Un.2040-7. 2040 Proposed Project Tug Auxiliary Generator Engines Average Daily Unmitigated Emissions.

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Shipcalls (vessels/yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
VLCC	Maneuvering - Pilot to Berth	1.00	4	300	1.00	MGO	69.0	1,550	381	62	64	59	1
	Maneuvering - Berth to Pilot	1.00	2	300	1.00	MGO	69.0	775	190	31	32	29	0
AFRAMAX	Maneuvering - Pilot to Berth	1.00	2	300	1.00	MGO	36.0	404	99	16	17	15	0
	Maneuvering - Berth to Pilot	1.00	2	300	1.00	MGO	36.0	404	99	16	17	15	0
PANAMAX	Maneuvering - Pilot to Berth	1.00	2	300	1.00	MGO	18.0	202	50	8	8	8	0
	Maneuvering - Berth to Pilot	1.00	2	300	1.00	MGO	18.0	202	50	8	8	8	0
SUEZMAX	Maneuvering - Pilot to Berth	1.00	3	300	1.00	MGO	78.0	1,314	323	52	54	50	1
	Maneuvering - Berth to Pilot	1.00	2	300	1.00	MGO	78.0	876	215	35	36	33	1
<b>TOTAL</b>								<b>5,729</b>	<b>1,407</b>	<b>227</b>	<b>236</b>	<b>217</b>	<b>3</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Un.2040-8. 2040 Proposed Project Summary of Tug Average Daily Unmitigated Emissions.

Mode	Equipment	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Tug Assist	Main Engines	50,348	12,604	2,359	2,224	2,046	40
Tug Assist	Aux Generator	5,729	1,407	227	236	217	3
<b>TOTAL</b>		<b>56,078</b>	<b>14,011</b>	<b>2,587</b>	<b>2,460</b>	<b>2,263</b>	<b>44</b>

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Tug Assist	Main Engines	138	34.5	6.5	6.1	5.6	0.1
Tug Assist	Aux Generator	16	3.9	0.6	0.6	0.6	0.0
<b>TOTAL</b>		<b>154</b>	<b>38.4</b>	<b>7.1</b>	<b>6.7</b>	<b>6.2</b>	<b>0.1</b>

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Table H.2.PP.Un.2040-9. 2040 Proposed Project VDU Crude Average Daily Unmitigated Emissions.

	Annual Vessel Calls	crude vapors from tanks(scft/call)	annual gas usage (mmscf/yr)	mw crude vapors	destruction efficiency
Aframax	36	224000	8.1	50	98%
VLCC	69	596,313	41.1	50	98%
Panamax	18	116,667	2.1	50	98%
Suezmax	78	333,333	26.0	50	98%
<b>TOTAL</b>	<b>201</b>		<b>77.3</b>		

Assumed Distribution based on tank storage volume:  
 Site 1 12.5%  
 Site 2 87.5%

Annual Average (lb/yr)

	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene
EF (lb/MMSCF)	130	35	7	7.5	0.38%	9.90%	0.017	0.0004	0.0003	0.0043	0.0027	0.731	0.0366	0.0272	0.0095
Aframax	524.2	141.1	28.2	30.2	0.11	2.79	0.1	0.002	0.001	0.017	0.011	2.9	0.1	0.1	0.0
VLCC	2674.5	720.0	144.0	154.3	0.55	14.26	0.3	0.008	0.006	0.088	0.056	15.0	0.8	0.6	0.2
Panamax	136.5	36.8	7.4	7.9	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.8	0.0	0.0	0.0
Suezmax	1690.0	455.0	91.0	97.5	0.0	1.3	0.2	0.0	0.0	0.1	0.0	9.5	0.5	0.4	0.1
<b>TOTAL</b>	<b>5025.1</b>	<b>1352.9</b>	<b>270.6</b>	<b>289.9</b>	<b>0.7</b>	<b>18.4</b>	<b>0.7</b>	<b>0.0</b>	<b>0.0</b>	<b>0.2</b>	<b>0.1</b>	<b>28.3</b>	<b>1.4</b>	<b>1.1</b>	<b>0.4</b>

Assumed a ratio of 500/1000 based on the corresponding Btu values with respect to natural gas combustion emission factors.

Annual Average (lb/yr)

	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene	SO <sub>x</sub>
Site 1	628	169.1	33.82	36.2	0.088	2.31	0.082	0.0019	0.0014	0.0208	0.0130	3.53	0.177	0.131	0.046	112
Site 2	4397	1184	236.8	253.7	0.62	16.14	0.575	0.0135	0.0101	0.145	0.091	24.7	1.24	0.92	0.321	787

270.58

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Table H.2.PP.Un.2040-10. 2040 Proposed Project VDU Legs Average Daily Unmitigated Emissions.

	tanks	crude vapors from tanks on legs(scf/yr)	annual gas usage (mmscf/yr)	mw crude vapors	destruction efficiency
Site 1	4	8640000	34.6	50	98%
Site 2	14	8640000	121.0	50	98%
<b>TOTAL</b>	<b>18</b>		<b>155.5</b>		

<b>48</b>	<b>hr/event</b>
<b>6</b>	<b>events/yr</b>
<b>500</b>	<b>ft3/min</b>

		Annual Average (lb/yr)													
	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene
EF (lb/MMSCF)	130	35	7	7.5	0.38%	9.90%	0.017	0.0004	0.0003	0.0043	0.0027	0.731	0.0366	0.0272	0.0095
<b>TOTAL</b>	<b>10108.8</b>	<b>2721.6</b>	<b>544.3</b>	<b>583.2</b>	<b>2.1</b>	<b>53.9</b>	<b>1.3</b>	<b>0.0</b>	<b>0.0</b>	<b>0.3</b>	<b>0.2</b>	<b>56.8</b>	<b>2.8</b>	<b>2.1</b>	<b>0.7</b>

Assumed a ratio of 500/1000 based on the corresponding Btu values with respect to natural gas combustion emission factors.

		Annual Average (lb/yr)														
	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene	SO <sub>x</sub>
Site 1	2246.4	604.8	121.0	129.6	0.46	11.98	0.29	0.007	0.005	0.074	0.05	12.63	0.63	0.47	0.16	402
Site 2	7862.4	2116.8	423.4	453.6	1.61	41.91	1.03	0.024	0.018	0.260	0.16	44.21	2.21	1.65	0.57	1407



Table H.2.PP.Un.Bar.2040-1. 2040 Proposed Project Main Engines Average Daily Unmitigated Emissions from Barge Fuel Deliveries for OGV.

Ship	Direction	Mode	Distance (nautical miles)	Ship speed (knots)	Activity (hours)	Maximum Speed (knots)	Load Factor	MCR (kW)	Energy (kW-hr)	Fuel Type	Shipcalls (vessels/ yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Barge	North In	Volpak to Berth 408	5	3	1.67	3	0.50	4,800	4,000.00	MGO	12.0	1,744	145	66	95	95	95	107
Barge	North Out	Volpak to Berth 408	5	3	1.67	3.0	0.50	4,800	4,000.00	MGO	12.0	1,744	145	66	95	95	95	107
TOTAL												3,489	291	132	190	190	190	214



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Table H.2.PP.Un.Bar.2040-2. 2040 Proposed Project Tug Main Engines Average Daily Unmitigated Emissions from Barge Fuel Deliveries for OGV.

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Shipcalls (vessels/ yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Barge	Maneuvering - Pilot to Berth	1.00	1	4,800	0.50	MGO	12.0	1,047	87	40	57	53	64
	Maneuvering - Berth to Pilot	1.00	1	4,800	0.50	MGO	12.0	1,047	87	40	57	53	64
<b>TOTAL</b>								<b>2,093</b>	<b>174</b>	<b>79</b>	<b>114</b>	<b>105</b>	<b>128</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Un.Bar.2040-3. 2040 Proposed Project Tug Auxiliary Generator Engines Average Daily Unmitigated Emissions from Barge Fuel Deliveries for OGV.

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Shipcalls (vessels/yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Barge	Maneuvering - Pilot to Berth	1.00	1	300	1.00	MGO	12.0	99	17	3	4	4	8
	Maneuvering - Berth to Pilot	1.00	1	300	1.00	MGO	12.0	99	17	3	4	4	8
<b>TOTAL</b>								<b>198</b>	<b>34</b>	<b>5</b>	<b>8</b>	<b>7</b>	<b>16</b>

**Table H.2.PP.Un.Bar.2040-4. 2040 Proposed Project Summary of Tug Average Daily Unmitigated Emissions from Barge Fuel Deliveries for OGV.**

<b>Mode</b>	<b>Equipment</b>	<b>NO<sub>x</sub> Emissions (lb/yr)</b>	<b>CO Emissions (lb/yr)</b>	<b>ROG Emissions (lb/yr)</b>	<b>PM<sub>10</sub> Emissions (lb/yr)</b>	<b>PM<sub>2.5</sub> Emissions (lb/yr)</b>	<b>SO<sub>2</sub> Emissions (lb/yr)</b>
Tug Assist	Main Engines	2,093	174	79	114	105	128
Tug Assist	Aux Generator	198	34	5	8	7	16
<b>TOTAL</b>		<b>2,292</b>	<b>208</b>	<b>85</b>	<b>122</b>	<b>112</b>	<b>145</b>

<b>Mode</b>	<b>Equipment</b>	<b>NO<sub>x</sub> Emissions (lb/day)</b>	<b>CO Emissions (lb/day)</b>	<b>ROG Emissions (lb/day)</b>	<b>PM<sub>10</sub> Emissions (lb/day)</b>	<b>PM<sub>2.5</sub> Emissions (lb/day)</b>	<b>SO<sub>2</sub> Emissions (lb/day)</b>
Tug Assist	Main Engines	6	0.5	0.2	0.3	0.3	0.4
Tug Assist	Aux Generator	0.54	0.09	0.01	0.02	0.02	0.04
<b>TOTAL</b>		<b>6</b>	<b>0.6</b>	<b>0.2</b>	<b>0.3</b>	<b>0.3</b>	<b>0.4</b>

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Table H.2.PP.Un.Bar.2040-5. 2040 Proposed Project Summary of Average Daily Unmitigated Vessel Emissions from Barge Fuel Deliveries for OGV.

Operation	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Barge	3,489	291	132	190	190	214
Tug Assistance	2,292	208	85	122	112	145
<b>TOTAL</b>	<b>5,781</b>	<b>499</b>	<b>217</b>	<b>312</b>	<b>303</b>	<b>359</b>

Operation	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Barge	9.56	0.80	0.36	0.52	0.52	0.59
Tug Assistance	6.28	0.57	0.23	0.33	0.31	0.40
<b>TOTAL</b>	<b>15.84</b>	<b>1.37</b>	<b>0.59</b>	<b>0.86</b>	<b>0.83</b>	<b>0.98</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Un.Max.2040-1. 2040 Proposed Project Main Engines Maximum Daily Unmitigated Emissions.

Ship	Direction	Mode	Distance (nautical miles)	Ship speed (knots)	Activity (hours)	Maximum Speed (knots)	Load Factor	MCR (kW)	Energy (kW-hr)	Fuel Type	Maximum Daily Shipcalls (vessels/day)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)		
VLCC	North In	Cruising - CW to VSR	22	15.54	1.42	16.9	0.777	25,400	27,957	HFO	1.0	1,393	108	46	120	120	110	808		
		Cruising - VSR to PZ	21	12	1.75	16.9	0.358	25,400	15,913	HFO	1.0	793	61	26	68	68	63	460		
		Cruising - PZ to Pilot	4.7	7	0.67	16.9	0.071	25,400	1,212	HFO	1.0	86	13	9	9	9	8	35		
	North Out	Maneuvering - Pilot to Berth			3	1.00	16.9	0.006	25,400	142	HFO	1.0	114	20	50	17	17	15	4	
		Maneuvering - Berth to Pilot			5	1.00	16.9	0.026	25,400	658	HFO	1.0	98	20	23	13	13	12	19	
		Cruising - Pilot to PZ			3.8	7	0.54	16.9	0.071	25,400	980	HFO	1.0	69	11	8	7	7	28	
		Cruising - PZ to VSR			21	12	1.75	16.9	0.358	25,400	15,913	HFO	1.0	793	61	26	68	68	63	460
		Cruising - VSR to CW			22	15.54	1.42	16.9	0.777	25,400	27,957	HFO	1.0	1,393	108	46	120	120	110	808
		<b>TOTAL</b>											<b>4,740</b>	<b>401</b>	<b>235</b>	<b>422</b>	<b>422</b>	<b>389</b>	<b>2,623</b>	
AFRAMAX	South In	Cruising - CW to VSR	23	14.7	1.56	16.1	0.761	12,477	14,859	HFO	1.0	741	57	25	64	64	59	430		
		Cruising - VSR to PZ	11	12	0.92	16.1	0.414	12,477	4,736	HFO	1.0	236	18	8	20	20	19	137		
		Cruising - PZ to Pilot	4.7	7	0.67	16.1	0.082	12,477	689	HFO	1.0	45	6	4	5	5	4	20		
	South Out	Maneuvering - Pilot to Berth			3	1.00	16.1	0.006	12,477	81	HFO	1.0	61	10	23	9	9	8	2	
		Maneuvering - Berth to Pilot			5	1.00	16.1	0.030	12,477	374	HFO	1.0	54	10	11	7	7	6	11	
		Cruising - Pilot to PZ			3.5	7	0.50	16.1	0.082	12,477	513	HFO	1.0	34	5	3	3	3	15	
		Cruising - PZ to VSR			12.5	12	1.04	16.1	0.414	12,477	5,382	HFO	1.0	268	21	9	23	23	21	156
		Cruising - VSR to CW			24.5	14.7	1.67	16.1	0.761	12,477	15,828	HFO	1.0	789	61	26	68	68	63	458
		<b>TOTAL</b>											<b>2,228</b>	<b>188</b>	<b>108</b>	<b>199</b>	<b>199</b>	<b>183</b>	<b>1,228</b>	
PANAMAX	South In	Cruising - CW to VSR	23	14.7	1.56	15.8	0.805	10,300	12,979	HFO	1.0	647	50	21	56	56	51	375		
		Cruising - VSR to PZ	11	12	0.92	15.8	0.438	10,300	4,136	HFO	1.0	206	16	7	18	18	16	120		
		Cruising - PZ to Pilot	4.7	7	0.67	15.8	0.087	10,300	601	HFO	1.0	30	2	1	3	3	2	17		
	South Out	Maneuvering - Pilot to Berth			3	1.00	15.8	0.007	10,300	71	HFO	1.0	4	0.3	0.1	0.3	0.3	0.3	2	
		Maneuvering - Berth to Pilot			5	1.00	15.8	0.032	10,300	326	HFO	1.0	16	1	1	1	1	1	9	
		Cruising - Pilot to PZ			3.5	7	0.50	15.8	0.087	10,300	448	HFO	1.0	22	2	1	2	2	2	13
		Cruising - PZ to VSR			12.5	12	1.04	15.8	0.438	10,300	4,700	HFO	1.0	234	18	8	20	20	19	136
		Cruising - VSR to CW			24.5	14.7	1.67	15.8	0.805	10,300	13,825	HFO	1.0	689	53	23	59	59	55	400
		<b>TOTAL</b>											<b>1,848</b>	<b>143</b>	<b>61</b>	<b>159</b>	<b>159</b>	<b>147</b>	<b>1,072</b>	
SUEZMAX	North In	Cruising - CW to VSR	22	15.54	1.42	17	0.764	16,000	17,302	HFO	1.0	862	67	29	74	74	68	500		
		Cruising - VSR to PZ	21	12	1.75	17	0.352	16,000	9,848	HFO	1.0	491	38	16	42	42	39	285		
		Cruising - PZ to Pilot	4.7	7	0.67	17	0.070	16,000	750	HFO	1.0	37	3	1	3	3	3	22		
	North Out	Maneuvering - Pilot to Berth			3	1.00	17	0.005	16,000	88	HFO	1.0	4	0.3	0.1	0	0.4	0.3	3	
		Maneuvering - Berth to Pilot			5	1.00	17	0.025	16,000	407	HFO	1.0	20	2	1	2	2	2	12	
		Cruising - Pilot to PZ			3.8	7	0.54	17	0.070	16,000	606	HFO	1.0	30	2	1	3	3	2	18
		Cruising - PZ to VSR			21	12	1.75	17	0.352	16,000	9,848	HFO	1.0	491	38	16	42	42	39	285
		Cruising - VSR to CW			22	15.54	1.42	17	0.764	16,000	17,302	HFO	1.0	862	67	29	74	74	68	500
		<b>TOTAL</b>											<b>2,798</b>	<b>216</b>	<b>93</b>	<b>241</b>	<b>241</b>	<b>222</b>	<b>1,623</b>	
<b>MAXIMUM</b>												<b>4,740</b>	<b>401</b>	<b>235</b>	<b>422</b>	<b>422</b>	<b>389</b>	<b>2,623</b>		

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Table H.2.PP.Un.Max.2040-2. 2040 Proposed Project Auxiliary Generator Maximum Daily Unmitigated Emissions.

Ship	Direction	Mode	Activity (hours)	MCR (kW)	Load Factor	Energy (kW-hr)	Fuel Type	Maximum Daily Shipcalls (vessels/day)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
VLCC	North In	Cruising	3.84	3,600	0.278	3,840	HFO	1.0	155	12	4	16	15	12	130
		Maneuvering	2.00	3,600	0.278	2,002	HFO	1.0	81	6	2	8	8	6	68
	North Out	Maneuvering	1.50	3,600	0.278	1,501	HFO	1.0	61	5	2	6	6	5	51
		Cruising	3.71	3,600	0.278	3,712	HFO	1.0	150	11	4	15	15	12	126
<b>TOTAL</b>								<b>447</b>	<b>33</b>	<b>12</b>	<b>46</b>	<b>44</b>	<b>35</b>	<b>374</b>	
AFRAMAX	South In	Cruising	3.15	3,600	0.278	3,155	HFO	1.0	128	10	3	13	13	10	107
		Maneuvering	2.00	3,600	0.278	2,002	HFO	1.0	81	6	2	8	8	6	68
	South Out	Maneuvering	1.50	3,600	0.278	1,501	HFO	1.0	61	5	2	6	6	5	51
		Cruising	3.21	3,600	0.278	3,211	HFO	1.0	130	10	4	13	13	10	109
<b>TOTAL</b>								<b>399</b>	<b>30</b>	<b>11</b>	<b>41</b>	<b>39</b>	<b>31</b>	<b>334</b>	
PANAMAX	South In	Cruising	3.15	3,600	0.278	3,155	HFO	1.0	128	10	3	13	13	10	107
		Maneuvering	2.00	3,600	0.278	2,002	HFO	1.0	81	6	2	8	8	6	68
	South Out	Maneuvering	1.5	3,600	0.278	1,501	HFO	1.0	61	5	2	6	6	5	51
		Cruising	3.21	3,600	0.278	3,211	HFO	1.0	130	10	4	13	13	10	109
<b>TOTAL</b>								<b>399</b>	<b>30</b>	<b>11</b>	<b>41</b>	<b>39</b>	<b>31</b>	<b>334</b>	
SUEZMAX	North In	Cruising	3.84	3,600	0.278	3,840	HFO	1.0	155	12	4	16	15	12	130
		Maneuvering	2.00	3,600	0.278	2,002	HFO	1.0	81	6	2	8	8	6	68
	North Out	Maneuvering	1.5	3,600	0.278	1,501	HFO	1.0	61	5	2	6	6	5	51
		Cruising	3.71	3,600	0.278	3,712	HFO	1.0	150	11	4	15	15	12	126
<b>TOTAL</b>								<b>447</b>	<b>33</b>	<b>12</b>	<b>46</b>	<b>44</b>	<b>35</b>	<b>374</b>	
<b>MAXIMUM</b>								<b>447</b>	<b>33</b>	<b>12</b>	<b>46</b>	<b>44</b>	<b>35</b>	<b>374</b>	

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Table H.2.PP.Un.Max.2040-3. 2040 Proposed Project Summary of Maximum Daily Unmitigated Vessel Emissions.

<b>Mode</b>	<b>Equipment</b>	<b>NO<sub>x</sub> Emissions (lb/day)</b>	<b>CO Emissions (lb/day)</b>	<b>ROG Emissions (lb/day)</b>	<b>PM Emissions (lb/day)</b>	<b>PM<sub>10</sub> Emissions (lb/day)</b>	<b>PM<sub>2.5</sub> Emissions (lb/day)</b>	<b>SO<sub>2</sub> Emissions (lb/day)</b>
Cruising	Main Engines	4,527	362	162	393	393	362	2,600
Cruising	Aux Generator	306	23	8	31	30	24	256
Maneuvering	Main Engines	212	39	73	29	29	27	23
Maneuvering	Aux Generator	142	11	4	14	14	11	119
<b>Cruising and Maneuvering</b>	<b>TOTAL</b>	<b>5,187</b>	<b>435</b>	<b>248</b>	<b>468</b>	<b>466</b>	<b>424</b>	<b>2,997</b>

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Table H.2.PP.Un.Max.2040-4. 2040 Proposed Project Boiler Warm-Up Maximum Daily Unmitigated Emissions.

Shipcalls (vessels/day)	Vessel Size	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	HFO	2.70	107.96	30%	3	50,000	42	4	1	9	8	5	327
1.0	VLCC	HFO	2.70	84.93	30%	3	90,000	51	5	1	32	28	18	463
1.0	Panamax	HFO	2.70	63.30	30%	3	35,000	17	2	0.4	4	3	2	134
1.0	Suezmax	HFO	2.70	87.54	30%	3	70,000	48	4	1	10	9	6	371

**MAXIMUM      51                      5                      1                      32                      28                      18                      463**



**Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR**

**Table H.2.PP.Un.Max.2040-5. 2040 Proposed Project Summary of Boiler Warm-Up Maximum Unmitigated Emissions.**

<b>Mode</b>	<b>Equipment</b>	<b>NO<sub>x</sub> Emissions (lb/day)</b>	<b>CO Emissions (lb/day)</b>	<b>ROG Emissions (lb/day)</b>	<b>PM Emissions (lb/day)</b>	<b>PM<sub>10</sub> Emissions (lb/day)</b>	<b>PM<sub>2.5</sub> Emissions (lb/day)</b>	<b>SO<sub>2</sub> Emissions (lb/day)</b>
Boiler Warm-up	Boiler	51	5	1	32	28	18	463

Table H.2.PP.Un.Max.2040-6. 2040 Proposed Project Berth Operations Maximum Daily Unmitigated Emissions.

Auxiliary Generator Pre-Pumpin

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bb/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	700,000	HFO	2.70	3,600	27.8%	2.5	101	8	3	10	10	8	85
1.0	VLCC	2,000,000	HFO	2.70	3,600	27.8%	2.5	101	8	3	10	10	8	85
1.0	Panamax	350,000	HFO	2.70	3,600	27.8%	2.5	101	8	3	10	10	8	85
1.0	Suezmax	1,000,000	HFO	2.70	3,600	27.8%	2.5	101	8	3	10	10	8	85
MAXIMUM								101	8	3	10	10	8	85

Boiler Pre-Pumping

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bb/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bb/hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	700,000	HFO	2.70	107.96	30.0%	2.5	50,000	35	3	1	7	6	4	273
1.0	VLCC	2,000,000	HFO	2.70	84.93	30.0%	2.5	90,000	43	5	1	27	23	15	386
1.0	Panamax	350,000	HFO	2.70	63.30	30.0%	2.5	35,000	14	1	0	3	3	2	112
1.0	Suezmax	1,000,000	HFO	2.70	87.54	30.0%	2.5	70,000	40	4	1	8	7	5	310
MAXIMUM									43	5	1	27	23	15	386

Auxiliary Generator Pumpin

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bb/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	700,000	MDO	0.52	3,600	55.6%	15.0	1,149	91	33	25	24	19	196
1.0	VLCC	2,000,000	MDO	0.52	3,600	55.6%	23.2	1,777	141	51	38	37	29	303
1.0	Panamax	350,000	MDO	0.52	3,600	55.6%	11.0	843	67	24	18	17	14	144
1.0	Suezmax	1,000,000	MDO	0.52	3,600	55.6%	15.3	1,172	93	34	25	24	19	200
MAXIMUM								1,777	141	51	38	37	29	303

Boiler Pumping

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bb/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Inerting Fuel Consumption Savings (lb/1000 bbl offloaded)	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	700,000	MDO	0.52	102.17	28.06	15.0	184	46	3	30	21	14	673
1.0	VLCC	2,000,000	MDO	0.52	80.38	28.06	23.2	444	93	20	61	43	29	1,357
1.0	Panamax	350,000	MDO	0.52	59.91	28.06	11.0	39	10	1	7	5	3	145
1.0	Suezmax	1,000,000	MDO	0.52	82.85	28.06	15.3	194	49	3	32	22	15	711
MAXIMUM								444	93	20	61	43	29	1,357

Auxiliary Generator Post-Pumpin

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bb/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	700,000	HFO	2.70	3,600	27.8%	1.0	41	3	1	4	4	3	34
1.0	VLCC	2,000,000	HFO	2.70	3,600	27.8%	1.0	41	3	1	4	4	3	34
1.0	Panamax	350,000	HFO	2.70	3,600	27.8%	1.0	41	3	1	4	4	3	34
1.0	Suezmax	1,000,000	HFO	2.70	3,600	27.8%	1.0	41	3	1	4	4	3	34
MAXIMUM								41	3	1	4	4	3	34

**Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR**

**Table H.2.PP.Un.Max.2040-7. 2040 Proposed Project Summary of Berth Operations Maximum Daily Unmitigated Emissions.**

<b>Mode</b>	<b>Equipment</b>	<b>NO<sub>x</sub> Emissions (lb/day)</b>	<b>CO Emissions (lb/day)</b>	<b>ROG Emissions (lb/day)</b>	<b>PM Emissions (lb/day)</b>	<b>PM<sub>10</sub> Emissions (lb/day)</b>	<b>PM<sub>2.5</sub> Emissions (lb/day)</b>	<b>SO<sub>2</sub> Emissions (lb/day)</b>
Berth Operations	Boiler	486	97	21	88	66	44	1,743
Berth Operations	Aux Generator	1,919	151	55	53	51	41	422

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Table H.2.PP.Un.Max.2040-8. 2040 Proposed Project Tug Main Engines Maximum Daily Unmitigated Emissions.

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Shipcalls (vessels/day)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
VLCC	Maneuvering - Pilot to Berth	1.00	4	4,800	0.50	MGO	1.0	197	49	9	9	8	0
	Maneuvering - Berth to Pilot	1.00	2	4,800	0.50	MGO	1.0	99	25	5	4	4	0
							<b>TOTAL</b>	<b>296</b>	<b>74</b>	<b>14</b>	<b>13</b>	<b>12</b>	<b>0</b>
AFRAMAX	Maneuvering - Pilot to Berth	1.00	2	4,800	0.50	MGO	1.0	99	25	5	4	4	0
	Maneuvering - Berth to Pilc	1.00	2	4,800	0.50	MGO	1.0	99	25	5	4	4	0
							<b>TOTAL</b>	<b>197</b>	<b>49</b>	<b>9</b>	<b>9</b>	<b>8</b>	<b>0</b>
PANAMAX	Maneuvering - Pilot to Berth	1.00	2	4,800	0.50	MGO	1.0	99	25	5	4	4	0
	Maneuvering - Berth to Pilot	1.00	2	4,800	0.50	MGO	1.0	99	25	5	4	4	0
							<b>TOTAL</b>	<b>197</b>	<b>49</b>	<b>9</b>	<b>9</b>	<b>8</b>	<b>0</b>
SUEZMAX	Maneuvering - Pilot to Berth	1.00	3	4,800	0.50	MGO	1.0	148	37	7	7	6	0
	Maneuvering - Berth to Pilc	1.00	2	4,800	0.50	MGO	1.0	99	25	5	4	4	0
							<b>TOTAL</b>	<b>247</b>	<b>62</b>	<b>12</b>	<b>11</b>	<b>10</b>	<b>0</b>
							<b>MAXIMUM</b>	<b>296</b>	<b>74</b>	<b>14</b>	<b>13</b>	<b>12</b>	<b>0</b>

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Table H.2.PP.Un.Max.2040-9. 2040 Proposed Project Tug Auxiliary Generator Engines Maximum Daily Unmitigated Emissions.

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Shipcalls (vessels/day)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
VLCC	Maneuvering - Pilot to Berth	1.00	4	300	1.00	MGO	1.0	22	6	1	1	1	0
	Maneuvering - Berth to Pilot	1.00	2	300	1.00	MGO	1.0	11	3	0	0	0	0
							<b>TOTAL</b>	<b>34</b>	<b>8</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>0</b>
AFRAMAX	Maneuvering - Pilot to Berth	1.00	2	300	1.00	MGO	1.0	11	3	0	0	0	0
	Maneuvering - Berth to Pilot	1.00	2	300	1.00	MGO	1.0	11	3	0	0	0	0
							<b>TOTAL</b>	<b>22</b>	<b>6</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>0</b>
PANAMAX	Maneuvering - Pilot to Berth	1.00	2	300	1.00	MGO	1.0	11	3	0	0	0	0
	Maneuvering - Berth to Pilot	1.00	2	300	1.00	MGO	1.0	11	3	0	0	0	0
							<b>TOTAL</b>	<b>22</b>	<b>6</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>0</b>
SUEZMAX	Maneuvering - Pilot to Berth	1.00	3	300	1.00	MGO	1.0	17	4	1	1	1	0
	Maneuvering - Berth to Pilot	1.00	2	300	1.00	MGO	1.0	11	3	0	0	0	0
							<b>TOTAL</b>	<b>28</b>	<b>7</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>0</b>
							<b>MAXIMUM</b>	<b>34</b>	<b>8</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>0</b>

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Table H.2.PP.Un.Max.2040-10. 2040 Proposed Project Summary of Tug Maximum Daily Unmitigated Emissions.

Mode	Equipment	Maximum Daily NO <sub>x</sub> Emissions (lb/day)	Maximum Daily CO Emissions (lb/day)	Maximum Daily ROG Emissions (lb/day)	Maximum Daily PM <sub>10</sub> Emissions (lb/day)	Maximum Daily PM <sub>2.5</sub> Emissions (lb/day)	Maximum Daily SO <sub>2</sub> Emissions (lb/day)
Tug Assist	Main Engines	296	74	14	13	12	0
Tug Assist	Aux Generator	34	8	1	1	1	0
<b>TOTAL</b>		<b>330</b>	<b>82</b>	<b>15</b>	<b>14</b>	<b>13</b>	<b>0</b>

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Table H.2.PP.Un.Max.2040-11. 2040 Proposed Project VDU Crude Maximum Daily Unmitigated Emissions.

	Maximum Daily Vessel Calls	crude vapors from tanks(scfc/call)	daily gas usage (mmscf/day)	mw crude vapors	destruction efficiency
Aframax	1	224000	0.2	50	98%
VLCC	1	596,313	0.6	50	98%
Panamax	1	116,667	0.1	50	98%
Suezmax	1	333,333	0.3	50	98%
<b>TOTAL</b>	<b>4</b>		<b>1.3</b>		

<b>Assumed Distribution based on tank storage volume:</b>	
<b>Site 1</b>	<b>12.5%</b>
<b>Site 2</b>	<b>87.5%</b>

Maximum Daily Emissions (lb/day)

	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene
EF (lb/MMSCF)	130	35	7	7.5	0.38%	9.90%	0.017	0.0004	0.0003	0.0043	0.0027	0.731	0.0366	0.0272	0.0095
Aframax	14.6	3.9	0.8	0.8	0.00	0.08	0.0	0.000	0.000	0.000	0.000	0.1	0.0	0.0	0.0
VLCC	38.8	10.4	2.1	2.2	0.01	0.21	0.0	0.000	0.000	0.001	0.001	0.2	0.0	0.0	0.0
Panamax	7.6	2.0	0.4	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Suezmax	21.7	5.8	1.2	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0
<b>MAXIMUM</b>	<b>38.8</b>	<b>10.4</b>	<b>2.1</b>	<b>2.2</b>	<b>0.0</b>	<b>0.2</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.2</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>

Assumed a ratio of 500/1000 based on the corresponding Btu values with respect to natural gas combustion emission factors.

Maximum Daily Emissions (lb/day)

	NO <sub>x</sub>	CO	VOC	PM10	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene	SO <sub>x</sub>
Site 1	5	1.3	0.26	0.3	0.001	0.03	0.001	0.0000	0.0000	0.0002	0.0001	0.03	0.001	0.001	0.000	2
Site 2	34	9	1.8	2.0	0.01	0.18	0.004	0.0001	0.0001	0.001	0.001	0.2	0.01	0.01	0.002	13

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Table H.2.PP.Un.Max.2040-12. 2040 Proposed Project VDU Legs Maximum Daily Unmitigated Emissions.

	tanks	crude vapors from tanks on legs(scfd/day)	daily gas usage (mmscf/day)	mw crude vapors	destruction efficiency
Site 1	4	23671.23	0.09	50	98%
Site 2	14	23671.23	0.3	50	98%
<b>TOTAL</b>	<b>18</b>		<b>0.4</b>		

<b>48</b>	<b>hr/event</b>
<b>6</b>	<b>events/yr</b>
<b>500</b>	<b>ft3/min</b>

Maximum Daily Emissions (lb/day)															
	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene
EF (lb/MMSCF)	130	35	7	7.5	0.38%	9.90%	0.017	0.0004	0.0003	0.0043	0.0027	0.731	0.0366	0.0272	0.0095
<b>TOTAL</b>	<b>27.7</b>	<b>7.5</b>	<b>1.5</b>	<b>1.6</b>	<b>0.0</b>	<b>0.1</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.2</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>

Assumed a ratio of 500/1000 based on the corresponding Btu values with respect to natural gas combustion emission factors.

Maximum Daily Emissions (lb/day)																
	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene	SO <sub>x</sub>
Site 1	6.2	1.7	0.3	0.4	0.00	0.03	0.00	0.000	0.000	0.000	0.00	0.03	0.00	0.00	0.00	1
Site 2	21.5	5.8	1.2	1.2	0.00	0.11	0.00	0.000	0.000	0.001	0.00	0.12	0.01	0.00	0.00	4





Table H.2.PP.Un.Max.Bar.2040-1. 2040 Proposed Project Main Engines Maximum Daily Unmitigated Emissions from Barge Fuel Deliveries for OGV.

Ship	Direction	Mode	Distance (nautical miles)	Ship speed (knots)	Activity (hours)	Maximum Speed (knots)	Load Factor	MCR (kW)	Energy (kW-hr)	Fuel Type	Shipcalls (vessels/ yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Barge	North In	Volpak to Berth 408	5	3	1.67	3	1.00	4,800	8,000.00	MGO	1.0	291	24	11	16	16	16	18
Barge	North Out	Volpak to Berth 408	5	3	1.67	3.0	1.00	4,800	8,000.00	MGO	1.0	291	24	11	16	16	16	18
TOTAL												581	48	22	32	32	32	36

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Table H.2.PP.Un.Max.Bar.2040-2. 2040 Proposed Project Tug Main Engines Maximum Daily Unmitigated Emissions from Barge Fuel Deliveries for OGV.

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Shipcalls (vessels/day)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Barge	Maneuvering - Pilot to Berth	1.00	1	4,800	0.50	MGO	1.0	87	7	3	5	4	5
	Maneuvering - Berth to Pilot	1.00	1	4,800	0.50	MGO	1.0	87	7	3	5	4	5
							<b>TOTAL</b>	<b>174</b>	<b>15</b>	<b>7</b>	<b>10</b>	<b>9</b>	<b>11</b>
<b>MAXIMUM</b>								<b>174</b>	<b>15</b>	<b>7</b>	<b>10</b>	<b>9</b>	<b>11</b>

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Table H.2.PP.Un.Max.Bar.2040-3. 2040 Proposed Project Tug Auxiliary Generator Engines Maximum Daily Unmitigated Emissions from Barge Fuel Deliveries for OGV.

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Shipcalls (vessels/day)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Barge	Maneuvering - Pilot to Berth	1.00	1	300	1.00	MGO	1.0	8	1	0	0	0	1
	Maneuvering - Berth to Pilot	1.00	1	300	1.00	MGO	1.0	8	1	0	0	0	1
<b>TOTAL</b>								<b>17</b>	<b>3</b>	<b>0</b>	<b>1</b>	<b>1</b>	<b>1</b>
<b>MAXIMUM</b>								<b>17</b>	<b>3</b>	<b>0</b>	<b>1</b>	<b>1</b>	<b>1</b>

Table H.2.PP.Un.Max.Bar.2040-4. 2040 Proposed Project Summary of Tug Maximum Daily Unmitigated Emissions from Barge Fuel Deliveries for OGV.

Mode	Equipment	Maximum Daily NO <sub>x</sub> Emissions (lb/day)	Maximum Daily CO Emissions (lb/day)	Maximum Daily ROG Emissions (lb/day)	Maximum Daily PM <sub>10</sub> Emissions (lb/day)	Maximum Daily PM <sub>2.5</sub> Emissions (lb/day)	Maximum Daily SO <sub>2</sub> Emissions (lb/day)
Tug Assist	Main Engines	174	15	7	10	9	11
Tug Assist	Aux Generator	17	3	0	1	1	1
<b>TOTAL</b>		<b>191</b>	<b>17</b>	<b>7</b>	<b>10</b>	<b>9</b>	<b>12</b>

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Table H.2.PP.Un.Max.Bar.2040-5. 2040 Proposed Project Summary of Maximum Daily Unmitigated Vessel Emissions from Barge Fuel Deliveries for OGV.

Operation	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Barge	581	48	22	32	32	36
Tug Assistance	191	17	7	10	9	12
<b>TOTAL</b>	<b>772</b>	<b>66</b>	<b>29</b>	<b>42</b>	<b>41</b>	<b>48</b>

Operation	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Barge	1.59	0.13	0.06	0.09	0.09	0.10
Tug Assistance	0.52	0.05	0.02	0.03	0.03	0.03
<b>TOTAL</b>	<b>2.12</b>	<b>0.18</b>	<b>0.08</b>	<b>0.11</b>	<b>0.11</b>	<b>0.13</b>

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Table H.2.PP.Mit.2010-1. 2010 Proposed Project Main Engines Average Daily Mitigated Emissions.

Ship	Direction	Mode	Distance (nautical miles)	Ship speed (knots)	Activity (hours)	Maximum Speed (knots)	Load Factor	MCR (kW)	Energy (kW-hr)	Fuel Type	Annual Shipcalls (vessels/yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
VLCC	North In	Cruising - CW to VSR	22	12	1.83	16.9	0.358	25,400	16,671	MDO	26	20,288	1,671	716	465	465	428	2,413
		Cruising - VSR to PZ	21	12	1.75	16.9	0.358	25,400	15,913	MDO	26	19,366	1,595	683	444	444	409	2,304
		Cruising - PZ to Pilot	4.7	7	0.67	16.9	0.071	25,400	1,212	MDO	26	2,088	342	246	58	58	54	175
		Maneuvering - Pilot to Berth		3	1.00	16.9	0.006	25,400	142	MDO	26	2,786	509	1,303	108	108	99	21
<b>TOTAL</b>											<b>44,528</b>	<b>4,117</b>	<b>2,949</b>	<b>1,076</b>	<b>1,076</b>	<b>990</b>	<b>4,913</b>	
	North Out	Maneuvering - Berth to Pilot	3.8	5	1.00	16.9	0.026	25,400	658	Dist at 0.2	26	2,402	509	606	61	61	56	37
		Cruising - Pilot to PZ		7	0.54	16.9	0.071	25,400	980	Dist at 0.2	26	1,688	276	199	35	35	32	55
		Cruising - PZ to VSR	21	12	1.75	16.9	0.358	25,400	15,913	Dist at 0.2	26	19,366	1,595	683	330	330	304	886
		Cruising - VSR to CW	22	12	1.83	16.9	0.358	25,400	16,671	Dist at 0.2	26	20,288	1,671	716	346	346	318	928
<b>TOTAL</b>											<b>43,744</b>	<b>4,051</b>	<b>2,204</b>	<b>773</b>	<b>773</b>	<b>711</b>	<b>1,905</b>	
AFRAMAX	South In	Cruising - CW to VSR	23	12	1.92	16.1	0.414	12,477	9,902	MDO	32	14,831	1,221	523	340	340	313	1,764
		Cruising - VSR to PZ	11	12	0.92	16.1	0.414	12,477	4,736	MDO	32	7,093	584	250	163	163	150	844
		Cruising - PZ to Pilot	4.7	7	0.67	16.1	0.082	12,477	689	MDO	32	1,362	207	138	37	37	34	123
		Maneuvering - Pilot to Berth		3	1.00	16.1	0.006	12,477	81	MDO	32	1,827	308	733	71	71	65	14
<b>TOTAL</b>											<b>25,113</b>	<b>2,320</b>	<b>1,645</b>	<b>611</b>	<b>611</b>	<b>562</b>	<b>2,745</b>	
	South Out	Maneuvering - Berth to Pilot	3.5	5	1.00	16.1	0.030	12,477	374	Dist at 0.2	32	1,632	308	341	41	41	38	26
		Cruising - Pilot to PZ		7	0.50	16.1	0.082	12,477	513	Dist at 0.2	32	1,014	154	103	20	20	19	35
		Cruising - PZ to VSR	12.5	12	1.04	16.1	0.414	12,477	5,382	Dist at 0.2	32	8,060	664	284	138	138	127	369
		Cruising - VSR to CW	24.5	12	2.04	16.1	0.414	12,477	10,548	Dist at 0.2	32	15,798	1,301	558	270	270	248	723
<b>TOTAL</b>											<b>26,505</b>	<b>2,427</b>	<b>1,286</b>	<b>469</b>	<b>469</b>	<b>431</b>	<b>1,152</b>	
PANAMAX	South In	Cruising - CW to VSR	23	12	1.92	15.8	0.438	10,300	8,649	MDO	26	10,525	867	371	241	241	222	1,252
		Cruising - VSR to PZ	11	12	0.92	15.8	0.438	10,300	4,136	MDO	26	5,034	415	178	115	115	106	599
		Cruising - PZ to Pilot	4.7	7	0.67	15.8	0.087	10,300	601	MDO	26	946	139	90	25	25	23	87
		Maneuvering - Pilot to Berth		3	1.00	15.8	0.007	10,300	71	MDO	26	1,261	207	478	49	49	45	10
<b>TOTAL</b>											<b>17,765</b>	<b>1,627</b>	<b>1,117</b>	<b>431</b>	<b>431</b>	<b>397</b>	<b>1,948</b>	
	South Out	Maneuvering - Berth to Pilot	3.5	5	1.00	15.8	0.032	10,300	326	Dist at 0.2	26	1,100	207	222	28	28	25	18
		Cruising - Pilot to PZ		7	0.50	15.8	0.087	10,300	448	Dist at 0.2	26	704	103	67	14	14	13	25
		Cruising - PZ to VSR	12.5	12	1.04	15.8	0.438	10,300	4,700	Dist at 0.2	26	5,720	471	202	98	98	90	262
		Cruising - VSR to CW	24.5	12	2.04	15.8	0.438	10,300	9,213	Dist at 0.2	26	11,212	923	396	191	191	176	513
<b>TOTAL</b>											<b>18,736</b>	<b>1,704</b>	<b>887</b>	<b>330</b>	<b>330</b>	<b>304</b>	<b>818</b>	
SUEZMAX	North In	Cruising - CW to VSR	22	12	1.83	17	0.352	16,000	10,317	MDO	45	21,731	1,790	767	499	499	459	2,585
		Cruising - VSR to PZ	21	12	1.75	17	0.352	16,000	9,848	MDO	45	20,743	1,708	732	476	476	438	2,467
		Cruising - PZ to Pilot	4.7	7	0.67	17	0.070	16,000	750	MDO	45	2,259	373	270	63	63	58	188
		Maneuvering - Pilot to Berth		3	1.00	17	0.005	16,000	88	MDO	45	3,005	555	1,434	117	117	107	22
<b>TOTAL</b>											<b>47,738</b>	<b>4,426</b>	<b>3,203</b>	<b>1,154</b>	<b>1,154</b>	<b>1,062</b>	<b>5,262</b>	
	North Out	Maneuvering - Berth to Pilot	3.8	5	1.00	17	0.025	16,000	407	Dist at 0.2	45	2,626	555	667	67	67	62	39
		Cruising - Pilot to PZ		7	0.54	17	0.070	16,000	606	Dist at 0.2	45	1,827	301	219	38	38	35	58
		Cruising - PZ to VSR	21	12	1.75	17	0.352	16,000	9,848	Dist at 0.2	45	20,743	1,708	732	354	354	326	949
		Cruising - VSR to CW	22	12	1.83	17	0.352	16,000	10,317	Dist at 0.2	45	21,731	1,790	767	371	371	341	994
<b>TOTAL</b>											<b>46,927</b>	<b>4,355</b>	<b>2,384</b>	<b>830</b>	<b>830</b>	<b>763</b>	<b>2,041</b>	
<b>GRAND TOTAL</b>												<b>271,056</b>	<b>25,026</b>	<b>15,675</b>	<b>5,673</b>	<b>5,673</b>	<b>5,220</b>	<b>20,785</b>

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Table H.2.PP.Mit.2010-2. 2010 Proposed Project Auxiliary Generator Average Daily Mitigated Emissions

Ship	Direction	Mode	Activity (hours)	MCR (kW)	Load Factor	Energy (kW-hr)	Fuel Type	Annual Shipcalls (vessels/yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
VLCC	North In	Cruising	4.25	3,600	0.278	4,258	MDO	26.0	4,237	335	122	91	88	70	722
		Maneuvering	2.00	3,600	0.278	2,002	MDO	26.0	1,992	158	57	43	41	33	339
	North Out	Maneuvering	1.50	3,600	0.278	1,501	Dist at 0.2	26.0	1,494	118	43	32	31	25	98
		Cruising	4.13	3,600	0.278	4,129	Dist at 0.2	26.0	4,109	325	118	89	85	68	269
		<b>TOTAL</b>							<b>6,229</b>	<b>493</b>	<b>179</b>	<b>134</b>	<b>129</b>	<b>103</b>	<b>1,062</b>
AFRAMAX	South In	Cruising	3.50	3,600	0.278	3,508	MDO	32.0	4,296	340	124	93	89	71	732
		Maneuvering	2.00	3,600	0.278	2,002	MDO	32.0	2,451	194	71	53	51	41	418
	South Out	Maneuvering	1.50	3,600	0.278	1,501	Dist at 0.2	32.0	1,838	145	53	40	38	30	121
		Cruising	3.58	3,600	0.278	3,586	Dist at 0.2	32.0	4,392	348	126	95	91	73	288
		<b>TOTAL</b>							<b>6,230</b>	<b>493</b>	<b>179</b>	<b>134</b>	<b>129</b>	<b>103</b>	<b>408</b>
PANAMAX	South In	Cruising	3.50	3,600	0.278	3,508	MDO	26	3,490	276	100	75	72	58	595
		Maneuvering	2.00	3,600	0.278	2,002	MDO	26	1,992	158	57	43	41	33	339
	South Out	Maneuvering	1.5	3,600	0.278	1,501	Dist at 0.2	26	1,494	118	43	32	31	25	98
		Cruising	3.58	3,600	0.278	3,586	Dist at 0.2	26	3,568	282	103	77	74	59	234
		<b>TOTAL</b>							<b>5,062</b>	<b>401</b>	<b>146</b>	<b>109</b>	<b>105</b>	<b>84</b>	<b>332</b>
SUEZMAX	North In	Cruising	4.25	3,600	0.278	4,258	MDO	45	7,333	580	211	158	152	122	1,250
		Maneuvering	2.00	3,600	0.278	2,002	MDO	45	3,447	273	99	74	71	57	587
	North Out	Maneuvering	1.5	3,600	0.278	1,501	Dist at 0.2	45	2,585	205	74	56	54	43	169
		Cruising	4.13	3,600	0.278	4,129	Dist at 0.2	45	7,112	563	205	153	147	118	466
		<b>TOTAL</b>							<b>10,781</b>	<b>853</b>	<b>310</b>	<b>233</b>	<b>223</b>	<b>179</b>	<b>1,837</b>
<b>TOTAL</b>									<b>9,697</b>	<b>767</b>	<b>279</b>	<b>209</b>	<b>201</b>	<b>161</b>	<b>636</b>
<b>GRAND TOTAL</b>									<b>55,831</b>	<b>4,418</b>	<b>1,607</b>	<b>1,205</b>	<b>1,157</b>	<b>925</b>	<b>6,726</b>



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Table H.2.PP.Mit.2010-3. 2010 Proposed Project Summary of Average Daily Mitigated Vessel Emissions.

Mode	Equipment	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Cruising	Main Engines	254,417	21,868	9,891	5,133	5,133	4,722	20,598
Cruising	Aux Generator	38,537	3,050	1,109	832	798	639	4,556
Maneuvering	Main Engines	16,639	3,158	5,784	541	541	497	187
Maneuvering	Aux Generator	17,293	1,369	498	373	358	287	2,170
<b>Cruising &amp; Maneuvering</b>	<b>TOTAL</b>	<b>326,886</b>	<b>29,445</b>	<b>17,281</b>	<b>6,878</b>	<b>6,830</b>	<b>6,145</b>	<b>27,511</b>

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Cruising	Main Engines	697	60	27	14	14	13	56
Cruising	Aux Generator	106	8	3	2	2	2	12
Maneuvering	Main Engines	46	9	16	1	1	1	1
Maneuvering	Aux Generator	47	4	1	1	1	1	6
<b>Cruising &amp; Maneuvering</b>	<b>TOTAL</b>	<b>896</b>	<b>81</b>	<b>47</b>	<b>19</b>	<b>19</b>	<b>17</b>	<b>75</b>

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Table H.2.PP.Mit.2010-4. 2010 Proposed Project Boiler Warm-Up Average Daily Mitigated Emissions.

Shipcalls (vessels/yr)	Vessel Size	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
32.0	Aframax	MDO	0.52	102.17	30%	3	50,000	521	130	7	86	60	40	1,908
26.0	VLCC	MDO	0.52	80.38	30%	3	90,000	718	150	32	99	69	46	2,196
26.0	Panamax	MDO	0.52	59.91	30%	3	35,000	174	43	2	29	20	13	636
45.0	Suezmax	MDO	0.52	82.85	30%	3	70,000	832	208	12	138	96	64	3,047
<b>TOTAL</b>								<b>2,245</b>	<b>532</b>	<b>53</b>	<b>352</b>	<b>246</b>	<b>165</b>	<b>7,787</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Mit.2010-5. 2010 Proposed Project Summary of Boiler Warm-Up Average Daily Mitigated Emissions.

Mode	Equipment	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Boiler Warm-up	Boiler	2,245	532	53	352	246	165	7,787

Table H.2.PP.Mit.2010-6. 2010 Proposed Project Berth Operations Average Daily Mitigated Emissions.

**Auxiliary Generator Pre-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
32.0	Aframax	700,000	MDO	0.52	3,600	27.8%	2.5	3,064	242	88	66	63	51	522
26.0	VLCC	2,000,000	MDO	0.52	3,600	27.8%	2.5	2,490	197	72	54	52	41	424
26.0	Panamax	350,000	MDO	0.52	3,600	27.8%	2.5	2,490	197	72	54	52	41	424
45.0	Suezmax	1,000,000	MDO	0.52	3,600	27.8%	2.5	4,309	341	124	93	89	71	734
<b>TOTAL</b>								<b>12,352</b>	<b>978</b>	<b>355</b>	<b>267</b>	<b>256</b>	<b>205</b>	<b>2,105</b>

**Boiler Pre-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
32.0	Aframax	700,000	MDO	0.52	102.17	30.0%	2.5	50,000	434	109	6	72	50	34	1,590
26.0	VLCC	2,000,000	MDO	0.52	80.38	30.0%	2.5	90,000	598	125	26	83	58	39	1,830
26.0	Panamax	350,000	MDO	0.52	59.91	30.0%	2.5	35,000	145	36	2	24	17	11	530
45.0	Suezmax	1,000,000	MDO	0.52	82.85	30.0%	2.5	70,000	693	173	10	115	80	54	2,539
<b>TOTAL</b>									<b>1,871</b>	<b>443</b>	<b>44</b>	<b>293</b>	<b>205</b>	<b>137</b>	<b>6,489</b>

**Auxiliary Generator Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
32.0	Aframax	700,000	Dist at 0.2%S	0.20	3,600	55.6%	15.0	36,769	2,910	1,058	794	762	609	2,410
26.0	VLCC	2,000,000	Dist at 0.2%S	0.20	3,600	55.6%	23.2	46,207	3,657	1,330	997	957	766	3,029
26.0	Panamax	350,000	Dist at 0.2%S	0.20	3,600	55.6%	11.0	21,908	1,734	630	473	454	363	1,436
45.0	Suezmax	1,000,000	Dist at 0.2%S	0.20	3,600	55.6%	15.3	52,741	4,174	1,518	1,138	1,093	874	3,457
<b>TOTAL</b>								<b>157,626</b>	<b>12,474</b>	<b>4,536</b>	<b>3,402</b>	<b>3,266</b>	<b>2,613</b>	<b>10,332</b>

**Boiler Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Inerting Fuel Consumption Savings (lb/1000 bbl offloaded)	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
32.0	Aframax	700,000	Dist at 0.2%S	0.20	102.17	28.06	15.0	5,880	1,470	83	973	681	455	8,282
26.0	VLCC	2,000,000	Dist at 0.2%S	0.20	80.38	28.06	23.2	11,536	2,409	509	1,595	1,116	746	13,572
26.0	Panamax	350,000	Dist at 0.2%S	0.20	59.91	28.06	11.0	1,027	257	14	170	119	80	1,446
45.0	Suezmax	1,000,000	Dist at 0.2%S	0.20	82.85	28.06	15.3	8,733	2,183	123	1,445	1,012	676	12,300
<b>TOTAL</b>								<b>27,175</b>	<b>6,319</b>	<b>729</b>	<b>4,183</b>	<b>2,928</b>	<b>1,958</b>	<b>35,599</b>

**Auxiliary Generator Post-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
32.0	Aframax	700,000	Dist at 0.2%S	0.20	3,600	27.8%	1.0	1,226	97	35	26	25	20	80
26.0	VLCC	2,000,000	Dist at 0.2%S	0.20	3,600	27.8%	1.0	996	79	29	21	21	17	65
26.0	Panamax	350,000	Dist at 0.2%S	0.20	3,600	27.8%	1.0	996	79	29	21	21	17	65
45.0	Suezmax	1,000,000	Dist at 0.2%S	0.20	3,600	27.8%	1.0	1,724	136	50	37	36	29	113
<b>TOTAL</b>								<b>4,941</b>	<b>391</b>	<b>142</b>	<b>107</b>	<b>102</b>	<b>82</b>	<b>324</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Mit.2010-7. 2010 Proposed Project Summary of Berth Operations Average Daily Mitigated Emissions.

No AMP

Mode	Equipment	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Berth Operations	Boiler	29,046	6,762	774	4,476	3,133	2,095	42,088
Berth Operations	Aux Generator	174,919	13,843	5,034	3,775	3,624	2,899	12,761

Table H.2.PP.Mit.Max.2010-1. 2010 Proposed Project Main Engines Maximum Daily Mitigated Emissions.

Ship	Direction	Mode	Distance (nautical miles)	Ship speed (knots)	Activity (hours)	Maximum Speed (knots)	Load Factor	MCR (kW)	Energy (kW-hr)	Fuel Type	Maximum Daily Shipcalls (vessels/day)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)	
VLCC	North In	Cruising - CW to VSR	22	12	1.83	16.9	0.358	25,400	16,671	MDO	1.0	780	64	28	18	18	16	93	
		Cruising - VSR to PZ	21	12	1.75	16.9	0.358	25,400	15,913	MDO	1.0	745	61	26	17	17	16	89	
		Cruising - PZ to Pilot	4.7	7	0.67	16.9	0.071	25,400	1,212	MDO	1.0	80	13	9	2	2	2	7	
	North Out	Maneuvering - Pilot to Berth	3	1.00	16.9	0.006	25,400	142	MDO	1.0	107	20	50	4	4	4	4	1	
		Maneuvering - Berth to Pilot	5	1.00	16.9	0.026	25,400	658	Dist at 0.2	1.0	92	20	23	2	2	2	2	1	
		Cruising - Pilot to PZ	3.8	7	0.54	16.9	0.071	25,400	980	Dist at 0.2	1.0	65	11	8	1	1	1	2	
		Cruising - PZ to VSR	21	12	1.75	16.9	0.358	25,400	15,913	Dist at 0.2	1.0	745	61	26	13	13	12	34	
		Cruising - VSR to CW	22	12	1.83	16.9	0.358	25,400	16,671	Dist at 0.2	1.0	780	64	28	13	13	12	36	
		<b>TOTAL</b>											<b>3,395</b>	<b>314</b>	<b>198</b>	<b>71</b>	<b>71</b>	<b>65</b>	<b>262</b>
		AFRAMAX	South In	Cruising - CW to VSR	23	12	1.92	16.1	0.414	12,477	9,902	MDO	1.0	463	38	16	11	11	10
Cruising - VSR to PZ	11			12	0.92	16.1	0.414	12,477	4,736	MDO	1.0	222	18	8	5	5	5	26	
Cruising - PZ to Pilot	4.7			7	0.67	16.1	0.082	12,477	689	MDO	1.0	43	6	4	1	1	1	4	
South Out	Maneuvering - Pilot to Berth		3	1.00	16.1	0.006	12,477	81	MDO	1.0	57	10	23	2	2	2	0		
	Maneuvering - Berth to Pilot		5	1.00	16.1	0.030	12,477	374	Dist at 0.2	1.0	51	10	11	1	1	1	1		
	Cruising - Pilot to PZ		3.5	7	0.50	16.1	0.082	12,477	513	Dist at 0.2	1.0	32	5	3	1	1	1		
	Cruising - PZ to VSR		12.5	12	1.04	16.1	0.414	12,477	5,382	Dist at 0.2	1.0	252	21	9	4	4	4	12	
	Cruising - VSR to CW		24.5	12	2.04	16.1	0.414	12,477	10,548	Dist at 0.2	1.0	494	41	17	8	8	8	23	
	<b>TOTAL</b>												<b>1,613</b>	<b>148</b>	<b>92</b>	<b>34</b>	<b>34</b>	<b>31</b>	<b>122</b>
	PANAMAX		South In	Cruising - CW to VSR	23	12	1.92	15.8	0.438	10,300	8,649	MDO	1.0	405	33	14	9	9	9
Cruising - VSR to PZ		11		12	0.92	15.8	0.438	10,300	4,136	MDO	1.0	194	16	7	4	4	4	23	
Cruising - PZ to Pilot		4.7		7	0.67	15.8	0.087	10,300	601	MDO	1.0	28	2	1	1	1	1	3	
South Out		Maneuvering - Pilot to Berth	3	1.00	15.8	0.007	10,300	71	MDO	1.0	3	0	0	0	0	0	0		
		Maneuvering - Berth to Pilot	5	1.00	15.8	0.032	10,300	326	Dist at 0.2	1.0	15	1	1	0	0	0	1		
		Cruising - Pilot to PZ	3.5	7	0.50	15.8	0.087	10,300	448	Dist at 0.2	1.0	21	2	1	0	0	0	1	
		Cruising - PZ to VSR	12.5	12	1.04	15.8	0.438	10,300	4,700	Dist at 0.2	1.0	220	18	8	4	4	3	10	
		Cruising - VSR to CW	24.5	12	2.04	15.8	0.438	10,300	9,213	Dist at 0.2	1.0	431	36	15	7	7	7	20	
		<b>TOTAL</b>											<b>1,317</b>	<b>108</b>	<b>46</b>	<b>26</b>	<b>26</b>	<b>24</b>	<b>106</b>
		SUEZMAX	North In	Cruising - CW to VSR	22	12	1.83	17	0.352	16,000	10,317	MDO	1.0	483	40	17	11	11	10
Cruising - VSR to PZ	21			12	1.75	17	0.352	16,000	9,848	MDO	1.0	461	38	16	11	11	10	55	
Cruising - PZ to Pilot	4.7			7	0.67	17	0.070	16,000	750	MDO	1.0	35	3	1	1	1	1	4	
North Out	Maneuvering - Pilot to Berth		3	1.00	17	0.005	16,000	88	MDO	1.0	4	0	0	0	0	0	0		
	Maneuvering - Berth to Pilot		5	1.00	17	0.025	16,000	407	Dist at 0.2	1.0	19	2	1	0	0	0	1		
	Cruising - Pilot to PZ		3.8	7	0.54	17	0.070	16,000	606	Dist at 0.2	1.0	28	2	1	0	0	0	1	
	Cruising - PZ to VSR		21	12	1.75	17	0.352	16,000	9,848	Dist at 0.2	1.0	461	38	16	8	8	7	21	
	Cruising - VSR to CW		22	12	1.83	17	0.352	16,000	10,317	Dist at 0.2	1.0	483	40	17	8	8	8	22	
	<b>TOTAL</b>												<b>1,974</b>	<b>163</b>	<b>70</b>	<b>39</b>	<b>39</b>	<b>36</b>	<b>162</b>
	<b>MAXIMUM</b>												<b>3,395</b>	<b>314</b>	<b>198</b>	<b>71</b>	<b>71</b>	<b>65</b>	<b>262</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Mit.Max.2010-2. 2010 Proposed Project Auxiliary Generator Maximum Daily Mitigated Emissions

Ship	Direction	Mode	Activity (hours)	MCR (kW)	Load Factor	Energy (kW-hr)	Fuel Type	Maximum Daily Shipcalls (vessels/day)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
VLCC	North In	Cruising	4.25	3,600	0.278	4,258	MDO	1.0	163	13	5	4	3	3	28
		Maneuvering	2.00	3,600	0.278	2,002	MDO	1.0	77	6	2	2	2	1	13
	North Out	Maneuvering	1.50	3,600	0.278	1,501	Dist at 0.2	1.0	57	5	2	1	1	1	4
		Cruising	4.13	3,600	0.278	4,129	Dist at 0.2	1.0	158	13	5	3	3	3	10
<b>TOTAL</b>									<b>455</b>	<b>36</b>	<b>13</b>	<b>10</b>	<b>9</b>	<b>8</b>	<b>55</b>
AFRAMAX	South In	Cruising	3.50	3,600	0.278	3,508	MDO	1.0	134	11	4	3	3	2	23
		Maneuvering	2.00	3,600	0.278	2,002	MDO	1.0	77	6	2	2	2	1	13
	South Out	Maneuvering	1.50	3,600	0.278	1,501	Dist at 0.2	1.0	57	5	2	1	1	1	4
		Cruising	3.58	3,600	0.278	3,586	Dist at 0.2	1.0	137	11	4	3	3	2	9
<b>TOTAL</b>									<b>406</b>	<b>32</b>	<b>12</b>	<b>9</b>	<b>8</b>	<b>7</b>	<b>49</b>
PANAMAX	South In	Cruising	3.15	3,600	0.278	3,155	MDO	1.0	121	10	3	3	3	2	21
		Maneuvering	2.00	3,600	0.278	2,002	MDO	1.0	77	6	2	2	2	1	13
	South Out	Maneuvering	1.5	3,600	0.278	1,501	Dist at 0.2	1.0	57	5	2	1	1	1	4
		Cruising	3.21	3,600	0.278	3,211	Dist at 0.2	1.0	123	10	4	3	3	2	8
<b>TOTAL</b>									<b>378</b>	<b>30</b>	<b>11</b>	<b>8</b>	<b>8</b>	<b>6</b>	<b>45</b>
SUEZMAX	North In	Cruising	3.84	3,600	0.278	3,840	MDO	1.0	147	12	4	3	3	2	25
		Maneuvering	2.00	3,600	0.278	2,002	MDO	1.0	77	6	2	2	2	1	13
	North Out	Maneuvering	1.5	3,600	0.278	1,501	Dist at 0.2	1.0	57	5	2	1	1	1	4
		Cruising	3.71	3,600	0.278	3,712	Dist at 0.2	1.0	142	11	4	3	3	2	9
<b>TOTAL</b>									<b>423</b>	<b>33</b>	<b>12</b>	<b>9</b>	<b>9</b>	<b>7</b>	<b>51</b>
<b>MAXIMUM</b>									<b>455</b>	<b>36</b>	<b>13</b>	<b>10</b>	<b>9</b>	<b>8</b>	<b>55</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Mit.Max.2010-3. 2010 Proposed Project Summary of Maximum Daily Mitigated Vessel Emissions.

<b>Mode</b>	<b>Equipment</b>	<b>NO<sub>x</sub> Emissions (lb/day)</b>	<b>CO Emissions (lb/day)</b>	<b>ROG Emissions (lb/day)</b>	<b>PM Emissions (lb/day)</b>	<b>PM<sub>10</sub> Emissions (lb/day)</b>	<b>PM<sub>2.5</sub> Emissions (lb/day)</b>	<b>SO<sub>2</sub> Emissions (lb/day)</b>
Cruising	Main Engines	3,196	275	125	65	65	59	260
Cruising	Aux Generator	321	25	9	7	7	5	38
Maneuvering	Main Engines	200	39	73	7	7	6	2
Maneuvering	Aux Generator	134	11	4	3	3	2	17
<b>Cruising and Maneuvering</b>	<b>TOTAL</b>	<b>3,850</b>	<b>350</b>	<b>211</b>	<b>81</b>	<b>81</b>	<b>73</b>	<b>317</b>



Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Mit.Max.2010-4. 2010 Proposed Project Boiler Warm-Up Maximum Daily Mitigated Emissions.

Shipcalls (vessels/day)	Vessel Size	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	MDO	0.52	102.17	30%	3	50,000	16	4	0	3	2	1	60
1.0	VLCC	MDO	0.52	80.38	30%	3	90,000	28	6	1	4	3	2	84
1.0	Panamax	MDO	0.52	59.91	30%	3	35,000	7	2	0	1	1	1	24
1.0	Suezmax	MDO	0.52	82.85	30%	3	70,000	18	5	0	3	2	1	68
<b>MAXIMUM</b>								<b>28</b>	<b>6</b>	<b>1</b>	<b>4</b>	<b>3</b>	<b>2</b>	<b>84</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Mit.Max.2010-5. 2010 Proposed Project Summary of Boiler Warm-Up Maximum Mitigated Emissions.

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Boiler Warm-up	Boiler	28	6	1	4	3	2	84

Table H.2.PP.Mit.Max.2010-6. 2010 Proposed Project Berth Operations Maximum Daily Mitigated Emissions.

**Auxiliary Generator Pre-Pumping**

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	700,000	MDO	0.52	3,600	27.8%	2.5	96	8	3	2	2	2	16
1.0	VLCC	2,000,000	MDO	0.52	3,600	27.8%	2.5	96	8	3	2	2	2	16
1.0	Panamax	350,000	MDO	0.52	3,600	27.8%	2.5	96	8	3	2	2	2	16
1.0	Suezmax	1,000,000	MDO	0.52	3,600	27.8%	2.5	96	8	3	2	2	2	16
<b>MAXIMUM</b>								<b>96</b>	<b>8</b>	<b>3</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>16</b>

**Boiler Pre-Pumping**

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	700,000	MDO	0.52	102.17	30.0%	2.5	50,000	14	3	0	2	2	1	50
1.0	VLCC	2,000,000	MDO	0.52	80.38	30.0%	2.5	90,000	23	5	1	3	2	1	70
1.0	Panamax	350,000	MDO	0.52	59.91	30.0%	2.5	35,000	6	1	0	1	1	0	20
1.0	Suezmax	1,000,000	MDO	0.52	82.85	30.0%	2.5	70,000	15	4	0	3	2	1	56
<b>MAXIMUM</b>									<b>23</b>	<b>5</b>	<b>1</b>	<b>3</b>	<b>2</b>	<b>1</b>	<b>70</b>

**Auxiliary Generator Pumping**

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	700,000	Dist at 0.2%S	0.20	3,600	55.6%	15.0	1,149	91	33	25	24	19	75
1.0	VLCC	2,000,000	Dist at 0.2%S	0.20	3,600	55.6%	23.2	1,777	141	51	38	37	29	116
1.0	Panamax	350,000	Dist at 0.2%S	0.20	3,600	55.6%	11.0	843	67	24	18	17	14	55
1.0	Suezmax	1,000,000	Dist at 0.2%S	0.20	3,600	55.6%	15.3	1,172	93	34	25	24	19	77
<b>MAXIMUM</b>								<b>1,777</b>	<b>141</b>	<b>51</b>	<b>38</b>	<b>37</b>	<b>29</b>	<b>116</b>

**Boiler Pumping**

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Inerting Fuel Consumption Savings (lb/1000 bbl offloaded)	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	700,000	Dist at 0.2%S	0.20	102.17	28.06	15.0	184	46	3	30	21	14	259
1.0	VLCC	2,000,000	Dist at 0.2%S	0.20	80.38	28.06	23.2	444	93	20	61	43	29	522
1.0	Panamax	350,000	Dist at 0.2%S	0.20	59.91	28.06	11.0	39	10	1	7	5	3	56
1.0	Suezmax	1,000,000	Dist at 0.2%S	0.20	82.85	28.06	15.3	194	49	3	32	22	15	273
<b>MAXIMUM</b>								<b>444</b>	<b>93</b>	<b>20</b>	<b>61</b>	<b>43</b>	<b>29</b>	<b>522</b>

**Auxiliary Generator Post-Pumping**

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	700,000	Dist at 0.2%S	0.20	3,600	27.8%	1.0	38	3	1	1	1	1	3
1.0	VLCC	2,000,000	Dist at 0.2%S	0.20	3,600	27.8%	1.0	38	3	1	1	1	1	3
1.0	Panamax	350,000	Dist at 0.2%S	0.20	3,600	27.8%	1.0	38	3	1	1	1	1	3
1.0	Suezmax	1,000,000	Dist at 0.2%S	0.20	3,600	27.8%	1.0	38	3	1	1	1	1	3
<b>MAXIMUM</b>								<b>38</b>	<b>3</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>3</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Mit.Max.2010-7. 2010 Proposed Project Summary of Berth Operations Maximum Daily Mitigated Emissions.

No AMP

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Berth Operations	Boiler	467	97	21	65	45	30	592
Berth Operations	Aux Generator	1,911	151	55	41	40	32	135

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Mit.2015-1. 2015 Proposed Project Main Engines Average Daily Mitigated Emissions.

Ship	Direction	Mode	Distance (nautical miles)	Ship speed (knots)	Activity (hours)	Maximum Speed (knots)	Load Factor	MCR (KW)	Energy (KW-hr)	Fuel Type	Annual Shipcalls (vessels/yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)	
VLCC	North In	Cruising - CW to VSR	22	12	1.83	16.9	0.358	25,400	16,671	MDO	26	19,898	1,639	702	456	456	420	2,367	
		Cruising - VSR to PZ	21	12	1.75	16.9	0.358	25,400	15,913	MDO	26	18,993	1,564	670	436	436	401	2,259	
		Cruising - PZ to Pilot	4.7	7	0.67	16.9	0.071	25,400	1,212	MDO	26	2,048	335	241	57	57	53	172	
	North In	Maneuvering - Pilot to Berth	3	3	1.00	16.9	0.006	25,400	142	MDO	26	2,732	500	1,278	106	106	97	20	
		Cruising - CW to VSR	22	12	1.83	16.9	0.358	25,400	16,671	Dist at 0.2	26	19,898	1,639	702	339	339	312	910	
		Cruising - VSR to PZ	21	12	1.75	16.9	0.358	25,400	15,913	Dist at 0.2	26	18,993	1,564	670	324	324	298	869	
		Cruising - PZ to Pilot	4.7	7	0.67	16.9	0.071	25,400	1,212	Dist at 0.2	26	2,048	335	241	43	43	39	66	
		Maneuvering - Pilot to Berth	3	3	1.00	16.9	0.006	25,400	142	Dist at 0.2	26	2,732	500	1,278	79	79	72	8	
		<b>TOTAL</b>											<b>87,342</b>	<b>8,075</b>	<b>5,784</b>	<b>1,840</b>	<b>1,840</b>	<b>1,693</b>	<b>6,672</b>
		North Out	Maneuvering - Berth to Pilot	5	5	1.00	16.9	0.026	25,400	658	Dist at 0.2	51	4,712	999	1,189	120	120	110	72
	Cruising - Pilot to PZ		3.8	7	0.54	16.9	0.071	25,400	980	Dist at 0.2	51	3,312	542	390	69	69	63	107	
	Cruising - PZ to VSR		21	12	1.75	16.9	0.358	25,400	15,913	Dist at 0.2	51	37,986	3,128	1,341	648	648	596	1,738	
	Cruising - VSR to CW		22	12	1.83	16.9	0.358	25,400	16,671	Dist at 0.2	51	39,795	3,277	1,405	679	679	625	1,821	
<b>TOTAL</b>											<b>85,806</b>	<b>7,947</b>	<b>4,324</b>	<b>1,515</b>	<b>1,515</b>	<b>1,394</b>	<b>3,737</b>		
AFRAMAX	South In	Cruising - CW to VSR	23	12	1.92	16.1	0.414	12,477	9,902	MDO	12	5,562	458	196	128	128	110	662	
		Cruising - VSR to PZ	11	12	0.92	16.1	0.414	12,477	4,736	MDO	12	2,660	219	94	61	61	56	316	
		Cruising - PZ to Pilot	4.7	7	0.67	16.1	0.082	12,477	689	MDO	12	511	78	52	14	14	13	46	
	South In	Maneuvering - Pilot to Berth	3	3	1.00	16.1	0.006	12,477	81	MDO	12	685	115	275	27	27	24	5	
		Cruising - CW to VSR	23	12	1.92	16.1	0.414	12,477	9,902	Dist at 0.2	12	5,562	458	196	95	95	87	254	
		Cruising - VSR to PZ	11	12	0.92	16.1	0.414	12,477	4,736	Dist at 0.2	12	2,660	219	94	45	45	42	122	
		Cruising - PZ to Pilot	4.7	7	0.67	16.1	0.082	12,477	689	Dist at 0.2	12	511	78	52	10	10	9	18	
		Maneuvering - Pilot to Berth	3	3	1.00	16.1	0.006	12,477	81	Dist at 0.2	12	685	115	275	20	20	18	2	
		<b>TOTAL</b>											<b>18,835</b>	<b>1,740</b>	<b>1,234</b>	<b>399</b>	<b>399</b>	<b>367</b>	<b>1,425</b>
		South Out	Maneuvering - Berth to Pilot	5	5	1.00	16.1	0.030	12,477	374	Dist at 0.2	24	1,224	231	256	31	31	28	19
	Cruising - Pilot to PZ		3.5	7	0.50	16.1	0.082	12,477	513	Dist at 0.2	24	761	115	77	15	15	14	26	
	Cruising - PZ to VSR		12.5	12	1.04	16.1	0.414	12,477	5,382	Dist at 0.2	24	6,045	498	213	103	103	95	277	
	Cruising - VSR to CW		24.5	12	2.04	16.1	0.414	12,477	10,548	Dist at 0.2	24	11,849	976	418	202	202	186	542	
<b>TOTAL</b>											<b>19,879</b>	<b>1,820</b>	<b>964</b>	<b>352</b>	<b>352</b>	<b>323</b>	<b>864</b>		
PANAMAX	South In	Cruising - CW to VSR	23	12	1.92	15.8	0.438	10,300	8,649	MDO	6	2,429	200	86	56	56	51	289	
		Cruising - VSR to PZ	11	12	0.92	15.8	0.438	10,300	4,136	MDO	6	1,162	96	41	27	27	25	138	
		Cruising - PZ to Pilot	4.7	7	0.67	15.8	0.087	10,300	601	MDO	6	169	14	6	4	4	4	20	
	South In	Maneuvering - Pilot to Berth	3	3	1.00	15.8	0.007	10,300	71	MDO	6	20	2	1	0	0	0	2	
		Cruising - CW to VSR	23	12	1.92	15.8	0.438	10,300	8,649	Dist at 0.2	6	2,429	200	86	41	41	38	111	
		Cruising - VSR to PZ	11	12	0.92	15.8	0.438	10,300	4,136	Dist at 0.2	6	1,162	96	41	20	20	18	53	
		Cruising - PZ to Pilot	4.7	7	0.67	15.8	0.087	10,300	601	Dist at 0.2	6	169	14	6	3	3	3	8	
		Maneuvering - Pilot to Berth	3	3	1.00	15.8	0.007	10,300	71	Dist at 0.2	6	20	2	1	0	0	0	1	
		<b>TOTAL</b>											<b>7,559</b>	<b>622</b>	<b>267</b>	<b>151</b>	<b>151</b>	<b>139</b>	<b>622</b>
		South Out	Maneuvering - Berth to Pilot	5	5	1.00	15.8	0.032	10,300	326	Dist at 0.2	12	183	15	6	3	3	3	8
	Cruising - Pilot to PZ		3.5	7	0.50	15.8	0.087	10,300	448	Dist at 0.2	12	252	21	9	4	4	4	12	
	Cruising - PZ to VSR		12.5	12	1.04	15.8	0.438	10,300	4,700	Dist at 0.2	12	2,640	217	93	45	45	41	121	
	Cruising - VSR to CW		24.5	12	2.04	15.8	0.438	10,300	9,213	Dist at 0.2	12	5,175	426	183	88	88	81	237	
<b>TOTAL</b>											<b>8,250</b>	<b>679</b>	<b>291</b>	<b>141</b>	<b>141</b>	<b>129</b>	<b>377</b>		
SUEZMAX	North In	Cruising - CW to VSR	22	12	1.83	17	0.352	16,000	10,317	MDO	30	14,487	1,193	511	332	332	306	1,723	
		Cruising - VSR to PZ	21	12	1.75	17	0.352	16,000	9,848	MDO	30	13,829	1,139	488	317	317	292	1,645	
		Cruising - PZ to Pilot	4.7	7	0.67	17	0.070	16,000	750	MDO	30	1,053	87	37	24	24	22	125	
	North In	Maneuvering - Pilot to Berth	3	3	1.00	17	0.005	16,000	88	MDO	30	123	10	4	3	3	3	15	
		Cruising - CW to VSR	22	12	1.83	17	0.352	16,000	10,317	Dist at 0.2	30	14,487	1,193	511	247	247	227	663	
		Cruising - VSR to PZ	21	12	1.75	17	0.352	16,000	9,848	Dist at 0.2	30	13,829	1,139	488	236	236	217	633	
		Cruising - PZ to Pilot	4.7	7	0.67	17	0.070	16,000	750	Dist at 0.2	30	1,053	87	37	18	18	17	48	
		Maneuvering - Pilot to Berth	3	3	1.00	17	0.005	16,000	88	Dist at 0.2	30	123	10	4	2	2	2	6	
		<b>TOTAL</b>											<b>58,985</b>	<b>4,858</b>	<b>2,082</b>	<b>1,180</b>	<b>1,180</b>	<b>1,085</b>	<b>4,858</b>
		North Out	Maneuvering - Berth to Pilot	5	5	1.00	17	0.025	16,000	407	Dist at 0.2	60	1,143	94	40	20	20	18	52
	Cruising - Pilot to PZ		3.8	7	0.54	17	0.070	16,000	606	Dist at 0.2	60	1,703	140	60	29	29	27	78	
	Cruising - PZ to VSR		21	12	1.75	17	0.352	16,000	9,848	Dist at 0.2	60	27,657	2,278	976	472	472	434	1,265	
	Cruising - VSR to CW		22	12	1.83	17	0.352	16,000	10,317	Dist at 0.2	60	28,974	2,386	1,023	494	494	455	1,326	
<b>TOTAL</b>											<b>59,478</b>	<b>4,898</b>	<b>2,099</b>	<b>1,015</b>	<b>1,015</b>	<b>933</b>	<b>2,721</b>		
<b>GRAND TOTAL</b>												<b>346,133</b>	<b>30,640</b>	<b>17,045</b>	<b>6,593</b>	<b>6,593</b>	<b>6,065</b>	<b>21,277</b>	

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Mit.2015-2. 2015 Proposed Project Auxiliary Generator Average Daily Mitigated Emissions

Ship	Direction	Mode	Activity (hours)	MCR (kW)	Load Factor	Energy (kW-hr)	Fuel Type	Annual Shipcalls (vessels/yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
VLCC	North In	Cruising	4.25	3,600	0.278	4,258	MDO	26	4,156	329	120	90	86	69	708
		Maneuvering	2.00	3,600	0.278	2,002	MDO	26	1,953	155	56	42	40	32	333
	North In	Cruising	4.25	3,600	0.278	4,258	Dist at 0.2	26	4,156	329	120	90	86	69	272
		Maneuvering	2.00	3,600	0.278	2,002	Dist at 0.2	26	1,953	155	56	42	40	32	128
	North Out	Maneuvering	1.50	3,600	0.278	1,501	Dist at 0.2	51	2,930	232	84	63	61	49	192
		Cruising	4.13	3,600	0.278	4,129	Dist at 0.2	51	8,060	638	232	174	167	134	528
								<b>TOTAL</b>	<b>12,218</b>	<b>967</b>	<b>352</b>	<b>264</b>	<b>253</b>	<b>203</b>	<b>1,442</b>
AFRAMAX	South In	Cruising	3.50	3,600	0.278	3,508	MDO	12	1,611	127	46	35	33	27	275
		Maneuvering	2.00	3,600	0.278	2,002	MDO	12	919	73	26	20	19	15	157
	South In	Cruising	3.50	3,600	0.278	3,508	Dist at 0.2	12	1,611	127	46	35	33	27	106
		Maneuvering	2.00	3,600	0.278	2,002	Dist at 0.2	12	919	73	26	20	19	15	60
	South Out	Maneuvering	1.50	3,600	0.278	1,501	Dist at 0.2	24	1,379	109	40	30	29	23	90
		Cruising	3.58	3,600	0.278	3,586	Dist at 0.2	24	3,294	261	95	71	68	55	216
								<b>TOTAL</b>	<b>4,673</b>	<b>370</b>	<b>134</b>	<b>101</b>	<b>97</b>	<b>77</b>	<b>306</b>
PANAMAX	South In	Cruising	3.50	3,600	0.278	3,508	MDO	6	805	64	23	17	17	13	137
		Maneuvering	2.00	3,600	0.278	2,002	MDO	6	460	36	13	10	10	8	78
	South In	Cruising	3.50	3,600	0.278	3,508	Dist at 0.2	6	805	64	23	17	17	13	53
		Maneuvering	2.00	3,600	0.278	2,002	Dist at 0.2	6	460	36	13	10	10	8	30
	South Out	Maneuvering	1.5	3,600	0.278	1,501	Dist at 0.2	12	689	55	20	15	14	11	45
		Cruising	3.58	3,600	0.278	3,586	Dist at 0.2	12	1,647	130	47	36	34	27	108
								<b>TOTAL</b>	<b>2,336</b>	<b>185</b>	<b>67</b>	<b>50</b>	<b>48</b>	<b>39</b>	<b>153</b>
SUEZMAX	North In	Cruising	4.25	3,600	0.278	4,258	MDO	30	4,889	387	141	106	101	81	833
		Maneuvering	2.00	3,600	0.278	2,002	MDO	30	2,298	182	66	50	48	38	392
	North In	Cruising	4.25	3,600	0.278	4,258	Dist at 0.2	30	4,889	387	141	106	101	81	320
		Maneuvering	2.00	3,600	0.278	2,002	Dist at 0.2	30	2,298	182	66	50	48	38	151
	North Out	Maneuvering	1.5	3,600	0.278	1,501	Dist at 0.2	60	3,447	273	99	74	71	57	226
		Cruising	4.13	3,600	0.278	4,129	Dist at 0.2	60	9,482	750	273	205	196	157	622
								<b>TOTAL</b>	<b>14,374</b>	<b>1,138</b>	<b>414</b>	<b>310</b>	<b>298</b>	<b>238</b>	<b>1,696</b>
								<b>TOTAL</b>	<b>12,930</b>	<b>1,023</b>	<b>372</b>	<b>279</b>	<b>268</b>	<b>214</b>	<b>847</b>
								<b>GRAND TOTAL</b>	<b>65,111</b>	<b>5,153</b>	<b>1,874</b>	<b>1,405</b>	<b>1,349</b>	<b>1,079</b>	<b>6,060</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Mit.2015-3. 2015 Proposed Project Summary of Average Daily Mitigated Vessel Emissions.

Mode	Equipment	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Cruising	Main Engines	331,748	28,047	12,437	6,183	6,183	5,688	21,067
Cruising	Aux Generator	45,405	3,593	1,307	980	941	753	4,178
Maneuvering	Main Engines	14,384	2,593	4,608	410	410	377	211
Maneuvering	Aux Generator	19,706	1,559	567	425	408	327	1,882
<b>Cruising and Maneuvering</b>	<b>TOTAL</b>	<b>411,244</b>	<b>35,793</b>	<b>18,918</b>	<b>7,998</b>	<b>7,942</b>	<b>7,144</b>	<b>27,338</b>

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Cruising	Main Engines	909	77	34	17	17	16	58
Cruising	Aux Generator	124	10	4	3	3	2	11
Maneuvering	Main Engines	39	7	13	1	1	1	1
Maneuvering	Aux Generator	54	4	2	1	1	1	5
<b>Cruising and Maneuvering</b>	<b>TOTAL</b>	<b>1,127</b>	<b>98</b>	<b>52</b>	<b>22</b>	<b>22</b>	<b>20</b>	<b>75</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Mit.2015-4. 2015 Proposed Project Boiler Warm-Up Average Daily Mitigated Emissions.

Shipcalls (vessels/yr)	Vessel Size	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
12.0	Aframax	MDO	0.52	102.17	30%	3	50,000	195	49	3	32	23	15	716
12.0	Aframax	Dist at 0.2	0.20	102.17	30%	3	50,000	195	49	3	32	23	15	275
25.5	VLCC	MDO	0.52	80.38	30%	3	90,000	704	147	31	97	68	46	2,153
25.5	VLCC	Dist at 0.2	0.20	80.38	30%	3	90,000	704	147	31	97	68	46	828
6	Panamax	MDO	0.52	59.91	30%	3	35,000	33	8	0	6	4	3	122
6	Panamax	Dist at 0.2	0.20	59.91	30%	3	35,000	33	8	0	6	4	3	47
30	Suezmax	MDO	0.52	82.85	30%	3	70,000	462	116	7	76	54	36	1,693
30	Suezmax	Dist at 0.2	0.20	82.85	30%	3	70,000	462	116	7	76	54	36	651
<b>TOTAL</b>								<b>2,790</b>	<b>640</b>	<b>82</b>	<b>423</b>	<b>296</b>	<b>198</b>	<b>6,485</b>



Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Mit.2015-5. 2015 Proposed Project Summary of Boiler Warm-Up Average Daily Mitigated Emissions.

Mode	Equipment	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Boiler Warm-up	Boiler	2,790	640	82	423	296	198	6,485

Table H.2.PP.Mit.2015-6. 2015 Proposed Project Berth Operations Average Daily Mitigated Emissions.

**Auxiliary Generator Pre-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
12.0	Aframax	700,000	MDO	0.52	3,600	27.8%	2.5	1,149	91	33	25	24	19	196
12.0	Aframax	700,000	Dist at 0.2%S	0.20	3,600	27.8%	2.5	1,149	91	33	25	24	19	75
25.5	VLCC	2,000,000	MDO	0.52	3,600	27.8%	2.5	2,442	193	70	53	51	40	416
25.5	VLCC	2,000,000	Dist at 0.2%S	0.20	3,600	27.8%	2.5	2,442	193	70	53	51	40	160
6.0	Panamax	350,000	MDO	0.52	3,600	27.8%	2.5	575	45	17	12	12	10	98
6.0	Panamax	350,000	Dist at 0.2%S	0.20	3,600	27.8%	2.5	575	45	17	12	12	10	38
30.0	Suezmax	1,000,000	MDO	0.52	3,600	27.8%	2.5	2,873	227	83	62	60	48	490
30.0	Suezmax	1,000,000	Dist at 0.2%S	0.20	3,600	27.8%	2.5	2,873	227	83	62	60	48	188
<b>TOTAL</b>								<b>14,076</b>	<b>1,114</b>	<b>405</b>	<b>304</b>	<b>292</b>	<b>233</b>	<b>1,661</b>

**Boiler Pre-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
12.0	Aframax	700,000	MDO	0.52	102.17	30.0%	2.5	50,000	163	41	2	27	19	13	596
12.0	Aframax	700,000	Dist at 0.2%S	0.20	102.17	30.0%	2.5	50,000	163	41	2	27	19	13	229
25.5	VLCC	2,000,000	MDO	0.52	80.38	30.0%	2.5	90,000	587	123	26	81	57	38	1,795
25.5	VLCC	2,000,000	Dist at 0.2%S	0.20	80.38	30.0%	2.5	90,000	587	123	26	81	57	38	690
6.0	Panamax	350,000	MDO	0.52	59.91	30.0%	2.5	35,000	33	8	0	6	4	3	122
6.0	Panamax	350,000	Dist at 0.2%S	0.20	59.91	30.0%	2.5	35,000	33	8	0	6	4	3	47
30.0	Suezmax	1,000,000	MDO	0.52	82.85	30.0%	2.5	70,000	462	116	7	76	54	36	1,693
30.0	Suezmax	1,000,000	Dist at 0.2%S	0.20	82.85	30.0%	2.5	70,000	462	116	7	76	54	36	651
<b>TOTAL</b>									<b>2,490</b>	<b>574</b>	<b>70</b>	<b>380</b>	<b>266</b>	<b>178</b>	<b>5,823</b>

**Auxiliary Generator Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
24.0	Aframax	700,000	Dist at 0.2%S	0.20	3,600	55.6%	15.0	27,577	2,182	794	595	571	457	1,808
51.0	VLCC	2,000,000	Dist at 0.2%S	0.20	3,600	55.6%	23.2	90,637	7,173	2,608	1,956	1,878	1,502	5,941
12.0	Panamax	350,000	Dist at 0.2%S	0.20	3,600	55.6%	11.0	10,112	800	291	218	210	168	663
60.0	Suezmax	1,000,000	Dist at 0.2%S	0.20	3,600	55.6%	15.3	70,322	5,565	2,024	1,518	1,457	1,166	4,609
<b>TOTAL</b>								<b>198,647</b>	<b>15,720</b>	<b>5,716</b>	<b>4,287</b>	<b>4,116</b>	<b>3,293</b>	<b>13,021</b>

**Boiler Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Inerting Fuel Consumption Savings (lb/1000 bbl offloaded)	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
24.0	Aframax	700,000	Dist at 0.2%S	0.20	102.17	28.06	15.0	4,410	1,102	62	730	511	342	6,211
51.0	VLCC	2,000,000	Dist at 0.2%S	0.20	80.38	28.06	23.2	22,628	4,725	998	3,128	2,190	1,464	26,621
12.0	Panamax	350,000	Dist at 0.2%S	0.20	59.91	28.06	11.0	474	118	7	78	55	37	667
60.0	Suezmax	1,000,000	Dist at 0.2%S	0.20	82.85	28.06	15.3	11,644	2,911	164	1,927	1,349	902	16,400
<b>TOTAL</b>								<b>39,156</b>	<b>8,857</b>	<b>1,231</b>	<b>5,863</b>	<b>4,104</b>	<b>2,744</b>	<b>49,900</b>

**Auxiliary Generator Post-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
24.0	Aframax	700,000	Dist at 0.2%S	0.20	3,600	27.8%	1.0	919	73	26	20	19	15	60
51.0	VLCC	2,000,000	Dist at 0.2%S	0.20	3,600	27.8%	1.0	1,953	155	56	42	40	32	128
12.0	Panamax	350,000	Dist at 0.2%S	0.20	3,600	27.8%	1.0	460	36	13	10	10	8	30
60.0	Suezmax	1,000,000	Dist at 0.2%S	0.20	3,600	27.8%	1.0	2,298	182	66	50	48	38	151
<b>TOTAL</b>								<b>5,630</b>	<b>446</b>	<b>162</b>	<b>122</b>	<b>117</b>	<b>93</b>	<b>369</b>

**Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR**

**Table H.2.PP.Mit.2015-7. 2015 Proposed Project Summary of Berth Operations Average Daily Mitigated Emissions.**

**No AMP**

<b>Mode</b>	<b>Equipment</b>	<b>NO<sub>x</sub> Emissions (lb/yr)</b>	<b>CO Emissions (lb/yr)</b>	<b>ROG Emissions (lb/yr)</b>	<b>PM Emissions (lb/yr)</b>	<b>PM<sub>10</sub> Emissions (lb/yr)</b>	<b>PM<sub>2.5</sub> Emissions (lb/yr)</b>	<b>SO<sub>2</sub> Emissions (lb/yr)</b>
Berth Operations	Boiler	41,646	9,431	1,301	6,243	4,370	2,922	55,723
Berth Operations	Aux Generator	218,353	17,280	6,284	4,713	4,524	3,619	15,051

**Mitigated Emissions with AMP - Year 2015**

AMP Reduction                      15%

Berth Operations	Boiler	41,646	9,431	1,301	6,243	4,370	2,922	55,723
Berth Operations	Aux Generator	185,600	14,688	5,341	4,006	3,846	3,076	12,793

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Mit.Max.2015-1. 2015 Proposed Project Main Engines Maximum Daily Mitigated Emissions.

Ship	Direction	Mode	Distance (nautical miles)	Ship speed (knots)	Activity (hours)	Maximum Speed (knots)	Load Factor	MCR (kW)	Energy (kW-hr)	Fuel Type	Maximum Daily Shipcalls (vessels/day)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
VLCC	North In	Cruising - CW to VSR	22	12	1.83	16.9	0.358	25,400	16,671	MDO	0.5	390	32	14	9	9	8	46
		Cruising - VSR to PZ	21	12	1.75	16.9	0.358	25,400	15,913	MDO	0.5	372	31	13	9	9	8	44
		Cruising - PZ to Pilot	4.7	7	0.67	16.9	0.071	25,400	1,212	MDO	0.5	40	7	5	1	1	1	3
	North In	Maneuvering - Pilot to Berth	3	1.00	16.9	0.006	25,400	142	MDO	0.5	54	10	25	2	2	2	2	0
		Cruising - CW to VSR	22	12	1.83	16.9	0.358	25,400	16,671	Dist at 0.2	0.5	390	32	14	7	7	6	18
		Cruising - VSR to PZ	21	12	1.75	16.9	0.358	25,400	15,913	Dist at 0.2	0.5	372	31	13	6	6	6	17
		Cruising - PZ to Pilot	4.7	7	0.67	16.9	0.071	25,400	1,212	Dist at 0.2	0.5	40	7	5	1	1	1	1
		Maneuvering - Pilot to Berth	3	1.00	16.9	0.006	25,400	142	Dist at 0.2	0.5	54	10	25	2	2	2	1	0
		Maneuvering - Berth to Pilot	5	1.00	16.9	0.026	25,400	658	Dist at 0.2	1.0	92	20	23	2	2	2	2	1
	North Out	Cruising - Pilot to PZ	3.8	7	0.54	16.9	0.071	25,400	980	Dist at 0.2	1.0	65	11	8	1	1	1	2
		Cruising - PZ to VSR	21	12	1.75	16.9	0.358	25,400	15,913	Dist at 0.2	1.0	745	61	26	13	13	12	34
		Cruising - VSR to CW	22	12	1.83	16.9	0.358	25,400	16,671	Dist at 0.2	1.0	780	64	28	13	13	12	36
<b>TOTAL</b>											<b>3,395</b>	<b>314</b>	<b>198</b>	<b>66</b>	<b>66</b>	<b>61</b>	<b>204</b>	
AFRAMAX	South In	Cruising - CW to VSR	23	12	1.92	16.1	0.414	12,477	9,902	MDO	0.5	232	19	8	5	5	5	28
		Cruising - VSR to PZ	11	12	0.92	16.1	0.414	12,477	4,736	MDO	0.5	111	9	4	3	3	2	13
		Cruising - PZ to Pilot	4.7	7	0.67	16.1	0.082	12,477	689	MDO	0.5	21	3	2	1	1	1	2
		Maneuvering - Pilot to Berth	3	1.00	16.1	0.006	12,477	81	MDO	0.5	29	5	11	1	1	1	0	
AFRAMAX	South In	Cruising - CW to VSR	23	12	1.92	16.1	0.414	12,477	9,902	Dist at 0.2	0.5	232	19	8	4	4	4	11
		Cruising - VSR to PZ	11	12	0.92	16.1	0.414	12,477	4,736	Dist at 0.2	0.5	111	9	4	2	2	2	5
		Cruising - PZ to Pilot	4.7	7	0.67	16.1	0.082	12,477	689	Dist at 0.2	0.5	21	3	2	0	0	0	1
		Maneuvering - Pilot to Berth	3	1.00	16.1	0.006	12,477	81	Dist at 0.2	0.5	29	5	11	1	1	1	0	
South Out	Maneuvering - Berth to Pilot	5	1.00	16.1	0.030	12,477	374	Dist at 0.2	1.0	51	10	11	1	1	1	1	1	
	Cruising - Pilot to PZ	3.5	7	0.50	16.1	0.082	12,477	513	Dist at 0.2	1.0	32	5	3	1	1	1	1	
	Cruising - PZ to VSR	12.5	12	1.04	16.1	0.414	12,477	5,382	Dist at 0.2	1.0	252	21	9	4	4	4	12	
	Cruising - VSR to CW	24.5	12	2.04	16.1	0.414	12,477	10,548	Dist at 0.2	1.0	494	41	17	8	8	8	23	
<b>TOTAL</b>											<b>1,613</b>	<b>148</b>	<b>92</b>	<b>31</b>	<b>31</b>	<b>29</b>	<b>95</b>	
PANAMAX	South In	Cruising - CW to VSR	23	12	1.92	15.8	0.438	10,300	8,649	MDO	0.5	202	17	7	5	5	4	24
		Cruising - VSR to PZ	11	12	0.92	15.8	0.438	10,300	4,136	MDO	0.5	97	8	3	2	2	2	12
		Cruising - PZ to Pilot	4.7	7	0.67	15.8	0.087	10,300	601	MDO	0.5	14	1	0	0	0	0	2
		Maneuvering - Pilot to Berth	3	1.00	15.8	0.007	10,300	71	MDO	0.5	2	0	0	0	0	0	0	
PANAMAX	South In	Cruising - CW to VSR	23	12	1.92	15.8	0.438	10,300	8,649	Dist at 0.2	0.5	202	17	7	3	3	3	9
		Cruising - VSR to PZ	11	12	0.92	15.8	0.438	10,300	4,136	Dist at 0.2	0.5	97	8	3	2	2	2	4
		Cruising - PZ to Pilot	4.7	7	0.67	15.8	0.087	10,300	601	Dist at 0.2	0.5	14	1	0	0	0	0	1
		Maneuvering - Pilot to Berth	3	1.00	15.8	0.007	10,300	71	Dist at 0.2	0.5	2	0	0	0	0	0	0	
South Out	Maneuvering - Berth to Pilot	5	1.00	15.8	0.032	10,300	326	Dist at 0.2	1.0	15	1	1	0	0	0	0	1	
	Cruising - Pilot to PZ	3.5	7	0.50	15.8	0.087	10,300	448	Dist at 0.2	1.0	21	2	1	0	0	0	1	
	Cruising - PZ to VSR	12.5	12	1.04	15.8	0.438	10,300	4,700	Dist at 0.2	1.0	220	18	8	4	4	3	10	
	Cruising - VSR to CW	24.5	12	2.04	15.8	0.438	10,300	9,213	Dist at 0.2	1.0	431	36	15	7	7	7	20	
<b>TOTAL</b>											<b>1317</b>	<b>108</b>	<b>46</b>	<b>24</b>	<b>24</b>	<b>22</b>	<b>83</b>	
SUEZMAX	North In	Cruising - CW to VSR	22	12	1.83	17	0.352	16,000	10,317	MDO	0.5	241	20	9	6	6	5	29
		Cruising - VSR to PZ	21	12	1.75	17	0.352	16,000	9,848	MDO	0.5	230	19	8	5	5	5	27
		Cruising - PZ to Pilot	4.7	7	0.67	17	0.070	16,000	750	MDO	0.5	18	1	1	0	0	0	2
		Maneuvering - Pilot to Berth	3	1.00	17	0.005	16,000	88	MDO	0.5	2	0	0	0	0	0	0	
SUEZMAX	North In	Cruising - CW to VSR	22	12	1.83	17	0.352	16,000	10,317	Dist at 0.2	0.5	241	20	9	4	4	4	11
		Cruising - VSR to PZ	21	12	1.75	17	0.352	16,000	9,848	Dist at 0.2	0.5	230	19	8	4	4	4	11
		Cruising - PZ to Pilot	4.7	7	0.67	17	0.070	16,000	750	Dist at 0.2	0.5	18	1	1	0	0	0	1
		Maneuvering - Pilot to Berth	3	1.00	17	0.005	16,000	88	Dist at 0.2	0.5	2	0	0	0	0	0	0	
North Out	Maneuvering - Berth to Pilot	5	1.00	17	0.025	16,000	407	Dist at 0.2	1.0	19	2	1	0	0	0	0	1	
	Cruising - Pilot to PZ	3.8	7	0.54	17	0.070	16,000	606	Dist at 0.2	1.0	28	2	1	0	0	0	1	
	Cruising - PZ to VSR	21	12	1.75	17	0.352	16,000	9,848	Dist at 0.2	1.0	461	38	16	8	8	7	21	
	Cruising - VSR to CW	22	12	1.83	17	0.352	16,000	10,317	Dist at 0.2	1.0	483	40	17	8	8	8	22	
<b>TOTAL</b>											<b>1974</b>	<b>163</b>	<b>70</b>	<b>37</b>	<b>37</b>	<b>34</b>	<b>126</b>	
<b>MAXIMUM</b>											<b>3,395</b>	<b>314</b>	<b>198</b>	<b>66</b>	<b>66</b>	<b>61</b>	<b>204</b>	

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Mit.Max.2015-2. 2015 Proposed Project Auxiliary Generator Maximum Daily Mitigated Emissions

Ship	Direction	Mode	Activity (hours)	MCR (kW)	Load Factor	Energy (kW-hr)	Fuel Type	Maximum Daily Shipcalls (vessels/day)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
VLCC	North In	Cruising	4.25	3,600	0.278	4,258	MDO	0.5	81	6	2	2	2	1	14
		Maneuvering	2.00	3,600	0.278	2,002	MDO	0.5	38	3	1	1	1	1	7
VLCC	North In	Cruising	4.25	3,600	0.278	4,258	Dist at 0.2	0.5	81	6	2	2	2	1	5
		Maneuvering	2.00	3,600	0.278	2,002	Dist at 0.2	0.5	38	3	1	1	1	1	3
	North Out	Maneuvering	1.50	3,600	0.278	1,501	Dist at 0.2	1.0	57	5	2	1	1	1	4
		Cruising	4.13	3,600	0.278	4,129	Dist at 0.2	1.0	158	13	5	3	3	3	10
<b>TOTAL</b>									<b>455</b>	<b>36</b>	<b>13</b>	<b>10</b>	<b>9</b>	<b>8</b>	<b>42</b>
AFRAMAX	South In	Cruising	3.50	3,600	0.278	3,508	MDO	0.5	67	5	2	1	1	1	11
AFRAMAX	South In	Maneuvering	2.00	3,600	0.278	2,002	MDO	0.5	38	3	1	1	1	1	7
		Cruising	3.50	3,600	0.278	3,508	Dist at 0.2	0.5	67	5	2	1	1	1	4
	South Out	Maneuvering	2.00	3,600	0.278	2,002	Dist at 0.2	0.5	38	3	1	1	1	1	3
		Maneuvering	1.50	3,600	0.278	1,501	Dist at 0.2	1.0	57	5	2	1	1	1	4
		Cruising	3.58	3,600	0.278	3,586	Dist at 0.2	1.0	137	11	4	3	3	2	9
<b>TOTAL</b>									<b>406</b>	<b>32</b>	<b>12</b>	<b>9</b>	<b>8</b>	<b>7</b>	<b>38</b>
PANAMAX	South In	Cruising	3.15	3,600	0.278	3,155	MDO	0.5	60	5	2	1	1	1	10
PANAMAX	South In	Maneuvering	2.00	3,600	0.278	2,002	MDO	0.5	38	3	1	1	1	1	7
		Cruising	3.15	3,600	0.278	3,155	Dist at 0.2	0.5	60	5	2	1	1	1	4
	South Out	Maneuvering	2.00	3,600	0.278	2,002	Dist at 0.2	0.5	38	3	1	1	1	1	3
		Maneuvering	1.5	3,600	0.278	1,501	Dist at 0.2	1.0	57	5	2	1	1	1	4
		Cruising	3.21	3,600	0.278	3,211	Dist at 0.2	1.0	123	10	4	3	3	2	8
<b>TOTAL</b>									<b>378</b>	<b>30</b>	<b>11</b>	<b>8</b>	<b>8</b>	<b>6</b>	<b>35</b>
SUEZMAX	North In	Cruising	3.84	3,600	0.278	3,840	MDO	0.5	73	6	2	2	2	1	13
SUEZMAX	North In	Maneuvering	2.00	3,600	0.278	2,002	MDO	0.5	38	3	1	1	1	1	7
		Cruising	3.84	3,600	0.278	3,840	Dist at 0.2	0.5	73	6	2	2	2	1	5
	North Out	Maneuvering	2.00	3,600	0.278	2,002	Dist at 0.2	0.5	38	3	1	1	1	1	3
		Maneuvering	1.5	3,600	0.278	1,501	Dist at 0.2	1.0	57	5	2	1	1	1	4
		Cruising	3.71	3,600	0.278	3,712	Dist at 0.2	1.0	142	11	4	3	3	2	9
<b>TOTAL</b>									<b>423</b>	<b>33</b>	<b>12</b>	<b>9</b>	<b>9</b>	<b>7</b>	<b>39</b>
<b>MAXIMUM</b>									<b>455</b>	<b>36</b>	<b>13</b>	<b>10</b>	<b>9</b>	<b>8</b>	<b>42</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Mit.Max.2015-3. 2015 Proposed Project Summary of Maximum Daily Mitigated Vessel Emissions.

<b>Mode</b>	<b>Equipment</b>	<b>NO<sub>x</sub> Emissions (lb/day)</b>	<b>CO Emissions (lb/day)</b>	<b>ROG Emissions (lb/day)</b>	<b>PM Emissions (lb/day)</b>	<b>PM<sub>10</sub> Emissions (lb/day)</b>	<b>PM<sub>2.5</sub> Emissions (lb/day)</b>	<b>SO<sub>2</sub> Emissions (lb/day)</b>
Cruising	Main Engines	3,196	275	125	60	60	55	202
Cruising	Aux Generator	321	25	9	7	7	5	30
Maneuvering	Main Engines	200	39	73	6	6	5	2
Maneuvering	Aux Generator	134	11	4	3	3	2	13
<b>Cruising and Maneuvering</b>	<b>TOTAL</b>	<b>3,850</b>	<b>350</b>	<b>211</b>	<b>76</b>	<b>75</b>	<b>68</b>	<b>246</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Mit.Max.2015-4. 2015 Proposed Project Boiler Warm-Up Maximum Daily Mitigated Emissions.

Shipcalls (vessels/ day)	Vessel Size	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
0.5	Aframax	MDO	0.52	102.17	30%	3	50,000	8	2	0	1	1	1	30
0.5	Aframax	Dist at 0.2	0.20	102.17	30%	3	50,000	8	2	0	1	1	1	11
							<b>TOTAL</b>	<b>16</b>	<b>4</b>	<b>0</b>	<b>3</b>	<b>2</b>	<b>1</b>	<b>41</b>
0.5	VLCC	MDO	0.52	80.38	30%	3	90,000	14	3	1	2	1	1	42
0.5	VLCC	Dist at 0.2	0.20	80.38	30%	3	90,000	14	3	1	2	1	1	16
							<b>TOTAL</b>	<b>28</b>	<b>6</b>	<b>1</b>	<b>4</b>	<b>3</b>	<b>2</b>	<b>58</b>
0.5	Panamax	MDO	0.52	59.91	30%	3	35,000	3	1	0	1	0	0	12
0.5	Panamax	Dist at 0.2	0.20	59.91	30%	3	35,000	3	1	0	1	0	0	5
							<b>TOTAL</b>	<b>7</b>	<b>2</b>	<b>0</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>17</b>
0.5	Suezmax	MDO	0.52	82.85	30%	3	70,000	9	2	0	2	1	1	34
0.5	Suezmax	Dist at 0.2	0.20	82.85	30%	3	70,000	9	2	0	2	1	1	13
							<b>TOTAL</b>	<b>18</b>	<b>5</b>	<b>0</b>	<b>3</b>	<b>2</b>	<b>1</b>	<b>47</b>
							<b>MAXIMUM</b>	<b>28</b>	<b>6</b>	<b>1</b>	<b>4</b>	<b>3</b>	<b>2</b>	<b>58</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Mit.Max.2015-5. 2015 Proposed Project Summary of Boiler Warm-Up Maximum Mitigated Emissions.

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Boiler Warm-up	Boiler	28	6	1	4	3	2	58



Table H.2.PP.Mit.Max.2015-6. 2015 Proposed Project Berth Operations Maximum Daily Mitigated Emissions.

**Auxiliary Generator Pre-Pumping**

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
0.5	Aframax	700,000	MDO	0.52	3,600	27.8%	2.5	48	4	1	1	1	1	8
0.5	Aframax	700,000	Dist at 0.2%S	0.20	3,600	27.8%	2.5	48	4	1	1	1	1	3
<b>TOTAL</b>								<b>96</b>	<b>8</b>	<b>3</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>11</b>
0.5	VLCC	2,000,000	MDO	0.52	3,600	27.8%	2.5	48	4	1	1	1	1	8
0.5	VLCC	2,000,000	Dist at 0.2%S	0.20	3,600	27.8%	2.5	48	4	1	1	1	1	3
<b>TOTAL</b>								<b>96</b>	<b>8</b>	<b>3</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>11</b>
0.5	Panamax	350,000	MDO	0.52	3,600	27.8%	2.5	48	4	1	1	1	1	8
0.5	Panamax	350,000	Dist at 0.2%S	0.20	3,600	27.8%	2.5	48	4	1	1	1	1	3
<b>TOTAL</b>								<b>96</b>	<b>8</b>	<b>3</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>11</b>
0.5	Suezmax	1,000,000	MDO	0.52	3,600	27.8%	2.5	48	4	1	1	1	1	8
0.5	Suezmax	1,000,000	Dist at 0.2%S	0.20	3,600	27.8%	2.5	48	4	1	1	1	1	3
<b>TOTAL</b>								<b>96</b>	<b>8</b>	<b>3</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>11</b>
<b>MAXIMUM</b>								<b>96</b>	<b>8</b>	<b>3</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>11</b>

**Boiler Pre-Pumping**

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
0.5	Aframax	700,000	MDO	0.52	102.17	30.0%	2.5	50,000	7	2	0	1	1	1	25
0.5	Aframax	700,000	Dist at 0.2%S	0.20	102.17	30.0%	2.5	50,000	7	2	0	1	1	1	10
<b>TOTAL</b>									<b>14</b>	<b>3</b>	<b>0</b>	<b>2</b>	<b>2</b>	<b>1</b>	<b>34</b>
0.5	VLCC	2,000,000	MDO	0.52	80.38	30.0%	2.5	75,000	10	2	0	1	1	1	29
0.5	VLCC	2,000,000	Dist at 0.2%S	0.20	80.38	30.0%	2.5	75,000	10	2	0	1	1	1	11
<b>TOTAL</b>									<b>19</b>	<b>4</b>	<b>1</b>	<b>3</b>	<b>2</b>	<b>1</b>	<b>41</b>
0.5	Panamax	350,000	MDO	0.52	59.91	30.0%	2.5	35,000	3	1	0	0	0	0	10
0.5	Panamax	350,000	Dist at 0.2%S	0.20	59.91	30.0%	2.5	35,000	3	1	0	0	0	0	4
<b>TOTAL</b>									<b>6</b>	<b>1</b>	<b>0</b>	<b>1</b>	<b>1</b>	<b>0</b>	<b>14</b>
0.5	Suezmax	1,000,000	MDO	0.52	82.85	30.0%	2.5	70,000	8	2	0	1	1	1	28
0.5	Suezmax	1,000,000	Dist at 0.2%S	0.20	82.85	30.0%	2.5	70,000	8	2	0	1	1	1	11
<b>TOTAL</b>									<b>15</b>	<b>4</b>	<b>0</b>	<b>3</b>	<b>2</b>	<b>1</b>	<b>39</b>
<b>MAXIMUM</b>									<b>19</b>	<b>4</b>	<b>1</b>	<b>3</b>	<b>2</b>	<b>1</b>	<b>41</b>

**Auxiliary Generator Pumping**

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	700,000	Dist at 0.2%S	0.20	3,600	55.6%	15.0	1,149	91	33	25	24	19	75
1.0	VLCC	2,000,000	Dist at 0.2%S	0.20	3,600	55.6%	23.2	1,777	141	51	38	37	29	116
1.0	Panamax	350,000	Dist at 0.2%S	0.20	3,600	55.6%	11.0	843	67	24	18	17	14	55
1.0	Suezmax	1,000,000	Dist at 0.2%S	0.20	3,600	55.6%	15.3	1,172	93	34	25	24	19	77
<b>MAXIMUM</b>								<b>1,777</b>	<b>141</b>	<b>51</b>	<b>38</b>	<b>37</b>	<b>29</b>	<b>116</b>

**Boiler Pumping**

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Inerting Fuel Consumption Savings (lb/1000 bbl offloaded)	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	700,000	Dist at 0.2%S	0.20	102.17	28.06	15.0	184	46	3	30	21	14	259
1.0	VLCC	2,000,000	Dist at 0.2%S	0.20	80.38	28.06	23.2	444	93	20	61	43	29	522
1.0	Panamax	350,000	Dist at 0.2%S	0.20	59.91	28.06	11.0	39	10	1	7	5	3	56
1.0	Suezmax	1,000,000	Dist at 0.2%S	0.20	82.85	28.06	15.3	194	49	3	32	22	15	273
<b>MAXIMUM</b>								<b>444</b>	<b>93</b>	<b>20</b>	<b>61</b>	<b>43</b>	<b>29</b>	<b>522</b>

**Auxiliary Generator Post-Pumping**

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	700,000	Dist at 0.2%S	0.20	3,600	27.8%	1.0	38	3	1	1	1	1	3
1.0	VLCC	2,000,000	Dist at 0.2%S	0.20	3,600	27.8%	1.0	38	3	1	1	1	1	3
1.0	Panamax	350,000	Dist at 0.2%S	0.20	3,600	27.8%	1.0	38	3	1	1	1	1	3
1.0	Suezmax	1,000,000	Dist at 0.2%S	0.20	3,600	27.8%	1.0	38	3	1	1	1	1	3
<b>MAXIMUM</b>								<b>38</b>	<b>3</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>3</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Mit.Max.2015-7. 2015 Proposed Project Summary of Berth Operations Maximum Daily Mitigated Emissions.

No AMP

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Berth Operations	Boiler	463	97	20	64	45	30	563
Berth Operations	Aux Generator	1,911	151	55	41	40	32	130

Mitigated Emissions with AMP - Year 2015

AMP Reduction            15%

Berth Operations	Boiler	463	97	20	64	45	30	563
Berth Operations	Aux Generator	1624.56	128.56	46.75	35.06	33.66	26.93	110.75

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Mit.2025-1. 2025 Proposed Project Main Engines Average Daily Mitigated Emissions.

Ship	Direction	Mode	Distance (nautical miles)	Ship speed (knots)	Activity (hours)	Maximum Speed (knots)	Load Factor	MCR (KW)	Energy (KW-hr)	Fuel Type	Annual Shipcalls (vessels/yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
VLCC	North In	Cruising - CW to VSR	22	12	1.83	16.9	0.358	25,400	16,671	MDO	7	5,384	443	190	124	124	114	640
		Cruising - VSR to PZ	21	12	1.75	16.9	0.358	25,400	15,913	MDO	7	5,139	423	181	118	118	108	611
		Cruising - PZ to Pilot	4.7	7	0.67	16.9	0.071	25,400	1,212	MDO	7	554	91	65	15	15	14	47
		Maneuvering - Pilot to Berth	3	1.00	16.9	0.006	25,400	142	MDO	7	739	135	346	29	29	26	5	
VLCC	North In	Cruising - CW to VSR	22	12	1.83	16.9	0.358	25,400	16,671	Dist at 0.2	62	48,457	3,991	1,710	827	827	760	2,217
		Cruising - VSR to PZ	21	12	1.75	16.9	0.358	25,400	15,913	Dist at 0.2	62	46,254	3,809	1,632	789	789	726	2,116
		Cruising - PZ to Pilot	4.7	7	0.67	16.9	0.071	25,400	1,212	Dist at 0.2	62	4,988	817	587	104	104	95	161
		Maneuvering - Pilot to Berth	3	1.00	16.9	0.006	25,400	142	Dist at 0.2	62	6,654	1,217	3,113	192	192	177	19	
<b>TOTAL</b>											<b>118,169</b>	<b>10,926</b>	<b>7,826</b>	<b>2,197</b>	<b>2,197</b>	<b>2,021</b>	<b>5,817</b>	
	North Out	Maneuvering - Berth to Pilot	5	1.00	16.9	0.026	25,400	658	Dist at 0.2	69	6,375	1,352	1,608	162	162	149	97	
		Cruising - Pilot to PZ	3.8	7	0.54	16.9	0.071	25,400	980	Dist at 0.2	69	4,481	734	527	93	93	86	145
		Cruising - PZ to VSR	21	12	1.75	16.9	0.358	25,400	15,913	Dist at 0.2	69	51,393	4,232	1,814	877	877	807	2,351
		Cruising - VSR to CW	22	12	1.83	16.9	0.358	25,400	16,671	Dist at 0.2	69	53,841	4,434	1,900	918	918	845	2,463
<b>TOTAL</b>											<b>116,090</b>	<b>10,752</b>	<b>5,850</b>	<b>2,050</b>	<b>2,050</b>	<b>1,886</b>	<b>5,057</b>	
AFRAMAX	South In	Cruising - CW to VSR	23	12	1.92	16.1	0.414	12,477	9,902	MDO	4	1,669	137	59	38	38	35	198
		Cruising - VSR to PZ	11	12	0.92	16.1	0.414	12,477	4,736	MDO	4	798	66	28	18	18	17	95
		Cruising - PZ to Pilot	4.7	7	0.67	16.1	0.082	12,477	689	MDO	4	153	23	16	4	4	4	14
		Maneuvering - Pilot to Berth	3	1.00	16.1	0.006	12,477	81	MDO	4	206	35	82	8	8	7	2	
AFRAMAX	South In	Cruising - CW to VSR	23	12	1.92	16.1	0.414	12,477	9,902	Dist at 0.2	32	15,017	1,237	530	256	256	236	687
		Cruising - VSR to PZ	11	12	0.92	16.1	0.414	12,477	4,736	Dist at 0.2	32	7,182	591	253	123	123	113	329
		Cruising - PZ to Pilot	4.7	7	0.67	16.1	0.082	12,477	689	Dist at 0.2	32	1,379	209	140	28	28	26	48
		Maneuvering - Pilot to Berth	3	1.00	16.1	0.006	12,477	81	Dist at 0.2	32	1,850	312	742	53	53	49	6	
<b>TOTAL</b>											<b>28,252</b>	<b>2,610</b>	<b>1,850</b>	<b>528</b>	<b>528</b>	<b>486</b>	<b>1,378</b>	
	South Out	Maneuvering - Berth to Pilot	5	1.00	16.1	0.030	12,477	374	Dist at 0.2	36	1,836	346	383	46	46	43	29	
		Cruising - Pilot to PZ	3.5	7	0.50	16.1	0.082	12,477	513	Dist at 0.2	36	1,141	173	116	23	23	21	40
		Cruising - PZ to VSR	12.5	12	1.04	16.1	0.414	12,477	5,382	Dist at 0.2	36	9,068	747	320	155	155	142	415
		Cruising - VSR to CW	24.5	12	2.04	16.1	0.414	12,477	10,548	Dist at 0.2	36	17,773	1,464	627	303	303	279	813
<b>TOTAL</b>											<b>29,818</b>	<b>2,730</b>	<b>1,446</b>	<b>527</b>	<b>527</b>	<b>485</b>	<b>1,296</b>	
PANAMAX	South In	Cruising - CW to VSR	23	12	1.92	15.8	0.438	10,300	8,649	MDO	2	729	60	26	17	17	15	87
		Cruising - VSR to PZ	11	12	0.92	15.8	0.438	10,300	4,136	MDO	2	348	29	12	8	8	7	41
		Cruising - PZ to Pilot	4.7	7	0.67	15.8	0.087	10,300	601	MDO	2	51	4	2	1	1	1	6
		Maneuvering - Pilot to Berth	3	1.00	15.8	0.007	10,300	71	MDO	2	6	0	0	0	0	0	1	
PANAMAX	South In	Cruising - CW to VSR	23	12	1.92	15.8	0.438	10,300	8,649	Dist at 0.2	16	6,558	540	231	112	112	103	300
		Cruising - VSR to PZ	11	12	0.92	15.8	0.438	10,300	4,136	Dist at 0.2	16	3,136	258	111	54	54	49	143
		Cruising - PZ to Pilot	4.7	7	0.67	15.8	0.087	10,300	601	Dist at 0.2	16	456	38	16	8	8	7	21
		Maneuvering - Pilot to Berth	3	1.00	15.8	0.007	10,300	71	Dist at 0.2	16	53	4	2	1	1	1	2	
<b>TOTAL</b>											<b>11,338</b>	<b>934</b>	<b>400</b>	<b>200</b>	<b>200</b>	<b>184</b>	<b>602</b>	
	South Out	Maneuvering - Berth to Pilot	5	1.00	15.8	0.032	10,300	326	Dist at 0.2	18	275	23	10	5	5	4	13	
		Cruising - Pilot to PZ	3.5	7	0.50	15.8	0.087	10,300	448	Dist at 0.2	18	377	31	13	6	6	6	17
		Cruising - PZ to VSR	12.5	12	1.04	15.8	0.438	10,300	4,700	Dist at 0.2	18	3,960	326	140	68	68	62	181
		Cruising - VSR to CW	24.5	12	2.04	15.8	0.438	10,300	9,213	Dist at 0.2	18	7,762	639	274	132	132	122	355
<b>TOTAL</b>											<b>12,374</b>	<b>1,019</b>	<b>437</b>	<b>211</b>	<b>211</b>	<b>194</b>	<b>566</b>	
SUEZMAX	North In	Cruising - CW to VSR	22	12	1.83	17	0.352	16,000	10,317	MDO	8	3,767	310	133	86	86	79	448
		Cruising - VSR to PZ	21	12	1.75	17	0.352	16,000	9,848	MDO	8	3,595	296	127	82	82	76	428
		Cruising - PZ to Pilot	4.7	7	0.67	17	0.070	16,000	750	MDO	8	274	23	10	6	6	6	33
		Maneuvering - Pilot to Berth	3	1.00	17	0.005	16,000	88	MDO	8	32	3	1	1	1	1	4	
SUEZMAX	North In	Cruising - CW to VSR	22	12	1.83	17	0.352	16,000	10,317	Dist at 0.2	70	33,900	2,792	1,196	578	578	532	1,551
		Cruising - VSR to PZ	21	12	1.75	17	0.352	16,000	9,848	Dist at 0.2	70	32,359	2,665	1,142	552	552	508	1,480
		Cruising - PZ to Pilot	4.7	7	0.67	17	0.070	16,000	750	Dist at 0.2	70	2,464	203	87	42	42	39	113
		Maneuvering - Pilot to Berth	3	1.00	17	0.005	16,000	88	Dist at 0.2	70	289	24	10	5	5	5	13	
<b>TOTAL</b>											<b>76,680</b>	<b>6,315</b>	<b>2,706</b>	<b>1,353</b>	<b>1,353</b>	<b>1,245</b>	<b>4,070</b>	
	North Out	Maneuvering - Berth to Pilot	5	1.00	17	0.025	16,000	407	Dist at 0.2	78	1,486	122	52	25	25	23	68	
		Cruising - Pilot to PZ	3.8	7	0.54	17	0.070	16,000	606	Dist at 0.2	78	2,214	182	78	38	38	35	101
		Cruising - PZ to VSR	21	12	1.75	17	0.352	16,000	9,848	Dist at 0.2	78	35,954	2,961	1,269	613	613	564	1,645
		Cruising - VSR to CW	22	12	1.83	17	0.352	16,000	10,317	Dist at 0.2	78	37,667	3,102	1,329	643	643	591	1,723
<b>TOTAL</b>											<b>77,321</b>	<b>6,368</b>	<b>2,729</b>	<b>1,319</b>	<b>1,319</b>	<b>1,213</b>	<b>3,538</b>	
<b>GRAND TOTAL</b>												<b>470,044</b>	<b>41,653</b>	<b>23,244</b>	<b>8,386</b>	<b>8,386</b>	<b>7,715</b>	<b>22,323</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Mit.2025-2. 2025 Proposed Project Auxiliary Generator Average Daily Mitigated Emissions

Ship	Direction	Mode	Activity (hours)	MCR (kW)	Load Factor	Energy (kW-hr)	Fuel Type	Annual Shipcalls (vessels/yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
VLCC	North In	Cruising	4.25	3,600	0.278	4,258	MDO	7	1,124	89	32	24	23	19	192
		Maneuvering	2.00	3,600	0.278	2,002	MDO	7	529	42	15	11	11	9	90
	North Out	Cruising	4.25	3,600	0.278	4,258	Dist at 0.2	62	10,120	801	291	218	210	168	663
		Maneuvering	2.00	3,600	0.278	2,002	Dist at 0.2	62	4,757	376	137	103	99	79	312
<b>TOTAL</b>								<b>16,530</b>	<b>1,308</b>	<b>476</b>	<b>357</b>	<b>342</b>	<b>274</b>	<b>1,257</b>	
AFRAMAX	South In	Cruising	3.50	3,600	0.278	3,508	MDO	4	483	38	14	10	10	8	82
		Maneuvering	2.00	3,600	0.278	2,002	MDO	4	276	22	8	6	6	5	47
	South Out	Cruising	3.50	3,600	0.278	3,508	Dist at 0.2	32	4,349	344	125	94	90	72	285
		Maneuvering	2.00	3,600	0.278	2,002	Dist at 0.2	32	2,482	196	71	54	51	41	163
<b>TOTAL</b>								<b>7,590</b>	<b>601</b>	<b>218</b>	<b>164</b>	<b>157</b>	<b>126</b>	<b>577</b>	
PANAMAX	South In	Cruising	3.50	3,600	0.278	3,508	MDO	2	242	19	7	5	5	4	41
		Maneuvering	2.00	3,600	0.278	2,002	MDO	2	138	11	4	3	3	2	23
	South Out	Cruising	3.50	3,600	0.278	3,508	Dist at 0.2	16	2,175	172	63	47	45	36	143
		Maneuvering	2.00	3,600	0.278	2,002	Dist at 0.2	16	1,241	98	36	27	26	21	81
<b>TOTAL</b>								<b>3,795</b>	<b>300</b>	<b>109</b>	<b>82</b>	<b>79</b>	<b>63</b>	<b>289</b>	
SUEZMAX	North In	Cruising	4.25	3,600	0.278	4,258	MDO	8	1,271	101	37	27	26	21	217
		Maneuvering	2.00	3,600	0.278	2,002	MDO	8	598	47	17	13	12	10	102
	North Out	Cruising	4.25	3,600	0.278	4,258	Dist at 0.2	70	11,440	905	329	247	237	190	750
		Maneuvering	2.00	3,600	0.278	2,002	Dist at 0.2	70	5,378	426	155	116	111	89	352
<b>TOTAL</b>								<b>18,686</b>	<b>1,479</b>	<b>538</b>	<b>403</b>	<b>387</b>	<b>310</b>	<b>1,421</b>	
<b>TOTAL</b>								<b>16,808</b>	<b>1,330</b>	<b>484</b>	<b>363</b>	<b>348</b>	<b>279</b>	<b>1,102</b>	
<b>GRAND TOTAL</b>								<b>88,793</b>	<b>7,027</b>	<b>2,555</b>	<b>1,916</b>	<b>1,840</b>	<b>1,472</b>	<b>6,309</b>	

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Mit.2025-3. 2025 Proposed Project Summary of Average Daily Mitigated Vessel Emissions.

Mode	Equipment	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Cruising	Main Engines	450,242	38,080	16,893	7,859	7,859	7,231	22,064
Cruising	Aux Generator	61,848	4,894	1,780	1,335	1,281	1,025	4,381
Maneuvering	Main Engines	19,802	3,573	6,351	527	527	485	258
Maneuvering	Aux Generator	26,945	2,132	775	582	558	447	1,928
<b>Cruising and Maneuvering</b>	<b>TOTAL</b>	<b>558,836</b>	<b>48,679</b>	<b>25,800</b>	<b>10,302</b>	<b>10,226</b>	<b>9,187</b>	<b>28,632</b>

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Cruising	Main Engines	1234	104	46	22	22	20	60
Cruising	Aux Generator	169	13	5	4	4	3	12
Maneuvering	Main Engines	54	10	17	1	1	1	1
Maneuvering	Aux Generator	74	6	2	2	2	1	5
<b>Cruising and Maneuvering</b>	<b>TOTAL</b>	<b>1,531</b>	<b>133</b>	<b>71</b>	<b>28</b>	<b>28</b>	<b>25</b>	<b>78</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Mit.2025-4. 2025 Proposed Project Boiler Warm-Up Average Daily Mitigated Emissions.

Shipcalls (vessels/ day)	Vessel Size	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
3.6	Aframax	MDO	0.52	102.17	30%	3	50,000	59	15	1	10	7	5	215
32.4	Aframax	Dist at 0.2	0.20	102.17	30%	3	50,000	528	132	7	87	61	41	743
6.9	VLCC	MDO	0.52	80.38	30%	3	90,000	190	40	8	26	18	12	583
62.1	VLCC	Dist at 0.2	0.20	80.38	30%	3	90,000	1,714	358	76	237	166	111	2,017
1.8	Panamax	MDO	0.52	59.91	30%	3	35,000	10	3	0	2	1	1	37
16.2	Panamax	Dist at 0.2	0.20	59.91	30%	3	35,000	90	23	1	15	10	7	127
7.8	Suezmax	MDO	0.52	82.85	30%	3	70,000	120	30	2	20	14	9	440
70.2	Suezmax	Dist at 0.2	0.20	82.85	30%	3	70,000	1,082	270	15	179	125	84	1,523
<b>TOTAL</b>								<b>3,793</b>	<b>870</b>	<b>111</b>	<b>576</b>	<b>403</b>	<b>270</b>	<b>5,685</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Mit.2025-5. 2025 Proposed Project Summary of Boiler Warm-Up Average Daily Mitigated Emissions.

Mode	Equipment	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Boiler Warm-up	Boiler	3,793	870	111	576	403	270	5,685

Table H.2.PP.Mit.2025-6. 2025 Proposed Project Berth Operations Average Daily Mitigated Emissions.

**Auxiliary Generator Pre-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
3.6	Aframax	700,000	MDO	0.52	3,600	27.8%	2.5	345	27	10	7	7	6	59
32.4	Aframax	700,000	Dist at 0.2%S	0.20	3,600	27.8%	2.5	3,102	246	89	67	64	51	203
6.9	VLCC	2,000,000	MDO	0.52	3,600	27.8%	2.5	661	52	19	14	14	11	113
62.1	VLCC	2,000,000	Dist at 0.2%S	0.20	3,600	27.8%	2.5	5,946	471	171	128	123	99	390
1.8	Panamax	350,000	MDO	0.52	3,600	27.8%	2.5	172	14	5	4	4	3	29
16.2	Panamax	350,000	Dist at 0.2%S	0.20	3,600	27.8%	2.5	1,551	123	45	33	32	26	102
7.8	Suezmax	1,000,000	MDO	0.52	3,600	27.8%	2.5	747	59	21	16	15	12	127
70.2	Suezmax	1,000,000	Dist at 0.2%S	0.20	3,600	27.8%	2.5	6,722	532	193	145	139	111	441
<b>TOTAL</b>								<b>19,247</b>	<b>1,523</b>	<b>554</b>	<b>415</b>	<b>399</b>	<b>319</b>	<b>1,463</b>

**Boiler Pre-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
3.6	Aframax	700,000	MDO	0.52	102.17	30.0%	2.5	50,000	49	12	1	8	6	4	179
32.4	Aframax	700,000	Dist at 0.2%S	0.20	102.17	30.0%	2.5	50,000	440	110	6	73	51	34	619
6.9	VLCC	2,000,000	MDO	0.52	80.38	30.0%	2.5	90,000	159	33	7	22	15	10	486
62.1	VLCC	2,000,000	Dist at 0.2%S	0.20	80.38	30.0%	2.5	90,000	1,429	298	63	197	138	92	1,681
1.8	Panamax	350,000	MDO	0.52	59.91	30.0%	2.5	35,000	10	3	0	2	1	1	37
16.2	Panamax	350,000	Dist at 0.2%S	0.20	59.91	30.0%	2.5	35,000	90	23	1	15	10	7	127
7.8	Suezmax	1,000,000	MDO	0.52	82.85	30.0%	2.5	70,000	120	30	2	20	14	9	440
70.2	Suezmax	1,000,000	Dist at 0.2%S	0.20	82.85	30.0%	2.5	70,000	1,082	270	15	179	125	84	1,523
<b>TOTAL</b>									<b>3,378</b>	<b>779</b>	<b>95</b>	<b>516</b>	<b>361</b>	<b>241</b>	<b>5,092</b>

**Auxiliary Generator Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
36.0	Aframax	700,000	Dist at 0.2%S	0.20	3,600	55.6%	15.0	41,366	3,274	1,190	893	857	686	2,711
69.0	VLCC	2,000,000	Dist at 0.2%S	0.20	3,600	55.6%	23.2	122,626	9,704	3,529	2,647	2,541	2,033	8,038
18.0	Panamax	350,000	Dist at 0.2%S	0.20	3,600	55.6%	11.0	15,167	1,200	436	327	314	251	994
78.0	Suezmax	1,000,000	Dist at 0.2%S	0.20	3,600	55.6%	15.3	91,418	7,235	2,631	1,973	1,894	1,515	5,992
<b>TOTAL</b>								<b>270,577</b>	<b>21,413</b>	<b>7,786</b>	<b>5,840</b>	<b>5,606</b>	<b>4,485</b>	<b>17,736</b>

**Boiler Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Inerting Fuel Consumption Savings (lb/1000 bbl offloaded)	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
36.0	Aframax	700,000	Dist at 0.2%S	0.20	102.17	28.06	15.0	6,615	1,654	93	1,095	766	512	9,317
69.0	VLCC	2,000,000	Dist at 0.2%S	0.20	80.38	28.06	23.2	30,615	6,393	1,351	4,232	2,962	1,981	36,017
18.0	Panamax	350,000	Dist at 0.2%S	0.20	59.91	28.06	11.0	711	178	10	118	82	55	1,001
78.0	Suezmax	1,000,000	Dist at 0.2%S	0.20	82.85	28.06	15.3	15,137	3,784	213	2,505	1,754	1,173	21,320
<b>TOTAL</b>								<b>53,077</b>	<b>12,009</b>	<b>1,667</b>	<b>7,949</b>	<b>5,565</b>	<b>3,721</b>	<b>67,655</b>

**Auxiliary Generator Post-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
36.0	Aframax	700,000	Dist at 0.2%S	0.20	3,600	27.8%	1.0	1,379	109	40	30	29	23	90
69.0	VLCC	2,000,000	Dist at 0.2%S	0.20	3,600	27.8%	1.0	2,643	209	76	57	55	44	173
18.0	Panamax	350,000	Dist at 0.2%S	0.20	3,600	27.8%	1.0	689	55	20	15	14	11	45
78.0	Suezmax	1,000,000	Dist at 0.2%S	0.20	3,600	27.8%	1.0	2,988	236	86	64	62	50	196
<b>TOTAL</b>								<b>7,699</b>	<b>609</b>	<b>222</b>	<b>166</b>	<b>160</b>	<b>128</b>	<b>505</b>



**Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR**

**Table H.2.PP.Mit.2025-7. 2025 Proposed Project Summary of Berth Operations Average Daily Mitigated Emissions.**

**No AMP**

<b>Mode</b>	<b>Equipment</b>	<b>NO<sub>x</sub> Emissions (lb/yr)</b>	<b>CO Emissions (lb/yr)</b>	<b>ROG Emissions (lb/yr)</b>	<b>PM Emissions (lb/yr)</b>	<b>PM<sub>10</sub> Emissions (lb/yr)</b>	<b>PM<sub>2.5</sub> Emissions (lb/yr)</b>	<b>SO<sub>2</sub> Emissions (lb/yr)</b>
Berth Operations	Boiler	56,455	12,788	1,762	8,465	5,926	3,962	72,746
Berth Operations	Aux Generator	297,523	23,545	8,562	6,421	6,164	4,932	19,704

**Mitigated Emissions with AMP - Year 2025**

AMP Reduction            40%

Berth Operations	Boiler	56,455	12,788	1,762	8,465	5,926	3,962	72,746
Berth Operations	Aux Generator	178,514	14,127	5,137	3,853	3,699	2,959	11,822

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Mit.Max.2025-1. 2025 Proposed Project Main Engines Maximum Daily Mitigated Emissions.

Ship	Direction	Mode	Distance (nautical miles)	Ship speed (knots)	Activity (hours)	Maximum Speed (knots)	Load Factor	MCR (kW)	Energy (kW-hr)	Fuel Type	Maximum Daily Shipcalls (vessels/day)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
VLCC	North In	Cruising - CW to VSR	22	12	1.83	16.9	0.358	25,400	16,671	MDO	0.1	78	6	3	2	2	2	9
		Cruising - VSR to PZ	21	12	1.75	16.9	0.358	25,400	15,913	MDO	0.1	74	6	3	2	2	2	9
		Cruising - PZ to Pilot	4.7	7	0.67	16.9	0.071	25,400	1,212	MDO	0.1	8	1	0	0	0	0	1
		Maneuvering - Pilot to Berth		3	1.00	16.9	0.006	25,400	142	MDO	0.1	11	2	5	0	0	0	0
	North In	Cruising - CW to VSR	22	12	1.83	16.9	0.358	25,400	16,671	Dist at 0.2	0.9	702	58	25	12	12	11	32
		Cruising - VSR to PZ	21	12	1.75	16.9	0.358	25,400	15,913	Dist at 0.2	0.9	670	55	24	11	11	11	31
		Cruising - PZ to Pilot	4.7	7	0.67	16.9	0.071	25,400	1,212	Dist at 0.2	0.9	72	9	2	2	2	1	2
		Maneuvering - Pilot to Berth		3	1.00	16.9	0.006	25,400	142	Dist at 0.2	0.9	96	18	45	3	3	3	0
		Maneuvering - Berth to Pilot		5	1.00	16.9	0.026	25,400	658	Dist at 0.2	1.0	92	20	23	2	2	2	1
		Cruising - Pilot to PZ	3.8	7	0.54	16.9	0.071	25,400	980	Dist at 0.2	1.0	65	11	8	1	1	1	2
		Cruising - PZ to VSR	21	12	1.75	16.9	0.358	25,400	15,913	Dist at 0.2	1.0	745	61	26	13	13	12	34
		Cruising - VSR to CW	22	12	1.83	16.9	0.358	25,400	16,671	Dist at 0.2	1.0	780	64	28	13	13	12	36
<b>TOTAL</b>											<b>3,395</b>	<b>314</b>	<b>198</b>	<b>62</b>	<b>62</b>	<b>57</b>	<b>158</b>	
AFRAMAX	South In	Cruising - CW to VSR	23	12	1.92	16.1	0.414	12,477	9,902	MDO	0.1	46	4	2	1	1	1	6
		Cruising - VSR to PZ	11	12	0.92	16.1	0.414	12,477	4,736	MDO	0.1	22	2	1	1	1	0	3
		Cruising - PZ to Pilot	4.7	7	0.67	16.1	0.082	12,477	689	MDO	0.1	4	1	0	0	0	0	0
		Maneuvering - Pilot to Berth		3	1.00	16.1	0.006	12,477	81	MDO	0.1	6	1	2	0	0	0	0
	South In	Cruising - CW to VSR	23	12	1.92	16.1	0.414	12,477	9,902	Dist at 0.2	0.9	417	34	15	7	7	7	19
		Cruising - VSR to PZ	11	12	0.92	16.1	0.414	12,477	4,736	Dist at 0.2	0.9	199	16	7	3	3	3	9
		Cruising - PZ to Pilot	4.7	7	0.67	16.1	0.082	12,477	689	Dist at 0.2	0.9	38	6	4	1	1	1	1
		Maneuvering - Pilot to Berth		3	1.00	16.1	0.006	12,477	81	Dist at 0.2	0.9	51	9	21	1	1	1	0
		Maneuvering - Berth to Pilot		5	1.00	16.1	0.030	12,477	374	Dist at 0.2	1.0	51	10	11	1	1	1	1
		Cruising - Pilot to PZ	3.5	7	0.50	16.1	0.082	12,477	513	Dist at 0.2	1.0	32	5	3	1	1	1	1
		Cruising - PZ to VSR	12.5	12	1.04	16.1	0.414	12,477	5,382	Dist at 0.2	1.0	252	21	9	4	4	4	12
		Cruising - VSR to CW	24.5	12	2.04	16.1	0.414	12,477	10,548	Dist at 0.2	1.0	494	41	17	8	8	8	23
<b>TOTAL</b>											<b>1,613</b>	<b>148</b>	<b>92</b>	<b>29</b>	<b>29</b>	<b>27</b>	<b>74</b>	
PANAMAX	South In	Cruising - CW to VSR	23	12	1.92	15.8	0.438	10,300	8,649	MDO	0.1	40	3	1	1	1	1	5
		Cruising - VSR to PZ	11	12	0.92	15.8	0.438	10,300	4,136	MDO	0.1	19	2	1	0	0	0	2
		Cruising - PZ to Pilot	4.7	7	0.67	15.8	0.087	10,300	601	MDO	0.1	3	0	0	0	0	0	0
		Maneuvering - Pilot to Berth		3	1.00	15.8	0.007	10,300	71	MDO	0.1	0	0	0	0	0	0	0
	South In	Cruising - CW to VSR	23	12	1.92	15.8	0.438	10,300	8,649	Dist at 0.2	0.9	364	30	13	6	6	6	17
		Cruising - VSR to PZ	11	12	0.92	15.8	0.438	10,300	4,136	Dist at 0.2	0.9	174	14	6	3	3	3	8
		Cruising - PZ to Pilot	4.7	7	0.67	15.8	0.087	10,300	601	Dist at 0.2	0.9	25	2	1	0	0	0	1
		Maneuvering - Pilot to Berth		3	1.00	15.8	0.007	10,300	71	Dist at 0.2	0.9	3	0	0	0	0	0	0
		Maneuvering - Berth to Pilot		5	1.00	15.8	0.032	10,300	326	Dist at 0.2	1.0	15	1	1	0	0	0	1
		Cruising - Pilot to PZ	3.5	7	0.50	15.8	0.087	10,300	448	Dist at 0.2	1.0	21	2	1	0	0	0	1
		Cruising - PZ to VSR	12.5	12	1.04	15.8	0.438	10,300	4,700	Dist at 0.2	1.0	220	18	8	4	4	3	10
		Cruising - VSR to CW	24.5	12	2.04	15.8	0.438	10,300	9,213	Dist at 0.2	1.0	431	36	15	7	7	7	20
<b>TOTAL</b>											<b>1317</b>	<b>108</b>	<b>46</b>	<b>23</b>	<b>23</b>	<b>21</b>	<b>65</b>	
SUEZMAX	North In	Cruising - CW to VSR	22	12	1.83	17	0.352	16,000	10,317	MDO	0.1	48	4	2	1	1	1	6
		Cruising - VSR to PZ	21	12	1.75	17	0.352	16,000	9,848	MDO	0.1	46	4	2	1	1	1	5
		Cruising - PZ to Pilot	4.7	7	0.67	17	0.070	16,000	750	MDO	0.1	4	0	0	0	0	0	0
		Maneuvering - Pilot to Berth		3	1.00	17	0.005	16,000	88	MDO	0.1	0	0	0	0	0	0	0
	North In	Cruising - CW to VSR	22	12	1.83	17	0.352	16,000	10,317	Dist at 0.2	0.9	435	36	15	7	7	7	20
		Cruising - VSR to PZ	21	12	1.75	17	0.352	16,000	9,848	Dist at 0.2	0.9	415	34	15	7	7	7	19
		Cruising - PZ to Pilot	4.7	7	0.67	17	0.070	16,000	750	Dist at 0.2	0.9	32	3	1	1	1	0	1
		Maneuvering - Pilot to Berth		3	1.00	17	0.005	16,000	88	Dist at 0.2	0.9	4	0	0	0	0	0	0
		Maneuvering - Berth to Pilot		5	1.00	17	0.025	16,000	407	Dist at 0.2	1.0	19	2	1	0	0	0	1
		Cruising - Pilot to PZ	3.8	7	0.54	17	0.070	16,000	606	Dist at 0.2	1.0	28	2	1	0	0	0	1
		Cruising - PZ to VSR	21	12	1.75	17	0.352	16,000	9,848	Dist at 0.2	1.0	461	38	16	8	8	7	21
		Cruising - VSR to CW	22	12	1.83	17	0.352	16,000	10,317	Dist at 0.2	1.0	483	40	17	8	8	8	22
<b>TOTAL</b>											<b>1974</b>	<b>163</b>	<b>70</b>	<b>34</b>	<b>34</b>	<b>32</b>	<b>98</b>	
<b>MAXIMUM</b>											<b>3,395</b>	<b>314</b>	<b>198</b>	<b>62</b>	<b>62</b>	<b>57</b>	<b>158</b>	

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Mit.Max.2025-2. 2025 Proposed Project Auxiliary Generator Maximum Daily Mitigated Emissions

Ship	Direction	Mode	Activity (hours)	MCR (kW)	Load Factor	Energy (kW-hr)	Fuel Type	Maximum Daily Shipcalls (vessels/day)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
VLCC	North In	Cruising	4.25	3,600	0.278	4,258	MDO	0.1	16	1	0	0	0	0	3
		Maneuvering	2.00	3,600	0.278	2,002	MDO	0.1	8	1	0	0	0	0	1
VLCC	North In	Cruising	4.25	3,600	0.278	4,258	Dist at 0.2	0.9	147	12	4	3	3	2	10
		Maneuvering	2.00	3,600	0.278	2,002	Dist at 0.2	0.9	69	5	2	1	1	1	5
	North Out	Maneuvering	1.50	3,600	0.278	1,501	Dist at 0.2	1.0	57	5	2	1	1	1	4
		Cruising	4.13	3,600	0.278	4,129	Dist at 0.2	1.0	158	13	5	3	3	3	10
<b>TOTAL</b>								<b>455</b>	<b>36</b>	<b>13</b>	<b>10</b>	<b>9</b>	<b>8</b>	<b>32</b>	
AFRAMAX	South In	Cruising	3.50	3,600	0.278	3,508	MDO	0.1	13	1	0	0	0	0	2
AFRAMAX	South In	Maneuvering	2.00	3,600	0.278	2,002	MDO	0.1	8	1	0	0	0	0	1
		Cruising	3.50	3,600	0.278	3,508	Dist at 0.2	0.9	121	10	3	3	3	2	8
	South Out	Maneuvering	2.00	3,600	0.278	2,002	Dist at 0.2	0.9	69	5	2	1	1	1	5
		Maneuvering	1.50	3,600	0.278	1,501	Dist at 0.2	1.0	57	5	2	1	1	1	4
		Cruising	3.58	3,600	0.278	3,586	Dist at 0.2	1.0	137	11	4	3	3	2	9
<b>TOTAL</b>								<b>406</b>	<b>32</b>	<b>12</b>	<b>9</b>	<b>8</b>	<b>7</b>	<b>29</b>	
PANAMAX	South In	Cruising	3.15	3,600	0.278	3,155	MDO	0.1	12	1	0	0	0	0	2
PANAMAX	South In	Maneuvering	2.00	3,600	0.278	2,002	MDO	0.1	8	1	0	0	0	0	1
		Cruising	3.15	3,600	0.278	3,155	Dist at 0.2	0.9	109	9	3	2	2	2	7
	South Out	Maneuvering	2.00	3,600	0.278	2,002	Dist at 0.2	0.9	69	5	2	1	1	1	5
		Maneuvering	1.5	3,600	0.278	1,501	Dist at 0.2	1.0	57	5	2	1	1	1	4
		Cruising	3.21	3,600	0.278	3,211	Dist at 0.2	1.0	123	10	4	3	3	2	8
<b>TOTAL</b>								<b>378</b>	<b>30</b>	<b>11</b>	<b>8</b>	<b>8</b>	<b>6</b>	<b>27</b>	
SUEZMAX	North In	Cruising	3.84	3,600	0.278	3,840	MDO	0.1	15	1	0	0	0	0	3
SUEZMAX	North In	Maneuvering	2.00	3,600	0.278	2,002	MDO	0.1	8	1	0	0	0	0	1
		Cruising	3.84	3,600	0.278	3,840	Dist at 0.2	0.9	132	10	4	3	3	2	9
	North Out	Maneuvering	2.00	3,600	0.278	2,002	Dist at 0.2	0.9	69	5	2	1	1	1	5
		Maneuvering	1.5	3,600	0.278	1,501	Dist at 0.2	1.0	57	5	2	1	1	1	4
		Cruising	3.71	3,600	0.278	3,712	Dist at 0.2	1.0	142	11	4	3	3	2	9
<b>TOTAL</b>								<b>423</b>	<b>33</b>	<b>12</b>	<b>9</b>	<b>9</b>	<b>7</b>	<b>30</b>	
<b>MAXIMUM</b>								<b>455</b>	<b>36</b>	<b>13</b>	<b>10</b>	<b>9</b>	<b>8</b>	<b>32</b>	

**Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR**

**Table H.2.PP.Mit.Max.2025-3. 2025 Proposed Project Summary of Maximum Daily Mitigated Vessel Emissions.**

<b>Mode</b>	<b>Equipment</b>	<b>NO<sub>x</sub> Emissions (lb/day)</b>	<b>CO Emissions (lb/day)</b>	<b>ROG Emissions (lb/day)</b>	<b>PM Emissions (lb/day)</b>	<b>PM<sub>10</sub> Emissions (lb/day)</b>	<b>PM<sub>2.5</sub> Emissions (lb/day)</b>	<b>SO<sub>2</sub> Emissions (lb/day)</b>
Cruising	Main Engines	3,196	275	125	56	56	52	156
Cruising	Aux Generator	321	25	9	7	7	5	23
Maneuvering	Main Engines	200	39	73	6	6	5	2
Maneuvering	Aux Generator	134	11	4	3	3	2	10
<b>Cruising and Maneuvering</b>	<b>TOTAL</b>	<b>3,850</b>	<b>350</b>	<b>211</b>	<b>71</b>	<b>71</b>	<b>64</b>	<b>190</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Mit.Max.2025-4. 2025 Proposed Project Boiler Warm-Up Maximum Daily Mitigated Emissions.

Shipcalls (vessels/ day)	Vessel Size	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
0.1	Aframax	MDO	0.52	102.17	30%	3	50,000	2	0	0	0	0	0	6
0.9	Aframax	Dist at 0.2	0.20	102.17	30%	3	50,000	15	4	0	2	2	1	21
							<b>TOTAL</b>	<b>16</b>	<b>4</b>	<b>0</b>	<b>3</b>	<b>2</b>	<b>1</b>	<b>27</b>
0.1	VLCC	MDO	0.52	80.38	30%	3	90,000	3	1	0	0	0	0	8
0.9	VLCC	Dist at 0.2	0.20	80.38	30%	3	90,000	25	5	1	3	2	2	29
							<b>TOTAL</b>	<b>28</b>	<b>6</b>	<b>1</b>	<b>4</b>	<b>3</b>	<b>2</b>	<b>38</b>
0.1	Panamax	MDO	0.52	59.91	30%	3	35,000	1	0	0	0	0	0	2
0.9	Panamax	Dist at 0.2	0.20	59.91	30%	3	35,000	6	2	0	1	1	0	8
							<b>TOTAL</b>	<b>7</b>	<b>2</b>	<b>0</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>11</b>
0.1	Suezmax	MDO	0.52	82.85	30%	3	70,000	2	0	0	0	0	0	7
0.9	Suezmax	Dist at 0.2	0.20	82.85	30%	3	70,000	17	4	0	3	2	1	23
							<b>TOTAL</b>	<b>18</b>	<b>5</b>	<b>0</b>	<b>3</b>	<b>2</b>	<b>1</b>	<b>30</b>
							<b>MAXIMUM</b>	<b>28</b>	<b>6</b>	<b>1</b>	<b>4</b>	<b>3</b>	<b>2</b>	<b>38</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Mit.Max.2025-5. 2025 Proposed Project Summary of Boiler Warm-Up Maximum Mitigated Emissions.

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Boiler Warm-up	Boiler	28	6	1	4	3	2	38

Table H.2.PP.Mit.Max.2025-6. 2025 Proposed Project Berth Operations Maximum Daily Mitigated Emissions.

**Auxiliary Generator Pre-Pumping**

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
0.1	Aframax	700,000	MDO	0.52	3,600	27.8%	2.5	10	1	0	0	0	0	2
0.9	Aframax	700,000	Dist at 0.2%S	0.20	3,600	27.8%	2.5	86	7	2	2	2	1	6
							<b>TOTAL</b>	<b>96</b>	<b>8</b>	<b>3</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>7</b>
0.1	VLCC	2,000,000	MDO	0.52	3,600	27.8%	2.5	10	1	0	0	0	0	2
0.9	VLCC	2,000,000	Dist at 0.2%S	0.20	3,600	27.8%	2.5	86	7	2	2	2	1	6
							<b>TOTAL</b>	<b>96</b>	<b>8</b>	<b>3</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>7</b>
0.1	Panamax	350,000	MDO	0.52	3,600	27.8%	2.5	10	1	0	0	0	0	2
0.9	Panamax	350,000	Dist at 0.2%S	0.20	3,600	27.8%	2.5	86	7	2	2	2	1	6
							<b>TOTAL</b>	<b>96</b>	<b>8</b>	<b>3</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>7</b>
0.1	Suezmax	1,000,000	MDO	0.52	3,600	27.8%	2.5	10	1	0	0	0	0	2
0.9	Suezmax	1,000,000	Dist at 0.2%S	0.20	3,600	27.8%	2.5	86	7	2	2	2	1	6
							<b>TOTAL</b>	<b>96</b>	<b>8</b>	<b>3</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>7</b>
							<b>MAXIMUM</b>	<b>96</b>	<b>8</b>	<b>3</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>7</b>

**Boiler Pre-Pumping**

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
0.1	Aframax	700,000	MDO	0.52	102.17	30.0%	2.5	50,000	1	0	0	0	0	0	5
0.9	Aframax	700,000	Dist at 0.2%S	0.20	102.17	30.0%	2.5	50,000	12	3	0	2	1	1	17
							<b>TOTAL</b>		<b>14</b>	<b>3</b>	<b>0</b>	<b>2</b>	<b>2</b>	<b>1</b>	<b>22</b>
0.1	VLCC	2,000,000	MDO	0.52	80.38	30.0%	2.5	90,000	2	0	0	0	0	0	7
0.9	VLCC	2,000,000	Dist at 0.2%S	0.20	80.38	30.0%	2.5	90,000	21	4	1	3	2	1	24
							<b>TOTAL</b>		<b>23</b>	<b>5</b>	<b>1</b>	<b>3</b>	<b>2</b>	<b>1</b>	<b>31</b>
0.1	Panamax	350,000	MDO	0.52	59.91	30.0%	2.5	35,000	1	0	0	0	0	0	2
0.9	Panamax	350,000	Dist at 0.2%S	0.20	59.91	30.0%	2.5	35,000	5	1	0	1	1	0	7
							<b>TOTAL</b>		<b>6</b>	<b>1</b>	<b>0</b>	<b>1</b>	<b>1</b>	<b>0</b>	<b>9</b>
0.1	Suezmax	1,000,000	MDO	0.52	82.85	30.0%	2.5	70,000	2	0	0	0	0	0	6
0.9	Suezmax	1,000,000	Dist at 0.2%S	0.20	82.85	30.0%	2.5	70,000	14	3	0	2	2	1	20
							<b>TOTAL</b>		<b>15</b>	<b>4</b>	<b>0</b>	<b>3</b>	<b>2</b>	<b>1</b>	<b>25</b>
							<b>MAXIMUM</b>		<b>23</b>	<b>5</b>	<b>1</b>	<b>3</b>	<b>2</b>	<b>1</b>	<b>31</b>

**Auxiliary Generator Pumping**

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	700,000	Dist at 0.2%S	0.20	3,600	55.6%	15.0	1,149	91	33	25	24	19	75
1.0	VLCC	2,000,000	Dist at 0.2%S	0.20	3,600	55.6%	23.2	1,777	141	51	38	37	29	116
1.0	Panamax	350,000	Dist at 0.2%S	0.20	3,600	55.6%	11.0	843	67	24	18	17	14	55
1.0	Suezmax	1,000,000	Dist at 0.2%S	0.20	3,600	55.6%	15.3	1,172	93	34	25	24	19	77
							<b>MAXIMUM</b>	<b>1,777</b>	<b>141</b>	<b>51</b>	<b>38</b>	<b>37</b>	<b>29</b>	<b>116</b>

**Boiler Pumping**

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Inerting Fuel Consumption Savings (lb/1000 bbl offloaded)	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	700,000	Dist at 0.2%S	0.20	102.17	28.06	15.0	184	46	3	30	21	14	259
1.0	VLCC	2,000,000	Dist at 0.2%S	0.20	80.38	28.06	23.2	444	93	20	61	43	29	522
1.0	Panamax	350,000	Dist at 0.2%S	0.20	59.91	28.06	11.0	39	10	1	7	5	3	56
1.0	Suezmax	1,000,000	Dist at 0.2%S	0.20	82.85	28.06	15.3	194	49	3	32	22	15	273
							<b>MAXIMUM</b>	<b>444</b>	<b>93</b>	<b>20</b>	<b>61</b>	<b>43</b>	<b>29</b>	<b>522</b>

**Auxiliary Generator Post-Pumping**

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	700,000	Dist at 0.2%S	0.20	3,600	27.8%	1.0	38	3	1	1	1	1	3
1.0	VLCC	2,000,000	Dist at 0.2%S	0.20	3,600	27.8%	1.0	38	3	1	1	1	1	3
1.0	Panamax	350,000	Dist at 0.2%S	0.20	3,600	27.8%	1.0	38	3	1	1	1	1	3
1.0	Suezmax	1,000,000	Dist at 0.2%S	0.20	3,600	27.8%	1.0	38	3	1	1	1	1	3
							<b>MAXIMUM</b>	<b>38</b>	<b>3</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>3</b>

**Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR**

**Table H.2.PP.Mit.Max.2025-7. 2025 Proposed Project Summary of Berth Operations Maximum Daily Mitigated Emissions.**

**No AMP**

<b>Mode</b>	<b>Equipment</b>	<b>NO<sub>x</sub> Emissions (lb/day)</b>	<b>CO Emissions (lb/day)</b>	<b>ROG Emissions (lb/day)</b>	<b>PM Emissions (lb/day)</b>	<b>PM<sub>10</sub> Emissions (lb/day)</b>	<b>PM<sub>2.5</sub> Emissions (lb/day)</b>	<b>SO<sub>2</sub> Emissions (lb/day)</b>
Berth Operations	Boiler	467	97	21	65	45	30	553
Berth Operations	Aux Generator	1,911	151	55	41	40	32	126

**Mitigated Emissions with AMP - Year 2025**

AMP Reduction            40%

Berth Operations	Boiler	467	97	21	65	45	30	553
Berth Operations	Aux Generator	1147	91	33	25	24	19	76



Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Mit.2040-1. 2040 Proposed Project Main Engines Average Daily Mitigated Emissions.

Ship	Direction	Mode	Distance (nautical miles)	Ship speed (knots)	Activity (hours)	Maximum Speed (knots)	Load Factor	MCR (kW)	Energy (kW-hr)	Fuel Type	Annual Shipcalls (vessels/yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
VLCC	North In	Cruising - CW to VSR	22	12	1.83	16.9	0.358	25,400	16,671	MDO	7	5,384	443	190	124	124	114	640
		Cruising - VSR to PZ	21	12	1.75	16.9	0.358	25,400	15,913	MDO	7	5,139	423	181	118	118	108	611
		Cruising - PZ to Pilot	4.7	7	0.67	16.9	0.071	25,400	1,212	MDO	7	554	91	65	15	15	14	47
	North In	Maneuvering - Pilot to Berth	3	1.00	16.9	0.006	25,400	142	MDO	7	739	135	346	29	29	26	5	
		Cruising - CW to VSR	22	12	1.83	16.9	0.358	25,400	16,671	Dist at 0.2	62	48,457	3,991	1,710	827	827	760	2,217
		Cruising - VSR to PZ	21	12	1.75	16.9	0.358	25,400	15,913	Dist at 0.2	62	46,254	3,809	1,632	789	789	726	2,116
		Cruising - PZ to Pilot	4.7	7	0.67	16.9	0.071	25,400	1,212	Dist at 0.2	62	4,988	817	587	104	104	95	161
Maneuvering - Pilot to Berth	3	1.00	16.9	0.006	25,400	142	Dist at 0.2	62	6,654	1,217	3,113	192	192	177	19			
<b>TOTAL</b>											<b>118,169</b>	<b>10,926</b>	<b>7,826</b>	<b>2,197</b>	<b>2,197</b>	<b>2,021</b>	<b>5,817</b>	
	North Out	Maneuvering - Berth to Pilot	5	1.00	16.9	0.026	25,400	658	Dist at 0.2	69	6,375	1,352	1,608	162	162	149	97	
		Cruising - Pilot to PZ	3.8	7	0.54	16.9	0.071	25,400	980	Dist at 0.2	69	4,481	734	527	93	93	86	145
		Cruising - PZ to VSR	21	12	1.75	16.9	0.358	25,400	15,913	Dist at 0.2	69	51,393	4,232	1,814	877	877	807	2,351
		Cruising - VSR to CW	22	12	1.83	16.9	0.358	25,400	16,671	Dist at 0.2	69	53,841	4,434	1,900	918	918	845	2,463
		<b>TOTAL</b>										<b>116,090</b>	<b>10,752</b>	<b>5,850</b>	<b>2,050</b>	<b>2,050</b>	<b>1,886</b>	<b>5,057</b>
AFRAMAX	South In	Cruising - CW to VSR	23	12	1.92	16.1	0.414	12,477	9,902	MDO	4	1,669	137	59	38	38	35	198
		Cruising - VSR to PZ	11	12	0.92	16.1	0.414	12,477	4,736	MDO	4	798	66	28	18	18	17	95
		Cruising - PZ to Pilot	4.7	7	0.67	16.1	0.082	12,477	689	MDO	4	153	23	16	4	4	4	14
		Maneuvering - Pilot to Berth	3	1.00	16.1	0.006	12,477	81	MDO	4	206	35	82	8	8	7	2	
AFRAMAX	South In	Cruising - CW to VSR	23	12	1.92	16.1	0.414	12,477	9,902	Dist at 0.2	32	15,017	1,237	530	256	256	236	687
		Cruising - VSR to PZ	11	12	0.92	16.1	0.414	12,477	4,736	Dist at 0.2	32	7,182	591	253	123	123	113	329
		Cruising - PZ to Pilot	4.7	7	0.67	16.1	0.082	12,477	689	Dist at 0.2	32	1,379	209	140	28	28	26	48
		Maneuvering - Pilot to Berth	3	1.00	16.1	0.006	12,477	81	Dist at 0.2	32	1,850	312	742	53	53	49	6	
<b>TOTAL</b>										<b>28,252</b>	<b>2,610</b>	<b>1,850</b>	<b>528</b>	<b>528</b>	<b>486</b>	<b>1,378</b>		
	South Out	Maneuvering - Berth to Pilot	5	1.00	16.1	0.030	12,477	374	Dist at 0.2	36	1,836	346	383	46	46	43	29	
		Cruising - Pilot to PZ	3.5	7	0.50	16.1	0.082	12,477	513	Dist at 0.2	36	1,141	173	116	23	23	21	40
		Cruising - PZ to VSR	12.5	12	1.04	16.1	0.414	12,477	5,382	Dist at 0.2	36	9,068	747	320	155	155	142	415
		Cruising - VSR to CW	24.5	12	2.04	16.1	0.414	12,477	10,548	Dist at 0.2	36	17,773	1,464	627	303	303	279	813
<b>TOTAL</b>										<b>29,818</b>	<b>2,730</b>	<b>1,446</b>	<b>527</b>	<b>527</b>	<b>485</b>	<b>1,296</b>		
PANAMAX	South In	Cruising - CW to VSR	23	12	1.92	15.8	0.438	10,300	8,649	MDO	2	729	60	26	17	17	15	87
		Cruising - VSR to PZ	11	12	0.92	15.8	0.438	10,300	4,136	MDO	2	348	29	12	8	8	7	41
		Cruising - PZ to Pilot	4.7	7	0.67	15.8	0.087	10,300	601	MDO	2	51	4	2	1	1	1	6
		Maneuvering - Pilot to Berth	3	1.00	15.8	0.007	10,300	71	MDO	2	6	0	0	0	0	0	1	
PANAMAX	South In	Cruising - CW to VSR	23	12	1.92	15.8	0.438	10,300	8,649	Dist at 0.2	16	6,558	540	231	112	112	103	300
		Cruising - VSR to PZ	11	12	0.92	15.8	0.438	10,300	4,136	Dist at 0.2	16	3,136	258	111	54	54	49	143
		Cruising - PZ to Pilot	4.7	7	0.67	15.8	0.087	10,300	601	Dist at 0.2	16	456	38	16	8	8	7	21
		Maneuvering - Pilot to Berth	3	1.00	15.8	0.007	10,300	71	Dist at 0.2	16	53	4	2	1	1	1	2	
<b>TOTAL</b>										<b>11,338</b>	<b>934</b>	<b>400</b>	<b>200</b>	<b>200</b>	<b>184</b>	<b>602</b>		
	South Out	Maneuvering - Berth to Pilot	5	1.00	15.8	0.032	10,300	326	Dist at 0.2	18	275	23	10	5	5	4	13	
		Cruising - Pilot to PZ	3.5	7	0.50	15.8	0.087	10,300	448	Dist at 0.2	18	377	31	13	6	6	6	17
		Cruising - PZ to VSR	12.5	12	1.04	15.8	0.438	10,300	4,700	Dist at 0.2	18	3,960	326	140	68	68	62	181
		Cruising - VSR to CW	24.5	12	2.04	15.8	0.438	10,300	9,213	Dist at 0.2	18	7,762	639	274	132	132	122	355
<b>TOTAL</b>										<b>12,374</b>	<b>1,019</b>	<b>437</b>	<b>211</b>	<b>211</b>	<b>194</b>	<b>566</b>		
SUEZMAX	North In	Cruising - CW to VSR	22	12	1.83	17	0.352	16,000	10,317	MDO	8	3,767	310	133	86	86	79	448
		Cruising - VSR to PZ	21	12	1.75	17	0.352	16,000	9,848	MDO	8	3,595	296	127	82	82	76	428
		Cruising - PZ to Pilot	4.7	7	0.67	17	0.070	16,000	750	MDO	8	274	23	10	6	6	33	
	North In	Maneuvering - Pilot to Berth	3	1.00	17	0.005	16,000	88	MDO	8	32	3	1	1	1	1	4	
		Cruising - CW to VSR	22	12	1.83	17	0.352	16,000	10,317	Dist at 0.2	70	33,900	2,792	1,196	578	578	532	1,551
		Cruising - VSR to PZ	21	12	1.75	17	0.352	16,000	9,848	Dist at 0.2	70	32,359	2,665	1,142	552	552	508	1,480
		Cruising - PZ to Pilot	4.7	7	0.67	17	0.070	16,000	750	Dist at 0.2	70	2,464	203	87	42	42	39	113
Maneuvering - Pilot to Berth	3	1.00	17	0.005	16,000	88	Dist at 0.2	70	289	24	10	5	5	5	13			
<b>TOTAL</b>										<b>76,680</b>	<b>6,315</b>	<b>2,706</b>	<b>1,353</b>	<b>1,353</b>	<b>1,245</b>	<b>4,070</b>		
	North Out	Maneuvering - Berth to Pilot	5	1.00	17	0.025	16,000	407	Dist at 0.2	78	1,486	122	52	25	25	23	68	
		Cruising - Pilot to PZ	3.8	7	0.54	17	0.070	16,000	606	Dist at 0.2	78	2,214	182	78	38	38	35	101
		Cruising - PZ to VSR	21	12	1.75	17	0.352	16,000	9,848	Dist at 0.2	78	35,954	2,961	1,269	613	613	564	1,645
		Cruising - VSR to CW	22	12	1.83	17	0.352	16,000	10,317	Dist at 0.2	78	37,667	3,102	1,329	643	643	591	1,723
<b>TOTAL</b>										<b>77,321</b>	<b>6,368</b>	<b>2,729</b>	<b>1,319</b>	<b>1,319</b>	<b>1,213</b>	<b>3,538</b>		
<b>GRAND TOTAL</b>												<b>470,044</b>	<b>41,653</b>	<b>23,244</b>	<b>8,386</b>	<b>8,386</b>	<b>7,715</b>	<b>22,323</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Mit.2040-2. 2040 Proposed Project Auxiliary Generator Average Daily Mitigated Emissions

Ship	Direction	Mode	Activity (hours)	MCR (kW)	Load Factor	Energy (kW-hr)	Fuel Type	Annual Shipcalls (vessels/yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
VLCC	North In	Cruising	4.25	3,600	0.278	4,258	MDO	7	1,124	89	32	24	23	19	192
		Maneuvering	2.00	3,600	0.278	2,002	MDO	7	529	42	15	11	11	9	90
	North In	Cruising	4.25	3,600	0.278	4,258	Dist at 0.2	62	10,120	801	291	218	210	168	663
		Maneuvering	2.00	3,600	0.278	2,002	Dist at 0.2	62	4,757	376	137	103	99	79	312
	<b>TOTAL</b>								<b>16,530</b>	<b>1,308</b>	<b>476</b>	<b>357</b>	<b>342</b>	<b>274</b>	<b>1,257</b>
North Out	Maneuvering	1.50	3,600	0.278	1,501	Dist at 0.2	69	3,964	314	114	86	82	66	260	
	Cruising	4.13	3,600	0.278	4,129	Dist at 0.2	69	10,905	863	314	235	226	181	715	
<b>TOTAL</b>								<b>14,869</b>	<b>1,177</b>	<b>428</b>	<b>321</b>	<b>308</b>	<b>246</b>	<b>975</b>	
AFRAMAX	South In	Cruising	3.50	3,600	0.278	3,508	MDO	4	483	38	14	10	10	8	82
		Maneuvering	2.00	3,600	0.278	2,002	MDO	4	276	22	8	6	6	5	47
AFRAMAX	South In	Cruising	3.50	3,600	0.278	3,508	Dist at 0.2	32	4,349	344	125	94	90	72	285
		Maneuvering	2.00	3,600	0.278	2,002	Dist at 0.2	32	2,482	196	71	54	51	41	163
<b>TOTAL</b>								<b>7,590</b>	<b>601</b>	<b>218</b>	<b>164</b>	<b>157</b>	<b>126</b>	<b>577</b>	
South Out	Maneuvering	1.50	3,600	0.278	1,501	Dist at 0.2	36	2,068	164	60	45	43	34	136	
	Cruising	3.58	3,600	0.278	3,586	Dist at 0.2	36	4,941	391	142	107	102	82	324	
<b>TOTAL</b>								<b>7,009</b>	<b>555</b>	<b>202</b>	<b>151</b>	<b>145</b>	<b>116</b>	<b>459</b>	
PANAMAX	South In	Cruising	3.50	3,600	0.278	3,508	MDO	2	242	19	7	5	5	4	41
		Maneuvering	2.00	3,600	0.278	2,002	MDO	2	138	11	4	3	3	2	23
PANAMAX	South In	Cruising	3.50	3,600	0.278	3,508	Dist at 0.2	16	2,175	172	63	47	45	36	143
		Maneuvering	2.00	3,600	0.278	2,002	Dist at 0.2	16	1,241	98	36	27	26	21	81
<b>TOTAL</b>								<b>3,795</b>	<b>300</b>	<b>109</b>	<b>82</b>	<b>79</b>	<b>63</b>	<b>289</b>	
South Out	Maneuvering	1.5	3,600	0.278	1,501	Dist at 0.2	18	1,034	82	30	22	21	17	68	
	Cruising	3.58	3,600	0.278	3,586	Dist at 0.2	18	2,470	196	71	53	51	41	162	
<b>TOTAL</b>								<b>3,505</b>	<b>277</b>	<b>101</b>	<b>76</b>	<b>73</b>	<b>58</b>	<b>230</b>	
SUEZMAX	North In	Cruising	4.25	3,600	0.278	4,258	MDO	8	1,271	101	37	27	26	21	217
		Maneuvering	2.00	3,600	0.278	2,002	MDO	8	598	47	17	13	12	10	102
SUEZMAX	North In	Cruising	4.25	3,600	0.278	4,258	Dist at 0.2	70	11,440	905	329	247	237	190	750
		Maneuvering	2.00	3,600	0.278	2,002	Dist at 0.2	70	5,378	426	155	116	111	89	352
<b>TOTAL</b>								<b>18,686</b>	<b>1,479</b>	<b>538</b>	<b>403</b>	<b>387</b>	<b>310</b>	<b>1,421</b>	
North Out	Maneuvering	1.5	3,600	0.278	1,501	Dist at 0.2	78	4,481	355	129	97	93	74	294	
	Cruising	4.13	3,600	0.278	4,129	Dist at 0.2	78	12,327	976	355	266	255	204	808	
<b>TOTAL</b>								<b>16,808</b>	<b>1,330</b>	<b>484</b>	<b>363</b>	<b>348</b>	<b>279</b>	<b>1,102</b>	
<b>GRAND TOTAL</b>									<b>88,793</b>	<b>7,027</b>	<b>2,555</b>	<b>1,916</b>	<b>1,840</b>	<b>1,472</b>	<b>6,309</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Mit.2040-3. 2040 Proposed Project Summary of Average Daily Mitigated Vessel Emissions.

Mode	Equipment	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Cruising	Main Engines	450,242	38,080	16,893	7,859	7,859	7,231	22,064
Cruising	Aux Generator	61,848	4,894	1,780	1,335	1,281	1,025	4,381
Maneuvering	Main Engines	19,802	3,573	6,351	527	527	485	258
Maneuvering	Aux Generator	26,945	2,132	775	582	558	447	1,928
<b>Cruising and Maneuvering</b>	<b>TOTAL</b>	<b>558,836</b>	<b>48,679</b>	<b>25,800</b>	<b>10,302</b>	<b>10,226</b>	<b>9,187</b>	<b>28,632</b>

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Cruising	Main Engines	1234	104	46	22	22	20	60
Cruising	Aux Generator	169	13	5	4	4	3	12
Maneuvering	Main Engines	54	10	17	1	1	1	1
Maneuvering	Aux Generator	74	6	2	2	2	1	5
<b>Cruising and Maneuvering</b>	<b>TOTAL</b>	<b>1,531</b>	<b>133</b>	<b>71</b>	<b>28</b>	<b>28</b>	<b>25</b>	<b>78</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Mit.2040-4. 2040 Proposed Project Boiler Warm-Up Average Daily Mitigated Emissions.

Shipcalls (vessels/ day)	Vessel Size	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
3.6	Aframax	MDO	0.52	102.17	30%	3	50,000	59	15	1	10	7	5	215
32.4	Aframax	Dist at 0.2	0.20	102.17	30%	3	50,000	528	132	7	87	61	41	743
6.9	VLCC	MDO	0.52	80.38	30%	3	90,000	190	40	8	26	18	12	583
62.1	VLCC	Dist at 0.2	0.20	80.38	30%	3	90,000	1,714	358	76	237	166	111	2,017
1.8	Panamax	MDO	0.52	59.91	30%	3	35,000	10	3	0	2	1	1	37
16.2	Panamax	Dist at 0.2	0.20	59.91	30%	3	35,000	90	23	1	15	10	7	127
7.8	Suezmax	MDO	0.52	82.85	30%	3	70,000	120	30	2	20	14	9	440
70.2	Suezmax	Dist at 0.2	0.20	82.85	30%	3	70,000	1,082	270	15	179	125	84	1,523
<b>TOTAL</b>								<b>3,793</b>	<b>870</b>	<b>111</b>	<b>576</b>	<b>403</b>	<b>270</b>	<b>5,685</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Mit.2040-5. 2040 Proposed Project Summary of Boiler Warm-Up Average Daily Mitigated Emissions.

Mode	Equipment	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Boiler Warm-up	Boiler	3,793	870	111	576	403	270	5,685

Table H.2.PP.Mit.2040-6. 2040 Proposed Project Berth Operations Average Daily Mitigated Emissions.

Auxiliary Generator Pre-Pumpin

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
4	Aframax	700,000	MDO	0.52	3,600	27.8%	2.5	345	27	10	7	7	6	59
32	Aframax	700,000	Dist at 0.2%S	0.20	3,600	27.8%	2.5	3,102	246	89	67	64	51	203
7	VLCC	2,000,000	MDO	0.52	3,600	27.8%	2.5	661	52	19	14	14	11	113
62	VLCC	2,000,000	Dist at 0.2%S	0.20	3,600	27.8%	2.5	5,946	471	171	128	123	99	390
2	Panamax	350,000	MDO	0.52	3,600	27.8%	2.5	172	14	5	4	4	3	29
16	Panamax	350,000	Dist at 0.2%S	0.20	3,600	27.8%	2.5	1,551	123	45	33	32	26	102
8	Suezmax	1,000,000	MDO	0.52	3,600	27.8%	2.5	747	59	21	16	15	12	127
70	Suezmax	1,000,000	Dist at 0.2%S	0.20	3,600	27.8%	2.5	6,722	532	193	145	139	111	441
<b>TOTAL</b>								<b>19,247</b>	<b>1,523</b>	<b>554</b>	<b>415</b>	<b>399</b>	<b>319</b>	<b>1,463</b>

Boiler Pre-Pumping

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
4	Aframax	700,000	MDO	0.52	102.17	30.0%	2.5	50,000	49	12	1	8	6	4	179
32	Aframax	700,000	Dist at 0.2%S	0.20	102.17	30.0%	2.5	50,000	440	110	6	73	51	34	619
7	VLCC	2,000,000	MDO	0.52	80.38	30.0%	2.5	90,000	159	33	7	22	15	10	486
62	VLCC	2,000,000	Dist at 0.2%S	0.20	80.38	30.0%	2.5	90,000	1,429	298	63	197	138	92	1,681
2	Panamax	350,000	MDO	0.52	59.91	30.0%	2.5	35,000	10	3	0	2	1	1	37
16	Panamax	350,000	Dist at 0.2%S	0.20	59.91	30.0%	2.5	35,000	90	23	1	15	10	7	127
8	Suezmax	1,000,000	MDO	0.52	82.85	30.0%	2.5	70,000	120	30	2	20	14	9	440
70	Suezmax	1,000,000	Dist at 0.2%S	0.20	82.85	30.0%	2.5	70,000	1,082	270	15	179	125	84	1,523
<b>TOTAL</b>									<b>3,378</b>	<b>779</b>	<b>95</b>	<b>516</b>	<b>361</b>	<b>241</b>	<b>5,092</b>

Auxiliary Generator Pumpin

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
36	Aframax	700,000	Dist at 0.2%S	0.20	3,600	55.6%	15.0	41,366	3,274	1,190	893	857	686	2,711
69	VLCC	2,000,000	Dist at 0.2%S	0.20	3,600	55.6%	23.2	122,626	9,704	3,529	2,647	2,541	2,033	8,038
18	Panamax	350,000	Dist at 0.2%S	0.20	3,600	55.6%	11.0	15,167	1,200	436	327	314	251	994
78	Suezmax	1,000,000	Dist at 0.2%S	0.20	3,600	55.6%	15.3	91,418	7,235	2,631	1,973	1,894	1,515	5,992
<b>TOTAL</b>								<b>270,577</b>	<b>21,413</b>	<b>7,786</b>	<b>5,840</b>	<b>5,606</b>	<b>4,485</b>	<b>17,736</b>

Boiler Pumping

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Inerting Fuel Consumption Savings (lb/1000 bbl offloaded)	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
36	Aframax	700,000	Dist at 0.2%S	0.20	102.17	28.06	15.0	6,615	1,654	93	1,095	766	512	9,317
69	VLCC	2,000,000	Dist at 0.2%S	0.20	80.38	28.06	23.2	30,615	6,393	1,351	4,232	2,962	1,981	36,017
18	Panamax	350,000	Dist at 0.2%S	0.20	59.91	28.06	11.0	711	178	10	118	82	55	1,001
78	Suezmax	1,000,000	Dist at 0.2%S	0.20	82.85	28.06	15.3	15,137	3,784	213	2,505	1,754	1,173	21,320
<b>TOTAL</b>								<b>53,077</b>	<b>12,009</b>	<b>1,667</b>	<b>7,949</b>	<b>5,565</b>	<b>3,721</b>	<b>67,655</b>

Auxiliary Generator Post-Pumpin

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
36	Aframax	700,000	Dist at 0.2%S	0.20	3,600	27.8%	1.0	1,379	109	40	30	29	23	90
69	VLCC	2,000,000	Dist at 0.2%S	0.20	3,600	27.8%	1.0	2,643	209	76	57	55	44	173
18	Panamax	350,000	Dist at 0.2%S	0.20	3,600	27.8%	1.0	689	55	20	15	14	11	45
78	Suezmax	1,000,000	Dist at 0.2%S	0.20	3,600	27.8%	1.0	2,988	236	86	64	62	50	196
<b>TOTAL</b>								<b>7,699</b>	<b>609</b>	<b>222</b>	<b>166</b>	<b>160</b>	<b>128</b>	<b>505</b>

**Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR**

**Table H.2.PP.Mit.2040-7. 2040 Proposed Project Summary of Berth Operations Average Daily Mitigated Emissions.**

**No AMP**

<b>Mode</b>	<b>Equipment</b>	<b>NO<sub>x</sub> Emissions (lb/yr)</b>	<b>CO Emissions (lb/yr)</b>	<b>ROG Emissions (lb/yr)</b>	<b>PM Emissions (lb/yr)</b>	<b>PM<sub>10</sub> Emissions (lb/yr)</b>	<b>PM<sub>2.5</sub> Emissions (lb/yr)</b>	<b>SO<sub>2</sub> Emissions (lb/yr)</b>
Berth Operations	Boiler	56,455	12,788	1,762	8,465	5,926	3,962	72,746
Berth Operations	Aux Generator	297,523	23,545	8,562	6,421	6,164	4,932	19,704

**Mitigated Emissions with AMP - Year 2040**

AMP Reduction            70%

Berth Operations	Boiler	56,455	12,788	1,762	8,465	5,926	3,962	72,746
Berth Operations	Aux Generator	89,257	7,063	2,569	1,926	1,849	1,479	5,911

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Mit.Max.2040-1. 2040 Proposed Project Main Engines Maximum Daily Mitigated Emissions.

Ship	Direction	Mode	Distance (nautical miles)	Ship speed (knots)	Activity (hours)	Maximum Speed (knots)	Load Factor	MCR (KW)	Energy (kW-hr)	Fuel Type	Maximum Daily Shipcalls (vessels/day)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
VLCC	North In	Cruising - CW to VSR	22	12	1.83	16.9	0.358	25,400	16,671	MDO	0.1	78	6	3	2	2	2	9
		Cruising - VSR to PZ	21	12	1.75	16.9	0.358	25,400	15,913	MDO	0.1	74	6	3	2	2	2	9
		Cruising - PZ to Pilot	4.7	7	0.67	16.9	0.071	25,400	1,212	MDO	0.1	8	1	1	0	0	0	1
	North In	Maneuvering - Pilot to Berth	3	1.00	16.9	0.006	25,400	142	MDO	0.1	11	2	5	0	0	0	0	0
		Cruising - CW to VSR	22	12	1.83	16.9	0.358	25,400	16,671	Dist at 0.2	0.9	702	58	25	12	12	11	32
		Cruising - VSR to PZ	21	12	1.75	16.9	0.358	25,400	15,913	Dist at 0.2	0.9	670	55	24	11	11	11	31
		Cruising - PZ to Pilot	4.7	7	0.67	16.9	0.071	25,400	1,212	Dist at 0.2	0.9	72	12	9	2	2	1	2
		Maneuvering - Pilot to Berth	3	1.00	16.9	0.006	25,400	142	Dist at 0.2	0.9	96	18	45	3	3	3	0	
		Maneuvering - Berth to Pilot	5	1.00	16.9	0.026	25,400	658	Dist at 0.2	1.0	92	20	23	2	2	2	1	
		Cruising - Pilot to PZ	3.8	7	0.54	16.9	0.071	25,400	980	Dist at 0.2	1.0	65	11	8	1	1	1	2
		Cruising - PZ to VSR	21	12	1.75	16.9	0.358	25,400	15,913	Dist at 0.2	1.0	745	61	26	13	13	12	34
		Cruising - VSR to CW	22	12	1.83	16.9	0.358	25,400	16,671	Dist at 0.2	1.0	780	64	28	13	13	12	36
<b>TOTAL</b>											<b>3,395</b>	<b>314</b>	<b>198</b>	<b>62</b>	<b>62</b>	<b>57</b>	<b>158</b>	
AFRAMAX	South In	Cruising - CW to VSR	23	12	1.92	16.1	0.414	12,477	9,902	MDO	0.1	46	4	2	1	1	1	6
		Cruising - VSR to PZ	11	12	0.92	16.1	0.414	12,477	4,736	MDO	0.1	22	2	1	1	1	0	3
		Cruising - PZ to Pilot	4.7	7	0.67	16.1	0.082	12,477	689	MDO	0.1	4	1	0	0	0	0	0
	South In	Maneuvering - Pilot to Berth	3	1.00	16.1	0.006	12,477	81	MDO	0.1	6	1	2	0	0	0	0	0
		Cruising - CW to VSR	23	12	1.92	16.1	0.414	12,477	9,902	Dist at 0.2	0.9	417	34	15	7	7	7	19
		Cruising - VSR to PZ	11	12	0.92	16.1	0.414	12,477	4,736	Dist at 0.2	0.9	199	16	7	3	3	3	9
South Out	Cruising - PZ to Pilot	4.7	7	0.67	16.1	0.082	12,477	689	Dist at 0.2	0.9	38	6	4	1	1	1	1	
	Maneuvering - Pilot to Berth	3	1.00	16.1	0.006	12,477	81	Dist at 0.2	0.9	51	9	21	1	1	1	0		
	Maneuvering - Berth to Pilot	5	1.00	16.1	0.030	12,477	374	Dist at 0.2	1.0	51	10	11	1	1	1	1		
	Cruising - Pilot to PZ	3.5	7	0.50	16.1	0.082	12,477	513	Dist at 0.2	1.0	32	5	3	1	1	1	1	
	Cruising - PZ to VSR	12.5	12	1.04	16.1	0.414	12,477	5,382	Dist at 0.2	1.0	252	21	9	4	4	4	12	
	Cruising - VSR to CW	24.5	12	2.04	16.1	0.414	12,477	10,548	Dist at 0.2	1.0	494	41	17	8	8	8	23	
<b>TOTAL</b>											<b>1,613</b>	<b>148</b>	<b>92</b>	<b>29</b>	<b>29</b>	<b>27</b>	<b>74</b>	
PANAMAX	South In	Cruising - CW to VSR	23	12	1.92	15.8	0.438	10,300	8,649	MDO	0.1	40	3	1	1	1	1	5
		Cruising - VSR to PZ	11	12	0.92	15.8	0.438	10,300	4,136	MDO	0.1	19	2	1	0	0	0	2
		Cruising - PZ to Pilot	4.7	7	0.67	15.8	0.087	10,300	601	MDO	0.1	3	0	0	0	0	0	0
	South In	Maneuvering - Pilot to Berth	3	1.00	15.8	0.007	10,300	71	MDO	0.1	0	0	0	0	0	0	0	0
		Cruising - CW to VSR	23	12	1.92	15.8	0.438	10,300	8,649	Dist at 0.2	0.9	364	30	13	6	6	6	17
		Cruising - VSR to PZ	11	12	0.92	15.8	0.438	10,300	4,136	Dist at 0.2	0.9	174	14	6	3	3	3	8
South Out	Cruising - PZ to Pilot	4.7	7	0.67	15.8	0.087	10,300	601	Dist at 0.2	0.9	25	2	1	0	0	0	1	
	Maneuvering - Pilot to Berth	3	1.00	15.8	0.007	10,300	71	Dist at 0.2	0.9	3	0	0	0	0	0	0	0	
	Maneuvering - Berth to Pilot	5	1.00	15.8	0.032	10,300	326	Dist at 0.2	1.0	15	1	1	0	0	0	1		
	Cruising - Pilot to PZ	3.5	7	0.50	15.8	0.087	10,300	448	Dist at 0.2	1.0	21	2	1	0	0	0	1	
	Cruising - PZ to VSR	12.5	12	1.04	15.8	0.438	10,300	4,700	Dist at 0.2	1.0	220	18	8	4	4	3	10	
	Cruising - VSR to CW	24.5	12	2.04	15.8	0.438	10,300	9,213	Dist at 0.2	1.0	431	36	15	7	7	7	20	
<b>TOTAL</b>											<b>1317</b>	<b>108</b>	<b>46</b>	<b>23</b>	<b>23</b>	<b>21</b>	<b>65</b>	
SUEZMAX	North In	Cruising - CW to VSR	22	12	1.83	17	0.352	16,000	10,317	MDO	0.1	48	4	2	1	1	1	6
		Cruising - VSR to PZ	21	12	1.75	17	0.352	16,000	9,848	MDO	0.1	46	4	2	1	1	1	5
		Cruising - PZ to Pilot	4.7	7	0.67	17	0.070	16,000	750	MDO	0.1	4	0	0	0	0	0	0
	North In	Maneuvering - Pilot to Berth	3	1.00	17	0.005	16,000	88	MDO	0.1	0	0	0	0	0	0	0	0
		Cruising - CW to VSR	22	12	1.83	17	0.352	16,000	10,317	Dist at 0.2	0.9	435	36	15	7	7	7	20
		Cruising - VSR to PZ	21	12	1.75	17	0.352	16,000	9,848	Dist at 0.2	0.9	415	34	15	7	7	7	19
North Out	Cruising - PZ to Pilot	4.7	7	0.67	17	0.070	16,000	750	Dist at 0.2	0.9	32	3	1	1	1	0	1	
	Maneuvering - Pilot to Berth	3	1.00	17	0.005	16,000	88	Dist at 0.2	0.9	4	0	0	0	0	0	0	0	
	Maneuvering - Berth to Pilot	5	1.00	17	0.025	16,000	407	Dist at 0.2	1.0	19	2	1	0	0	0	1		
	Cruising - Pilot to PZ	3.8	7	0.54	17	0.070	16,000	606	Dist at 0.2	1.0	28	2	1	0	0	0	1	
	Cruising - PZ to VSR	21	12	1.75	17	0.352	16,000	9,848	Dist at 0.2	1.0	461	38	16	8	8	7	21	
	Cruising - VSR to CW	22	12	1.83	17	0.352	16,000	10,317	Dist at 0.2	1.0	483	40	17	8	8	8	22	
<b>TOTAL</b>											<b>1974</b>	<b>163</b>	<b>70</b>	<b>34</b>	<b>34</b>	<b>32</b>	<b>98</b>	
<b>MAXIMUM</b>											<b>3,395</b>	<b>314</b>	<b>198</b>	<b>62</b>	<b>62</b>	<b>57</b>	<b>158</b>	



Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Mit.Max.2040-2. 2040 Proposed Project Auxiliary Generator Maximum Daily Mitigated Emissions

Ship	Direction	Mode	Activity (hours)	MCR (kW)	Load Factor	Energy (kW-hr)	Fuel Type	Maximum Daily Shipcalls (vessels/day)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
VLCC	North In	Cruising	4.25	3,600	0.278	4,258	MDO	0.1	16	1	0	0	0	0	3
		Maneuvering	2.00	3,600	0.278	2,002	MDO	0.1	8	1	0	0	0	0	1
VLCC	North In	Cruising	4.25	3,600	0.278	4,258	Dist at 0.2	0.9	147	12	4	3	3	2	10
		Maneuvering	2.00	3,600	0.278	2,002	Dist at 0.2	0.9	69	5	2	1	1	1	5
	North Out	Maneuvering	1.50	3,600	0.278	1,501	Dist at 0.2	1.0	57	5	2	1	1	1	4
		Cruising	4.13	3,600	0.278	4,129	Dist at 0.2	1.0	158	13	5	3	3	3	10
<b>TOTAL</b>								<b>455</b>	<b>36</b>	<b>13</b>	<b>10</b>	<b>9</b>	<b>8</b>	<b>32</b>	
AFRAMAX	South In	Cruising	3.50	3,600	0.278	3,508	MDO	0.1	13	1	0	0	0	0	2
AFRAMAX	South In	Maneuvering	2.00	3,600	0.278	2,002	MDO	0.1	8	1	0	0	0	0	1
		Cruising	3.50	3,600	0.278	3,508	Dist at 0.2	0.9	121	10	3	3	3	2	8
	South Out	Maneuvering	2.00	3,600	0.278	2,002	Dist at 0.2	0.9	69	5	2	1	1	1	5
		Cruising	1.50	3,600	0.278	1,501	Dist at 0.2	1.0	57	5	2	1	1	1	4
<b>TOTAL</b>								<b>137</b>	<b>11</b>	<b>4</b>	<b>3</b>	<b>3</b>	<b>2</b>	<b>9</b>	
PANAMAX	South In	Cruising	3.15	3,600	0.278	3,155	MDO	0.1	12	1	0	0	0	0	2
PANAMAX	South In	Maneuvering	2.00	3,600	0.278	2,002	MDO	0.1	8	1	0	0	0	0	1
		Cruising	3.15	3,600	0.278	3,155	Dist at 0.2	0.9	109	9	3	2	2	2	7
	South Out	Maneuvering	2.00	3,600	0.278	2,002	Dist at 0.2	0.9	69	5	2	1	1	1	5
		Cruising	1.5	3,600	0.278	1,501	Dist at 0.2	1.0	57	5	2	1	1	1	4
<b>TOTAL</b>								<b>123</b>	<b>10</b>	<b>4</b>	<b>3</b>	<b>3</b>	<b>2</b>	<b>8</b>	
SUEZMAX	North In	Cruising	3.84	3,600	0.278	3,840	MDO	0.1	15	1	0	0	0	0	3
SUEZMAX	North In	Maneuvering	2.00	3,600	0.278	2,002	MDO	0.1	8	1	0	0	0	0	1
		Cruising	3.84	3,600	0.278	3,840	Dist at 0.2	0.9	132	10	4	3	3	2	9
	North Out	Maneuvering	2.00	3,600	0.278	2,002	Dist at 0.2	0.9	69	5	2	1	1	1	5
		Cruising	1.5	3,600	0.278	1,501	Dist at 0.2	1.0	57	5	2	1	1	1	4
<b>TOTAL</b>								<b>142</b>	<b>11</b>	<b>4</b>	<b>3</b>	<b>3</b>	<b>2</b>	<b>9</b>	
<b>TOTAL</b>									<b>423</b>	<b>33</b>	<b>12</b>	<b>9</b>	<b>9</b>	<b>7</b>	<b>30</b>
<b>MAXIMUM</b>									<b>455</b>	<b>36</b>	<b>13</b>	<b>10</b>	<b>9</b>	<b>8</b>	<b>32</b>

**Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR**

**Table H.2.PP.Mit.Max.2040-3. 2040 Proposed Project Summary of Maximum Daily Mitigated Vessel Emissions.**

<b>Mode</b>	<b>Equipment</b>	<b>NO<sub>x</sub> Emissions (lb/day)</b>	<b>CO Emissions (lb/day)</b>	<b>ROG Emissions (lb/day)</b>	<b>PM Emissions (lb/day)</b>	<b>PM<sub>10</sub> Emissions (lb/day)</b>	<b>PM<sub>2.5</sub> Emissions (lb/day)</b>	<b>SO<sub>2</sub> Emissions (lb/day)</b>
Cruising	Main Engines	3,196	275	125	56	56	52	156
Cruising	Aux Generator	321	25	9	7	7	5	23
Maneuvering	Main Engines	200	39	73	6	6	5	2
Maneuvering	Aux Generator	134	11	4	3	3	2	10
<b>Cruising and Maneuvering</b>	<b>TOTAL</b>	<b>3,850</b>	<b>350</b>	<b>211</b>	<b>71</b>	<b>71</b>	<b>64</b>	<b>190</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Mit.Max.2040-4. 2040 Proposed Project Boiler Warm-Up Maximum Daily Mitigated Emissions.

Shipcalls (vessels/ day)	Vessel Size	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
0.1	Aframax	MDO	0.52	102.17	30%	3	50,000	2	0	0	0	0	0	6
0.9	Aframax	Dist at 0.2	0.20	102.17	30%	3	50,000	15	4	0	2	2	1	21
							<b>TOTAL</b>	<b>16</b>	<b>4</b>	<b>0</b>	<b>3</b>	<b>2</b>	<b>1</b>	<b>27</b>
0.1	VLCC	MDO	0.52	80.38	30%	3	90,000	3	1	0	0	0	0	8
0.9	VLCC	Dist at 0.2	0.20	80.38	30%	3	90,000	25	5	1	3	2	2	29
							<b>TOTAL</b>	<b>28</b>	<b>6</b>	<b>1</b>	<b>4</b>	<b>3</b>	<b>2</b>	<b>38</b>
0.1	Panamax	MDO	0.52	59.91	30%	3	35,000	1	0	0	0	0	0	2
0.9	Panamax	Dist at 0.2	0.20	59.91	30%	3	35,000	6	2	0	1	1	0	8
							<b>TOTAL</b>	<b>7</b>	<b>2</b>	<b>0</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>11</b>
0.1	Suezmax	MDO	0.52	82.85	30%	3	70,000	2	0	0	0	0	0	7
0.9	Suezmax	Dist at 0.2	0.20	82.85	30%	3	70,000	17	4	0	3	2	1	23
							<b>TOTAL</b>	<b>18</b>	<b>5</b>	<b>0</b>	<b>3</b>	<b>2</b>	<b>1</b>	<b>30</b>
							<b>MAXIMUM</b>	<b>28</b>	<b>6</b>	<b>1</b>	<b>4</b>	<b>3</b>	<b>2</b>	<b>38</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Mit.Max.2040-5. 2040 Proposed Project Summary of Boiler Warm-Up Maximum Mitigated Emissions.

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Boiler Warm-up	Boiler	28	6	1	4	3	2	38

Table H.2.PP.Mit.Max.2040-6. 2040 Proposed Project Berth Operations Maximum Daily Mitigated Emissions.

**Auxiliary Generator Pre-Pumpin**

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
0.1	Aframax	700,000	MDO	0.52	3,600	27.8%	2.5	10	1	0	0	0	0	2
0.9	Aframax	700,000	Dist at 0.2%S	0.20	3,600	27.8%	2.5	86	7	2	2	2	1	6
<b>TOTAL</b>								<b>96</b>	<b>8</b>	<b>3</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>7</b>
0.1	VLCC	2,000,000	MDO	0.52	3,600	27.8%	2.5	10	1	0	0	0	0	2
0.9	VLCC	2,000,000	Dist at 0.2%S	0.20	3,600	27.8%	2.5	86	7	2	2	2	1	6
<b>TOTAL</b>								<b>96</b>	<b>8</b>	<b>3</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>7</b>
0.1	Panamax	350,000	MDO	0.52	3,600	27.8%	2.5	10	1	0	0	0	0	2
0.9	Panamax	350,000	Dist at 0.2%S	0.20	3,600	27.8%	2.5	86	7	2	2	2	1	6
<b>TOTAL</b>								<b>96</b>	<b>8</b>	<b>3</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>7</b>
0.1	Suezmax	1,000,000	MDO	0.52	3,600	27.8%	2.5	10	1	0	0	0	0	2
0.9	Suezmax	1,000,000	Dist at 0.2%S	0.20	3,600	27.8%	2.5	86	7	2	2	2	1	6
<b>TOTAL</b>								<b>96</b>	<b>8</b>	<b>3</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>7</b>
<b>MAXIMUM</b>								<b>96</b>	<b>8</b>	<b>3</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>7</b>

**Boiler Pre-Pumpin**

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
0.1	Aframax	700,000	MDO	0.52	102.17	30.0%	2.5	50,000	1	0	0	0	0	0	5
0.9	Aframax	700,000	Dist at 0.2%S	0.20	102.17	30.0%	2.5	50,000	12	3	0	2	1	1	17
<b>TOTAL</b>								<b>14</b>	<b>3</b>	<b>0</b>	<b>2</b>	<b>2</b>	<b>1</b>	<b>22</b>	
0.1	VLCC	2,000,000	MDO	0.52	80.38	30.0%	2.5	90,000	2	0	0	0	0	0	7
0.9	VLCC	2,000,000	Dist at 0.2%S	0.20	80.38	30.0%	2.5	90,000	21	4	1	3	2	1	24
<b>TOTAL</b>								<b>23</b>	<b>5</b>	<b>1</b>	<b>3</b>	<b>2</b>	<b>1</b>	<b>31</b>	
0.1	Panamax	350,000	MDO	0.52	59.91	30.0%	2.5	35,000	1	0	0	0	0	0	2
0.9	Panamax	350,000	Dist at 0.2%S	0.20	59.91	30.0%	2.5	35,000	5	1	0	1	1	0	7
<b>TOTAL</b>								<b>6</b>	<b>1</b>	<b>0</b>	<b>1</b>	<b>1</b>	<b>0</b>	<b>9</b>	
0.1	Suezmax	1,000,000	MDO	0.52	82.85	30.0%	2.5	70,000	2	0	0	0	0	0	6
0.9	Suezmax	1,000,000	Dist at 0.2%S	0.20	82.85	30.0%	2.5	70,000	14	3	0	2	2	1	20
<b>TOTAL</b>								<b>15</b>	<b>4</b>	<b>0</b>	<b>3</b>	<b>2</b>	<b>1</b>	<b>25</b>	
<b>MAXIMUM</b>								<b>23</b>	<b>5</b>	<b>1</b>	<b>3</b>	<b>2</b>	<b>1</b>	<b>31</b>	

**Auxiliary Generator Pumpin**

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	700,000	Dist at 0.2%S	0.20	3,600	55.6%	15.0	1,149	91	33	25	24	19	75
1.0	VLCC	2,000,000	Dist at 0.2%S	0.20	3,600	55.6%	23.2	1,777	141	51	38	37	29	116
1.0	Panamax	350,000	Dist at 0.2%S	0.20	3,600	55.6%	11.0	843	67	24	18	17	14	55
1.0	Suezmax	1,000,000	Dist at 0.2%S	0.20	3,600	55.6%	15.3	1,172	93	34	25	24	19	77
<b>MAXIMUM</b>								<b>1,777</b>	<b>141</b>	<b>51</b>	<b>38</b>	<b>37</b>	<b>29</b>	<b>116</b>

**Boiler Pumpin**

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Inerting Fuel Consumption Savings (lb/1000 bbl offloaded)	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	700,000	Dist at 0.2%S	0.20	102.17	28.06	15.0	184	46	3	30	21	14	259
1.0	VLCC	2,000,000	Dist at 0.2%S	0.20	80.38	28.06	23.2	444	93	20	61	43	29	522
1.0	Panamax	350,000	Dist at 0.2%S	0.20	59.91	28.06	11.0	39	10	1	7	5	3	56
1.0	Suezmax	1,000,000	Dist at 0.2%S	0.20	82.85	28.06	15.3	194	49	3	32	22	15	273
<b>MAXIMUM</b>								<b>444</b>	<b>93</b>	<b>20</b>	<b>61</b>	<b>43</b>	<b>29</b>	<b>522</b>

**Auxiliary Generator Post-Pumpin**

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	700,000	Dist at 0.2%S	0.20	3,600	27.8%	1.0	38	3	1	1	1	1	3
1.0	VLCC	2,000,000	Dist at 0.2%S	0.20	3,600	27.8%	1.0	38	3	1	1	1	1	3
1.0	Panamax	350,000	Dist at 0.2%S	0.20	3,600	27.8%	1.0	38	3	1	1	1	1	3
1.0	Suezmax	1,000,000	Dist at 0.2%S	0.20	3,600	27.8%	1.0	38	3	1	1	1	1	3
<b>MAXIMUM</b>								<b>38</b>	<b>3</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>3</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Mit.Max.2040-7. 2040 Proposed Project Summary of Berth Operations Maximum Daily Mitigated Emissions.

No AMP

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Berth Operations	Boiler	467	97	21	65	45	30	553
Berth Operations	Aux Generator	1,911	151	55	41	40	32	126

Mitigated Emissions with AMP - Year 2040

AMP Reduction            70%

Berth Operations	Boiler	467	97	21	65	45	30	553
Berth Operations	Aux Generator	573	45	16	12	12	10	38

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.NFA/NPA.Un.BP.2010-1. 2010 No Federal Action/No Project Alternative BP Main Engines Average Daily Unmitigated Emissions.

Ship	Direction	Mode	Distance (nautical miles)	Ship speed (knots )	Activity (hours)	Maximum Speed (knots)	Load Factor	MCR (kW)	Energy (kW-hr)	Fuel Type	Shipcalls (vessels/ yr)	NO <sub>x</sub> Emission s (lb/yr)	CO Emission s (lb/yr)	ROG Emission s (lb/yr)	PM Emission s (lb/yr)	PM <sub>10</sub> Emission s (lb/yr)	PM <sub>2.5</sub> Emission s (lb/yr)	SO <sub>2</sub> Emission s (lb/yr)
AFRAMAX	South In	Cruising - CW to VSR	23	12	1.92	16.1	0.414	12,477	9,902	HFO	29	14,310	1,107	474	1,233	1,233	1,135	8,302
		Cruising - VSR to PZ	11	12	0.92	16.1	0.414	12,477	4,736	HFO	29	6,844	529	227	590	590	543	3,970
		Cruising - PZ to Pilot	4.7	7	0.67	16.1	0.082	12,477	689	HFO	29	995	77	33	86	86	79	577
	South Out	Maneuvering - Pilot to Berth	3	1.00	16.1	0.006	12,477	81	HFO	29	117	9	4	10	10	9	68	
		Maneuvering - Berth to Pilot	5	1.00	16.1	0.030	12,477	374	HFO	29	540	42	18	47	47	43	313	
		Cruising - Pilot to PZ	3.5	7	0.50	16.1	0.082	12,477	513	HFO	29	741	57	25	64	64	59	430
		Cruising - PZ to VSR	12.5	12	1.04	16.1	0.414	12,477	5,382	HFO	29	7,777	602	258	670	670	617	4,512
		Cruising - VSR to CW	24.5	12	2.04	16.1	0.414	12,477	10,548	HFO	29	15,244	1,179	505	1,314	1,314	1,209	8,843
		<b>TOTAL</b>											<b>46,569</b>	<b>3,602</b>	<b>1,544</b>	<b>4,014</b>	<b>4,014</b>	<b>3,693</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

**Table H.2.NFA/NPA.Un.BP.2010-2. 2010 No Federal Action/No Project Alternative BP Project Auxiliary Generator Average Daily Unmitigated Emissions.**

Ship	Direction	Mode	Activity (hours)	MCR (kW)	Load Factor	Energy (kW-hr)	Fuel Type	Shipcalls (vessels/yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
AFRAMAX	South In	Cruising	3.50	3,600	0.28	3,533	HFO	29	4,147	310	113	423	406	325	3,470
		Maneuvering	2.00	3,600	0.28	2,016	HFO	29	2,366	177	64	241	232	185	1,980
	South Out	Maneuvering	1.5	3,600	0.28	1,512	HFO	29	1,775	133	48	181	174	139	1,485
		Cruising	3.50	3,600	0.28	3,528	HFO	29	4,141	310	113	423	406	325	3,465
<b>TOTAL</b>									<b>12,428</b>	<b>930</b>	<b>338</b>	<b>1,268</b>	<b>1,217</b>	<b>974</b>	<b>10,399</b>



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**Table H.2.NFA/NPA.Un.BP.2010-3. 2010 No Federal Action/No Project Alternative BP Boiler Warm-Up Average Daily Unmitigated Emissions.**

Shipcalls (vessels/yr)	Vessel Size	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
29.0	Aframax	HFO	2.70	102.17	30%	3	50,000	1,161	105	27	243	209	136	8,979
<b>TOTAL</b>								<b>1,161</b>	<b>105</b>	<b>27</b>	<b>243</b>	<b>209</b>	<b>136</b>	<b>8,979</b>

Table H.2.NFA/NPA.Un.BP.2010-4. 2010 No Federal Action/No Project Alternative BP Berth Operations Average Daily Unmitigated Emissions.

**Auxiliary Generator Pre-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
29.0	Aframax	400,000	HFO	2.70	3,600	28%	2.5	2,958	221	80	302	290	232	2,475
<b>TOTAL</b>								2,958	221	80	302	290	232	2,475

**Boiler Pre-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
29.0	Aframax	400,000	HFO	2.70	102.17	30%	2.5	50,000	826	87	18	519	447	291	7,483
<b>TOTAL</b>									826	87	18	519	447	291	7,483

**Auxiliary Generator Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
29.0	Aframax	400,000	HFO	2.70	3,600	56%	15.0	35,494	2,656	966	3,622	3,477	2,782	29,699
<b>TOTAL</b>								35,494	2,656	966	3,622	3,477	2,782	29,699

**Boiler Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Inerting Fuel Consumption Savings (lb/1000 bbl offloaded)	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
29.0	Aframax	400,000	HFO	2.70	102.17	28.06	15.0	6,390	675	139	4,018	3,456	2,250	57,897
<b>TOTAL</b>								6,390	675	139	4,018	3,456	2,250	57,897

**Auxiliary Generator Post-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
29.0	Aframax	400,000	HFO	2.70	3,600	28%	1.0	1,183	89	32	121	116	93	990
<b>TOTAL</b>								1,183	89	32	121	116	93	990

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Table H.2.NFA/NPA.Un.BP.2010-5. 2010 No Federal Action/No Project Alternative BP Summary of Average Daily Unmitigated Vessel Emissions.

Mode	Equipment	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Cruising	Main Engines	45,912	3,551	1,522	3,957	3,957	3,640	26,634
Cruising	Aux Generator	8,287	620	226	846	812	649	6,934
Maneuvering	Main Engines	657	51	22	57	57	52	381
Maneuvering	Aux Generator	4,141	310	113	423	406	325	3,465
Boiler Warm-up	Boiler	1,161	105	27	243	209	136	8,979
Berth Operations	Boiler	7,216	763	157	4,538	3,903	2,541	65,379
Berth Operations	Aux Generator	39,635	2,966	1,078	4,044	3,883	3,106	33,164
Propulsion	TOTAL	58,997	4,532	1,882	5,282	5,231	4,667	37,414
Non-Propulsion	TOTAL	48,011	3,833	1,262	8,825	7,994	5,783	107,523
<b>Total Emissions</b>		<b>107,008</b>	<b>8,365</b>	<b>3,144</b>	<b>14,107</b>	<b>13,225</b>	<b>10,450</b>	<b>144,937</b>

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Cruising	Main Engines	125.8	9.7	4.2	10.8	10.8	10.0	73.0
Cruising	Aux Generator	22.7	1.7	0.6	2.3	2.2	1.8	19.0
Maneuvering	Main Engines	1.8	0.1	0.1	0.2	0.2	0.1	1.0
Maneuvering	Aux Generator	11.3	0.8	0.3	1.2	1.1	0.9	9.5
Boiler Warm-up	Boiler	3.2	0.3	0.1	0.7	0.6	0.4	24.6
Berth Operations	Boiler	19.8	2.1	0.4	12.4	10.7	7.0	179.1
Berth Operations	Aux Generator	108.6	8.1	3.0	11.1	10.6	8.5	90.9
Propulsion	TOTAL	161.6	12.4	5.2	14.5	14.3	12.8	102.5
Non-Propulsion	TOTAL	131.5	10.5	3.5	24.2	21.9	15.8	294.6
<b>Total Emissions</b>		<b>293</b>	<b>23</b>	<b>9</b>	<b>39</b>	<b>36</b>	<b>29</b>	<b>397</b>

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**Table H.2.NFA/NPA.Un.BP.2010-6. 2010 No Federal Action/No Project Alternative BP Tug Main Engines Average Daily Unmitigated Emissions.**

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Shipcalls (vessels/yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
AFRAMAX	Maneuvering - Pilot to Berth	1.00	2	4,800	0.50	MGO	29.0	4,503	717	142	184	169	2
	Maneuvering - Berth to Pilot	1.00	2	4,800	0.50	MGO	29.0	4,503	717	142	184	169	2
<b>TOTAL</b>								<b>9,007</b>	<b>1,433</b>	<b>284</b>	<b>368</b>	<b>338</b>	<b>5</b>

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**Table H.2.NFA/NPA.Un.BP.2010-7. 2010 No Federal Action/No Project Alternative BP Tug Auxiliary Generator Engines Average Daily Unmitigated Emissions.**

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Shipcalls (vessels/yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
AFRAMAX	Maneuvering - Pilot to Berth	1.00	2	300	1.00	MGO	29.0	462	80	13	22	20	0
	Maneuvering - Berth to Pilot	1.00	2	300	1.00	MGO	29.0	462	80	13	22	20	0
<b>TOTAL</b>								<b>924</b>	<b>160</b>	<b>26</b>	<b>43</b>	<b>40</b>	<b>0</b>

**Table H.2.NFA/NPA.Un.BP.2010-8. 2010 No Federal Action/No Project Alternative BP Summary of Tug Average Daily Unmitigated Emissions.**

<b>Mode</b>	<b>Equipment</b>	<b>NO<sub>x</sub> Emissions (lb/yr)</b>	<b>CO Emissions (lb/yr)</b>	<b>ROG Emissions (lb/yr)</b>	<b>PM<sub>10</sub> Emissions (lb/yr)</b>	<b>PM<sub>2.5</sub> Emissions (lb/yr)</b>	<b>SO<sub>2</sub> Emissions (lb/yr)</b>
Tug Assist	Main Engines	9,007	1,433	284	368	338	5
Tug Assist	Aux Generator	924	160	26	43	40	0
<b>TOTAL</b>		<b>9,930</b>	<b>1,593</b>	<b>309</b>	<b>411</b>	<b>378</b>	<b>5</b>

<b>Mode</b>	<b>Equipment</b>	<b>NO<sub>x</sub> Emissions (lb/day)</b>	<b>CO Emissions (lb/day)</b>	<b>ROG Emissions (lb/day)</b>	<b>PM<sub>10</sub> Emissions (lb/day)</b>	<b>PM<sub>2.5</sub> Emissions (lb/day)</b>	<b>SO<sub>2</sub> Emissions (lb/day)</b>
Tug Assist	Main Engines	25	3.9	0.8	1.0	0.9	0.0
Tug Assist	Aux Generator	3	0.4	0.1	0.1	0.1	0.0
<b>TOTAL</b>		<b>27</b>	<b>4.4</b>	<b>0.8</b>	<b>1.1</b>	<b>1.0</b>	<b>0.0</b>

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**Table H.2.NFA/NPA.Un.BP.2010-9. 2010 No Federal Action/No Project Alternative BP VDU Crude Average Daily Unmitigated Emissions.**

	Annual Vessel Calls	crude vapors from tanks(sc/call)	annual gas usage (mmscf/yr)	mw crude vapors	destruction efficiency
Aframax	29	224,000	6.5	50	98%
<b>TOTAL</b>	<b>29</b>		<b>6.5</b>		

Annual Average (lb/yr)

	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene
EF (lb/MMSCF)	130	35	7	7.5	0.38%	9.90%	0.017	0.0004	0.0003	0.0043	0.0027	0.731	0.0366	0.0272	0.0095
Panamax	422.2	113.7	22.7	24.4	0.0	0.3	0.1	0.0	0.0	0.0	0.0	2.4	0.1	0.1	0.0
<b>TOTAL</b>	<b>422.2</b>	<b>113.7</b>	<b>22.7</b>	<b>24.4</b>	<b>0.0</b>	<b>0.3</b>	<b>0.1</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>2.4</b>	<b>0.1</b>	<b>0.1</b>	<b>0.0</b>

*Assumed a ratio of 500/1000 based on the corresponding Btu values with respect to natural gas combustion emission factors.*

Annual Average (lb/yr)

	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene	SO <sub>x</sub>
Site 1	53	14.2	2.84	3.0	0.002	0.04	0.007	0.0002	0.0001	0.0017	0.0011	0.30	0.015	0.011	0.004	9
Site 2	369	99	19.9	21.3	0.01	0.28	0.048	0.0011	0.0009	0.012	0.008	2.1	0.10	0.08	0.027	66

22.74

**Table H.2.NFA/NPA.Un.BP.2010-10. 2010 No Federal Action/No Project Alternative BP VDU Legs Average Daily Unmitigated Emissions.**

	tanks	crude vapors from tanks on legs(scf/yr)	annual gas usage (mmscf/yr)	mw crude vapors	destruction efficiency
Site 1	4	8640000	34.6	50	98%
Site 2	14	8640000	121.0	50	98%
<b>TOTAL</b>	<b>18</b>		<b>155.5</b>		

		Annual Average (lb/yr)													
	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene
EF (lb/MMSCF)	130	35	7	7.5	0.38%	9.90%	0.017	0.0004	0.0003	0.0043	0.0027	0.731	0.0366	0.0272	0.0095
<b>TOTAL</b>	<b>10108.8</b>	<b>2721.6</b>	<b>544.3</b>	<b>583.2</b>	<b>2.1</b>	<b>53.9</b>	<b>1.3</b>	<b>0.0</b>	<b>0.0</b>	<b>0.3</b>	<b>0.2</b>	<b>56.8</b>	<b>2.8</b>	<b>2.1</b>	<b>0.7</b>

*Assumed a ratio of 500/1000 based on the corresponding Btu values with respect to natural gas combustion emission factors.*

		Annual Average (lb/yr)														
	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene	SO <sub>x</sub>
Site 1	2246.4	604.8	121.0	129.6	0.46	11.98	0.29	0.007	0.005	0.074	0.05	12.63	0.63	0.47	0.16	402
Site 2	7862.4	2116.8	423.4	453.6	1.61	41.91	1.03	0.024	0.018	0.260	0.16	44.21	2.21	1.65	0.57	1407





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Table H.2.NFA/NPA.Un.BP.2010-12.

2010 No Federal Action/No Project Alternative BP Berth Summary of Maximum Daily Unmitigated Emissions.

Operation	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Tanker Cruising and Manuevering	58,997	4,532	1,882	5,282	5,231	4,667	37,414
Tanker Hoteling	39,635	2,966	1,078	4,044	3,883	3,106	33,164
Offloading Emissions	7,216	763	157	4,538	3,903	2,541	65,379
Transiting Operations	1,161	105	27	243	209	136	8,979
Tug Assistance	9,930	1,593	309	---	411	378	5
Tanks	---	---	3,152	---	---	---	---
Vapor Destruction Units	10,531	2,835	567	---	608	---	1,885
Valves, Flanges, Pumps	---	---	1,188	---	---	---	---
<b>TOTAL</b>	<b>127,470</b>	<b>12,794</b>	<b>8,360</b>	<b>14,107</b>	<b>14,244</b>	<b>10,828</b>	<b>146,826</b>

Operation	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Tanker Cruising and Manuevering	162	12	5	14	14	13	103
Tanker Hoteling	109	8	3	11	11	9	91
Offloading Emissions	20	2	0	12	11	7	179
Transiting Operations	3	0.3	0.07	0.7	0.6	0.37	25
Tug Assistance	27	4	0.8	---	1.1	1.0	0.0
Tanks	---	---	8.6	---	---	---	---
Vapor Destruction Units	29	8	2	---	2	---	5
Valves, Flanges, Pumps	---	---	3	---	---	---	---
<b>TOTAL</b>	<b>349</b>	<b>35</b>	<b>23</b>	<b>39</b>	<b>39</b>	<b>30</b>	<b>402</b>

Table H.2.NFA/NPA.Un.Max.BP.2010-1. 2010 No Federal Action/No Project Alternative BP Main Engines Maximum Daily Unmitigated Emissions.

Ship	Direction	Mode	Distance (nautical miles)	Ship speed (knots)	Activity (hours)	Maximum Speed (knots)	Load Factor	MCR (kW)	Energy (kW-hr)	Fuel Type	Maximum Daily Shipcalls (vessels/day)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)	
AFRAMAX	South In	Cruising - CW to VSR	23	12	1.92	16.1	0.414	12,477	9,902	HFO	1.0	493	38	16	43	43	39	286	
		Cruising - VSR to PZ	11	12	0.92	16.1	0.414	12,477	4,736	HFO	1.0	236	18	8	20	20	19	137	
		Cruising - PZ to Pilot	4.7	7	0.67	16.1	0.082	12,477	689	HFO	1.0	34	3	1	3	3	3	20	
		Maneuvering - Pilot to Berth		3	1.00	16.1	0.006	12,477	81	HFO	1.0	4	0.3	0.1	0.3	0.3	0.3	2	
			<b>TOTAL</b>									<b>768</b>	<b>59</b>	<b>25</b>	<b>66</b>	<b>66</b>	<b>61</b>	<b>445</b>	
	South Out	Maneuvering - Berth to Pilot			5	1.00	16.1	0.030	12,477	374	HFO	1.0	19	1	1	2	2	1	11
		Cruising - Pilot to PZ	3.5	7	0.50	16.1	0.082	12,477	513	HFO	1.0	26	2	1	2	2	2	15	
		Cruising - PZ to VSR	12.5	12	1.04	16.1	0.414	12,477	5,382	HFO	1.0	268	21	9	23	23	21	156	
		Cruising - VSR to CW	24.5	12	2.04	16.1	0.414	12,477	10,548	HFO	1.0	526	41	17	45	45	42	305	
			<b>TOTAL</b>									<b>838</b>	<b>65</b>	<b>28</b>	<b>72</b>	<b>72</b>	<b>66</b>	<b>486</b>	
			<b>MAXIMUM</b>									<b>838</b>	<b>65</b>	<b>28</b>	<b>72</b>	<b>72</b>	<b>66</b>	<b>486</b>	

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**Table H.2.NFA/NPA.Un.Max.BP.2010-2. 2010 No Federal Action/No Project Alternative BP Project Auxiliary Generator Maximum Daily Unmitigated Emissions.**

Ship	Direction	Mode	Activity (hours)	MCR (kW)	Load Factor	Energy (kW-hr)	Fuel Type	Maximum Daily Shipcalls (vessels/day)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
AFRAMAX	South In	Cruising	3.50	3,600	0.28	3,528	HFO	1.0	143	11	4	15	14	11	119
		Maneuvering	2.00	3,600	0.28	2,016	HFO	1.0	82	6	2	8	8	6	68
			<b>TOTAL</b>						<b>224</b>	<b>17</b>	<b>6</b>	<b>23</b>	<b>22</b>	<b>18</b>	<b>188</b>
	South Out	Maneuvering	1.5	3,600	0.28	1,512	HFO	1.0	61	5	2	6	6	5	51
		Cruising	3.50	3,600	0.28	3,528	HFO	1.0	143	11	4	15	14	11	119
			<b>TOTAL</b>						<b>204</b>	<b>15</b>	<b>6</b>	<b>21</b>	<b>20</b>	<b>16</b>	<b>171</b>
		<b>MAXIMUM</b>						<b>224</b>	<b>17</b>	<b>6</b>	<b>23</b>	<b>22</b>	<b>18</b>	<b>188</b>	

**Table H.2.NFA/NPA.Un.Max.BP.2010-3. 2010 No Federal Action/No Project Alternative BP Summary of Maximum Daily Unmitigated Vessel Emissions.**

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Cruising	Main Engines	819	63	27	71	71	65	475
Cruising	Aux Generator	143	11	4	15	14	11	119
Maneuvering	Main Engines	19	1	1	2	2	1	11
Maneuvering	Aux Generator	82	6	2	8	8	6	68
<b>Maneuvering</b>	<b>TOTAL</b>	<b>100</b>	<b>8</b>	<b>3</b>	<b>10</b>	<b>10</b>	<b>8</b>	<b>79</b>
<b>Propulsion</b>	<b>TOTAL</b>	<b>1,062</b>	<b>82</b>	<b>34</b>	<b>95</b>	<b>94</b>	<b>84</b>	<b>674</b>

Table H.2.NFA/NPA.Un.Max.BP.2010-4. 2010 No Federal Action/No Project Alternative BP Boiler Warm-Up Maximum Daily Unmitigated Emissions.

Shipcalls (vessels/day)	Vessel Size	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	HFO	2.70	102.17	30%	3	50,000	40	4	0.9	8	7	5	310
<b>MAXIMUM</b>								<b>40</b>	<b>4</b>	<b>1</b>	<b>8</b>	<b>7</b>	<b>5</b>	<b>310</b>

**Table H.2.NFA/NPA.Un.Max.BP.2010-5. 2010 No Federal Action/No Project Alternative BP Summary of Boiler Warm-Up Maximum Unmitigated Emissions.**

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Boiler Warm-up	Boiler	40	4	1	8	7	5	310

Table H.2.NFA/NPA.Un.Max.BP.2010-6. 2010 No Federal Action/No Project Alternative BP Berth Operations Maximum Daily Unmitigated Emissions.

**Auxiliary Generator Pre-Pumping**

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	400,000	HFO	2.70	3,600	28%	2.5	102	8	3	10	10	8	85

MAXIMUM 102 8 3 10 10 8 85

**Boiler Pre-Pumping**

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	400,000	HFO	2.70	102.17	30%	2.5	50,000	33	3	1	7	6	4	258

MAXIMUM 33 3 1 7 6 4 258

**Auxiliary Generator Pumping**

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	400,000	HFO	2.70	3,600	56%	15.0	1,224	92	33	125	120	96	1,024

MAXIMUM 1,224 92 33 125 120 96 1,024

**Boiler Pumping**

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Inerting Fuel Consumption Savings (lb/1000 bbl offloaded)	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	400,000	HFO	2.70	102.17	28.06	15.0	258	23	6	54	46	30	1,996

MAXIMUM 258 23 6 54 46 30 1,996

**Auxiliary Generator Post-Pumping**

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	400,000	HFO	2.70	3,600	28%	1.0	41	3	1	4	4	3	34

MAXIMUM 41 3 1 4 4 3 34



**Table H.2.NFA/NPA.Un.Max.BP.2010-7. 2010 No Federal Action/No Project Alternative BP Summary of Berth Operations Maximum Daily Unmitigated Emissions.**

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Berth Operations	Boiler	291	26	7	61	52	34	2,254
Berth Operations	Aux Generator	1,367	102	37	139	134	107	1,144

**Table H.2.NFA/NPA.Un.Max.BP.2010-8. 2010 No Federal Action/No Project Alternative BP Tug Main Engines Maximum Daily Unmitigated Emissions.**

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Shipcalls (vessels/day)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
AFRAMAX	Maneuvering - Pilot to Berth	1.00	2	4,800	0.50	MGO	1.0	155	25	5	6	6	0
	Maneuvering - Berth to Pilot	1.00	2	4,800	0.50	MGO	1.0	155	25	5	6	6	0
<b>TOTAL</b>								<b>311</b>	<b>49</b>	<b>10</b>	<b>13</b>	<b>12</b>	<b>0</b>
<b>MAXIMUM</b>								<b>311</b>	<b>49</b>	<b>10</b>	<b>13</b>	<b>12</b>	<b>0</b>

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**Table H.2.NFA/NPA.Un.Max.BP.2010-9. 2010 No Federal Action/No Project Alternative BP Tug Auxiliary Generator Engines Maximum Daily Unmit Emissions.**

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Shipcalls (vessels/day)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
AFRAMAX	Maneuvering - Pilot to Berth	1.00	2	300	1.00	MGO	1.0	16	3	0	1	1	0
	Maneuvering - Berth to Pilot	1.00	2	300	1.00	MGO	1.0	16	3	0	1	1	0
<b>TOTAL</b>								<b>32</b>	<b>6</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>0</b>
<b>MAXIMUM</b>								<b>32</b>	<b>6</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>0</b>

**Table H.2.NFA/NPA.Un.Max.BP.2010-10. 2010 No Federal Action/No Project Alternative BP Summary of Tug Maximum Daily Unmitigated Emissions.**

<b>Mode</b>	<b>Equipment</b>	<b>Maximum Daily NO<sub>x</sub> Emissions (lb/day)</b>	<b>Maximum Daily CO Emissions (lb/day)</b>	<b>Maximum Daily ROG Emissions (lb/day)</b>	<b>Maximum Daily PM<sub>10</sub> Emissions (lb/day)</b>	<b>Maximum Daily PM<sub>2.5</sub> Emissions (lb/day)</b>	<b>Maximum Daily SO<sub>2</sub> Emissions (lb/day)</b>
Tug Assist	Main Engines	311	49	10	13	12	0
Tug Assist	Aux Generator	32	6	1	1	1	0
<b>TOTAL</b>		<b>342</b>	<b>55</b>	<b>11</b>	<b>14</b>	<b>13</b>	<b>0</b>

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Table H.2.NFA/NPA.Un.Max.BP.2010-11. 2010 No Federal Action/No Project Alternative BP VDU Crude Maximum Daily Unmitigated Emissions.

	Maximum Daily Vessel Calls	crude vapors from tanks(scf/call)	daily gas usage (mmscf/day)	mw crude vapors	destruction efficiency
Aframax	1	224,000	0.2	50	98%
<b>TOTAL</b>	<b>1</b>		<b>0.2</b>		

Maximum Daily Emissions (lb/day)

	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene
EF (lb/MMSCF)	130	35	7	7.5	0.38%	9.90%	0.017	0.0004	0.0003	0.0043	0.0027	0.731	0.0366	0.0272	0.0095
Panamax	14.6	3.9	0.8	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0
<b>MAXIMUM</b>	<b>14.6</b>	<b>3.9</b>	<b>0.8</b>	<b>0.8</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.1</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>

Assumed a ratio of 500/1000 based on the corresponding Btu values with respect to natural gas combustion emission factors.

Maximum Daily Emissions (lb/day)

	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene	SO <sub>x</sub>
Site 1	2	0.5	0.10	0.1	0.000	0.00	0.000	0.0000	0.0000	0.0001	0.0000	0.01	0.001	0.000	0.000	0
Site 2	13	3	0.7	0.7	0.00	0.01	0.002	0.0000	0.0000	0.000	0.000	0.1	0.00	0.00	0.001	2

0.78

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Table H.2.NFA/NPA.Un.Max.BP.2010-12. 2010 No Federal Action/No Project Alternative BP VDU Legs Maximum Daily Unmitigated Emissions.

	tanks	crude vapors from tanks on legs(scf/day)	daily gas usage (mmscf/day)	mw crude vapors	destruction efficiency
Site 1	4	23671.23	0.09	50	98%
Site 2	14	23671.23	0.3	50	98%
<b>TOTAL</b>	<b>18</b>		<b>0.4</b>		

Maximum Daily Emissions (lb/day)															
	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene
EF (lb/MMSCF)	130	35	7	7.5	0.38%	9.90%	0.017	0.0004	0.0003	0.0043	0.0027	0.731	0.0366	0.0272	0.0095
<b>TOTAL</b>	<b>27.7</b>	<b>7.5</b>	<b>1.5</b>	<b>1.6</b>	<b>0.0</b>	<b>0.1</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.2</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>

Assumed a ratio of 500/1000 based on the corresponding Btu values with respect to natural gas combustion emission factors.

Maximum Daily Emissions (lb/day)																
	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene	SO <sub>x</sub>
Site 1	6.2	1.7	0.3	0.4	0.00	0.03	0.00	0.000	0.000	0.000	0.00	0.03	0.00	0.00	0.00	1
Site 2	21.5	5.8	1.2	1.2	0.00	0.11	0.00	0.000	0.000	0.001	0.00	0.12	0.01	0.00	0.00	4



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Table H.2.NFA/NPA.Un.Max.BP.2010-14.

2010 No Federal Action/No Project Alternative BP Berth Summary of Maximum Daily Unmitigated Emissions.

Scenario	Operation	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Vessel Arrival/Departure	Cruising and maneuvering	1,062	82	34	95	94	84	674
	Boiler Warm-Up	40	4	1	8	7	5	310
	Tug Assistance	342	55	11	---	14	13	0
	Tanks	---	---	86	---	---	---	---
	Vapor Destruction Units	42.3	11.4	2.3	---	2.4	---	7.6
	Valves, Flanges, Pumps	---	---	3	---	---	---	---
	<b>TOTAL</b>	<b>1,487</b>	<b>152</b>	<b>137</b>	<b>103</b>	<b>118</b>	<b>102</b>	<b>991</b>
Vessel Offloading	Tanker Hoteling	1,367	102	37	139	134	107	1,144
	Offloading	291	26	7	61	52	34	2,254
	Tanks	---	---	86	---	---	---	---
	Vapor Destruction Units	42.3	11.4	2.3	---	2.4	---	7.6
	Valves, Flanges, Pumps	---	---	3	---	---	---	---
	<b>TOTAL</b>	<b>1,700</b>	<b>140</b>	<b>135</b>	<b>200</b>	<b>189</b>	<b>141</b>	<b>3,406</b>
No Vessel/Empty Berth	Vapor Destruction Units	42.3	11.4	2.3	---	2.4	---	7.6
	Tanks	---	---	86	---	---	---	---
	Valves, Flanges, Pumps	---	---	3	---	---	---	---
	<b>TOTAL</b>	<b>42</b>	<b>11</b>	<b>91</b>	<b>0</b>	<b>2</b>	<b>0</b>	<b>8</b>



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Table H.2.NFA/NPA.Un.Ts.2010-1. 2010 No Federal Action/No Project Alternative Tesoro Main Engines Average Daily Unmitigated Emissions.

Ship	Direction	Mode	Distance (nautical miles)	Ship speed (knots)	Activity (hours)	Maximum Speed (knots)	Load Factor	MCR (kW)	Energy (kW-hr)	Fuel Type	Shipscalls (vessels/ yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
AFRAMAX	South In	Cruising - CW to VSR	23	12	1.92	16.1	0.414	12,477	9,902	Dist at 0.2	75	34,761	2,863	1,227	593	593	546	1,590
		Cruising - VSR to PZ	11	12	0.92	16.1	0.414	12,477	4,736	Dist at 0.2	75	16,625	1,369	587	284	284	261	761
		Cruising - PZ to Pilot	4.7	7	0.67	16.1	0.082	12,477	689	Dist at 0.2	75	2,417	199	85	41	41	38	111
	South Out	Maneuvering - Pilot to Berth	3	1.00	16.1	0.006	12,477	81	Dist at 0.2	75	283	23	10	5	5	4	13	
		Maneuvering - Berth to Pilot	5	1.00	16.1	0.030	12,477	374	Dist at 0.2	75	1,312	108	46	22	22	21	60	
		Cruising - Pilot to PZ	3.5	7	0.50	16.1	0.082	12,477	513	Dist at 0.2	75	1,800	148	64	31	31	28	82
		Cruising - PZ to VSR	12.5	12	1.04	16.1	0.414	12,477	5,382	Dist at 0.2	75	18,892	1,556	667	322	322	296	864
		Cruising - VSR to CW	24.5	12	2.04	16.1	0.414	12,477	10,548	Dist at 0.2	75	37,028	3,049	1,307	632	632	581	1,694
		<b>TOTAL</b>											<b>113,117</b>	<b>9,315</b>	<b>3,992</b>	<b>1,930</b>	<b>1,930</b>	<b>1,775</b>

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**Table H.2.NFA/NPA.Un.Ts.2010-2. 2010 No Federal Action/No Project Alternative Tesoro Project Auxiliary Generator Average Daily Unmitigated Emissions.**

Ship	Direction	Mode	Activity (hours)	MCR (kW)	Load Factor	Energy (kW-hr)	Fuel Type	Shipcalls (vessels/yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
AFRAMAX	South In	Cruising	3.50	3,600	0.28	3,533	Dist at 0.2	75	10,140	802	292	204	195	156	665
		Maneuvering	2.00	3,600	0.28	2,016	Dist at 0.2	75	5,787	458	167	116	112	89	379
	South Out	Maneuvering	1.5	3,600	0.28	1,512	Dist at 0.2	75	4,340	343	125	87	84	67	284
		Cruising	3.50	3,600	0.28	3,528	Dist at 0.2	75	10,126	801	291	203	195	156	664

**TOTAL      30,393      2,405      875      610      586      469      1,992**

**Table H.2.NFA/NPA.Un.Ts.2010-3. 2010 No Federal Action/No Project Alternative Tesoro Boiler Warm-Up Average Daily Unmitigated Emissions.**

Shipcalls (vessels/yr)	Vessel Size	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
75.0	Aframax	Dist at 0.2	0.20	102.17	30%	3	50,000	1,221	305	17	202	141	95	1,720
<b>TOTAL</b>								<b>1,221</b>	<b>305</b>	<b>17</b>	<b>202</b>	<b>141</b>	<b>95</b>	<b>1,720</b>

Table H.2.NFA/NPA.Un.Ts.2010-4. 2010 No Federal Action/No Project Alternative Tesoro Berth Operations Average Daily Unmitigated Emissions.

**Auxiliary Generator Pre-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
75.0	Aframax	400,000	Dist at 0.2	0.20	3,600	28%	2.5	7,233	572	208	145	139	112	474
<b>TOTAL</b>								<b>7,233</b>	<b>572</b>	<b>208</b>	<b>145</b>	<b>139</b>	<b>112</b>	<b>474</b>

**Boiler Pre-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
75.0	Aframax	400,000	Dist at 0.2	0.20	102.17	30%	2.5	50,000	1,218	254	54	168	118	79	1,434
<b>TOTAL</b>									<b>1,218</b>	<b>254</b>	<b>54</b>	<b>168</b>	<b>118</b>	<b>79</b>	<b>1,434</b>

**Auxiliary Generator Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
75.0	Aframax	400,000	Dist at 0.2	0.20	3,600	56%	15.0	86,798	6,869	2,498	1,742	1,673	1,338	5,689
<b>TOTAL</b>								<b>86,798</b>	<b>6,869</b>	<b>2,498</b>	<b>1,742</b>	<b>1,673</b>	<b>1,338</b>	<b>5,689</b>

**Boiler Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Inerting Fuel Consumption Savings (lb/1000 bbl offloaded)	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
75.0	Aframax	400,000	Dist at 0.2	0.20	102.17	28.06	15.0	9,428	1,969	416	1,303	912	610	11,091
<b>TOTAL</b>								<b>9,428</b>	<b>1,969</b>	<b>416</b>	<b>1,303</b>	<b>912</b>	<b>610</b>	<b>11,091</b>

**Auxiliary Generator Post-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
75.0	Aframax	400,000	Dist at 0.2	0.20	3,600	28%	1.0	2,893	229	83	58	56	45	190
<b>TOTAL</b>								<b>2,893</b>	<b>229</b>	<b>83</b>	<b>58</b>	<b>56</b>	<b>45</b>	<b>190</b>

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**Table H.2.NFA/NPA.Un.Ts.2010-5. 2010 No Federal Action/No Project Alternative Tesoro Summary of Average Daily Unmitigated Vessel Emissions.**

Mode	Equipment	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Cruising	Main Engines	111,521	9,184	3,936	1,902	1,902	1,750	5,102
Cruising	Aux Generator	20,267	1,604	583	407	391	312	1,328
Maneuvering	Main Engines	1,595	131	56	27	27	25	73
Maneuvering	Aux Generator	10,126	801	291	203	195	156	664
Boiler Warm-up	Boiler	1,221	305	17	202	141	95	1,720
Berth Operations	Boiler	10,646	2,223	470	1,472	1,030	689	12,525
Berth Operations	Aux Generator	96,925	7,670	2,789	1,945	1,868	1,494	6,353
Propulsion	TOTAL	143,510	11,721	4,867	2,540	2,515	2,244	7,167
Non-Propulsion	TOTAL	108,792	10,199	3,276	3,619	3,039	2,278	20,598
<b>Total Emissions</b>		<b>252,302</b>	<b>21,920</b>	<b>8,143</b>	<b>6,159</b>	<b>5,555</b>	<b>4,521</b>	<b>27,766</b>

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Cruising	Main Engines	305.5	25.2	10.8	5.2	5.2	4.8	14.0
Cruising	Aux Generator	55.5	4.4	1.6	1.1	1.1	0.9	3.6
Maneuvering	Main Engines	4.4	0.4	0.2	0.1	0.1	0.1	0.2
Maneuvering	Aux Generator	27.7	2.2	0.8	0.6	0.5	0.4	1.8
Boiler Warm-up	Boiler	3.3	0.8	0.0	0.6	0.4	0.3	4.7
Berth Operations	Boiler	29.2	6.1	1.3	4.0	2.8	1.9	34.3
Berth Operations	Aux Generator	265.5	21.0	7.6	5.3	5.1	4.1	17.4
Propulsion	TOTAL	393.2	32.1	13.3	7.0	6.9	6.1	19.6
Non-Propulsion	TOTAL	298.1	27.9	9.0	9.9	8.3	6.2	56.4
<b>Total Emissions</b>		<b>691</b>	<b>60</b>	<b>22</b>	<b>17</b>	<b>15</b>	<b>12</b>	<b>76</b>

**Table H.2.NFA/NPA.Un.Ts.2010-6. 2010 No Federal Action/No Project Alternative Tesoro Tug Main Engines Average Daily Unmitigated Emissions.**

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Shipcalls (vessels/yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
AFRAMAX	Maneuvering - Pilot to Berth	1.00	2	4,800	0.50	MGO	75.0	11,646	1,854	367	476	438	6
	Maneuvering - Berth to Pilot	1.00	2	4,800	0.50	MGO	75.0	11,646	1,854	367	476	438	6

**TOTAL      23,293      3,707      733      952      875      12**

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**Table H.2.NFA/NPA.Un.Ts.2010-7. 2010 No Federal Action/No Project Alternative Tesoro Tug Auxiliary Generator Engines Average Daily Unmitigated Emissions.**

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Shipcalls (vessels/yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
AFRAMAX	Maneuvering - Pilot to Berth	1.00	2	300	1.00	MGO	75.0	1,194	207	33	56	51	0
	Maneuvering - Berth to Pilot	1.00	2	300	1.00	MGO	75.0	1,194	207	33	56	51	0
<b>TOTAL</b>								<b>2,389</b>	<b>414</b>	<b>67</b>	<b>112</b>	<b>103</b>	<b>1</b>

**Table H.2.NFA/NPA.Un.Ts.2010-8. 2010 No Federal Action/No Project Alternative Tesoro Summary of Tug Average Daily Unmitigated Emissions.**

Mode	Equipment	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Tug Assist	Main Engines	23,293	3,707	733	952	875	12
Tug Assist	Aux Generator	2,389	414	67	112	103	1
<b>TOTAL</b>		<b>25,682</b>	<b>4,121</b>	<b>800</b>	<b>1,063</b>	<b>978</b>	<b>13</b>

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Tug Assist	Main Engines	64	10.2	2.0	2.6	2.4	0.0
Tug Assist	Aux Generator	7	1.1	0.2	0.3	0.3	0.0
<b>TOTAL</b>		<b>70</b>	<b>11.3</b>	<b>2.2</b>	<b>2.9</b>	<b>2.7</b>	<b>0.0</b>



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**Table H.2.NFA/NPA.Un.Ts.2010-9. 2010 No Federal Action/No Project Alternative Tesoro VDU Crude Average Daily Unmitigated Emissions.**

	Annual Vessel Calls	crude vapors from tanks(scf/call)	annual gas usage (mmscf/yr)	mw crude vapors	destruction efficiency
Aframax	75	224,000	16.8	50	98%
<b>TOTAL</b>	<b>75</b>		<b>16.8</b>		

Annual Average (lb/yr)

	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene
EF (lb/MMSCF)	130	35	7	7.5	0.38%	9.90%	0.017	0.0004	0.0003	0.0043	0.0027	0.731	0.0366	0.0272	0.0095
Panamax	1092.0	294.0	58.8	63.0	0.0	0.8	0.1	0.0	0.0	0.0	0.0	6.1	0.3	0.2	0.1
<b>TOTAL</b>	<b>1092.0</b>	<b>294.0</b>	<b>58.8</b>	<b>63.0</b>	<b>0.0</b>	<b>0.8</b>	<b>0.1</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>6.1</b>	<b>0.3</b>	<b>0.2</b>	<b>0.1</b>

Assumed a ratio of 500/1000 based on the corresponding Btu values with respect to natural gas combustion emission factors.

Annual Average (lb/yr)

	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene	SO <sub>x</sub>
Site 1	137	36.8	7.35	7.9	0.004	0.10	0.018	0.0004	0.0003	0.0045	0.0028	0.77	0.038	0.029	0.010	24
Site 2	956	257	51.5	55.1	0.03	0.73	0.125	0.0029	0.0022	0.032	0.020	5.4	0.27	0.20	0.070	171

58.80

**Table H.2.NFA/NPA.Un.Ts.2010-10. 2010 No Federal Action/No Project Alternative Tesoro VDU Legs Average Daily Unmitigated Emissions.**

	tanks	crude vapors from tanks on legs(scft/yr)	annual gas usage (mmscft/yr)	mw crude vapors	destruction efficiency
Site 1	4	8640000	34.6	50	98%
Site 2	14	8640000	121.0	50	98%
<b>TOTAL</b>	<b>18</b>		<b>155.5</b>		

	Annual Average (lb/yr)														
	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene
EF (lb/MMSCF)	130	35	7	7.5	0.38%	9.90%	0.017	0.0004	0.0003	0.0043	0.0027	0.731	0.0366	0.0272	0.0095
<b>TOTAL</b>	<b>10108.8</b>	<b>2721.6</b>	<b>544.3</b>	<b>583.2</b>	<b>2.1</b>	<b>53.9</b>	<b>1.3</b>	<b>0.0</b>	<b>0.0</b>	<b>0.3</b>	<b>0.2</b>	<b>56.8</b>	<b>2.8</b>	<b>2.1</b>	<b>0.7</b>

*Assumed a ratio of 500/1000 based on the corresponding Btu values with respect to natural gas combustion emission factors.*

	Annual Average (lb/yr)															
	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene	SO <sub>x</sub>
Site 1	2246.4	604.8	121.0	129.6	0.46	11.98	0.29	0.007	0.005	0.074	0.05	12.63	0.63	0.47	0.16	402
Site 2	7862.4	2116.8	423.4	453.6	1.61	41.91	1.03	0.024	0.018	0.260	0.16	44.21	2.21	1.65	0.57	1407



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Table H.2.NFA/NPA.Un.Ts.2010-12.

2010 No Federal Action/No Project Alternative Tesoro Berth Summary of Average Daily Unmitigated Emissions.

Operation	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Tanker Cruising and Maneuvering	143,510	11,721	4,867	2,540	2,515	2,244	7,167
Tanker Hoteling	96,925	7,670	2,789	1,945	1,868	1,494	6,353
Offloading Emissions	10,646	2,223	470	1,472	1,030	689	12,525
Transiting Operations	1,221	305	17	202	141	95	1,720
Tug Assistance	25,682	4,121	800	---	1,063	978	13
Tanks	---	---	3,152	---	---	---	---
Vapor Destruction Units	11,201	3,016	603	---	646	---	2,004
Valves, Flanges, Pumps	---	---	1,188	---	---	---	---
<b>TOTAL</b>	<b>289,185</b>	<b>29,056</b>	<b>13,886</b>	<b>6,159</b>	<b>7,264</b>	<b>5,499</b>	<b>29,783</b>

Operation	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Tanker Cruising and Maneuvering	393	32	13	7	7	6	20
Tanker Hoteling	266	21	8	5	5	4	17
Offloading Emissions	29	6	1	4	3	2	34
Transiting Operations	3	0.8	0.05	0.6	0.4	0.26	5
Tug Assistance	70	11	2.2	---	2.9	2.7	0.0
Tanks	---	---	8.6	---	---	---	---
Vapor Destruction Units	31	8	2	---	2	---	5
Valves, Flanges, Pumps	---	---	3	---	---	---	---
<b>TOTAL</b>	<b>792</b>	<b>80</b>	<b>38</b>	<b>17</b>	<b>20</b>	<b>15</b>	<b>82</b>

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**Table H.2.NFA/NPA.Un.Max.Ts.2010-1. 2010 No Federal Action/No Project Alternative Tesoro Main Engines Maximum Daily Unmitigated Emissions.**

Ship	Direction	Mode	Distance (nautical miles)	Ship speed (knots)	Activity (hours)	Maximum Speed (knots)	Load Factor	MCR (kW)	Energy (kW-hr)	Fuel Type	Maximum Daily Shipcalls (vessels/day)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)	
AFRAMAX	South In	Cruising - CW to VSR	23	12	1.92	16.1	0.414	12,477	9,902	Dist at 0.2	1.0	463	38	16	8	8	7	21	
		Cruising - VSR to PZ	11	12	0.92	16.1	0.414	12,477	4,736	Dist at 0.2	1.0	222	18	8	4	4	3	10	
		Cruising - PZ to Pilot	4.7	7	0.67	16.1	0.082	12,477	689	Dist at 0.2	1.0	32	3	1	1	1	1	1	
		Maneuvering - Pilot to Berth		3	1.00	16.1	0.006	12,477	81	Dist at 0.2	1.0	4	0.3	0.1	0.1	0.1	0.1	0	
	South Out	Maneuvering - Berth to Pilot			5	1.00	16.1	0.030	12,477	374	Dist at 0.2	1.0	17	1	1	0	0	0	1
		Cruising - Pilot to PZ	3.5	7	0.50	16.1	0.082	12,477	513	Dist at 0.2	1.0	24	2	1	0	0	0	1	
		Cruising - PZ to VSR	12.5	12	1.04	16.1	0.414	12,477	5,382	Dist at 0.2	1.0	252	21	9	4	4	4	12	
		Cruising - VSR to CW	24.5	12	2.04	16.1	0.414	12,477	10,548	Dist at 0.2	1.0	494	41	17	8	8	8	23	
		<b>TOTAL</b>											<b>787</b>	<b>65</b>	<b>28</b>	<b>13</b>	<b>13</b>	<b>12</b>	<b>36</b>
		<b>MAXIMUM</b>											<b>787</b>	<b>65</b>	<b>28</b>	<b>13</b>	<b>13</b>	<b>12</b>	<b>36</b>

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**Table H.2.NFA/NPA.Un.Max.Ts.2010-2. 2010 No Federal Action/No Project Alternative Tesoro Project Auxiliary Generator Maximum Daily Unmitigated Emissions**

Ship	Direction	Mode	Activity (hours)	MCR (kW)	Load Factor	Energy (kW-hr)	Fuel Type	Maximum Daily Shipcalls (vessels/day)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)	
AFRAMAX	South In	Cruising	3.50	3,600	0.28	3,528	Dist at 0.2	1.0	135	11	4	3	3	2	9	
		Maneuvering	2.00	3,600	0.28	2,016	Dist at 0.2	1.0	77	6	2	2	2	1	5	
			<b>TOTAL</b>						<b>212</b>	<b>17</b>	<b>6</b>	<b>5</b>	<b>4</b>	<b>4</b>	<b>4</b>	<b>14</b>
	South Out	Maneuvering	1.5	3,600	0.28	1,512	Dist at 0.2	1.0	58	5	2	1	1	1	4	
		Cruising	3.50	3,600	0.28	3,528	Dist at 0.2	1.0	135	11	4	3	3	2	9	
			<b>TOTAL</b>						<b>193</b>	<b>15</b>	<b>6</b>	<b>4</b>	<b>4</b>	<b>3</b>	<b>13</b>	
		<b>MAXIMUM</b>						<b>212</b>	<b>17</b>	<b>6</b>	<b>5</b>	<b>4</b>	<b>4</b>	<b>14</b>		

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**Table H.2.NFA/NPA.Un.Max.Ts.2010-3. 2010 No Federal Action/No Project Alternative Tesoro Summary of Maximum Daily Unmitigated Vessel Emissions.**

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Cruising	Main Engines	770	63	27	13	13	12	35
Cruising	Aux Generator	135	11	4	3	3	2	9
Maneuvering	Main Engines	17	1	1	0	0	0	1
Maneuvering	Aux Generator	77	6	2	2	2	1	5
<b>Maneuvering</b>	<b>TOTAL</b>	<b>95</b>	<b>8</b>	<b>3</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>6</b>
<b>Propulsion</b>	<b>TOTAL</b>	<b>999</b>	<b>82</b>	<b>34</b>	<b>18</b>	<b>18</b>	<b>16</b>	<b>50</b>

**Table H.2.NFA/NPA.Un.Max.Ts.2010-4. 2010 No Federal Action/No Project Alternative Tesoro Boiler Warm-Up Maximum Daily Unmitigated Emissions.**

Shipcalls (vessels/day)	Vessel Size	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	NO <sub>2</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	Dist at 0.2	0.20	102.17	30%	3	50,000	16	4	0.2	3	2	1	23

MAXIMUM      16      4      0      3      2      1      23



**Table H.2.NFA/NPA.Un.Max.Ts.2010-5. 2010 No Federal Action/No Project Alternative Tesoro Summary of Boiler Warm-Up Maximum Unmitigated Emissions.**

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Boiler Warm-up	Boiler	16	4	0	3	2	1	23

Table H.2.NFA/NPA.Un.Max.Ts.2010-6. 2010 No Federal Action/No Project Alternative Tesoro Berth Operations Maximum Daily Unmitigated Emissions.

**Auxiliary Generator Pre-Pumping**

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	400,000	Dist at 0.2	0.20	3,600	28%	2.5	96	8	3	2	2	2	6
MAXIMUM								96	8	3	2	2	2	6

**Boiler Pre-Pumping**

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	400,000	Dist at 0.2	0.20	102.17	30%	2.5	50,000	14	3	0	2	2	1	19
MAXIMUM									14	3	0	2	2	1	19

**Auxiliary Generator Pumping**

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	400,000	Dist at 0.2	0.20	3,600	56%	15.0	1,157	92	33	25	24	19	76
MAXIMUM								1,157	92	33	25	24	19	76

**Boiler Pumping**

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Inerting Fuel Consumption Savings (lb/1000 bbl offloaded)	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	400,000	Dist at 0.2	0.20	102.17	28.06	15.0	105	26	1	17	12	8	148
MAXIMUM								105	26	1	17	12	8	148

**Auxiliary Generator Post-Pumping**

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	400,000	Dist at 0.2	0.20	3,600	28%	1.0	39	3	1	1	1	1	3
MAXIMUM								39	3	1	1	1	1	3

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**Table H.2.NFA/NPA.Un.Max.Ts.2010-7. 2010 No Federal Action/No Project Alternative Tesoro Summary of Berth Operations Maximum Daily Unmitigated Emissions.**

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Berth Operations	Boiler	119	30	2	20	14	9	167
Berth Operations	Aux Generator	1,292	102	37	28	27	21	85

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**Table H.2.NFA/NPA.Un.Max.Ts.2010-8. 2010 No Federal Action/No Project Alternative Tesoro Tug Main Engines Maximum Daily Unmitigated Emissions.**

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Shipcalls (vessels/day)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
AFRAMAX	Maneuvering - Pilot to Berth	1.00	2	4,800	0.50	MGO	1.0	155	25	5	6	6	0
	Maneuvering - Berth to Pilot	1.00	2	4,800	0.50	MGO	1.0	155	25	5	6	6	0
<b>TOTAL</b>								<b>311</b>	<b>49</b>	<b>10</b>	<b>13</b>	<b>12</b>	<b>0</b>
<b>MAXIMUM</b>								<b>311</b>	<b>49</b>	<b>10</b>	<b>13</b>	<b>12</b>	<b>0</b>

**Table H.2.NFA/NPA.Un.Max.Ts.2010-9. 2010 No Federal Action/No Project Alternative Tesoro Tug Auxiliary Generator Engines Maximum Daily Unmitigated Emissions.**

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Shipcalls (vessels/day)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
AFRAMAX	Maneuvering - Pilot to Berth	1.00	2	300	1.00	MGO	1.0	16	3	0	1	1	0
	Maneuvering - Berth to Pilot	1.00	2	300	1.00	MGO	1.0	16	3	0	1	1	0
<b>TOTAL</b>								<b>32</b>	<b>6</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>0</b>
<b>MAXIMUM</b>								<b>32</b>	<b>6</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>0</b>

**Table H.2.NFA/NPA.Un.Max.Ts.2010-10. 2010 No Federal Action/No Project Alternative Tesoro Summary of Tug Maximum Daily Unmitigated Emissions.**

	<b>Equipment</b>	<b>Maximum Daily NO<sub>x</sub> Emissions (lb/day)</b>	<b>Maximum Daily CO Emissions (lb/day)</b>	<b>Maximum Daily ROG Emissions (lb/day)</b>	<b>Maximum Daily PM<sub>10</sub> Emissions (lb/day)</b>	<b>Maximum Daily PM<sub>2.5</sub> Emissions (lb/day)</b>	<b>Maximum Daily SO<sub>2</sub> Emissions (lb/day)</b>
Tug Assist	Main Engines	311	49	10	13	12	0
Tug Assist	Aux Generator	32	6	1	1	1	0
<b>TOTAL</b>		<b>342</b>	<b>55</b>	<b>11</b>	<b>14</b>	<b>13</b>	<b>0</b>

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**Table H.2.NFA/NPA.Un.Max.Ts.2010-11. 2010 No Federal Action/No Project Alternative Tesoro VDU Crude Maximum Daily Unmitigated Emissions.**

	Maximum Daily Vessel Calls	crude vapors from tanks(scf/call)	daily gas usage (mmscf/day)	mw crude vapors	destruction efficiency
Aframax	1	224,000	0.2	50	98%
<b>TOTAL</b>	<b>1</b>		<b>0.2</b>		

Maximum Daily Emissions (lb/day)

	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene
EF (lb/MMSCF)	130	35	7	7.5	0.38%	9.90%	0.017	0.0004	0.0003	0.0043	0.0027	0.731	0.0366	0.0272	0.0095
Panamax	14.6	3.9	0.8	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0
<b>MAXIMUM</b>	<b>14.6</b>	<b>3.9</b>	<b>0.8</b>	<b>0.8</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.1</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>

Assumed a ratio of 500/1000 based on the corresponding Btu values with respect to natural gas combustion emission factors.

Maximum Daily Emissions (lb/day)

	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene	SO <sub>x</sub>
Site 1	2	0.5	0.10	0.1	0.000	0.00	0.000	0.0000	0.0000	0.0001	0.0000	0.01	0.001	0.000	0.000	0
Site 2	13	3	0.7	0.7	0.00	0.01	0.002	0.0000	0.0000	0.000	0.000	0.1	0.00	0.00	0.001	2

0.78

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**Table H.2.NFA/NPA.Un.Max.Ts.2010-12. 2010 No Federal Action/No Project Alternative Tesoro VDU Legs Maximum Daily Unmitigated Emissions.**

	tanks	crude vapors from tanks on legs(scfd/day)	daily gas usage (mmscf/day)	mw crude vapors	destruction efficiency
Site 1	4	23671.23	0.09	50	98%
Site 2	14	23671.23	0.3	50	98%
<b>TOTAL</b>	<b>18</b>		<b>0.4</b>		

Maximum Daily Emissions (lb/day)															
	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene
EF (lb/MMSCF)	130	35	7	7.5	0.38%	9.90%	0.017	0.0004	0.0003	0.0043	0.0027	0.731	0.0366	0.0272	0.0095
<b>TOTAL</b>	<b>27.7</b>	<b>7.5</b>	<b>1.5</b>	<b>1.6</b>	<b>0.0</b>	<b>0.1</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.2</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>

Assumed a ratio of 500/1000 based on the corresponding Btu values with respect to natural gas combustion emission factors.

Maximum Daily Emissions (lb/day)																
	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene	SO <sub>x</sub>
Site 1	6.2	1.7	0.3	0.4	0.00	0.03	0.00	0.000	0.000	0.000	0.00	0.03	0.00	0.00	0.00	1
Site 2	21.5	5.8	1.2	1.2	0.00	0.11	0.00	0.000	0.000	0.001	0.00	0.12	0.01	0.00	0.00	4





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Table H.2.NFA/NPA.Un.Max.Ts.2010-14.

2010 No Federal Action/No Project Alternative Tesoro Berth Summary of Maximum Daily Unmitigated Emissions.

Scenario	Operation	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Vessel Arrival/Departure	Cruising and maneuvering	999	82	34	18	18	16	50
	Boiler Warm-Up	16	4	0	3	2	1	23
	Tug Assistance	342	55	11	---	14	13	0
	Tanks	---	---	86	---	---	---	---
	Vapor Destruction Units Valves, Flanges, Pumps	42.3 ---	11.4 ---	2.3 3.25	---	2.4 ---	---	7.6 ---
	<b>TOTAL</b>	<b>1,400</b>	<b>152</b>	<b>136</b>	<b>21</b>	<b>36</b>	<b>30</b>	<b>81</b>
Vessel Offloading	Tanker Hoteling	1,292	102	37	28	27	21	85
	Offloading	119	30	2	20	14	9	167
	Tanks	---	---	86	---	---	---	---
	Vapor Destruction Units	42.3	11.4	2.3	---	2.4	---	7.6
	Valves, Flanges, Pumps	---	---	3.25	---	---	---	---
	<b>TOTAL</b>	<b>1,453</b>	<b>143</b>	<b>130</b>	<b>48</b>	<b>43</b>	<b>31</b>	<b>259</b>
No Vessel/Empty Berth	Vapor Destruction Units	42.3	11.4	2.3	---	2.4	---	7.6
	Tanks	---	---	86	---	---	---	---
	Valves, Flanges, Pumps	---	---	3.25	---	---	---	---
	<b>TOTAL</b>	<b>42</b>	<b>11</b>	<b>91</b>	<b>0</b>	<b>2</b>	<b>0</b>	<b>8</b>

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Table H.2.NFA/NPA.Un.Ex.2010-1. 2010 No Federal Action/No Project Alternative Exxon Mobil Main Engines Average Daily Unmitigated Emissions.

Ship	Direction	Mode	Distance (nautical miles)	Ship speed (knots)	Activity (hours)	Maximum Speed (knots)	Load Factor	MCR (kW)	Energy (kW-hr)	Fuel Type	Shipcalls (vessels/ yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)	
PANAMAX	South In	Cruising - CW to VSR	23	12	1.92	15.8	0.438	10,300	8,649	HFO	125	53,876	4,167	1,786	4,643	4,643	4,272	31,254	
		Cruising - VSR to PZ	11	12	0.92	15.8	0.438	10,300	4,136	HFO	125	25,767	1,993	854	2,221	2,221	2,043	14,948	
		Cruising - PZ to Pilot	4.7	7	0.67	15.8	0.087	10,300	601	HFO	125	3,746	290	124	323	323	297	2,173	
	South Out	Maneuvering - Pilot to Berth			3	1.00	15.8	0.007	10,300	71	HFO	125	439	34	15	38	38	35	255
		Maneuvering - Berth to Pilot			5	1.00	15.8	0.032	10,300	326	HFO	125	2,033	157	67	175	175	161	1,180
		Cruising - Pilot to PZ		3.5	7	0.50	15.8	0.087	10,300	448	HFO	125	2,790	216	92	240	240	221	1,618
		Cruising - PZ to VSR		12.5	12	1.04	15.8	0.438	10,300	4,700	HFO	125	29,281	2,265	971	2,524	2,524	2,322	16,986
		Cruising - VSR to CW		24.5	12	2.04	15.8	0.438	10,300	9,213	HFO	125	57,390	4,439	1,902	4,946	4,946	4,551	33,293
		<b>TOTAL</b>											<b>175,323</b>	<b>13,561</b>	<b>5,812</b>	<b>15,111</b>	<b>15,111</b>	<b>13,902</b>	<b>101,707</b>

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**Table H.2.NFA/NPA.Un.Ex.2010-2. 2010 No Federal Action/No Project Alternative Exxon Mobil Project Auxiliary Generator Average Daily Unmitigated Emissions.**

Ship	Direction	Mode	Activity (hours)	MCR (kW)	Load Factor	Energy (kW-hr)	Fuel Type	Shipcalls (vessels/yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
PANAMAX	South In	Cruising	3.50	3,600	0.28	3,533	HFO	125	17,873	1,337	486	1,824	1,751	1,401	14,955
		Maneuvering	2.00	3,600	0.28	2,016	HFO	125	10,199	763	278	1,041	999	799	8,534
	South Out	Maneuvering	1.5	3,600	0.28	1,512	HFO	125	7,650	572	208	781	749	599	6,401
		Cruising	3.58	3,600	0.28	3,612	HFO	125	18,274	1,367	497	1,865	1,790	1,432	15,290
<b>TOTAL</b>									<b>53,996</b>	<b>4,041</b>	<b>1,469</b>	<b>5,510</b>	<b>5,289</b>	<b>4,232</b>	<b>45,180</b>

**Table H.2.NFA/NPA.Un.Ex.2010-3. 2010 No Federal Action/No Project Alternative Exxon Mobil Boiler Warm-Up Average Daily Unmitigated Emissions.**

Shipcalls (vessels/yr)	Vessel Size	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
125.0	Panamax	HFO	2.70	63.30	30%	3	35,000	2,170	196	50	454	390	254	16,786
<b>TOTAL</b>								<b>2,170</b>	<b>196</b>	<b>50</b>	<b>454</b>	<b>390</b>	<b>254</b>	<b>16,786</b>

Table H.2.NFA/NPA.Un.Ex.2010-4. 2010 No Federal Action/No Project Alternative Exxon Mobil Berth Operations Average Daily Unmitigated Emissions

**Auxiliary Generator Pre-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
125.0	Panamax	300,000	HFO	2.70	3,600	28%	2.5	12,749	954	347	1,301	1,249	999	10,668
<b>TOTAL</b>								<b>12,749</b>	<b>954</b>	<b>347</b>	<b>1,301</b>	<b>1,249</b>	<b>999</b>	<b>10,668</b>

**Boiler Pre-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
125.0	Panamax	300,000	HFO	2.70	59.91	30%	2.5	35,000	1,461	154	32	919	790	515	13,239
<b>TOTAL</b>									<b>1,461</b>	<b>154</b>	<b>32</b>	<b>919</b>	<b>790</b>	<b>515</b>	<b>13,239</b>

**Auxiliary Generator Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
125.0	Panamax	300,000	HFO	2.70	3,600	56%	11.0	112,193	8,395	3,053	11,448	10,990	8,792	93,876
<b>TOTAL</b>								<b>112,193</b>	<b>8,395</b>	<b>3,053</b>	<b>11,448</b>	<b>10,990</b>	<b>8,792</b>	<b>93,876</b>

**Boiler Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Inerting Fuel Consumption Savings (lb/1000 bbl offloaded)	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
125.0	Panamax	300,000	HFO	2.70	59.91	28.06	11.0	8,878	938	194	5,583	4,801	3,126	80,438
<b>TOTAL</b>								<b>8,878</b>	<b>938</b>	<b>194</b>	<b>5,583</b>	<b>4,801</b>	<b>3,126</b>	<b>80,438</b>

**Auxiliary Generator Post-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
125.0	Panamax	300,000	HFO	2.70	3,600	28%	1.0	5,100	382	139	520	500	400	4,267
<b>TOTAL</b>								<b>5,100</b>	<b>382</b>	<b>139</b>	<b>520</b>	<b>500</b>	<b>400</b>	<b>4,267</b>

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**Table H.2.NFA/NPA.Un.Ex.2010-5. 2010 No Federal Action/No Project Alternative Exxon Mobil Summary of Average Daily Unmitigated Vessel Emissions.**

Mode	Equipment	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Cruising	Main Engines	172,850	13,370	5,730	14,898	14,898	13,706	100,272
Cruising	Aux Generator	36,147	2,705	984	3,688	3,541	2,833	30,245
Maneuvering	Main Engines	2,473	191	82	213	213	196	1,434
Maneuvering	Aux Generator	17,849	1,336	486	1,821	1,748	1,399	14,935
Boiler Warm-up	Boiler	2,170	196	50	454	390	254	16,786
Berth Operations	Boiler	10,339	1,093	226	6,502	5,592	3,641	93,677
Berth Operations	Aux Generator	130,042	9,731	3,539	13,270	12,739	10,191	108,810
Propulsion	TOTAL	229,319	17,601	7,281	20,620	20,400	18,133	146,887
Non-Propulsion	TOTAL	142,550	11,020	3,814	20,225	18,721	14,086	219,273
<b>Total Emissions</b>		<b>371,869</b>	<b>28,621</b>	<b>11,095</b>	<b>40,846</b>	<b>39,121</b>	<b>32,220</b>	<b>366,159</b>

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Cruising	Main Engines	473.6	36.6	15.7	40.8	40.8	37.6	274.7
Cruising	Aux Generator	99.0	7.4	2.7	10.1	9.7	7.8	82.9
Maneuvering	Main Engines	6.8	0.5	0.2	0.6	0.6	0.5	3.9
Maneuvering	Aux Generator	48.9	3.7	1.3	5.0	4.8	3.8	40.9
Boiler Warm-up	Boiler	5.9	0.5	0.1	1.2	1.1	0.7	46.0
Berth Operations	Boiler	28.3	3.0	0.6	17.8	15.3	10.0	256.6
Berth Operations	Aux Generator	356.3	26.7	9.7	36.4	34.9	27.9	298.1
Propulsion	TOTAL	628.3	48.2	19.9	56.5	55.9	49.7	402.4
Non-Propulsion	TOTAL	390.5	30.2	10.4	55.4	51.3	38.6	600.7
<b>Total Emissions</b>		<b>1,019</b>	<b>78</b>	<b>30</b>	<b>112</b>	<b>107</b>	<b>88</b>	<b>1,003</b>

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**Table H.2.NFA/NPA.Un.Ex.2010-6. 2010 No Federal Action/No Project Alternative Exxon Mobil Tug Main Engines Average Daily Unmitigated Emissions.**

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Shipcalls (vessels/yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
PANAMAX	Maneuvering - Pilot to Berth	1.00	2	4,800	0.50	MGO	125.0	19,411	3,089	611	793	730	10
	Maneuvering - Berth to Pilot	1.00	2	4,800	0.50	MGO	125.0	19,411	3,089	611	793	730	10
<b>TOTAL</b>								<b>38,822</b>	<b>6,178</b>	<b>1,222</b>	<b>1,586</b>	<b>1,459</b>	<b>20</b>



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**Table H.2.NFA/NPA.Un.Ex.2010-7. 2010 No Federal Action/No Project Alternative Exxon Mobil Tug Auxiliary Generator Engines Average Daily Unmitigated Emissions.**

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Shipcalls (vessels/yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
PANAMAX	Maneuvering - Pilot to Berth	1.00	2	300	1.00	MGO	125.0	1,991	345	56	93	85	1
	Maneuvering - Berth to Pilot	1.00	2	300	1.00	MGO	125.0	1,991	345	56	93	85	1
<b>TOTAL</b>								<b>3,981</b>	<b>690</b>	<b>112</b>	<b>186</b>	<b>171</b>	<b>2</b>

**Table H.2.NFA/NPA.Un.Ex.2010-8. 2010 No Federal Action/No Project Alternative Exxon Mobil Summary of Tug Average Daily Unmitigated Emissions.**

Mode	Equipment	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Tug Assist	Main Engines	38,822	6,178	1,222	1,586	1,459	20
Tug Assist	Aux Generator	3,981	690	112	186	171	2
<b>TOTAL</b>		<b>42,803</b>	<b>6,868</b>	<b>1,334</b>	<b>1,772</b>	<b>1,630</b>	<b>21</b>

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Tug Assist	Main Engines	106	16.9	3.3	4.3	4.0	0.1
Tug Assist	Aux Generator	11	1.9	0.3	0.5	0.5	0.0
<b>TOTAL</b>		<b>117</b>	<b>18.8</b>	<b>3.7</b>	<b>4.9</b>	<b>4.5</b>	<b>0.1</b>

**Table H.2.NFA/NPA.Un.Ex.2010-9. 2010 No Federal Action/No Project Alternative Exxon Mobil VDU Crude Average Daily Unmitigated Emissions.**

	Annual Vessel Calls	crude vapors from tanks(scft/call)	annual gas usage (mmscft/yr)	mw crude vapors	destruction efficiency
Panamax	125	116,667	14.6	50	98%
<b>TOTAL</b>	<b>125</b>		<b>14.6</b>		

Annual Average (lb/yr)

	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene
EF (lb/MMSCF)	130	35	7	7.5	0.38%	9.90%	0.017	0.0004	0.0003	0.0043	0.0027	0.731	0.0366	0.0272	0.0095
Panamax	947.9	255.2	51.0	54.7	0.0	0.7	0.1	0.0	0.0	0.0	0.0	5.3	0.3	0.2	0.1
<b>TOTAL</b>	<b>947.9</b>	<b>255.2</b>	<b>51.0</b>	<b>54.7</b>	<b>0.0</b>	<b>0.7</b>	<b>0.1</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>5.3</b>	<b>0.3</b>	<b>0.2</b>	<b>0.1</b>

Assumed a ratio of 500/1000 based on the corresponding Btu values with respect to natural gas combustion emission factors.

Annual Average (lb/yr)

	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene	SO <sub>x</sub>
Site 1	118	31.9	6.38	6.8	0.003	0.09	0.015	0.0004	0.0003	0.0039	0.0025	0.67	0.033	0.025	0.009	21
Site 2	829	223	44.7	47.9	0.02	0.63	0.108	0.0026	0.0019	0.027	0.017	4.7	0.23	0.17	0.061	148

51.04

**Table H.2.NFA/NPA.Un.Ex.2010-10. 2010 No Federal Action/No Project Alternative Exxon Mobil VDU Legs Average Daily Unmitigated Emissions.**

	tanks	crude vapors from tanks on legs(sc/yr)	annual gas usage (mmscf/yr)	mw crude vapors	destruction efficiency
Site 1	4	8640000	34.6	50	98%
Site 2	14	8640000	121.0	50	98%
<b>TOTAL</b>	<b>18</b>		<b>155.5</b>		

Annual Average (lb/yr)															
	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene
EF (lb/MMSCF)	130	35	7	7.5	0.38%	9.90%	0.017	0.0004	0.0003	0.0043	0.0027	0.731	0.0366	0.0272	0.0095
<b>TOTAL</b>	<b>10108.8</b>	<b>2721.6</b>	<b>544.3</b>	<b>583.2</b>	<b>2.1</b>	<b>53.9</b>	<b>1.3</b>	<b>0.0</b>	<b>0.0</b>	<b>0.3</b>	<b>0.2</b>	<b>56.8</b>	<b>2.8</b>	<b>2.1</b>	<b>0.7</b>

*Assumed a ratio of 500/1000 based on the corresponding Btu values with respect to natural gas combustion emission factors.*

Annual Average (lb/yr)																
	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene	SO <sub>x</sub>
Site 1	2246.4	604.8	121.0	129.6	0.46	11.98	0.29	0.007	0.005	0.074	0.05	12.63	0.63	0.47	0.16	402
Site 2	7862.4	2116.8	423.4	453.6	1.61	41.91	1.03	0.024	0.018	0.260	0.16	44.21	2.21	1.65	0.57	1407



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Table H.2.NFA/NPA.Un.Ex.2010-12.

2010 No Federal Action/No Project Alternative Exxon Mobil Berth Summary of Average Daily Unmitigated Emissions.

Operation	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Tanker Cruising and Maneuvering	229,319	17,601	7,281	20,620	20,400	18,133	146,887
Tanker Hoteling	130,042	9,731	3,539	13,270	12,739	10,191	108,810
Offloading Emissions	10,339	1,093	226	6,502	5,592	3,641	93,677
Transiting Operations	2,170	196	50	454	390	254	16,786
Tug Assistance	42,803	6,868	1,334	---	1,772	1,630	21
Tanks	---	---	3,152	---	---	---	---
Vapor Destruction Units	11,057	2,977	595	---	638	---	1,979
Valves, Flanges, Pumps	---	---	1,188	---	---	---	---
<b>TOTAL</b>	<b>425,729</b>	<b>38,466</b>	<b>17,364</b>	<b>40,846</b>	<b>41,530</b>	<b>33,850</b>	<b>368,160</b>

Operation	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Tanker Cruising and Maneuvering	628	48	20	56	56	50	402
Tanker Hoteling	356	27	10	36	35	28	298
Offloading Emissions	28	3	1	18	15	10	257
Transiting Operations	6	1	0.1	1.2	1.1	0.7	46
Tug Assistance	117	19	3.7	---	4.9	4.5	0.1
Tanks	---	---	8.6	---	---	---	---
Vapor Destruction Units	30	8	2	---	2	---	5
Valves, Flanges, Pumps	---	---	3	---	---	---	---
<b>TOTAL</b>	<b>1,166</b>	<b>105</b>	<b>48</b>	<b>112</b>	<b>114</b>	<b>93</b>	<b>1,009</b>

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**Table H.2.NFA/NPA.Un.Max.Ex.2010-1. 2010 No Federal Action/No Project Alternative Exxon Mobil Main Engines Maximum Daily Unmitigated Emissions.**

Ship	Direction	Mode	Distance (nautical miles)	Ship speed (knots)	Activity (hours)	Maximum Speed (knots)	Load Factor	MCR (kW)	Energy (kW-hr)	Fuel Type	Maximum Daily Shipcalls (vessels/day)	NO <sub>x</sub> Emission s (lb/day)	CO Emission s (lb/day)	ROG Emission s (lb/day)	PM Emission s (lb/day)	PM <sub>10</sub> Emission s (lb/day)	PM <sub>2.5</sub> Emission s (lb/day)	SO <sub>2</sub> Emission s (lb/day)	
PANAMAX	South In	Cruising - CW to VSR	23	14.7	1.56	15.8	0.805	10,300	12,979	HFO	1.0	647	50	21	56	56	51	375	
		Cruising - VSR to PZ	11	12	0.92	15.8	0.438	10,300	4,136	HFO	1.0	206	16	7	18	18	16	120	
		Cruising - PZ to Pilot	4.7	7	0.67	15.8	0.087	10,300	601	HFO	1.0	30	2	1	3	3	2	17	
		Maneuvering - Pilot to Berth		3	1.00	15.8	0.007	10,300	71	HFO	1.0	4	0.3	0.1	0.3	0.3	0.3	2	
			<b>TOTAL</b>									<b>886</b>	<b>69</b>	<b>29</b>	<b>76</b>	<b>76</b>	<b>70</b>	<b>514</b>	
	South Out	Maneuvering - Berth to Pilot			5	1.00	15.8	0.032	10,300	326	HFO	1.0	16	1	1	1	1	1	9
		Cruising - Pilot to PZ		3.5	7	0.50	15.8	0.087	10,300	448	HFO	1.0	22	2	1	2	2	2	13
		Cruising - PZ to VSR		12.5	12	1.04	15.8	0.438	10,300	4,700	HFO	1.0	234	18	8	20	20	19	136
		Cruising - VSR to CW		24.5	14.7	1.67	15.8	0.805	10,300	13,825	HFO	1.0	689	53	23	59	59	55	400
				<b>TOTAL</b>									<b>962</b>	<b>74</b>	<b>32</b>	<b>83</b>	<b>83</b>	<b>76</b>	<b>558</b>
			<b>MAXIMUM</b>									<b>962</b>	<b>74</b>	<b>32</b>	<b>83</b>	<b>83</b>	<b>76</b>	<b>558</b>	

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Table H.2.NFA/NPA.Un.Max.Ex.2010-2. 2010 No Federal Action/No Project Alternative Exxon Mobil Project Auxiliary Generator Maximum Daily Unmitigated Emissions

Ship	Direction	Mode	Activity (hours)	MCR (kW)	Load Factor	Energy (kW-hr)	Fuel Type	Maximum Daily Shipcalls (vessels/day)	NO <sub>x</sub> Emission s (lb/day)	CO Emission s (lb/day)	ROG Emission s (lb/day)	PM Emission s (lb/day)	PM <sub>10</sub> Emission s (lb/day)	PM <sub>2.5</sub> Emission s (lb/day)	SO <sub>2</sub> Emission s (lb/day)
PANAMAX	South In	Cruising	3.15	3,600	0.28	3,178	HFO	1.0	129	10	3	13	13	10	108
		Maneuvering	2.00	3,600	0.28	2,016	HFO	1.0	82	6	2	8	8	6	68
			<b>TOTAL</b>						<b>210</b>	<b>16</b>	<b>6</b>	<b>21</b>	<b>21</b>	<b>16</b>	<b>176</b>
	South Out	Maneuvering	1.5	3,600	0.28	1,512	HFO	1.0	61	5	2	6	6	5	51
		Cruising	3.21	3,600	0.28	3,234	HFO	1.0	131	10	4	13	13	10	110
			<b>TOTAL</b>						<b>192</b>	<b>14</b>	<b>5</b>	<b>20</b>	<b>19</b>	<b>15</b>	<b>161</b>
		<b>MAXIMUM</b>						<b>210</b>	<b>16</b>	<b>6</b>	<b>21</b>	<b>21</b>	<b>16</b>	<b>176</b>	



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Table H.2.NFA/NPA.Un.Max.Ex.2010-3. 2010 No Federal Action/No Project Alternative Exxon Mobil Summary of Maximum Daily Unmitigated Vessel Emissions.

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Cruising	Main Engines	946	73	31	81	81	75	549
Cruising	Aux Generator	129	10	3	13	13	10	108
Maneuvering	Main Engines	16	1	1	1	1	1	9
Maneuvering	Aux Generator	82	6	2	8	8	6	68
<b>Maneuvering</b>	<b>TOTAL</b>	<b>98</b>	<b>7</b>	<b>3</b>	<b>10</b>	<b>9</b>	<b>8</b>	<b>78</b>
<b>Propulsion</b>	<b>TOTAL</b>	<b>1,172</b>	<b>90</b>	<b>38</b>	<b>104</b>	<b>103</b>	<b>93</b>	<b>734</b>

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Table H.2.NFA/NPA.Un.Max.Ex.2010-4. 2010 No Federal Action/No Project Alternative Exxon Mobil Boiler Warm-Up Maximum Daily Unmitigated Emissions.

Shipcalls (vessels/day)	Vessel Size	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Panamax	HFO	2.70	63.30	30%	3	35,000	17	2	0.4	4	3	2	134

MAXIMUM 17 2 0 4 3 2 134

**Table H.2.NFA/NPA.Un.Max.Ex.2010-5. 2010 No Federal Action/No Project Alternative Exxon Mobil Summary of Boiler Warm-Up Maximum Unmitigated Emissions.**

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Boiler Warm-up	Boiler	17	2	0	4	3	2	134

Table H.2.NFA/NPA.Un.Max.Ex.2010-6. 2010 No Federal Action/No Project Alternative Exxon Mobil Berth Operations Maximum Daily Unmitigated Emissions.

**Auxiliary Generator Pre-Pumping**

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bb/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Panamax	300,000	HFO	2.70	3,600	28%	2.5	102	8	3	10	10	8	85

MAXIMUM 102 8 3 10 10 8 85

**Boiler Pre-Pumping**

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bb/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Panamax	300,000	HFO	2.70	59.91	30%	2.5	35,000	14	1	0	3	2	2	106

MAXIMUM 14 1 0 3 2 2 106

**Auxiliary Generator Pumping**

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bb/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Panamax	300,000	HFO	2.70	3,600	56%	11.0	898	67	24	92	88	70	751

MAXIMUM 898 67 24 92 88 70 751

**Boiler Pumping**

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bb/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Inerting Fuel Consumption Savings (lb/1000 bbl offloaded)	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Panamax	300,000	HFO	2.70	59.91	28.06	11.0	83	8	2	17	15	10	644

MAXIMUM 83 8 2 17 15 10 644

**Auxiliary Generator Post-Pumping**

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bb/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Panamax	300,000	HFO	2.70	3,600	28%	1.0	41	3	1	4	4	3	34

MAXIMUM 41 3 1 4 4 3 34

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Table H.2.NFA/NPA.Un.Max.Ex.2010-7. 2010 No Federal Action/No Project Alternative Exxon Mobil Summary of Berth Operations Maximum Daily Unmitigated Emissions.

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Berth Operations	Boiler	97	9	2	20	17	11	749
Berth Operations	Aux Generator	1,040	78	28	106	102	82	870

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**Table H.2.NFA/NPA.Un.Max.Ex.2010-8. 2010 No Federal Action/No Project Alternative Exxon Mobil Tug Main Engines Maximum Daily Unmitigated Emissions.**

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Shipcalls (vessels/day)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
PANAMAX	Maneuvering - Pilot to Berth	1.00	2	4,800	0.50	MGO	1.0	155	25	5	6	6	0
	Maneuvering - Berth to Pilot	1.00	2	4,800	0.50	MGO	1.0	155	25	5	6	6	0
<b>TOTAL</b>								<b>311</b>	<b>49</b>	<b>10</b>	<b>13</b>	<b>12</b>	<b>0</b>
<b>MAXIMUM</b>								<b>311</b>	<b>49</b>	<b>10</b>	<b>13</b>	<b>12</b>	<b>0</b>

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Table H.2.NFA/NPA.Un.Max.Ex.2010-9. 2010 No Federal Action/No Project Alternative Exxon Mobil Tug Auxiliary Generator Engines Maximum Daily Unmitigated Emissions.

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Shipcalls (vessels/day)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
PANAMAX	Maneuvering - Pilot to Berth	1.00	2	300	1.00	MGO	1.0	16	3	0	1	1	0
	Maneuvering - Berth to Pilot	1.00	2	300	1.00	MGO	1.0	16	3	0	1	1	0
<b>TOTAL</b>								<b>32</b>	<b>6</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>0</b>
<b>MAXIMUM</b>								<b>32</b>	<b>6</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>0</b>

**Table H.2.NFA/NPA.Un.Max.Ex.2010-10. 2010 No Federal Action/No Project Alternative Exxon Mobil Summary of Tug Maximum Daily Unmitigated Emissions.**

<b>Mode</b>	<b>Equipment</b>	<b>Maximum Daily NO<sub>x</sub> Emissions (lb/day)</b>	<b>Maximum Daily CO Emissions (lb/day)</b>	<b>Maximum Daily ROG Emissions (lb/day)</b>	<b>Maximum Daily PM<sub>10</sub> Emissions (lb/day)</b>	<b>Maximum Daily PM<sub>2.5</sub> Emissions (lb/day)</b>	<b>Maximum Daily SO<sub>2</sub> Emissions (lb/day)</b>
Tug Assist	Main Engines	311	49	10	13	12	0
Tug Assist	Aux Generator	32	6	1	1	1	0
<b>TOTAL</b>		<b>342</b>	<b>55</b>	<b>11</b>	<b>14</b>	<b>13</b>	<b>0</b>



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Table H.2.NFA/NPA.Un.Max.Ex.2010-11. 2010 No Federal Action/No Project Alternative Exxon Mobil VDU Crude Maximum Daily Unmitigated Emissions.

	Maximum Daily Vessel Calls	crude vapors from tanks(scf/call)	daily gas usage (mmscf/day)	mw crude vapors	destruction efficiency
Panamax	1	116,667	0.1	50	98%
<b>TOTAL</b>	<b>1</b>		<b>0.1</b>		

Assumed Distribution based on tank storage volume:	
<b>Site 1</b>	<b>12.5%</b>
<b>Site 2</b>	<b>87.5%</b>

Maximum Daily Emissions (lb/day)

	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene
EF (lb/MMSCF)	130	35	7	7.5	0.38%	9.90%	0.017	0.0004	0.0003	0.0043	0.0027	0.731	0.0366	0.0272	0.0095
Panamax	7.6	2.0	0.4	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>MAXIMUM</b>	<b>7.6</b>	<b>2.0</b>	<b>0.4</b>	<b>0.4</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>

Assumed a ratio of 500/1000 based on the corresponding Btu values with respect to natural gas combustion emission factors.

Maximum Daily Emissions (lb/day)

	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene	SO <sub>x</sub>
Site 1	1	0.3	0.05	0.1	0.000	0.00	0.000	0.0000	0.0000	0.0000	0.0000	0.01	0.000	0.000	0.000	0
Site 2	7	2	0.4	0.4	0.00	0.01	0.001	0.0000	0.0000	0.000	0.000	0.0	0.00	0.00	0.000	1

0.41

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Table H.2.NFA/NPA.Un.Max.Ex.2010-12. 2010 No Federal Action/No Project Alternative Exxon Mobil VDU Legs Maximum Daily Unmitigated Emissions.

	tanks	crude vapors from tanks on legs(scfd/day)	daily gas usage (mmscf/day)	mw crude vapors	destruction efficiency
Site 1	4	23671.23	0.09	50	98%
Site 2	14	23671.23	0.3	50	98%
<b>TOTAL</b>	<b>18</b>		<b>0.4</b>		

  

<b>48</b>	<b>hr/event</b>
<b>6</b>	<b>events/yr</b>
<b>500</b>	<b>ft3/min</b>

Maximum Daily Emissions (lb/day)															
	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene
EF (lb/MMSCF)	130	35	7	7.5	0.38%	9.90%	0.017	0.0004	0.0003	0.0043	0.0027	0.731	0.0366	0.0272	0.0095
<b>TOTAL</b>	<b>27.7</b>	<b>7.5</b>	<b>1.5</b>	<b>1.6</b>	<b>0.0</b>	<b>0.1</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.2</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>

Assumed a ratio of 500/1000 based on the corresponding Btu values with respect to natural gas combustion emission factors.

Maximum Daily Emissions (lb/day)																
	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene	SO <sub>x</sub>
Site 1	6.2	1.7	0.3	0.4	0.00	0.03	0.00	0.000	0.000	0.000	0.00	0.03	0.00	0.00	0.00	1
Site 2	21.5	5.8	1.2	1.2	0.00	0.11	0.00	0.000	0.000	0.001	0.00	0.12	0.01	0.00	0.00	4



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Table H.2.NFA/NPA.Un.Max.Ex.2010-14.

2010 No Federal Action/No Project Alternative Exxon Mobil Berth Summary of Maximum Daily Unmitigated Emissions.

Scenario	Operation	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Vessel Arrival/Departure	Cruising and maneuvering	1,172	90	38	104	103	93	734
	Boiler Warm-Up	17	2	0	4	3	2	134
	Tug Assistance	342	55	11	---	14	13	0
	Tanks	---	---	86	---	---	---	---
	Vapor Destruction Units	35.3	9.5	1.9	---	2.0	---	6.3
	Valves, Flanges, Pumps	---	---	3.25	---	---	---	---
	<b>TOTAL</b>	<b>1,567</b>	<b>156</b>	<b>140</b>	<b>108</b>	<b>123</b>	<b>108</b>	<b>875</b>
Vessel Offloading	Tanker Hoteling	1,040	78	28	106	102	82	870
	Offloading	97	9	2	20	17	11	749
	Tanks	---	---	86	---	---	---	---
	Vapor Destruction Units	35.3	9.5	1.9	---	2.0	---	6.3
	Valves, Flanges, Pumps	---	---	3.25	---	---	---	---
		<b>TOTAL</b>	<b>1,172</b>	<b>96</b>	<b>122</b>	<b>126</b>	<b>121</b>	<b>93</b>
No Vessel/Empty Berth	Vapor Destruction Units	35.3	9.5	1.9	---	2.0	---	6.3
	Tanks	---	---	86	---	---	---	---
	Valves, Flanges, Pumps	---	---	3.25	---	---	---	---
		<b>TOTAL</b>	<b>35</b>	<b>9</b>	<b>91</b>	<b>0</b>	<b>2</b>	<b>0</b>

Table H.2.NFA/NPA.Un.BP.2015-1. 2015 No Federal Action/No Project Alternative BP Main Engines Average Daily Unmitigated Emissions

Ship	Direction	Mode	Distance (nautical miles)	Ship speed (knots)	Activity (hours)	Maximum Speed (knots)	Load Factor	MCR (kW)	Energy (kW-hr)	Fuel Type	Shipcalls (vessels/ yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)	
AFRAMAX	South In	Cruising - CW to VSR	23	12	1.92	16.1	0.414	12,477	9,902	HFO	34	16,778	1,298	556	1,446	1,446	1,330	9,733	
		Cruising - VSR to PZ	11	12	0.92	16.1	0.414	12,477	4,736	HFO	34	8,024	621	266	692	692	636	4,655	
		Cruising - PZ to Pilot	4.7	7	0.67	16.1	0.082	12,477	689	HFO	34	1,167	90	39	101	101	93	677	
	South Out	Maneuvering - Pilot to Berth	3	1.00	16.1	0.006	12,477	81	HFO	34	137	11	5	12	12	11	79		
		Maneuvering - Berth to Pilot	5	1.00	16.1	0.030	12,477	374	HFO	34	633	49	21	55	55	50	367		
		Cruising - Pilot to PZ	3.5	7	0.50	16.1	0.082	12,477	513	HFO	34	869	67	29	75	75	69	504	
		Cruising - PZ to VSR	12.5	12	1.04	16.1	0.414	12,477	5,382	HFO	34	9,118	705	302	786	786	723	5,290	
		Cruising - VSR to CW	24.5	12	2.04	16.1	0.414	12,477	10,548	HFO	34	17,872	1,382	592	1,540	1,540	1,417	10,368	
		<b>TOTAL</b>											<b>54,598</b>	<b>4,223</b>	<b>1,810</b>	<b>4,706</b>	<b>4,706</b>	<b>4,329</b>	<b>31,673</b>

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Table H.2.NFA/NPA.Un.BP.2015-2. 2015 No Federal Action/No Project Alternative BP Project Auxiliary Generator Average Daily Unmitigated Emissions.

Ship	Direction	Mode	Activity (hours)	MCR (kW)	Load Factor	Energy (kW-hr)	Fuel Type	Shipcalls (vessels/yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
AFRAMAX	South In	Cruising	3.50	3,600	0.28	3,533	HFO	34	4,861	364	132	496	476	381	4,068
		Maneuvering	2.00	3,600	0.28	2,016	HFO	34	2,774	208	75	283	272	217	2,321
	South Out	Maneuvering	1.5	3,600	0.28	1,512	HFO	34	2,081	156	57	212	204	163	1,741
		Cruising	3.50	3,600	0.28	3,528	HFO	34	4,855	363	132	495	476	380	4,062
<b>TOTAL</b>									<b>14,571</b>	<b>1,090</b>	<b>396</b>	<b>1,487</b>	<b>1,427</b>	<b>1,142</b>	<b>12,192</b>

**Table H.2.NFA/NPA.Un.BP.2015-3. 2015 No Federal Action/No Project Alternative BP Boiler Warm-Up Average Daily Unmitigated Emissions.**

Shipcalls (vessels/yr)	Vessel Size	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
34.0	Aframax	HFO	2.70	102.17	30%	3	50,000	1,361	123	31	285	245	159	10,528
<b>TOTAL</b>								<b>1,361</b>	<b>123</b>	<b>31</b>	<b>285</b>	<b>245</b>	<b>159</b>	<b>10,528</b>

Table H.2.NFA/NPA.Un.BP.2015-4. 2015 No Federal Action/No Project Alternative BP Berth Operations Average Daily Unmitigated Emissions.

**Auxiliary Generator Pre-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bb/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
34.0	Aframax	400,000	HFO	2.70	3,600	28%	2.5	3,468	259	94	354	340	272	2,902
<b>TOTAL</b>								3,468	259	94	354	340	272	2,902

**Boiler Pre-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bb/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bb/hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
34.0	Aframax	400,000	HFO	2.70	102.17	30%	2.5	50,000	968	102	21	609	524	341	8,773
<b>TOTAL</b>									968	102	21	609	524	341	8,773

**Auxiliary Generator Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bb/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
34.0	Aframax	400,000	HFO	2.70	3,600	56%	15.0	41,613	3,114	1,132	4,246	4,076	3,261	34,819
<b>TOTAL</b>								41,613	3,114	1,132	4,246	4,076	3,261	34,819

**Boiler Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bb/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Inerting Fuel Consumption Savings (lb/1000 bbl offloaded)	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
34.0	Aframax	400,000	HFO	2.70	102.17	28.06	15.0	7,492	792	163	4,711	4,052	2,638	67,879
<b>TOTAL</b>								7,492	792	163	4,711	4,052	2,638	67,879

**Auxiliary Generator Post-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bb/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
34.0	Aframax	400,000	HFO	2.70	3,600	28%	1.0	1,387	104	38	142	136	109	1,161
<b>TOTAL</b>								1,387	104	38	142	136	109	1,161



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Table H.2.NFA/NPA.Un.BP.2015-5. 2015 No Federal Action/No Project Alternative BP Summary of Average Daily Unmitigated Vessel Emissions.

Mode	Equipment	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Cruising	Main Engines	53,828	4,163	1,784	4,639	4,639	4,268	31,226
Cruising	Aux Generator	9,716	727	264	991	952	761	8,130
Maneuvering	Main Engines	770	60	26	66	66	61	447
Maneuvering	Aux Generator	4,855	363	132	495	476	380	4,062
Boiler Warm-up	Boiler	1,361	123	31	285	245	159	10,528
Berth Operations	Boiler	8,460	894	185	5,320	4,575	2,979	76,652
Berth Operations	Aux Generator	46,468	3,477	1,264	4,742	4,552	3,642	38,882
Propulsion	TOTAL	69,169	5,313	2,206	6,193	6,133	5,471	43,865
Non-Propulsion	TOTAL	56,289	4,494	1,480	10,346	9,372	6,780	126,061
<b>Total Emissions</b>		<b>125,458</b>	<b>9,808</b>	<b>3,687</b>	<b>16,539</b>	<b>15,505</b>	<b>12,251</b>	<b>169,926</b>

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Cruising	Main Engines	147.5	11.4	4.9	12.7	12.7	11.7	85.6
Cruising	Aux Generator	26.6	2.0	0.7	2.7	2.6	2.1	22.3
Maneuvering	Main Engines	2.1	0.2	0.1	0.2	0.2	0.2	1.2
Maneuvering	Aux Generator	13.3	1.0	0.4	1.4	1.3	1.0	11.1
Boiler Warm-up	Boiler	3.7	0.3	0.1	0.8	0.7	0.4	28.8
Berth Operations	Boiler	23.2	2.5	0.5	14.6	12.5	8.2	210.0
Berth Operations	Aux Generator	127.3	9.5	3.5	13.0	12.5	10.0	106.5
Propulsion	TOTAL	189.5	14.6	6.0	17.0	16.8	15.0	120.2
Non-Propulsion	TOTAL	154.2	12.3	4.1	28.3	25.7	18.6	345.4
<b>Total Emissions</b>		<b>344</b>	<b>27</b>	<b>10</b>	<b>45</b>	<b>42</b>	<b>34</b>	<b>466</b>

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Table H.2.NFA/NPA.Un.BP.2015-6. 2015 No Federal Action/No Project Alternative BP Tug Main Engines Average Daily Unmitigated Emissions.

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Shipcalls (vessels/yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
AFRAMAX	Maneuvering - Pilot to Berth	1.00	2	4,800	0.50	MGO	34.0	4,511	840	162	193	178	3
	Maneuvering - Berth to Pilot	1.00	2	4,800	0.50	MGO	34.0	4,511	840	162	193	178	3
TOTAL								9,023	1,681	324	386	356	5

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Table H.2.NFA/NPA.Un.BP.2015-7. 2015 No Federal Action/No Project Alternative BP Tug Auxiliary Generator Engines Average Daily Unmitigated Emissions.

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Shipcalls (vessels/yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
AFRAMAX	Maneuvering - Pilot to Berth	1.00	2	300	1.00	MGO	34.0	500	94	15	22	21	0
	Maneuvering - Berth to Pilot	1.00	2	300	1.00	MGO	34.0	500	94	15	22	21	0
<b>TOTAL</b>								<b>1,001</b>	<b>188</b>	<b>30</b>	<b>45</b>	<b>41</b>	<b>0</b>

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**Table H.2.NFA/NPA.Un.BP.2015-8. 2015 No Federal Action/No Project Alternative BP Summary of Tug Average Daily Unmitigated Emissions.**

<b>Mode</b>	<b>Equipment</b>	<b>NO<sub>x</sub> Emissions (lb/yr)</b>	<b>CO Emissions (lb/yr)</b>	<b>ROG Emissions (lb/yr)</b>	<b>PM<sub>10</sub> Emissions (lb/yr)</b>	<b>PM<sub>2.5</sub> Emissions (lb/yr)</b>	<b>SO<sub>2</sub> Emissions (lb/yr)</b>
Tug Assist	Main Engines	9,023	1,681	324	386	356	5
Tug Assist	Aux Generator	1,001	188	30	45	41	0
<b>TOTAL</b>		<b>10,024</b>	<b>1,868</b>	<b>354</b>	<b>431</b>	<b>397</b>	<b>6</b>

<b>Mode</b>	<b>Equipment</b>	<b>NO<sub>x</sub> Emissions (lb/day)</b>	<b>CO Emissions (lb/day)</b>	<b>ROG Emissions (lb/day)</b>	<b>PM<sub>10</sub> Emissions (lb/day)</b>	<b>PM<sub>2.5</sub> Emissions (lb/day)</b>	<b>SO<sub>2</sub> Emissions (lb/day)</b>
Tug Assist	Main Engines	25	4.6	0.9	1.1	1.0	0.0
Tug Assist	Aux Generator	3	0.5	0.1	0.1	0.1	0.0
<b>TOTAL</b>		<b>27</b>	<b>5.1</b>	<b>1.0</b>	<b>1.2</b>	<b>1.1</b>	<b>0.0</b>



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Table H.2.NFA/NPA.Un.BP.2015-10. 2015 No Federal Action/No Project Alternative BP VDU Legs Average Daily Unmitigated Emissions.

	tanks	crude vapors from tanks on legs(scf/yr)	annual gas usage (mmscf/yr)	mw crude vapors	destruction efficiency
Site 1	4	8640000	34.6	50	98%
Site 2	14	8640000	121.0	50	98%
<b>TOTAL</b>	<b>18</b>		<b>155.5</b>		

  

<b>48</b>	<b>hr/event</b>
<b>6</b>	<b>events/yr</b>
<b>500</b>	<b>ft3/min</b>

		Annual Average (lb/yr)													
	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene
EF (lb/MMSCF)	130	35	7	7.5	0.38%	9.90%	0.017	0.0004	0.0003	0.0043	0.0027	0.731	0.0366	0.0272	0.0095
<b>TOTAL</b>	<b>10108.8</b>	<b>2721.6</b>	<b>544.3</b>	<b>583.2</b>	<b>2.1</b>	<b>53.9</b>	<b>1.3</b>	<b>0.0</b>	<b>0.0</b>	<b>0.3</b>	<b>0.2</b>	<b>56.8</b>	<b>2.8</b>	<b>2.1</b>	<b>0.7</b>

Assumed a ratio of 500/1000 based on the corresponding Btu values with respect to natural gas combustion emission factors.

		Annual Average (lb/yr)														
	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene	SO <sub>x</sub>
Site 1	2246.4	604.8	121.0	129.6	0.46	11.98	0.29	0.007	0.005	0.074	0.05	12.63	0.63	0.47	0.16	402
Site 2	7862.4	2116.8	423.4	453.6	1.61	41.91	1.03	0.024	0.018	0.260	0.16	44.21	2.21	1.65	0.57	1407



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Table H.2.NFA/NPA.Un.BP.2015-12.

2015 No Federal Action/No Project Alternative BP Berth Summary of Average Daily Unmitigated Emissions.

Operation	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Tanker Cruising and Manuevering	69,169	5,313	2,206	6,193	6,133	5,471	43,865
Tanker Hoteling	46,468	3,477	1,264	4,742	4,552	3,642	38,882
Offloading Emissions	8,460	894	185	5,320	4,575	2,979	76,652
Transiting Operations	1,361	123	31	285	245	159	10,528
Tug Assistance	10,024	1,868	354	---	431	397	6
Tanks	---	---	3,660	---	---	---	---
Vapor Destruction Units	10,604	2,855	571	---	612	---	1,898
Valves, Flanges, Pumps	---	---	1,188	---	---	---	---
<b>TOTAL</b>	<b>146,086</b>	<b>14,531</b>	<b>9,459</b>	<b>16,539</b>	<b>16,548</b>	<b>12,648</b>	<b>171,829</b>

Operation	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Tanker Cruising and Manuevering	190	15	6	17	17	15	120
Tanker Hoteling	127	10	3	13	12	10	107
Offloading Emissions	23	2	1	15	13	8	210
Transiting Operations	4	0.3	0.09	0.8	0.7	0.44	29
Tug Assistance	27	5	1.0	---	1.2	1.1	0.0
Tanks	---	---	10.0	---	---	---	---
Vapor Destruction Units	29	8	2	---	2	---	5
Valves, Flanges, Pumps	---	---	3	---	---	---	---
<b>TOTAL</b>	<b>400</b>	<b>40</b>	<b>26</b>	<b>45</b>	<b>45</b>	<b>35</b>	<b>471</b>



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**Table H.2.NFA/NPA.Un.Max.BP.2015-1. 2015 No Federal Action/No Project Alternative BP Main Engines Maximum Daily Unmitigated Emissions.**

Ship	Direction	Mode	Distance (nautical miles)	Ship speed (knots)	Activity (hours)	Maximum Speed (knots)	Load Factor	MCR (kW)	Energy (kW-hr)	Fuel Type	Maximum Daily Shipcalls (vessels/day)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)	
AFRAMAX	South In	Cruising - CW to VSR	23	12	1.92	16.1	0.414	12,477	9,902	HFO	1.0	493	38	16	43	43	39	286	
		Cruising - VSR to PZ	11	12	0.92	16.1	0.414	12,477	4,736	HFO	1.0	236	18	8	20	20	19	137	
		Cruising - PZ to Pilot	4.7	7	0.67	16.1	0.082	12,477	689	HFO	1.0	34	3	1	3	3	3	20	
		Maneuvering - Pilot to Berth		3	1.00	16.1	0.006	12,477	81	HFO	1.0	4	0.3	0.1	0.3	0.3	0.3	2	
			<b>TOTAL</b>									<b>768</b>	<b>59</b>	<b>25</b>	<b>66</b>	<b>66</b>	<b>61</b>	<b>445</b>	
	South Out	Maneuvering - Berth to Pilot			5	1.00	16.1	0.030	12,477	374	HFO	1.0	19	1	1	2	2	1	11
		Cruising - Pilot to PZ	3.5	7	0.50	16.1	0.082	12,477	513	HFO	1.0	26	2	1	2	2	2	15	
		Cruising - PZ to VSR	12.5	12	1.04	16.1	0.414	12,477	5,382	HFO	1.0	268	21	9	23	23	21	156	
		Cruising - VSR to CW	24.5	12	2.04	16.1	0.414	12,477	10,548	HFO	1.0	526	41	17	45	45	42	305	
				<b>TOTAL</b>									<b>838</b>	<b>65</b>	<b>28</b>	<b>72</b>	<b>72</b>	<b>66</b>	<b>486</b>
		<b>MAXIMUM</b>									<b>838</b>	<b>65</b>	<b>28</b>	<b>72</b>	<b>72</b>	<b>66</b>	<b>486</b>		

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**Table H.2.NFA/NPA.Un.Max.BP.2015-2. 2015 No Federal Action/No Project Alternative BP Project Auxiliary Generator Maximum Daily Unmitigated Emissions.**

Ship	Direction	Mode	Activity (hours)	MCR (kW)	Load Factor	Energy (kW-hr)	Fuel Type	Maximum Daily Shipcalls (vessels/day)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
AFRAMAX	South In	Cruising	3.50	3,600	0.28	3,528	HFO	1.0	143	11	4	15	14	11	119
		Maneuvering	2.00	3,600	0.28	2,016	HFO	1.0	82	6	2	8	8	6	68
	<b>TOTAL</b>								<b>224</b>	<b>17</b>	<b>6</b>	<b>23</b>	<b>22</b>	<b>18</b>	<b>188</b>
	South Out	Maneuvering	1.5	3,600	0.28	1,512	HFO	1.0	61	5	2	6	6	5	51
		Cruising	3.50	3,600	0.28	3,528	HFO	1.0	143	11	4	15	14	11	119
	<b>TOTAL</b>								<b>204</b>	<b>15</b>	<b>6</b>	<b>21</b>	<b>20</b>	<b>16</b>	<b>171</b>
<b>MAXIMUM</b>								<b>224</b>	<b>17</b>	<b>6</b>	<b>23</b>	<b>22</b>	<b>18</b>	<b>188</b>	

**Table H.2.NFA/NPA.Un.Max.BP.2015-3. 2015 No Federal Action/No Project Alternative BP Summary of Maximum Daily Unmitigated Vessel Emissions.**

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Cruising	Main Engines	819	63	27	71	71	65	475
Cruising	Aux Generator	143	11	4	15	14	11	119
Maneuvering	Main Engines	19	1	1	2	2	1	11
Maneuvering	Aux Generator	82	6	2	8	8	6	68
<b>Maneuvering</b>	<b>TOTAL</b>	<b>100</b>	<b>8</b>	<b>3</b>	<b>10</b>	<b>10</b>	<b>8</b>	<b>79</b>

<b>Propulsion</b>	<b>TOTAL</b>	<b>1,062</b>	<b>82</b>	<b>34</b>	<b>95</b>	<b>94</b>	<b>84</b>	<b>674</b>	<b>2125.14</b>
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**Table H.2.NFA/NPA.Un.Max.BP.2015-4. 2015 No Federal Action/No Project Alternative BP Boiler Warm-Up Maximum Daily Unmitigated Emissions.**

Shipcalls (vessels/day)	Vessel Size	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	HFO	2.70	102.17	30%	3	50,000	40	4	0.9	8	7	5	310
MAXIMUM								40	4	1	8	7	5	310

**Table H.2.NFA/NPA.Un.Max.BP.2015-5. 2015 No Federal Action/No Project Alternative BP Summary of Boiler Warm-Up Maximum Unmitigated Emissions.**

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Boiler Warm-up	Boiler	40	4	1	8	7	5	310

Table H.2.NFA/NPA.Un.Max.BP.2015-6. 2015 No Federal Action/No Project Alternative BP Berth Operations Maximum Daily Unmitigated Emissions.

Auxiliary Generator Pre-Pumping

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	400,000	HFO	2.70	3,600	28%	2.5	102	8	3	10	10	8	85
MAXIMUM								102	8	3	10	10	8	85

Boiler Pre-Pumping

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	400,000	HFO	2.70	102.17	30%	2.5	50,000	33	3	1	7	6	4	258
MAXIMUM									33	3	1	7	6	4	258

Auxiliary Generator Pumping

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	400,000	HFO	2.70	3,600	56%	15.0	1,224	92	33	125	120	96	1,024
MAXIMUM								1,224	92	33	125	120	96	1,024

Boiler Pumping

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Inerting Fuel Consumption Savings (lb/1000 bbl offloaded)	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	400,000	HFO	2.70	102.17	28.06	15.0	258	23	6	54	46	30	1,996
MAXIMUM								258	23	6	54	46	30	1,996

Auxiliary Generator Post-Pumping

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	400,000	HFO	2.70	3,600	28%	1.0	41	3	1	4	4	3	34
MAXIMUM								41	3	1	4	4	3	34

**Table H.2.NFA/NPA.Un.Max.BP.2015-7. 2015 No Federal Action/No Project Alternative BP Summary of Berth Operations Maximum Daily Unmitigated Emissions.**

<b>Mode</b>	<b>Equipment</b>	<b>NO<sub>x</sub> Emissions (lb/day)</b>	<b>CO Emissions (lb/day)</b>	<b>ROG Emissions (lb/day)</b>	<b>PM Emissions (lb/day)</b>	<b>PM<sub>10</sub> Emissions (lb/day)</b>	<b>PM<sub>2.5</sub> Emissions (lb/day)</b>	<b>SO<sub>2</sub> Emissions (lb/day)</b>
Berth Operations	Boiler	291	26	7	61	52	34	2,254
Berth Operations	Aux Generator	1,367	102	37	139	134	107	1,144

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**Table H.2.NFA/NPA.Un.Max.BP.2015-8. 2015 No Federal Action/No Project Alternative BP Tug Main Engines Maximum Daily Unmitigated Emissions.**

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Shipcalls (vessels/day)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
AFRAMAX	Maneuvering - Pilot to Berth	1.00	2	4,800	0.50	MGO	1.0	133	25	5	6	5	0
	Maneuvering - Berth to Pilot	1.00	2	4,800	0.50	MGO	1.0	133	25	5	6	5	0
<b>TOTAL</b>								<b>265</b>	<b>49</b>	<b>10</b>	<b>11</b>	<b>10</b>	<b>0</b>
<b>MAXIMUM</b>								<b>265</b>	<b>49</b>	<b>10</b>	<b>11</b>	<b>10</b>	<b>0</b>



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Table H.2.NFA/NPA.Un.Max.BP.2015-9. 2015 No Federal Action/No Project Alternative BP Tug Auxiliary Generator Engines Maximum Daily Unmitigated Emissions.

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Shipcalls (vessels/day)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
AFRAMAX	Maneuvering - Pilot to Berth	1.00	2	300	1.00	MGO	1.0	15	3	0	1	1	0
	Maneuvering - Berth to Pilot	1.00	2	300	1.00	MGO	1.0	15	3	0	1	1	0
<b>TOTAL</b>								<b>29</b>	<b>6</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>0</b>
<b>MAXIMUM</b>								<b>29</b>	<b>6</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>0</b>

**Table H.2.NFA/NPA.Un.Max.BP.2015-10. 2015 No Federal Action/No Project Alternative BP Summary of Tug Maximum Daily Unmitigated Emissions.**

<b>Mode</b>	<b>Equipment</b>	<b>Maximum Daily NO<sub>x</sub> Emissions (lb/day)</b>	<b>Maximum Daily CO Emissions (lb/day)</b>	<b>Maximum Daily ROG Emissions (lb/day)</b>	<b>Maximum Daily PM<sub>10</sub> Emissions (lb/day)</b>	<b>Maximum Daily PM<sub>2.5</sub> Emissions (lb/day)</b>	<b>Maximum Daily SO<sub>2</sub> Emissions (lb/day)</b>
Tug Assist	Main Engines	265	49	10	11	10	0
Tug Assist	Aux Generator	29	6	1	1	1	0
<b>TOTAL</b>		<b>295</b>	<b>55</b>	<b>10</b>	<b>13</b>	<b>12</b>	<b>0</b>

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**Table H.2.NFA/NPA.Un.Max.BP.2015-11. 2015 No Federal Action/No Project Alternative BP VDU Crude Maximum Daily Unmitigated Emissions.**

	Maximum Daily Vessel Calls	crude vapors from tanks(sc/call)	daily gas usage (mmscf/day)	mw crude vapors	destruction efficiency
Aframax	1	224,000	0.2	50	98%
<b>TOTAL</b>	<b>1</b>		<b>0.2</b>		

Maximum Daily Emissions (lb/day)

	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene
EF (lb/MMSCF)	130	35	7	7.5	0.38%	9.90%	0.017	0.0004	0.0003	0.0043	0.0027	0.731	0.0366	0.0272	0.0095
Panamax	14.6	3.9	0.8	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0
<b>MAXIMUM</b>	<b>14.6</b>	<b>3.9</b>	<b>0.8</b>	<b>0.8</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.1</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>

Assumed a ratio of 500/1000 based on the corresponding Btu values with respect to natural gas combustion emission factors.

Maximum Daily Emissions (lb/day)

	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene	SO <sub>x</sub>
Site 1	2	0.5	0.10	0.1	0.000	0.00	0.000	0.0000	0.0000	0.0001	0.0000	0.01	0.001	0.000	0.000	0
Site 2	13	3	0.7	0.7	0.00	0.01	0.002	0.0000	0.0000	0.000	0.000	0.1	0.00	0.00	0.001	2

0.78

**Table H.2.NFA/NPA.Un.Max.BP.2015-12. 2015 No Federal Action/No Project Alternative BP VDU Legs Maximum Daily Unmitigated Emissions.**

	tanks	crude vapors from tanks on legs(sc/d)	daily gas usage (mmscf/day)	mw crude vapors	destruction efficiency
Site 1	4	23671.23	0.09	50	98%
Site 2	14	23671.23	0.3	50	98%
<b>TOTAL</b>	<b>18</b>		<b>0.4</b>		

Maximum Daily Emissions (lb/day)															
	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene
EF (lb/MMSCF)	130	35	7	7.5	0.38%	9.90%	0.017	0.0004	0.0003	0.0043	0.0027	0.731	0.0366	0.0272	0.0095
<b>TOTAL</b>	<b>27.7</b>	<b>7.5</b>	<b>1.5</b>	<b>1.6</b>	<b>0.0</b>	<b>0.1</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.2</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>

*Assumed a ratio of 500/1000 based on the corresponding Btu values with respect to natural gas combustion emission factors.*

Maximum Daily Emissions (lb/day)																
	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene	SO <sub>x</sub>
Site 1	6.2	1.7	0.3	0.4	0.00	0.03	0.00	0.000	0.000	0.000	0.00	0.03	0.00	0.00	0.00	1
Site 2	21.5	5.8	1.2	1.2	0.00	0.11	0.00	0.000	0.000	0.001	0.00	0.12	0.01	0.00	0.00	4



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Table H.2.NFA/NPA.Un.Max.BP.2015-14.

2015 No Federal Action/No Project Alternative BP Berth Summary of Maximum Daily Unmitigated Emissions.

Scenario	Operation	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Vessel Arrival/Departure	Cruising and maneuvering	1,062	82	34	95	94	84	674
	Boiler Warm-Up	40	4	1	8	7	5	310
	Tug Assistance	295	55	10	---	13	12	0
	Tanks	---	---	86	---	---	---	---
	Vapor Destruction Units Valves, Flanges, Pumps	42.3 ---	11.4 ---	2.3 3.25	---	2.4 ---	---	7.6 ---
	<b>TOTAL</b>	<b>1,439</b>	<b>152</b>	<b>137</b>	<b>103</b>	<b>117</b>	<b>100</b>	<b>991</b>
Vessel Offloading	Tanker Hoteling	1,367	102	37	139	134	107	1,144
	Offloading	291	26	7	61	52	34	2,254
	Tanks	---	---	86	---	---	---	---
	Vapor Destruction Units Valves, Flanges, Pumps	42.3 ---	11.4 ---	2.3 3.25	---	2.4 ---	---	7.6 ---
	<b>TOTAL</b>	<b>1,700</b>	<b>140</b>	<b>135</b>	<b>200</b>	<b>189</b>	<b>141</b>	<b>3,406</b>
No Vessel/Empty Berth	Vapor Destruction Units	42.3	11.4	2.3	---	2.4	---	7.6
	Tanks Valves, Flanges, Pumps	---	---	86 3.25	---	---	---	---
	<b>TOTAL</b>	<b>42</b>	<b>11</b>	<b>91</b>	<b>0</b>	<b>2</b>	<b>0</b>	<b>8</b>

Table H.2.NFA/NPA.Un.Ts.2015-1. 2015 No Federal Action/No Project Alternative Tesoro Main Engines Average Daily Unmitigated Emissions

Ship	Direction	Mode	Distance (nautical miles)	Ship speed (knots)	Activity (hours)	Maximum Speed (knots)	Load Factor	MCR (kW)	Energy (kW-hr)	Fuel Type	Shipcalls (vessels/ yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)	
AFRAMAX	South In	Cruising - CW to VSR	23	12	1.92	16.1	0.414	12,477	9,902	Dist at 0.2	87	40,322	3,321	1,423	688	688	633	1,845	
		Cruising - VSR to PZ	11	12	0.92	16.1	0.414	12,477	4,736	Dist at 0.2	87	19,285	1,588	681	329	329	303	882	
		Cruising - PZ to Pilot	4.7	7	0.67	16.1	0.082	12,477	689	Dist at 0.2	87	2,804	231	99	48	48	44	128	
	South Out	Maneuvering - Pilot to Berth	3	1.00	16.1	0.006	12,477		81	Dist at 0.2	87	329	27	12	6	6	5	15	
		Maneuvering - Berth to Pilot	5	1.00	16.1	0.030	12,477		374	Dist at 0.2	87	1,522	125	54	26	26	24	70	
		Cruising - Pilot to PZ	3.5	7	0.50	16.1	0.082	12,477	513	Dist at 0.2	87	2,088	172	74	36	36	33	96	
		Cruising - PZ to VSR	12.5	12	1.04	16.1	0.414	12,477	5,382	Dist at 0.2	87	21,914	1,805	773	374	374	344	1,003	
		Cruising - VSR to CW	24.5	12	2.04	16.1	0.414	12,477	10,548	Dist at 0.2	87	42,952	3,537	1,516	733	733	674	1,965	
		<b>TOTAL</b>											<b>131,215</b>	<b>10,806</b>	<b>4,631</b>	<b>2,238</b>	<b>2,238</b>	<b>2,059</b>	<b>6,003</b>

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**Table H.2.NFA/NPA.Un.Ts.2015-2. 2015 No Federal Action/No Project Alternative Tesoro Project Auxiliary Generator Average Daily Unmitigated Emissions.**

Ship	Direction	Mode	Activity (hours)	MCR (kW)	Load Factor	Energy (kW-hr)	Fuel Type	Shipcalls (vessels/yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
AFRAMAX	South In	Cruising	3.50	3,600	0.28	3,533	Dist at 0.2	87	11,763	931	338	236	227	181	771
		Maneuvering	2.00	3,600	0.28	2,016	Dist at 0.2	87	6,712	531	193	135	129	103	440
	South Out	Maneuvering	1.5	3,600	0.28	1,512	Dist at 0.2	87	5,034	398	145	101	97	78	330
		Cruising	3.50	3,600	0.28	3,528	Dist at 0.2	87	11,747	930	338	236	226	181	770
<b>TOTAL</b>									<b>35,256</b>	<b>2,790</b>	<b>1,015</b>	<b>708</b>	<b>679</b>	<b>543</b>	<b>2,311</b>



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**Table H.2.NFA/NPA.Un.Ts.2015-3. 2015 No Federal Action/No Project Alternative Tesoro Boiler Warm-Up Average Daily Unmitigated Emissions.**

Shipcalls (vessels/yr)	Vessel Size	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
87.0	Aframax	Dist at 0.2	0.20	102.17	30%	3	50,000	1,417	354	20	234	164	110	1,995
<b>TOTAL</b>								<b>1,417</b>	<b>354</b>	<b>20</b>	<b>234</b>	<b>164</b>	<b>110</b>	<b>1,995</b>

Table H.2.NFA/NPA.Un.Ts.2015-4. 2015 No Federal Action/No Project Alternative Tesoro Berth Operations Average Daily Unmitigated Emissions.

Auxiliary Generator Pre-Pumping

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
87.0	Aframax	400,000	Dist at 0.2	0.20	3,600	28%	2.5	8,391	664	241	168	162	129	550
<b>TOTAL</b>								<b>8,391</b>	<b>664</b>	<b>241</b>	<b>168</b>	<b>162</b>	<b>129</b>	<b>550</b>

Boiler Pre-Pumping

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
87.0	Aframax	400,000	Dist at 0.2	0.20	102.17	30%	2.5	50,000	1,413	295	62	195	137	91	1,663
<b>TOTAL</b>									<b>1,413</b>	<b>295</b>	<b>62</b>	<b>195</b>	<b>137</b>	<b>91</b>	<b>1,663</b>

Auxiliary Generator Pumping

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
87.0	Aframax	400,000	Dist at 0.2	0.20	3,600	56%	15.0	100,686	7,968	2,897	2,021	1,940	1,552	6,600
<b>TOTAL</b>								<b>100,686</b>	<b>7,968</b>	<b>2,897</b>	<b>2,021</b>	<b>1,940</b>	<b>1,552</b>	<b>6,600</b>

Boiler Pumping

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Inerting Fuel Consumption Savings (lb/1000 bbl offloaded)	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
87.0	Aframax	400,000	Dist at 0.2	0.20	102.17	28.06	15.0	10,936	2,284	482	1,512	1,058	708	12,866
<b>TOTAL</b>								<b>10,936</b>	<b>2,284</b>	<b>482</b>	<b>1,512</b>	<b>1,058</b>	<b>708</b>	<b>12,866</b>

Auxiliary Generator Post-Pumping

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
87.0	Aframax	400,000	Dist at 0.2	0.20	3,600	28%	1.0	3,356	266	97	67	65	52	220
<b>TOTAL</b>								<b>3,356</b>	<b>266</b>	<b>97</b>	<b>67</b>	<b>65</b>	<b>52</b>	<b>220</b>

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Table H.2.NFA/NPA.Un.Ts.2015-5. 2015 No Federal Action/No Project Alternative Tesoro Summary of Average Daily Unmitigated Vessel Emissions.

Mode	Equipment	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Cruising	Main Engines	129,365	10,654	4,566	2,207	2,207	2,030	5,919
Cruising	Aux Generator	23,509	1,860	677	472	453	362	1,541
Maneuvering	Main Engines	1,851	152	65	32	32	29	85
Maneuvering	Aux Generator	11,747	930	338	236	226	181	770
Boiler Warm-up	Boiler	1,417	354	20	234	164	110	1,995
Berth Operations	Boiler	12,349	2,579	545	1,707	1,195	799	14,529
Berth Operations	Aux Generator	112,433	8,898	3,235	2,257	2,166	1,733	7,370
Propulsion	TOTAL	166,472	13,596	5,646	2,946	2,918	2,603	8,314
Non-Propulsion	TOTAL	126,199	11,831	3,800	4,198	3,526	2,642	23,894
<b>Total Emissions</b>		<b>292,671</b>	<b>25,427</b>	<b>9,446</b>	<b>7,144</b>	<b>6,443</b>	<b>5,245</b>	<b>32,208</b>

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Cruising	Main Engines	354.4	29.2	12.5	6.0	6.0	5.6	16.2
Cruising	Aux Generator	64.4	5.1	1.9	1.3	1.2	1.0	4.2
Maneuvering	Main Engines	5.1	0.4	0.2	0.1	0.1	0.1	0.2
Maneuvering	Aux Generator	32.2	2.5	0.9	0.6	0.6	0.5	2.1
Boiler Warm-up	Boiler	3.9	1.0	0.1	0.6	0.4	0.3	5.5
Berth Operations	Boiler	33.8	7.1	1.5	4.7	3.3	2.2	39.8
Berth Operations	Aux Generator	308.0	24.4	8.9	6.2	5.9	4.7	20.2
Propulsion	TOTAL	456.1	37.2	15.5	8.1	8.0	7.1	22.8
Non-Propulsion	TOTAL	345.8	32.4	10.4	11.5	9.7	7.2	65.5
<b>Total Emissions</b>		<b>802</b>	<b>70</b>	<b>26</b>	<b>20</b>	<b>18</b>	<b>14</b>	<b>88</b>

Table H.2.NFA/NPA.Un.Ts.2015-6. 2015 No Federal Action/No Project Alternative Tesoro Tug Main Engines Average Daily Unmitigated Emissions.

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Shipcalls (vessels/yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
AFRAMAX	Maneuvering - Pilot to Berth	1.00	2	4,800	0.50	MGO	87.0	11,544	2,150	414	494	455	7
	Maneuvering - Berth to Pilot	1.00	2	4,800	0.50	MGO	87.0	11,544	2,150	414	494	455	7

TOTAL      23,088      4,300      828      989      910      14

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Table H.2.NFA/NPA.Un.Ts.2015-7. 2015 No Federal Action/No Project Alternative Tesoro Tug Auxiliary Generator Engines Average Daily Unmitigated Emissions.

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Shipcalls (vessels/yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
AFRAMAX	Maneuvering - Pilot to Berth	1.00	2	300	1.00	MGO	87.0	1,281	240	39	57	53	1
	Maneuvering - Berth to Pilot	1.00	2	300	1.00	MGO	87.0	1,281	240	39	57	53	1
<b>TOTAL</b>								<b>2,561</b>	<b>480</b>	<b>78</b>	<b>115</b>	<b>106</b>	<b>1</b>

**Table H.2.NFA/NPA.Un.Ts.2015-8. 2015 No Federal Action/No Project Alternative Tesoro Summary of Tug Average Daily Unmitigated Emissions.**

Mode	Equipment	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Tug Assist	Main Engines	23,088	4,300	828	989	910	14
Tug Assist	Aux Generator	2,561	480	78	115	106	1
<b>TOTAL</b>		<b>25,649</b>	<b>4,780</b>	<b>905</b>	<b>1,104</b>	<b>1,015</b>	<b>15</b>

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Tug Assist	Main Engines	63	11.8	2.3	2.7	2.5	0.0
Tug Assist	Aux Generator	7	1.3	0.2	0.3	0.3	0.0
<b>TOTAL</b>		<b>70</b>	<b>13.1</b>	<b>2.5</b>	<b>3.0</b>	<b>2.8</b>	<b>0.0</b>

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Table H.2.NFA/NPA.Un.Ts.2015-9. 2015 No Federal Action/No Project Alternative Tesoro VDU Crude Average Daily Unmitigated Emissions.

Assumed Distribution based on tank storage volume:	
Site 1	12.5%
Site 2	87.5%

	Annual Vessel Calls	crude vapors from tanks(scft/call)	annual gas usage (mmscf/yr)	mw crude vapors	destruction efficiency
Aframax	87	224,000	19.5	50	98%
<b>TOTAL</b>	<b>87</b>		<b>19.5</b>		

Annual Average (lb/yr)

	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene
EF (lb/MMSCF)	130	35	7	7.5	0.38%	9.90%	0.017	0.0004	0.0003	0.0043	0.0027	0.731	0.0366	0.0272	0.0095
Panamax	1266.7	341.0	68.2	73.1	0.0	1.0	0.2	0.0	0.0	0.0	0.0	7.1	0.4	0.3	0.1
<b>TOTAL</b>	<b>1266.7</b>	<b>341.0</b>	<b>68.2</b>	<b>73.1</b>	<b>0.0</b>	<b>1.0</b>	<b>0.2</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>7.1</b>	<b>0.4</b>	<b>0.3</b>	<b>0.1</b>

Assumed a ratio of 500/1000 based on the corresponding Btu values with respect to natural gas combustion emission factors.

Annual Average (lb/yr)

	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene	SO <sub>x</sub>
Site 1	158	42.6	8.53	9.1	0.005	0.12	0.021	0.0005	0.0004	0.0052	0.0033	0.89	0.045	0.033	0.012	28
Site 2	1108	298	59.7	63.9	0.03	0.84	0.145	0.0034	0.0026	0.037	0.023	6.2	0.31	0.23	0.081	198

68.21

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Table H.2.NFA/NPA.Un.Ts.2015-10. 2015 No Federal Action/No Project Alternative Tesoro VDU Legs Average Daily Unmitigated Emissions.

	tanks	crude vapors from tanks on legs(scft/yr)	annual gas usage (mmscf/yr)	mw crude vapors	destruction efficiency
Site 1	4	8640000	34.6	50	98%
Site 2	14	8640000	121.0	50	98%
<b>TOTAL</b>	<b>18</b>		<b>155.5</b>		

<b>48</b>	<b>hr/event</b>
<b>6</b>	<b>events/yr</b>
<b>500</b>	<b>ft3/min</b>

	Annual Average (lb/yr)														
	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene
EF (lb/MMSCF)	130	35	7	7.5	0.38%	9.90%	0.017	0.0004	0.0003	0.0043	0.0027	0.731	0.0366	0.0272	0.0095
<b>TOTAL</b>	<b>10108.8</b>	<b>2721.6</b>	<b>544.3</b>	<b>583.2</b>	<b>2.1</b>	<b>53.9</b>	<b>1.3</b>	<b>0.0</b>	<b>0.0</b>	<b>0.3</b>	<b>0.2</b>	<b>56.8</b>	<b>2.8</b>	<b>2.1</b>	<b>0.7</b>

Assumed a ratio of 500/1000 based on the corresponding Btu values with respect to natural gas combustion emission factors.

	Annual Average (lb/yr)															
	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene	SO <sub>x</sub>
Site 1	2246.4	604.8	121.0	129.6	0.46	11.98	0.29	0.007	0.005	0.074	0.05	12.63	0.63	0.47	0.16	402
Site 2	7862.4	2116.8	423.4	453.6	1.61	41.91	1.03	0.024	0.018	0.260	0.16	44.21	2.21	1.65	0.57	1407





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Table H.2.NFA/NPA.Un.Ts.2015-12.

2015 No Federal Action/No Project Alternative Tesoro Berth Summary of Average Daily Unmitigated Emissions.

Operation	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Tanker Cruising and Manuevering	166,472	13,596	5,646	2,946	2,918	2,603	8,314
Tanker Hoteling	112,433	8,898	3,235	2,257	2,166	1,733	7,370
Offloading Emissions	12,349	2,579	545	1,707	1,195	799	14,529
Transiting Operations	1,417	354	20	234	164	110	1,995
Tug Assistance	25,649	4,780	905	---	1,104	1,015	15
Tanks	---	---	3,660	---	---	---	---
Vapor Destruction Units	11,376	3,063	613	---	656	---	2,036
Valves, Flanges, Pumps	---	---	1,188	---	---	---	---
<b>TOTAL</b>	<b>329,695</b>	<b>33,270</b>	<b>15,812</b>	<b>7,144</b>	<b>8,203</b>	<b>6,260</b>	<b>34,259</b>

Operation	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Tanker Cruising and Manuevering	456	37	15	8	8	7	23
Tanker Hoteling	308	24	9	6	6	5	20
Offloading Emissions	34	7	1	5	3	2	40
Transiting Operations	4	1.0	0.05	0.6	0.4	0.30	5
Tug Assistance	70	13	2.5	---	3.0	2.8	0.0
Tanks	---	---	10.0	---	---	---	---
Vapor Destruction Units	31	8	2	---	2	---	6
Valves, Flanges, Pumps	---	---	3	---	---	---	---
<b>TOTAL</b>	<b>903</b>	<b>91</b>	<b>43</b>	<b>20</b>	<b>22</b>	<b>17</b>	<b>94</b>

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**Table H.2.NFA/NPA.Un.Max.Ts.2015-1. 2015 No Federal Action/No Project Alternative Tesoro Main Engines Maximum Daily Unmitigated Emissions.**

Ship	Direction	Mode	Distance (nautical miles)	Ship speed (knots)	Activity (hours)	Maximum Speed (knots)	Load Factor	MCR (kW)	Energy (kW-hr)	Fuel Type	Maximum Daily Shipcalls (vessels/day)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)	
AFRAMAX	South In	Cruising - CW to VSR	23	12	1.92	16.1	0.414	12,477	9,902	Dist at 0.2	1.0	463	38	16	8	8	7	21	
		Cruising - VSR to PZ	11	12	0.92	16.1	0.414	12,477	4,736	Dist at 0.2	1.0	222	18	8	4	4	3	10	
		Cruising - PZ to Pilot	4.7	7	0.67	16.1	0.082	12,477	689	Dist at 0.2	1.0	32	3	1	1	1	1	1	
		Maneuvering - Pilot to Berth		3	1.00	16.1	0.006	12,477	81	Dist at 0.2	1.0	4	0.3	0.1	0.1	0.1	0.1	0	
	South Out	Maneuvering - Berth to Pilot			5	1.00	16.1	0.030	12,477	374	Dist at 0.2	<b>TOTAL</b>	<b>721</b>	<b>59</b>	<b>25</b>	<b>12</b>	<b>12</b>	<b>11</b>	<b>33</b>
		Cruising - Pilot to PZ	3.5	7	0.50	16.1	0.082	12,477	513	Dist at 0.2	1.0	17	1	1	0	0	0	1	
		Cruising - PZ to VSR	12.5	12	1.04	16.1	0.414	12,477	5,382	Dist at 0.2	1.0	24	2	1	0	0	0	1	
		Cruising - VSR to CW	24.5	12	2.04	16.1	0.414	12,477	10,548	Dist at 0.2	1.0	252	21	9	4	4	4	12	
												1.0	494	41	17	8	8	8	23
													<b>TOTAL</b>	<b>787</b>	<b>65</b>	<b>28</b>	<b>13</b>	<b>13</b>	<b>12</b>
											<b>MAXIMUM</b>	<b>787</b>	<b>65</b>	<b>28</b>	<b>13</b>	<b>13</b>	<b>12</b>	<b>36</b>	

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**Table H.2.NFA/NPA.Un.Max.Ts.2015-2. 2015 No Federal Action/No Project Alternative Tesoro Project Auxiliary Generator Maximum Daily Unmitigated Emissions.**

Ship	Direction	Mode	Activity (hours)	MCR (kW)	Load Factor	Energy (kW-hr)	Fuel Type	Maximum Daily Shipcalls (vessels/day)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)	
AFRAMAX	South In	Cruising	3.50	3,600	0.28	3,528	Dist at 0.2	1.0	135	11	4	3	3	2	9	
		Maneuvering	2.00	3,600	0.28	2,016	Dist at 0.2	1.0	77	6	2	2	2	1	5	
			<b>TOTAL</b>					<b>2.0</b>	<b>212</b>	<b>17</b>	<b>6</b>	<b>5</b>	<b>4</b>	<b>4</b>	<b>4</b>	<b>14</b>
	South Out	Maneuvering	1.5	3,600	0.28	1,512	Dist at 0.2	1.0	58	5	2	1	1	1	4	
		Cruising	3.50	3,600	0.28	3,528	Dist at 0.2	1.0	135	11	4	3	3	2	9	
			<b>TOTAL</b>					<b>2.0</b>	<b>193</b>	<b>15</b>	<b>6</b>	<b>4</b>	<b>4</b>	<b>3</b>	<b>13</b>	
		<b>MAXIMUM</b>						<b>212</b>	<b>17</b>	<b>6</b>	<b>5</b>	<b>4</b>	<b>4</b>	<b>4</b>	<b>14</b>	

**Table H.2.NFA/NPA.Un.Max.Ts.2015-3. 2015 No Federal Action/No Project Alternative Tesoro Summary of Maximum Daily Unmitigated Vessel Emissions.**

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Cruising	Main Engines	770	63	27	13	13	12	35
Cruising	Aux Generator	135	11	4	3	3	2	9
Maneuvering	Main Engines	17	1	1	0	0	0	1
Maneuvering	Aux Generator	77	6	2	2	2	1	5
<b>Maneuvering</b>	<b>TOTAL</b>	<b>95</b>	<b>8</b>	<b>3</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>6</b>

Propulsion TOTAL 999 82 34 18 18 16 50 1216.37

**Table H.2.NFA/NPA.Un.Max.Ts.2015-4. 2015 No Federal Action/No Project Alternative Tesoro Boiler Warm-Up Maximum Daily Unmitigated Emissions.**

Shipcalls (vessels/day)	Vessel Size	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	Dist at 0.2	0.20	102.17	30%	3	50,000	16	4	0.2	3	2	1	23

MAXIMUM      16            4            0            3            2            1            23

**Table H.2.NFA/NPA.Un.Max.Ts.2015-5. 2015 No Federal Action/No Project Alternative Tesoro Summary of Boiler Warm-Up Maximum Unmitigated Emissions.**

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Boiler Warm-up	Boiler	16	4	0	3	2	1	23





**Table H.2.NFA/NPA.Un.Max.Ts.2015-7. 2015 No Federal Action/No Project Alternative Tesoro Summary of Berth Operations Maximum Daily Unmitigated Emissions.**

<b>Mode</b>	<b>Equipment</b>	<b>NO<sub>x</sub> Emissions (lb/day)</b>	<b>CO Emissions (lb/day)</b>	<b>ROG Emissions (lb/day)</b>	<b>PM Emissions (lb/day)</b>	<b>PM<sub>10</sub> Emissions (lb/day)</b>	<b>PM<sub>2.5</sub> Emissions (lb/day)</b>	<b>SO<sub>2</sub> Emissions (lb/day)</b>
Berth Operations	Boiler	119	30	2	20	14	9	167
Berth Operations	Aux Generator	1,292	102	37	28	27	21	85

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**Table H.2.NPA.Un.Max.Ts.2015-8. 2015 No Project Alternative Tesoro Tug Main Engines Maximum Daily Unmitigated Emissions.**

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Shipcalls (vessels/day)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
AFRAMAX	Maneuvering - Pilot to Berth	1.00	2	4,800	0.50	MGO	1.0	133	25	5	6	5	0
	Maneuvering - Berth to Pilot	1.00	2	4,800	0.50	MGO	1.0	133	25	5	6	5	0
<b>TOTAL</b>								<b>265</b>	<b>49</b>	<b>10</b>	<b>11</b>	<b>10</b>	<b>0</b>
<b>MAXIMUM</b>								<b>265</b>	<b>49</b>	<b>10</b>	<b>11</b>	<b>10</b>	<b>0</b>

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**Table H.2.NPA.Un.Max.Ts.2015-9. 2015 No Project Alternative Tesoro Tug Auxiliary Generator Engines Maximum Daily Unmitigated Emissions.**

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Shipcalls (vessels/day)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
AFRAMAX	Maneuvering - Pilot to Berth	1.00	2	300	1.00	MGO	1.0	15	3	0	1	1	0
	Maneuvering - Berth to Pilot	1.00	2	300	1.00	MGO	1.0	15	3	0	1	1	0
<b>TOTAL</b>								<b>29</b>	<b>6</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>0</b>
<b>MAXIMUM</b>								<b>29</b>	<b>6</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>0</b>

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Table H.2.NPA.Un.Max.Ts.2015-10. 2015 No Project Alternative Tesoro Summary of Tug Maximum Daily Unmitigated Emissions.

Mode	Equipment	Maximum Daily NO <sub>x</sub> Emissions (lb/day)	Maximum Daily CO Emissions (lb/day)	Maximum Daily ROG Emissions (lb/day)	Maximum Daily PM <sub>10</sub> Emissions (lb/day)	Maximum Daily PM <sub>2.5</sub> Emissions (lb/day)	Maximum Daily SO <sub>2</sub> Emissions (lb/day)
Tug Assist	Main Engines	265	49	10	11	10	0
Tug Assist	Aux Generator	29	6	1	1	1	0
<b>TOTAL</b>		<b>295</b>	<b>55</b>	<b>10</b>	<b>13</b>	<b>12</b>	<b>0</b>

Table H.2.NFA/NPA.Un.Max.Ts.2015-11. 2015 No Federal Action/No Project Alternative Tesoro VDU Crude Maximum Daily Unmitigated Emissions.

	Maximum Daily Vessel Calls	crude vapors from tanks(scf/call)	daily gas usage (mmscf/day)	mw crude vapors	destruction efficiency
Aframax	1	224,000	0.2	50	98%
<b>TOTAL</b>	<b>1</b>		<b>0.2</b>		

Assumed Distribution based on tank storage volume:

Site 1 12.5%

Site 2 87.5%

Maximum Daily Emissions (lb/day)

	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene
EF (lb/MMSCF)	130	35	7	7.5	0.38%	9.90%	0.017	0.0004	0.0003	0.0043	0.0027	0.731	0.0366	0.0272	0.0095
Panamax	14.6	3.9	0.8	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0
<b>MAXIMUM</b>	<b>14.6</b>	<b>3.9</b>	<b>0.8</b>	<b>0.8</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.1</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>

Assumed a ratio of 500/1000 based on the corresponding Btu values with respect to natural gas combustion emission factors.

Maximum Daily Emissions (lb/day)

	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene	SO <sub>x</sub>
Site 1	2	0.5	0.10	0.1	0.000	0.00	0.000	0.0000	0.0000	0.0001	0.0000	0.01	0.001	0.000	0.000	0
Site 2	13	3	0.7	0.7	0.00	0.01	0.002	0.0000	0.0000	0.000	0.000	0.1	0.00	0.00	0.001	2

0.78

**Table H.2.NFA/NPA.Un.Max.Ts.2015-12. 2015 No Federal Action/No Project Alternative Tesoro VDU Legs Maximum Daily Unmitigated Emissions.**

	tanks	crude vapors from tanks on legs(scfd/day)	daily gas usage (mmscf/day)	mw crude vapors	destruction efficiency
Site 1	4	23671.23	0.09	50	98%
Site 2	14	23671.23	0.3	50	98%
<b>TOTAL</b>	<b>18</b>		<b>0.4</b>		

48	hr/event
6	events/yr
500	ft3/min

Maximum Daily Emissions (lb/day)															
	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene
EF (lb/MMSCF)	130	35	7	7.5	0.38%	9.90%	0.017	0.0004	0.0003	0.0043	0.0027	0.731	0.0366	0.0272	0.0095
<b>TOTAL</b>	<b>27.7</b>	<b>7.5</b>	<b>1.5</b>	<b>1.6</b>	<b>0.0</b>	<b>0.1</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.2</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>

*Assumed a ratio of 500/1000 based on the corresponding Btu values with respect to natural gas combustion emission factors.*

Maximum Daily Emissions (lb/day)																
	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene	SO <sub>x</sub>
Site 1	6.2	1.7	0.3	0.4	0.00	0.03	0.00	0.000	0.000	0.000	0.00	0.03	0.00	0.00	0.00	1
Site 2	21.5	5.8	1.2	1.2	0.00	0.11	0.00	0.000	0.000	0.001	0.00	0.12	0.01	0.00	0.00	4



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Table H.2.NFA/NPA.Un.Max.Ts.2015-14.

2015 No Federal Action/No Project Alternative Tesoro Berth Summary of Maximum Daily Unmitigated Emissions.

Scenario	Operation	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Vessel Arrival/Departure	Cruising and maneuvering	999	82	34	18	18	16	50
	Boiler Warm-Up	16	4	0	3	2	1	23
	Tug Assistance	295	55	10	---	13	12	0
	Tanks	---	---	86	---	---	---	---
	Vapor Destruction Units	42.3	11.4	2.3	---	2.4	---	7.6
	Valves, Flanges, Pumps	---	---	3.25	---	---	---	---
	<b>TOTAL</b>	<b>1,353</b>	<b>152</b>	<b>136</b>	<b>21</b>	<b>35</b>	<b>29</b>	<b>81</b>
Vessel Offloading	Tanker Hoteling	1,292	102	37	28	27	21	85
	Offloading	119	30	2	20	14	9	167
	Tanks	---	---	86	---	---	---	---
	Vapor Destruction Units	42.3	11.4	2.3	---	2.4	---	7.6
	Valves, Flanges, Pumps	---	---	3.25	---	---	---	---
		<b>TOTAL</b>	<b>1,453</b>	<b>143</b>	<b>130</b>	<b>48</b>	<b>43</b>	<b>31</b>
No Vessel/Empty Berth	Vapor Destruction Units	42.3	11.4	2.3	---	2.4	---	7.6
	Tanks	---	---	86	---	---	---	---
	Valves, Flanges, Pumps	---	---	3.25	---	---	---	---
		<b>TOTAL</b>	<b>42</b>	<b>11</b>	<b>91</b>	<b>0</b>	<b>2</b>	<b>0</b>



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Table H.2.NFA/NPA.Un.Ex.2015-1. 2015 No Federal Action/No Project Alternative Exxon Mobil Main Engines Average Daily Unmitigated Emissions.

Ship	Direction	Mode	Distance (nautical miles)	Ship speed (knots)	Activity (hours)	Maximum Speed (knots)	Load Factor	MCR (kW)	Energy (kW-hr)	Fuel Type	Shipcalls (vessels/ yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)	
PANAMAX	South In	Cruising - CW to VSR	23	12	1.92	15.8	0.438	10,300	8,649	Dist at 0.2	146	59,103	4,867	2,086	1,008	1,008	928	2,704	
		Cruising - VSR to PZ	11	12	0.92	15.8	0.438	10,300	4,136	Dist at 0.2	146	28,267	2,328	998	482	482	444	1,293	
		Cruising - PZ to Pilot	4.7	7	0.67	15.8	0.087	10,300	601	Dist at 0.2	146	4,110	338	145	70	70	64	188	
	South Out	Maneuvering - Pilot to Berth			3	1.00	15.8	0.007	10,300	71	Dist at 0.2	146	482	40	17	8	8	8	22
		Maneuvering - Berth to Pilot			5	1.00	15.8	0.032	10,300	326	Dist at 0.2	146	2,231	184	79	38	38	35	102
		Cruising - Pilot to PZ		3.5	7	0.50	15.8	0.087	10,300	448	Dist at 0.2	146	3,060	252	108	52	52	48	140
		Cruising - PZ to VSR		12.5	12	1.04	15.8	0.438	10,300	4,700	Dist at 0.2	146	32,121	2,645	1,134	548	548	504	1,470
		Cruising - VSR to CW		24.5	12	2.04	15.8	0.438	10,300	9,213	Dist at 0.2	146	62,958	5,185	2,222	1,074	1,074	988	2,880
<b>TOTAL</b>												<b>192,332</b>	<b>15,839</b>	<b>6,788</b>	<b>3,281</b>	<b>3,281</b>	<b>3,018</b>	<b>8,800</b>	

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Table H.2.NFA/NPA.Un.Ex.2015-2. 2015 No Federal Action/No Project Alternative Exxon Mobil Project Auxiliary Generator Average Daily Unmitigated Emissions.

Ship	Direction	Mode	Activity (hours)	MCR (kW)	Load Factor	Energy (kW-hr)	Fuel Type	Shipcalls (vessels/yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
PANAMAX	South In	Cruising	3.50	3,600	0.28	3,533	Dist at 0.2	146	19,740	1,562	568	396	380	304	1,294
		Maneuvering	2.00	3,600	0.28	2,016	Dist at 0.2	146	11,265	891	324	226	217	174	738
	South Out	Maneuvering	1.5	3,600	0.28	1,512	Dist at 0.2	146	8,448	669	243	170	163	130	554
		Cruising	3.58	3,600	0.28	3,612	Dist at 0.2	146	20,182	1,597	581	405	389	311	1,323
<b>TOTAL</b>									<b>59,635</b>	<b>4,719</b>	<b>1,716</b>	<b>1,197</b>	<b>1,149</b>	<b>919</b>	<b>3,909</b>

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Table H.2.NFA/NPA.Un.Ex.2015-3. 2015 No Federal Action/No Project Alternative Exxon Mobil Boiler Warm-Up Average Daily Unmitigated Emissions.

Shipcalls (vessels/yr)	Vessel Size	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
146.0	Panamax	Dist at 0.2	0.20	59.91	30%	3	35,000	976	244	14	162	113	76	1,375

TOTAL      976      244      14      162      113      76      1,375

Table H.2.NFA/NPA.Un.Ex.2015-4. 2015 No Federal Action/No Project Alternative Exxon Mobil Berth Operations Average Daily Unmitigated Emissions.

Auxiliary Generator Pre-Pumping

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bb/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
146.0	Panamax	300,000	Dist at 0.2	0.20	3,600	28%	2.5	14,081	1,114	405	283	271	217	923

AMP Reduction 15%

TOTAL 11,969 947 344 240 231 184 785

Boiler Pre-Pumping

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bb/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
146.0	Panamax	300,000	Dist at 0.2	0.20	59.91	30%	2.5	35,000	974	203	43	135	94	63	1,145

TOTAL 974 203 43 135 94 63 1,145

Auxiliary Generator Pumping

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bb/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
146.0	Panamax	300,000	Dist at 0.2	0.20	3,600	56%	11.0	123,910	9,806	3,566	2,487	2,388	1,910	8,122

AMP Reduction 15%

TOTAL 105,323 8,335 3,031 2,114 2,029 1,624 6,904

Boiler Pumping

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bb/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Inerting Fuel Consumption Savings (lb/1000 bbl offloaded)	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
146.0	Panamax	300,000	Dist at 0.2	0.20	59.91	28.06	11.0	5,915	1,235	261	818	572	383	6,959

TOTAL 5,915 1,235 261 818 572 383 6,959

Auxiliary Generator Post-Pumping

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bb/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
146.0	Panamax	300,000	Dist at 0.2	0.20	3,600	28%	1.0	5,632	446	162	113	109	87	369

AMP Reduction 15%

TOTAL 4,787 379 138 96 92 74 314

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Table H.2.NFA/NPA.Un.Ex.2015-5. 2015 No Federal Action/No Project Alternative Exxon Mobil Summary of Average Daily Unmitigated Vessel Emissions.

Mode	Equipment	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Cruising	Main Engines	189,620	15,616	6,692	3,235	3,235	2,976	8,675
Cruising	Aux Generator	39,922	3,159	1,149	801	769	615	2,617
Maneuvering	Main Engines	2,712	223	96	46	46	43	124
Maneuvering	Aux Generator	19,713	1,560	567	396	380	304	1,292
Boiler Warm-up	Boiler	976	244	14	162	113	76	1,375
Berth Operations	Boiler	6,889	1,439	304	952	667	446	8,105
Berth Operations	Aux Generator	122,079	9,661	3,513	2,450	2,352	1,882	8,002
Propulsion	TOTAL	251,967	20,558	8,504	4,478	4,430	3,938	12,708
Non-Propulsion	TOTAL	129,944	11,344	3,831	3,564	3,132	2,403	17,481
<b>Total Emissions</b>		<b>381,911</b>	<b>31,902</b>	<b>12,335</b>	<b>8,042</b>	<b>7,562</b>	<b>6,341</b>	<b>30,190</b>

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Cruising	Main Engines	519.5	42.8	18.3	8.9	8.9	8.2	23.8
Cruising	Aux Generator	109.4	8.7	3.1	2.2	2.1	1.7	7.2
Maneuvering	Main Engines	7.4	0.6	0.3	0.1	0.1	0.1	0.3
Maneuvering	Aux Generator	54.0	4.3	1.6	1.1	1.0	0.8	3.5
Boiler Warm-up	Boiler	2.7	0.7	0.0	0.4	0.3	0.2	3.8
Berth Operations	Boiler	18.9	3.9	0.8	2.6	1.8	1.2	22.2
Berth Operations	Aux Generator	334.5	26.5	9.6	6.7	6.4	5.2	21.9
Propulsion	TOTAL	690.3	56.3	23.3	12.3	12.1	10.8	34.8
Non-Propulsion	TOTAL	356.0	31.1	10.5	9.8	8.6	6.6	47.9
<b>Total Emissions</b>		<b>1,046</b>	<b>87</b>	<b>34</b>	<b>22</b>	<b>21</b>	<b>17</b>	<b>83</b>

**Table H.2.NFA/NPA.Un.Ex.2015-6. 2015 No Federal Action/No Project Alternative Exxon Mobil Tug Main Engines Average Daily Unmitigated Emissions.**

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Shipcalls (vessels/yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
PANAMAX	Maneuvering - Pilot to Berth	1.00	2	4,800	0.50	MGO	146.0	19,372	3,608	695	830	763	12
	Maneuvering - Berth to Pilot	1.00	2	4,800	0.50	MGO	146.0	19,372	3,608	695	830	763	12

TOTAL      38,745      7,216      1,389      1,659      1,527      23

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**Table H.2.NFA/NPA.Un.Ex.2015-7. 2015 No Federal Action/No Project Alternative Exxon Mobil Tug Auxiliary Generator Engines Average Daily Unmitigated Emissions.**

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Shipcalls (vessels/yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
PANAMAX	Maneuvering - Pilot to Berth	1.00	2	300	1.00	MGO	146.0	2,149	403	65	96	89	1
	Maneuvering - Berth to Pilot	1.00	2	300	1.00	MGO	146.0	2,149	403	65	96	89	1
<b>TOTAL</b>								<b>4,298</b>	<b>806</b>	<b>130</b>	<b>193</b>	<b>178</b>	<b>2</b>

**Table H.2.NFA/NPA.Un.Ex.2015-8. 2015 No Federal Action/No Project Alternative Exxon Mobil Summary of Tug Average Daily Unmitigated Emissions.**

Mode	Equipment	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Tug Assist	Main Engines	38,745	7,216	1,389	1,659	1,527	23
Tug Assist	Aux Generator	4,298	806	130	193	178	2
<b>TOTAL</b>		<b>43,043</b>	<b>8,022</b>	<b>1,519</b>	<b>1,852</b>	<b>1,704</b>	<b>25</b>

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Tug Assist	Main Engines	106	19.8	3.8	4.5	4.2	0.1
Tug Assist	Aux Generator	12	2.2	0.4	0.5	0.5	0.0
<b>TOTAL</b>		<b>118</b>	<b>22.0</b>	<b>4.2</b>	<b>5.1</b>	<b>4.7</b>	<b>0.1</b>



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Table H.2.NFA/NPA.Un.Ex.2015-9. 2015 No Federal Action/No Project Alternative Exxon Mobil VDU Crude Average Daily Unmitigated Emissions.

Assumed Distribution based on tank storage volume:	
Site 1	12.5%
Site 2	87.5%

	Annual Vessel Calls	crude vapors from tanks(scf/call)	annual gas usage (mmscf/yr)	mw crude vapors	destruction efficiency
Panamax	146	116,667	17.0	50	98%
<b>TOTAL</b>	<b>146</b>		<b>17.0</b>		

Annual Average (lb/yr)

	<b>NO<sub>x</sub></b>	<b>CO</b>	<b>VOC</b>	<b>PM<sub>10</sub></b>	<b>benzene</b>	<b>hexane</b>	<b>formaldehyde</b>	<b>PAH</b>	<b>naphthalene</b>	<b>acetaldehyde</b>	<b>acrolein</b>	<b>propylene</b>	<b>toluene</b>	<b>xylene</b>	<b>ethylbenzene</b>
EF (lb/MMSCF)	130	35	7	7.5	0.38%	9.90%	0.017	0.0004	0.0003	0.0043	0.0027	0.731	0.0366	0.0272	0.0095
Panamax	1107.2	298.1	59.6	63.9	0.0	0.8	0.1	0.0	0.0	0.0	0.0	6.2	0.3	0.2	0.1
<b>TOTAL</b>	<b>1107.2</b>	<b>298.1</b>	<b>59.6</b>	<b>63.9</b>	<b>0.0</b>	<b>0.8</b>	<b>0.1</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>6.2</b>	<b>0.3</b>	<b>0.2</b>	<b>0.1</b>

Assumed a ratio of 500/1000 based on the corresponding Btu values with respect to natural gas combustion emission factors.

Annual Average (lb/yr)

	<b>NO<sub>x</sub></b>	<b>CO</b>	<b>VOC</b>	<b>PM<sub>10</sub></b>	<b>benzene</b>	<b>hexane</b>	<b>formaldehyde</b>	<b>PAH</b>	<b>naphthalene</b>	<b>acetaldehyde</b>	<b>acrolein</b>	<b>propylene</b>	<b>toluene</b>	<b>xylene</b>	<b>ethylbenzene</b>	<b>SO<sub>x</sub></b>
Site 1	138	37.3	7.45	8.0	0.004	0.11	0.018	0.0004	0.0003	0.0046	0.0029	0.78	0.039	0.029	0.010	25
Site 2	969	261	52.2	55.9	0.03	0.74	0.127	0.0030	0.0022	0.032	0.020	5.4	0.27	0.20	0.071	173

59.62

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Table H.2.NFA/NPA.Un.Ex.2015-10. 2015 No Federal Action/No Project Alternative Exxon Mobil VDU Legs Average Daily Unmitigated Emissions.

	tanks	crude vapors from tanks on legs(scft/yr)	annual gas usage (mmscf/yr)	mw crude vapors	destruction efficiency
Site 1	4	8640000	34.6	50	98%
Site 2	14	8640000	121.0	50	98%
<b>TOTAL</b>	<b>18</b>		<b>155.5</b>		

<b>48</b>	<b>hr/event</b>
<b>6</b>	<b>events/yr</b>
<b>500</b>	<b>ft3/min</b>

Annual Average (lb/yr)															
	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene
EF (lb/MMSCF)	130	35	7	7.5	0.38%	9.90%	0.017	0.0004	0.0003	0.0043	0.0027	0.731	0.0366	0.0272	0.0095
<b>TOTAL</b>	<b>10108.8</b>	<b>2721.6</b>	<b>544.3</b>	<b>583.2</b>	<b>2.1</b>	<b>53.9</b>	<b>1.3</b>	<b>0.0</b>	<b>0.0</b>	<b>0.3</b>	<b>0.2</b>	<b>56.8</b>	<b>2.8</b>	<b>2.1</b>	<b>0.7</b>

Assumed a ratio of 500/1000 based on the corresponding Btu values with respect to natural gas combustion emission factors.

Annual Average (lb/yr)																
	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene	SO <sub>x</sub>
Site 1	2246.4	604.8	121.0	129.6	0.46	11.98	0.29	0.007	0.005	0.074	0.05	12.63	0.63	0.47	0.16	402
Site 2	7862.4	2116.8	423.4	453.6	1.61	41.91	1.03	0.024	0.018	0.260	0.16	44.21	2.21	1.65	0.57	1407



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Table H.2.NFA/NPA.Un.Ex.2015-12.

2015 No Federal Action/No Project Alternative Exxon Mobil Berth Summary of Average Daily Unmitigated Emissions.

Operation	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Tanker Cruising and Maneuvering	251,967	20,558	8,504	4,478	4,430	3,938	12,708
Tanker Hoteling	122,079	9,661	3,513	2,450	2,352	1,882	8,002
Offloading Emissions	6,889	1,439	304	952	667	446	8,105
Transiting Operations	976	244	14	162	113	76	1,375
Tug Assistance	43,043	8,022	1,519	---	1,852	1,704	25
Tanks	---	---	3,660	---	---	---	---
Vapor Destruction Units	11,216	3,020	604	---	647	---	2,007
Valves, Flanges, Pumps	---	---	1,188	---	---	---	---
<b>TOTAL</b>	<b>436,170</b>	<b>42,944</b>	<b>19,306</b>	<b>8,042</b>	<b>10,061</b>	<b>8,045</b>	<b>32,222</b>

Operation	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Tanker Cruising and Maneuvering	690	56	23	12	12	11	35
Tanker Hoteling	334	26	10	7	6	5	22
Offloading Emissions	19	4	1	3	2	1	22
Transiting Operations	3	1	0.0	0.4	0.3	0.2	4
Tug Assistance	118	22	4.2	---	5.1	4.7	0.1
Tanks	---	---	10.0	---	---	---	---
Vapor Destruction Units	31	8	2	---	2	---	5
Valves, Flanges, Pumps	---	---	3	---	---	---	---
<b>TOTAL</b>	<b>1,195</b>	<b>118</b>	<b>53</b>	<b>22</b>	<b>28</b>	<b>22</b>	<b>88</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

**Table H.2.NFA/NPA.Un.Max.Ex.2015-1. 2015 No Federal Action/No Project Alternative Exxon Mobil Main Engines Maximum Daily Unmitigated Emissions.**

Ship	Direction	Mode	Distance (nautical miles)	Ship speed (knots)	Activity (hours)	Maximum Speed (knots)	Load Factor	MCR (kW)	Energy (kW-hr)	Fuel Type	Maximum Daily Shipcalls (vessels/day)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)	
PANAMAX	South In	Cruising - CW to VSR	23	12	1.92	15.8	0.438	10,300	8,649	Dist at 0.2	1.0	405	33	14	7	7	6	19	
		Cruising - VSR to PZ	11	12	0.92	15.8	0.438	10,300	4,136	Dist at 0.2	1.0	194	16	7	3	3	3	9	
		Cruising - PZ to Pilot	4.7	7	0.67	15.8	0.087	10,300	601	Dist at 0.2	1.0	28	2	1	0	0	0	1	
		Maneuvering - Pilot to Berth		3	1.00	15.8	0.007	10,300	71	Dist at 0.2	1.0	3	0.3	0.1	0.1	0.1	0.1	0	
			<b>TOTAL</b>									<b>630</b>	<b>52</b>	<b>22</b>	<b>11</b>	<b>11</b>	<b>10</b>	<b>29</b>	
	South Out	Maneuvering - Berth to Pilot			5	1.00	15.8	0.032	10,300	326	Dist at 0.2	1.0	15	1	1	0	0	0	1
		Cruising - Pilot to PZ	3.5	7	0.50	15.8	0.087	10,300	448	Dist at 0.2	1.0	21	2	1	0	0	0	1	
		Cruising - PZ to VSR	12.5	12	1.04	15.8	0.438	10,300	4,700	Dist at 0.2	1.0	220	18	8	4	4	3	10	
		Cruising - VSR to CW	24.5	12	2.04	15.8	0.438	10,300	9,213	Dist at 0.2	1.0	431	36	15	7	7	7	20	
				<b>TOTAL</b>									<b>687</b>	<b>57</b>	<b>24</b>	<b>12</b>	<b>12</b>	<b>11</b>	<b>31</b>
		<b>MAXIMUM</b>									<b>687</b>	<b>57</b>	<b>24</b>	<b>12</b>	<b>12</b>	<b>11</b>	<b>31</b>		

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Table H.2.NFA/NPA.Un.Max.Ex.2015-2. 2015 No Federal Action/No Project Alternative Exxon Mobil Project Auxiliary Generator Maximum Daily Unmitigated Emissions.

Ship	Direction	Mode	Activity (hours)	MCR (kW)	Load Factor	Energy (kW-hr)	Fuel Type	Maximum Daily Shipcalls (vessels/day)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
PANAMAX	South In	Cruising	3.15	3,600	0.28	3,178	Dist at 0.2	1.0	122	10	3	3	3	2	8
			2.00	3,600	0.28	2,016	Dist at 0.2	1.0	77	6	2	2	2	1	5
	<b>TOTAL</b>								<b>199</b>	<b>16</b>	<b>6</b>	<b>4</b>	<b>4</b>	<b>3</b>	<b>13</b>
	South Out	Maneuvering	1.5	3,600	0.28	1,512	Dist at 0.2	1.0	58	5	2	1	1	1	4
			3.21	3,600	0.28	3,234	Dist at 0.2	1.0	124	10	4	3	3	2	8
	<b>TOTAL</b>								<b>182</b>	<b>14</b>	<b>5</b>	<b>4</b>	<b>4</b>	<b>3</b>	<b>12</b>
<b>MAXIMUM</b>								<b>199</b>	<b>16</b>	<b>6</b>	<b>4</b>	<b>4</b>	<b>3</b>	<b>13</b>	

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.NFA/NPA.Un.Max.Ex.2015-3. 2015 No Federal Action/No Project Alternative Exxon Mobil Summary of Maximum Daily Unmitigated Vessel Emissions.

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Cruising	Main Engines	672	55	24	11	11	11	31
Cruising	Aux Generator	122	10	3	3	3	2	8
Maneuvering	Main Engines	15	1	1	0	0	0	1
Maneuvering	Aux Generator	77	6	2	2	2	1	5
<b>Maneuvering</b>	<b>TOTAL</b>	<b>92</b>	<b>7</b>	<b>3</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>6</b>
<b>Propulsion</b>	<b>TOTAL</b>	<b>886</b>	<b>72</b>	<b>30</b>	<b>16</b>	<b>16</b>	<b>14</b>	<b>44</b>

1079.00

**Table H.2.NFA/NPA.Un.Max.Ex.2015-4. 2015 No Federal Action/No Project Alternative Exxon Mobil Boiler Warm-Up Maximum Daily Unmitigated Emissions.**

Shipcalls (vessels/day)	Vessel Size	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Panamax	Dist at 0.2	0.20	59.91	30%	3	35,000	7	2	0.1	1	1	1	9
<b>MAXIMUM</b>								<b>7</b>	<b>2</b>	<b>0</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>9</b>



Table H.2.NFA/NPA.Un.Max.Ex.2015-5. 2015 No Federal Action/No Project Alternative Exxon Mobil Summary of Boiler Warm-Up Maximum Unmitigated Emissions.

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Boiler Warm-up	Boiler	7	2	0	1	1	1	9

Table H.2.NFA/NPA.Un.Max.Ex.2015-6. 2015 No Federal Action/No Project Alternative Exxon Mobil Berth Operations Maximum Daily Unmitigated Emissions.

Auxiliary Generator Pre-Pumping

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bb/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Panamax	300,000	Dist at 0.2	0.20	3,600	28%	2.5	96	8	3	2	2	2	6

AMP Reduction 15%

MAXIMUM 82 6 2 2 2 1 5

Boiler Pre-Pumping

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bb/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Panamax	300,000	Dist at 0.2	0.20	59.91	30%	2.5	35,000	6	1	0	1	1	0	8

MAXIMUM 6 1 0 1 1 0 8

Auxiliary Generator Pumping

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bb/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Panamax	300,000	Dist at 0.2	0.20	3,600	56%	11.0	849	67	24	18	18	14	56

AMP Reduction 15%

MAXIMUM 721 57 21 16 15 12 47

Boiler Pumping

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bb/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Inerting Fuel Consumption Savings (lb/1000 bbl offloaded)	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Panamax	300,000	Dist at 0.2	0.20	59.91	28.06	11.0	34	8	0	6	4	3	48

MAXIMUM 34 8 0 6 4 3 48

Auxiliary Generator Post-Pumping

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bb/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Panamax	300,000	Dist at 0.2	0.20	3,600	28%	1.0	39	3	1	1	1	1	3

AMP Reduction 15%

MAXIMUM 33 3 1 1 1 1 2

**Table H.2.NFA/NPA.Un.Max.Ex.2015-7. 2015 No Federal Action/No Project Alternative Exxon Mobil Summary of Berth Operations Maximum Daily Unmitigated Emissions.**

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Berth Operations	Boiler	39	10	1	7	5	3	56
Berth Operations	Aux Generator	836	66	24	18	17	14	55

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**Table H.2.NFA/NPA.Un.Max.Ex.2015-8. 2015 No Federal Action/No Project Alternative Exxon Mobil Tug Main Engines Maximum Daily Unmitigated Emissions.**

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Shipcalls (vessels/day)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
PANAMAX	Maneuvering - Pilot to Berth	1.00	2	4,800	0.50	MGO	1.0	133	25	5	6	5	0
	Maneuvering - Berth to Pilot	1.00	2	4,800	0.50	MGO	1.0	133	25	5	6	5	0
<b>TOTAL</b>								<b>265</b>	<b>49</b>	<b>10</b>	<b>11</b>	<b>10</b>	<b>0</b>
<b>MAXIMUM</b>								<b>265</b>	<b>49</b>	<b>10</b>	<b>11</b>	<b>10</b>	<b>0</b>

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**Table H.2.NFA/NPA.Un.Max.Ex.2015-9. 2015 No Federal Action/No Project Alternative Exxon Mobil Tug Auxiliary Generator Engines Maximum Daily Unmitigated Emissions.**

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Shipcalls (vessels/day)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
PANAMAX	Maneuvering - Pilot to Berth	1.00	2	300	1.00	MGO	1.0	15	3	0	1	1	0
	Maneuvering - Berth to Pilot	1.00	2	300	1.00	MGO	1.0	15	3	0	1	1	0
<b>TOTAL</b>								<b>29</b>	<b>6</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>0</b>
<b>MAXIMUM</b>								<b>29</b>	<b>6</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>0</b>

**Table H.2.NFA/NPA.Un.Max.Ex.2015-10. 2015 No Federal Action/No Project Alternative Exxon Mobil Summary of Tug Maximum Daily Unmitigated Emissions.**

<b>Mode</b>	<b>Equipment</b>	<b>Maximum Daily NO<sub>x</sub> Emissions (lb/day)</b>	<b>Maximum Daily CO Emissions (lb/day)</b>	<b>Maximum Daily ROG Emissions (lb/day)</b>	<b>Maximum Daily PM<sub>10</sub> Emissions (lb/day)</b>	<b>Maximum Daily PM<sub>2.5</sub> Emissions (lb/day)</b>	<b>Maximum Daily SO<sub>2</sub> Emissions (lb/day)</b>
Tug Assist	Main Engines	265	49	10	11	10	0
Tug Assist	Aux Generator	29	6	1	1	1	0
<b>TOTAL</b>		<b>295</b>	<b>55</b>	<b>10</b>	<b>13</b>	<b>12</b>	<b>0</b>

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Table H.2.NFA/NPA.Un.Max.Ex.2015-11. 2015 No Federal Action/No Project Alternative Exxon Mobil VDU Crude Maximum Daily Unmitigated Emissions.

	Maximum Daily Vessel Calls	crude vapors from tanks(scf/call)	daily gas usage (mmscf/day)	mw crude vapors	destruction efficiency
Panamax	1	116,667	0.1	50	98%
TOTAL	1		0.1		

Assumed Distribution based on tank storage volume:

Site 1 12.5%  
Site 2 87.5%

Maximum Daily Emissions (lb/day)

	NOx	CO	VOC	PM10	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene
EF (lb/MMSCF)	130	35	7	7.5	0.38%	9.90%	0.017	0.0004	0.0003	0.0043	0.0027	0.731	0.0366	0.0272	0.0095
Panamax	7.6	2.0	0.4	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MAXIMUM	7.6	2.0	0.4	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Assumed a ratio of 500/1000 based on the corresponding Btu values with respect to natural gas combustion emission factors.

Maximum Daily Emissions (lb/day)

	NOx	CO	VOC	PM10	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene	SOx
Site 1	1	0.3	0.05	0.1	0.000	0.00	0.000	0.0000	0.0000	0.0000	0.0000	0.01	0.000	0.000	0.000	0
Site 2	7	2	0.4	0.4	0.00	0.01	0.001	0.0000	0.0000	0.000	0.000	0.0	0.00	0.00	0.000	1

0.41

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Table H.2.NFA/NPA.Un.Max.Ex.2015-12. 2015 No Federal Action/No Project Alternative Exxon Mobil VDU Legs Maximum Daily Unmitigated Emissions.

	tanks	crude vapors from tanks on legs(scfd/day)	daily gas usage (mmscf/day)	mw crude vapors	destruction efficiency		
Site 1	4	23671.23	0.09	50	98%		
Site 2	14	23671.23	0.3	50	98%		
<b>TOTAL</b>	<b>18</b>		<b>0.4</b>				

  

<b>48</b>	<b>hr/event</b>
<b>6</b>	<b>events/yr</b>
<b>500</b>	<b>ft3/min</b>

Maximum Daily Emissions (lb/day)															
	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene
EF (lb/MMSCF)	130	35	7	7.5	0.38%	9.90%	0.017	0.0004	0.0003	0.0043	0.0027	0.731	0.0366	0.0272	0.0095
<b>TOTAL</b>	<b>27.7</b>	<b>7.5</b>	<b>1.5</b>	<b>1.6</b>	<b>0.0</b>	<b>0.1</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.2</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>

Assumed a ratio of 500/1000 based on the corresponding Btu values with respect to natural gas combustion emission factors.

Maximum Daily Emissions (lb/day)																
	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene	SO <sub>x</sub>
Site 1	6.2	1.7	0.3	0.4	0.00	0.03	0.00	0.000	0.000	0.000	0.00	0.03	0.00	0.00	0.00	1
Site 2	21.5	5.8	1.2	1.2	0.00	0.11	0.00	0.000	0.000	0.001	0.00	0.12	0.01	0.00	0.00	4





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Table H.2.NFA/NPA.Un.Max.Ex.2015-14.

2015 No Federal Action/No Project Alternative Exxon Mobil Berth Summary of Maximum Daily Unmitigated Emissions.

Scenario	Operation	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Vessel Arrival/Departure	Cruising and maneuvering	886	72	30	16	16	14	44
	Boiler Warm-Up	7	2	0	1	1	1	9
	Tug Assistance	295	55	10	---	13	12	0
	Tanks	---	---	86	---	---	---	---
	Vapor Destruction Units	35.3	9.5	1.9	---	2.0	---	6.3
	Valves, Flanges, Pumps	---	---	3.25	---	---	---	---
	<b>TOTAL</b>	<b>1,223</b>	<b>138</b>	<b>132</b>	<b>17</b>	<b>31</b>	<b>26</b>	<b>60</b>
Vessel Offloading	Tanker Hoteling	836	66	24	18	17	14	55
	Offloading	39	10	1	7	5	3	56
	Tanks	---	---	86	---	---	---	---
	Vapor Destruction Units	35.3	9.5	1.9	---	2.0	---	6.3
	Valves, Flanges, Pumps	---	---	3.25	---	---	---	---
		<b>TOTAL</b>	<b>911</b>	<b>86</b>	<b>116</b>	<b>25</b>	<b>24</b>	<b>17</b>
No Vessel/Empty Berth	Vapor Destruction Units	35.3	9.5	1.9	---	2.0	---	6.3
	Tanks	---	---	86	---	---	---	---
	Valves, Flanges, Pumps	---	---	3.25	---	---	---	---
	<b>TOTAL</b>	<b>35</b>	<b>9</b>	<b>91</b>	<b>0</b>	<b>2</b>	<b>0</b>	<b>6</b>

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Table H.2.NFA/NPA.Un.BP.2025-1. 2025 No Federal Action/No Project Alternative BP Main Engines Average Daily Unmitigated Emissions.

Ship	Direction	Mode	Distance (nautical miles)	Ship speed (knots)	Activity (hours)	Maximum Speed (knots)	Load Factor	MCR (kW)	Energy (kW-hr)	Fuel Type	Shipcalls (vessels/ yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)		
AFRAMAX	South In	Cruising - CW to VSR	23	12	1.92	16.1	0.414	12,477	9,902	Dist at 0.2	34	15,758	1,298	556	269	269	247	721		
		Cruising - VSR to PZ	11	12	0.92	16.1	0.414	12,477	4,736	Dist at 0.2	34	7,537	621	266	129	129	118	345		
		Cruising - PZ to Pilot	4.7	7	0.67	16.1	0.082	12,477	689	Dist at 0.2	34	1,096	90	39	19	19	17	50		
	South Out	Maneuvering - Pilot to Berth	3	1.00	16.1	0.006	12,477	81	12,477	81	Dist at 0.2	34	128	11	5	2	2	2	6	
		Maneuvering - Berth to Pilot	5	1.00	16.1	0.030	12,477	374	12,477	374	Dist at 0.2	34	595	49	21	10	10	9	27	
		Cruising - Pilot to PZ	3.5	7	0.50	16.1	0.082	12,477	513	12,477	513	Dist at 0.2	34	816	67	29	14	14	13	37
		Cruising - PZ to VSR	12.5	12	1.04	16.1	0.414	12,477	5,382	12,477	5,382	Dist at 0.2	34	8,564	705	302	146	146	134	392
		Cruising - VSR to CW	24.5	12	2.04	16.1	0.414	12,477	10,548	12,477	10,548	Dist at 0.2	34	16,786	1,382	592	286	286	263	768
		<b>TOTAL</b>											<b>51,280</b>	<b>4,223</b>	<b>1,810</b>	<b>875</b>	<b>875</b>	<b>805</b>	<b>2,346</b>	

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Table H.2.NFA/NPA.Un.BP.2025-2. 2025 No Federal Action/No Project Alternative BP Project Auxiliary Generator Average Daily Unmitigated Emissions.

Ship	Direction	Mode	Activity (hours)	MCR (kW)	Load Factor	Energy (kW-hr)	Fuel Type	Shipcalls (vessels/yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
AFRAMAX	South In	Cruising	3.50	3,600	0.28	3,533	Dist at 0.2	34	4,597	364	132	92	89	71	301
		Maneuvering	2.00	3,600	0.28	2,016	Dist at 0.2	34	2,623	208	75	53	51	40	172
	South Out	Maneuvering	1.5	3,600	0.28	1,512	Dist at 0.2	34	1,967	156	57	39	38	30	129
		Cruising	3.50	3,600	0.28	3,528	Dist at 0.2	34	4,591	363	132	92	88	71	301
<b>TOTAL</b>									<b>13,778</b>	<b>1,090</b>	<b>396</b>	<b>277</b>	<b>265</b>	<b>212</b>	<b>903</b>

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**Table H.2.NFA/NPA.Un.BP.2025-3. 2025 No Federal Action/No Project Alternative BP Boiler Warm-Up Average Daily Unmitigated Emissions.**

Shipcalls (vessels/yr)	Vessel Size	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
34.0	Aframax	Dist at 0.2	0.20	102.17	30%	3	50,000	554	138	8	92	64	43	780
<b>TOTAL</b>								<b>554</b>	<b>138</b>	<b>8</b>	<b>92</b>	<b>64</b>	<b>43</b>	<b>780</b>

Table H.2.NFA/NPA.Un.BP.2025-4. 2025 No Federal Action/No Project Alternative BP Berth Operations Average Daily Unmitigated Emissions.

Auxiliary Generator Pre-Pumping

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
34.0	Aframax	400,000	Dist at 0.2	0.20	3,600	28%	2.5	3,279	259	94	66	63	51	215

TOTAL 3,279 259 94 66 63 51 215

Boiler Pre-Pumping

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
34.0	Aframax	400,000	Dist at 0.2	0.20	102.17	30%	2.5	50,000	552	115	24	76	53	36	650

TOTAL 552 115 24 76 53 36 650

Auxiliary Generator Pumping

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
34.0	Aframax	400,000	Dist at 0.2	0.20	3,600	56%	15.0	39,349	3,114	1,132	790	758	607	2,579

TOTAL 39,349 3,114 1,132 790 758 607 2,579

Boiler Pumping

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Inerting Fuel Consumption Savings (lb/1000 bbl offloaded)	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
34.0	Aframax	400,000	Dist at 0.2	0.20	102.17	28.06	15.0	4,274	892	189	591	414	277	5,028

TOTAL 4,274 892 189 591 414 277 5,028

Auxiliary Generator Post-Pumping

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
34.0	Aframax	400,000	Dist at 0.2	0.20	3,600	28%	1.0	1,312	104	38	26	25	20	86

TOTAL 1,312 104 38 26 25 20 86

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Table H.2.NFA/NPA.Un.BP.2025-5. 2025 No Federal Action/No Project Alternative BP Summary of Average Daily Unmitigated Vessel Emissions.

Mode	Equipment	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Cruising	Main Engines	50,556	4,163	1,784	862	862	793	2,313
Cruising	Aux Generator	9,188	727	264	184	177	142	602
Maneuvering	Main Engines	723	60	26	12	12	11	33
Maneuvering	Aux Generator	4,591	363	132	92	88	71	301
Boiler Warm-up	Boiler	554	138	8	92	64	43	780
Berth Operations	Boiler	4,826	1,008	213	667	467	312	5,678
Berth Operations	Aux Generator	43,939	3,477	1,264	882	847	677	2,880
Propulsion	TOTAL	65,058	5,313	2,206	1,151	1,140	1,017	3,249
Non-Propulsion	TOTAL	49,319	4,623	1,485	1,641	1,378	1,033	9,338
<b>Total Emissions</b>		<b>114,377</b>	<b>9,937</b>	<b>3,692</b>	<b>2,792</b>	<b>2,518</b>	<b>2,050</b>	<b>12,587</b>

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Cruising	Main Engines	138.5	11.4	4.9	2.4	2.4	2.2	6.3
Cruising	Aux Generator	25.2	2.0	0.7	0.5	0.5	0.4	1.6
Maneuvering	Main Engines	2.0	0.2	0.1	0.0	0.0	0.0	0.1
Maneuvering	Aux Generator	12.6	1.0	0.4	0.3	0.2	0.2	0.8
Boiler Warm-up	Boiler	1.5	0.4	0.0	0.3	0.2	0.1	2.1
Berth Operations	Boiler	13.2	2.8	0.6	1.8	1.3	0.9	15.6
Berth Operations	Aux Generator	120.4	9.5	3.5	2.4	2.3	1.9	7.9
Propulsion	TOTAL	178.2	14.6	6.0	3.2	3.1	2.8	8.9
Non-Propulsion	TOTAL	135.1	12.7	4.1	4.5	3.8	2.8	25.6
<b>Total Emissions</b>		<b>313</b>	<b>27</b>	<b>10</b>	<b>8</b>	<b>7</b>	<b>6</b>	<b>34</b>

**Table H.2.NFA/NPA.Un.BP.2025-6. 2025 No Federal Action/No Project Alternative BP Tug Main Engines Average Daily Unmitigated Emissions.**

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Shipcalls (vessels/yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
AFRAMAX	Maneuvering - Pilot to Berth	1.00	2	4,800	0.50	MGO	34.0	3,743	840	157	162	149	3
	Maneuvering - Berth to Pilot	1.00	2	4,800	0.50	MGO	34.0	3,743	840	157	162	149	3

**TOTAL      7,486      1,681      315      324      298      5**



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**Table H.2.NFA/NPA.Un.BP.2025-7. 2025 No Federal Action/No Project Alternative BP Tug Auxiliary Generator Engines Average Daily Unmitigated Emissions.**

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Shipcalls (vessels/yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
AFRAMAX	Maneuvering - Pilot to Berth	1.00	2	300	1.00	MGO	34.0	421	94	15	18	17	0
	Maneuvering - Berth to Pilot	1.00	2	300	1.00	MGO	34.0	421	94	15	18	17	0
<b>TOTAL</b>								<b>843</b>	<b>188</b>	<b>30</b>	<b>36</b>	<b>33</b>	<b>0</b>

**Table H.2.NFA/NPA.Un.BP.2025-8. 2025 No Federal Action/No Project Alternative BP Summary of Tug Average Daily Unmitigated Emissions.**

Mode	Equipment	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Tug Assist	Main Engines	7,486	1,681	315	324	298	5
Tug Assist	Aux Generator	843	188	30	36	33	0
<b>TOTAL</b>		<b>8,329</b>	<b>1,868</b>	<b>345</b>	<b>359</b>	<b>331</b>	<b>6</b>

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Tug Assist	Main Engines	21	4.6	0.9	0.9	0.8	0.0
Tug Assist	Aux Generator	2	0.5	0.1	0.1	0.1	0.0
<b>TOTAL</b>		<b>23</b>	<b>5.1</b>	<b>0.9</b>	<b>1.0</b>	<b>0.9</b>	<b>0.0</b>

Table H.2.NFA/NPA.Un.BP.2025-9. 2025 No Federal Action/No Project Alternative BP VDU Crude Average Daily Unmitigated Emissions.

Assumed Distribution based on tank storage volume:	
Site 1	12.5%
Site 2	87.5%

	Annual Vessel Calls	crude vapors from tanks(scft/call)	annual gas usage (mmscf/yr)	mw crude vapors	destruction efficiency
Aframax	34	224,000	7.6	50	98%
<b>TOTAL</b>	<b>34</b>		<b>7.6</b>		

Annual Average (lb/yr)

	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene
EF (lb/MMSCF)	130	35	7	7.5	0.38%	9.90%	0.017	0.0004	0.0003	0.0043	0.0027	0.731	0.0366	0.0272	0.0095
Panamax	495.0	133.3	26.7	28.6	0.0	0.4	0.1	0.0	0.0	0.0	0.0	2.8	0.1	0.1	0.0
<b>TOTAL</b>	<b>495.0</b>	<b>133.3</b>	<b>26.7</b>	<b>28.6</b>	<b>0.0</b>	<b>0.4</b>	<b>0.1</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>2.8</b>	<b>0.1</b>	<b>0.1</b>	<b>0.0</b>

Assumed a ratio of 500/1000 based on the corresponding Btu values with respect to natural gas combustion emission factors.

Annual Average (lb/yr)

	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene	SO <sub>x</sub>
Site 1	62	16.7	3.33	3.6	0.002	0.05	0.008	0.0002	0.0001	0.0020	0.0013	0.35	0.017	0.013	0.005	11
Site 2	433	117	23.3	25.0	0.01	0.33	0.057	0.0013	0.0010	0.014	0.009	2.4	0.12	0.09	0.032	78

26.66

**Table H.2.NFA/NPA.Un.BP.2025-10. 2025 No Federal Action/No Project Alternative BP VDU Legs Average Daily Unmitigated Emissions.**

	tanks	crude vapors from tanks on legs(scf/yr)	annual gas usage (mmscf/yr)	mw crude vapors	destruction efficiency
Site 1	4	8640000	34.6	50	98%
Site 2	14	8640000	121.0	50	98%
<b>TOTAL</b>	<b>18</b>		<b>155.5</b>		

<b>48</b>	<b>hr/event</b>
<b>6</b>	<b>events/yr</b>
<b>500</b>	<b>ft3/min</b>

		Annual Average (lb/yr)														
	EF (lb/MMSCF)	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene
		130	35	7	7.5	0.38%	9.90%	0.017	0.0004	0.0003	0.0043	0.0027	0.731	0.0366	0.0272	0.0095
	<b>TOTAL</b>	<b>10108.8</b>	<b>2721.6</b>	<b>544.3</b>	<b>583.2</b>	<b>2.1</b>	<b>53.9</b>	<b>1.3</b>	<b>0.0</b>	<b>0.0</b>	<b>0.3</b>	<b>0.2</b>	<b>56.8</b>	<b>2.8</b>	<b>2.1</b>	<b>0.7</b>

*Assumed a ratio of 500/1000 based on the corresponding Btu values with respect to natural gas combustion emission factors.*

		Annual Average (lb/yr)															
		NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene	SO <sub>x</sub>
Site 1		2246.4	604.8	121.0	129.6	0.46	11.98	0.29	0.007	0.005	0.074	0.05	12.63	0.63	0.47	0.16	402
Site 2		7862.4	2116.8	423.4	453.6	1.61	41.91	1.03	0.024	0.018	0.260	0.16	44.21	2.21	1.65	0.57	1407



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**Table H.2.NFA/NPA.Un.BP.2025-12.**

**2025 No Federal Action/No Project Alternative BP Berth Summary of Average Daily Unmitigated Emissions.**

<b>Operation</b>	<b>NO<sub>x</sub> Emissions (lb/yr)</b>	<b>CO Emissions (lb/yr)</b>	<b>ROG Emissions (lb/yr)</b>	<b>PM Emissions (lb/yr)</b>	<b>PM<sub>10</sub> Emissions (lb/yr)</b>	<b>PM<sub>2.5</sub> Emissions (lb/yr)</b>	<b>SO<sub>2</sub> Emissions (lb/yr)</b>
Tanker Cruising and Manuevering	65,058	5,313	2,206	1,151	1,140	1,017	3,249
Tanker Hoteling	43,939	3,477	1,264	882	847	677	2,880
Offloading Emissions	4,826	1,008	213	667	467	312	5,678
Transiting Operations	554	138	8	92	64	43	780
Tug Assistance	8,329	1,868	345	---	359	331	6
Tanks	---	---	3,660	---	---	---	---
Vapor Destruction Units	10,604	2,855	571	---	612	---	1,898
Valves, Flanges, Pumps	---	---	1,188	---	---	---	---
<b>TOTAL</b>	<b>133,309</b>	<b>14,660</b>	<b>9,455</b>	<b>2,792</b>	<b>3,489</b>	<b>2,380</b>	<b>14,491</b>

<b>Operation</b>	<b>NO<sub>x</sub> Emissions (lb/day)</b>	<b>CO Emissions (lb/day)</b>	<b>ROG Emissions (lb/day)</b>	<b>PM Emissions (lb/day)</b>	<b>PM<sub>10</sub> Emissions (lb/day)</b>	<b>PM<sub>2.5</sub> Emissions (lb/day)</b>	<b>SO<sub>2</sub> Emissions (lb/day)</b>
Tanker Cruising and Manuevering	178	15	6	3	3	3	9
Tanker Hoteling	120	10	3	2	2	2	8
Offloading Emissions	13	3	1	2	1	1	16
Transiting Operations	2	0.4	0.02	0.3	0.2	0.12	2
Tug Assistance	23	5	0.9	---	1.0	0.9	0.0
Tanks	---	---	10.0	---	---	---	---
Vapor Destruction Units	29	8	2	---	2	---	5
Valves, Flanges, Pumps	---	---	3	---	---	---	---
<b>TOTAL</b>	<b>365</b>	<b>40</b>	<b>26</b>	<b>8</b>	<b>10</b>	<b>7</b>	<b>40</b>

Table H.2.NFA/NPA.Un.Max.BP.2025-1. 2025 No Federal Action/No Project Alternative BP Main Engines Maximum Daily Unmitigated Emissions.

Ship	Direction	Mode	Distance (nautical miles)	Ship speed (knots)	Activity (hours)	Maximum Speed (knots)	Load Factor	MCR (kW)	Energy (kW-hr)	Fuel Type	Maximum Daily Shipcalls (vessels/day)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>1.0</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)	
AFRAMAX	South In	Cruising - CW to VSR	23	12	1.92	16.1	0.414	12,477	9,902	Dist at 0.2	1.0	463	38	16	8	8	7	21	
		Cruising - VSR to PZ	11	12	0.92	16.1	0.414	12,477	4,736	Dist at 0.2	1.0	222	18	8	4	4	3	10	
		Cruising - PZ to Pilot	4.7	7	0.67	16.1	0.082	12,477	689	Dist at 0.2	1.0	32	3	1	1	1	1	1	
		Maneuvering - Pilot to Berth		3	1.00	16.1	0.006	12,477	81	Dist at 0.2	1.0	4	0.3	0.1	0.1	0.1	0.1	0	
			<b>TOTAL</b>								<b>721</b>	<b>59</b>	<b>25</b>	<b>12</b>	<b>12</b>	<b>11</b>	<b>33</b>		
	South Out	Maneuvering - Berth to Pilot			5	1.00	16.1	0.030	12,477	374	Dist at 0.2	1.0	17	1	1	0	0	0	1
		Cruising - Pilot to PZ		3.5	7	0.50	16.1	0.082	12,477	513	Dist at 0.2	1.0	24	2	1	0	0	0	1
		Cruising - PZ to VSR		12.5	12	1.04	16.1	0.414	12,477	5,382	Dist at 0.2	1.0	252	21	9	4	4	4	12
		Cruising - VSR to CW		24.5	12	2.04	16.1	0.414	12,477	10,548	Dist at 0.2	1.0	494	41	17	8	8	8	23
			<b>TOTAL</b>									<b>787</b>	<b>65</b>	<b>28</b>	<b>13</b>	<b>13</b>	<b>12</b>	<b>36</b>	
			<b>MAXIMUM</b>									<b>787</b>	<b>65</b>	<b>28</b>	<b>13</b>	<b>13</b>	<b>12</b>	<b>36</b>	

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Table H.2.NFA/NPA.Un.Max.BP.2025-2. 2025 No Federal Action/No Project Alternative BP Project Auxiliary Generator Maximum Daily Unmitigated Emissions.

Ship	Direction	Mode	Activity (hours)	MCR (kW)	Load Factor	Energy (kW-hr)	Fuel Type	Maximum Daily Shipcalls (vessels/day)	NO <sub>x</sub> Emission s (lb/day)	CO Emission s (lb/day)	ROG Emission s (lb/day)	PM Emission s (lb/day)	PM <sub>10</sub> Emission s (lb/day)	PM <sub>2.5</sub> Emission s (lb/day)	SO <sub>2</sub> Emission s (lb/day)	
AFRAMAX	South In	Cruising	3.50	3,600	0.28	3,528	Dist at 0.2	1.0	135	11	4	3	3	2	9	
		Maneuvering	2.00	3,600	0.28	2,016	Dist at 0.2	1.0	77	6	2	2	2	1	5	
	<b>TOTAL</b>								<b>2.0</b>	<b>212</b>	<b>17</b>	<b>6</b>	<b>5</b>	<b>4</b>	<b>4</b>	<b>14</b>
	South Out	Maneuvering	1.5	3,600	0.28	1,512	Dist at 0.2	1.0	58	5	2	1	1	1	4	
		Cruising	3.50	3,600	0.28	3,528	Dist at 0.2	1.0	135	11	4	3	3	2	9	
	<b>TOTAL</b>								<b>2.0</b>	<b>193</b>	<b>15</b>	<b>6</b>	<b>4</b>	<b>4</b>	<b>3</b>	<b>13</b>
<b>MAXIMUM</b>									<b>212</b>	<b>17</b>	<b>6</b>	<b>5</b>	<b>4</b>	<b>4</b>	<b>14</b>	



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**Table H.2.NFA/NPA.Un.Max.BP.2025-3. 2025 No Federal Action/No Project Alternative BP Summary of Maximum Daily Unmitigated Vessel Emissions.**

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)	
Cruising	Main Engines	770	63	27	13	13	12	35	
Cruising	Aux Generator	135	11	4	3	3	2	9	
Maneuvering	Main Engines	17	1	1	0	0	0	1	
Maneuvering	Aux Generator	77	6	2	2	2	1	5	
<b>Maneuvering</b>	<b>TOTAL</b>	<b>95</b>	<b>8</b>	<b>3</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>6</b>	
<b>Propulsion</b>	<b>TOTAL</b>	<b>999</b>	<b>82</b>	<b>34</b>	<b>18</b>	<b>18</b>	<b>16</b>	<b>50</b>	<b>1216.37</b>

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**Table H.2.NFA/NPA.Un.Max.BP.2025-4. 2025 No Federal Action/No Project Alternative BP Boiler Warm-Up Maximum Daily Unmitigated Emissions.**

Shipcalls (vessels/day)	Vessel Size	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	Dist at 0.2	0.20	102.17	30%	3	50,000	16	4	0.2	3	2	1	23
MAXIMUM								16	4	0	3	2	1	23

**Table H.2.NFA/NPA.Un.Max.BP.2025-5. 2025 No Federal Action/No Project Alternative BP Summary of Boiler Warm-Up Maximum Unmitigated Emissions.**

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Boiler Warm-up	Boiler	16	4	0	3	2	1	23

Table H.2.NFA/NPA.Un.Max.BP.2025-6. 2025 No Federal Action/No Project Alternative BP Berth Operations Maximum Daily Unmitigated Emissions.

**Auxiliary Generator Pre-Pumping**

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	400,000	Dist at 0.2	0.20	3,600	28%	2.5	96	8	3	2	2	2	6
MAXIMUM								96	8	3	2	2	2	6

**Boiler Pre-Pumping**

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	400,000	Dist at 0.2	0.20	102.17	30%	2.5	50,000	14	3	0	2	2	1	19
MAXIMUM									14	3	0	2	2	1	19

**Auxiliary Generator Pumping**

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	400,000	Dist at 0.2	0.20	3,600	56%	15.0	1,157	92	33	25	24	19	76
MAXIMUM								1,157	92	33	25	24	19	76

**Boiler Pumping**

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Inerting Fuel Consumption Savings (lb/1000 bbl offloaded)	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	400,000	Dist at 0.2	0.20	102.17	28.06	15.0	105	26	1	17	12	8	148
MAXIMUM								105	26	1	17	12	8	148

**Auxiliary Generator Post-Pumping**

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	400,000	Dist at 0.2	0.20	3,600	28%	1.0	39	3	1	1	1	1	3
MAXIMUM								39	3	1	1	1	1	3

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**Table H.2.NFA/NPA.Un.Max.BP.2025-7. 2025 No Federal Action/No Project Alternative BP Summary of Berth Operations Maximum Daily Unmitigated Emissions.**

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Berth Operations	Boiler	119	30	2	20	14	9	167
Berth Operations	Aux Generator	1,292	102	37	28	27	21	85

**Table H.2.NFA/NPA.Un.Max.BP.2025-8. 2025 No Federal Action/No Project Alternative BP Tug Main Engines Maximum Daily Unmitigated Emissions.**

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Shipcalls (vessels/day)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
AFRAMAX	Maneuvering - Pilot to Berth	1.00	2	4,800	0.50	MGO	1.0	110	25	5	5	4	0
	Maneuvering - Berth to Pilot	1.00	2	4,800	0.50	MGO	1.0	110	25	5	5	4	0
<b>TOTAL</b>								<b>220</b>	<b>49</b>	<b>9</b>	<b>10</b>	<b>9</b>	<b>0</b>
<b>MAXIMUM</b>								<b>220</b>	<b>49</b>	<b>9</b>	<b>10</b>	<b>9</b>	<b>0</b>

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Table H.2.NFA/NPA.Un.Max.BP.2025-9. 2025 No Federal Action/No Project Alternative BP Tug Auxiliary Generator Engines Maximum Daily Unmitigated Emissions.

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Shipcalls (vessels/day)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
AFRAMAX	Maneuvering - Pilot to Berth	1.00	2	300	1.00	MGO	1.0	12	3	0	1	0	0
	Maneuvering - Berth to Pilot	1.00	2	300	1.00	MGO	1.0	12	3	0	1	0	0
<b>TOTAL</b>								<b>25</b>	<b>6</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>0</b>
<b>MAXIMUM</b>								<b>25</b>	<b>6</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>0</b>

**Table H.2.NFA/NPA.Un.Max.BP.2025-10. 2025 No Federal Action/No Project Alternative BP Summary of Tug Maximum Daily Unmitigated Emissions.**

<b>Mode</b>	<b>Equipment</b>	<b>Maximum Daily NO<sub>x</sub> Emissions (lb/day)</b>	<b>Maximum Daily CO Emissions (lb/day)</b>	<b>Maximum Daily ROG Emissions (lb/day)</b>	<b>Maximum Daily PM<sub>10</sub> Emissions (lb/day)</b>	<b>Maximum Daily PM<sub>2.5</sub> Emissions (lb/day)</b>	<b>Maximum Daily SO<sub>2</sub> Emissions (lb/day)</b>
Tug Assist	Main Engines	220	49	9	10	9	0
Tug Assist	Aux Generator	25	6	1	1	1	0
<b>TOTAL</b>		<b>245</b>	<b>55</b>	<b>10</b>	<b>11</b>	<b>10</b>	<b>0</b>



Table H.2.NFA/NPA.Un.Max.BP.2025-11. 2025 No Federal Action/No Project Alternative BP VDU Crude Maximum Daily Unmitigated Emissions.

	Maximum Daily Vessel Calls	crude vapors from tanks(scf/call)	daily gas usage (mmscf/day)	mw crude vapors	destruction efficiency
Aframax	1	224,000	0.2	50	98%
<b>TOTAL</b>	<b>1</b>		<b>0.2</b>		

Assumed Distribution based on tank storage volume:	
Site 1	12.5%
Site 2	87.5%

Maximum Daily Emissions (lb/day)

	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene
EF (lb/MMSCF)	130	35	7	7.5	0.38%	9.90%	0.017	0.0004	0.0003	0.0043	0.0027	0.731	0.0366	0.0272	0.0095
Panamax	14.6	3.9	0.8	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0
<b>MAXIMUM</b>	<b>14.6</b>	<b>3.9</b>	<b>0.8</b>	<b>0.8</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.1</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>

Assumed a ratio of 500/1000 based on the corresponding Btu values with respect to natural gas combustion emission factors.

Maximum Daily Emissions (lb/day)

	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene	SO <sub>x</sub>
Site 1	2	0.5	0.10	0.1	0.000	0.00	0.000	0.0000	0.0000	0.0001	0.0000	0.01	0.001	0.000	0.000	0
Site 2	13	3	0.7	0.7	0.00	0.01	0.002	0.0000	0.0000	0.000	0.000	0.1	0.00	0.00	0.001	2

0.78

**Table H.2.NFA/NPA.Un.Max.BP.2025-12. 2025 No Federal Action/No Project Alternative BP VDU Legs Maximum Daily Unmitigated Emissions.**

	tanks	crude vapors from tanks on legs(scfd/day)	daily gas usage (mmscfd/day)	mw crude vapors	destruction efficiency
Site 1	4	23671.23	0.09	50	98%
Site 2	14	23671.23	0.3	50	98%
<b>TOTAL</b>	<b>18</b>		<b>0.4</b>		

<b>48</b>	<b>hr/event</b>
<b>6</b>	<b>events/yr</b>
<b>500</b>	<b>ft3/min</b>

Maximum Daily Emissions (lb/day)															
	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene
EF (lb/MMSCF)	130	35	7	7.5	0.38%	9.90%	0.017	0.0004	0.0003	0.0043	0.0027	0.731	0.0366	0.0272	0.0095
TOTAL	27.7	7.5	1.5	1.6	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0

*Assumed a ratio of 500/1000 based on the corresponding Btu values with respect to natural gas combustion emission factors.*

Maximum Daily Emissions (lb/day)																
	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene	SO <sub>x</sub>
Site 1	6.2	1.7	0.3	0.4	0.00	0.03	0.00	0.000	0.000	0.000	0.00	0.03	0.00	0.00	0.00	1
Site 2	21.5	5.8	1.2	1.2	0.00	0.11	0.00	0.000	0.000	0.001	0.00	0.12	0.01	0.00	0.00	4



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Table H.2.NFA/NPA.Un.Max.BP.2025-14.

2025 No Federal Action/No Project Alternative BP Berth Summary of Maximum Daily Unmitigated Emissions.

Scenario	Operation	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Vessel Arrival/Departure	Cruising and maneuvering	999	82	34	18	18	16	50
	Boiler Warm-Up	16	4	0	3	2	1	23
	Tug Assistance	245	55	10	---	11	10	0
	Tanks	---	---	86	---	---	---	---
	Vapor Destruction Units	42.3	11.4	2.3	---	2.4	---	7.6
	Valves, Flanges, Pumps	---	---	3.25	---	---	---	---
	<b>TOTAL</b>	<b>1,303</b>	<b>152</b>	<b>136</b>	<b>21</b>	<b>33</b>	<b>27</b>	<b>81</b>
Vessel Offloading	Tanker Hoteling	1,292	102	37	28	27	21	85
	Offloading	119	30	2	20	14	9	167
	Tanks	---	---	86	---	---	---	---
	Vapor Destruction Units	42.3	11.4	2.3	---	2.4	---	7.6
	Valves, Flanges, Pumps	---	---	3.25	---	---	---	---
	<b>TOTAL</b>	<b>1,453</b>	<b>143</b>	<b>130</b>	<b>48</b>	<b>43</b>	<b>31</b>	<b>259</b>
No Vessel/Empty Berth	Vapor Destruction Units	42.3	11.4	2.3	---	2.4	---	7.6
	Tanks	---	---	86	---	---	---	---
	Valves, Flanges, Pumps	---	---	3.25	---	---	---	---
	<b>TOTAL</b>	<b>42</b>	<b>11</b>	<b>91</b>	<b>0</b>	<b>2</b>	<b>0</b>	<b>8</b>

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Table H.2.NFA/NPA.Un.Ts.2025-1. 2025 No Federal Action/No Project Alternative Tesoro Main Engines Average Daily Unmitigated Emissions.

Ship	Direction	Mode	Distance (nautical miles)	Ship speed (knots)	Activity (hours)	Maximum Speed (knots)	Load Factor	MCR (kW)	Energy (kW-hr)	Fuel Type	Shipcalls (vessels/ yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)		
AFRAMAX	South In	Cruising - CW to VSR	23	12	1.92	16.1	0.414	12,477	9,902	Dist at 0.2	87	40,322	3,321	1,423	688	688	633	1,845		
		Cruising - VSR to PZ	11	12	0.92	16.1	0.414	12,477	4,736	Dist at 0.2	87	19,285	1,588	681	329	329	303	882		
		Cruising - PZ to Pilot	4.7	7	0.67	16.1	0.082	12,477	689	Dist at 0.2	87	2,804	231	99	48	48	44	128		
	South Out	Maneuvering - Pilot to Berth			3	1.00	16.1	0.006	12,477	81	Dist at 0.2	87	329	27	12	6	6	5	15	
		Maneuvering - Berth to Pilot			5	1.00	16.1	0.030	12,477	374	Dist at 0.2	87	1,522	125	54	26	26	24	70	
		Cruising - Pilot to PZ			3.5	7	0.50	16.1	0.082	12,477	513	Dist at 0.2	87	2,088	172	74	36	36	33	96
		Cruising - PZ to VSR			12.5	12	1.04	16.1	0.414	12,477	5,382	Dist at 0.2	87	21,914	1,805	773	374	374	344	1,003
		Cruising - VSR to CW			24.5	12	2.04	16.1	0.414	12,477	10,548	Dist at 0.2	87	42,952	3,537	1,516	733	733	674	1,965
		<b>TOTAL</b>											<b>131,215</b>	<b>10,806</b>	<b>4,631</b>	<b>2,238</b>	<b>2,238</b>	<b>2,059</b>	<b>6,003</b>	

Table H.2.NFA/NPA.Un.Ts.2025-2. 2025 No Federal Action/No Project Alternative Tesoro Project Auxiliary Generator Average Daily Unmitigated Emissions.

Ship	Direction	Mode	Activity (hours)	MCR (kW)	Load Factor	Energy (kW-hr)	Fuel Type	Shipcalls (vessels/yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
AFRAMAX	South In	Cruising	3.50	3,600	0.28	3,533	Dist at 0.2	87	11,763	931	338	236	227	181	771
		Maneuvering	2.00	3,600	0.28	2,016	Dist at 0.2	87	6,712	531	193	135	129	103	440
	South Out	Maneuvering	1.5	3,600	0.28	1,512	Dist at 0.2	87	5,034	398	145	101	97	78	330
		Cruising	3.50	3,600	0.28	3,528	Dist at 0.2	87	11,747	930	338	236	226	181	770
<b>TOTAL</b>									<b>35,256</b>	<b>2,790</b>	<b>1,015</b>	<b>708</b>	<b>679</b>	<b>543</b>	<b>2,311</b>

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**Table H.2.NFA/NPA.Un.Ts.2025-3. 2025 No Federal Action/No Project Alternative Tesoro Boiler Warm-Up Average Daily Unmitigated Emissions.**

Shipcalls (vessels/yr)	Vessel Size	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
87.0	Aframax	Dist at 0.2	0.20	102.17	30%	3	50,000	1,417	354	20	234	164	110	1,995
<b>TOTAL</b>								<b>1,417</b>	<b>354</b>	<b>20</b>	<b>234</b>	<b>164</b>	<b>110</b>	<b>1,995</b>

Table H.2.NFA/NPA.Un.Ts.2025-4. 2025 No Federal Action/No Project Alternative Tesoro Berth Operations Average Daily Unmitigated Emissions.

Auxiliary Generator Pre-Pumping

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
87.0	Aframax	400,000	Dist at 0.2	0.20	3,600	28%	2.5	8,391	664	241	168	162	129	550
<b>TOTAL</b>								<b>8,391</b>	<b>664</b>	<b>241</b>	<b>168</b>	<b>162</b>	<b>129</b>	<b>550</b>

Boiler Pre-Pumping

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
87.0	Aframax	400,000	Dist at 0.2	0.20	102.17	30%	2.5	50,000	1,413	295	62	195	137	91	1,663
<b>TOTAL</b>									<b>1,413</b>	<b>295</b>	<b>62</b>	<b>195</b>	<b>137</b>	<b>91</b>	<b>1,663</b>

Auxiliary Generator Pumping

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
87.0	Aframax	400,000	Dist at 0.2	0.20	3,600	56%	15.0	100,686	7,968	2,897	2,021	1,940	1,552	6,600
<b>TOTAL</b>								<b>100,686</b>	<b>7,968</b>	<b>2,897</b>	<b>2,021</b>	<b>1,940</b>	<b>1,552</b>	<b>6,600</b>

Boiler Pumping

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Inerting Fuel Consumption Savings (lb/1000 bbl offloaded)	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
87.0	Aframax	400,000	Dist at 0.2	0.20	102.17	28.06	15.0	10,936	2,284	482	1,512	1,058	708	12,866
<b>TOTAL</b>								<b>10,936</b>	<b>2,284</b>	<b>482</b>	<b>1,512</b>	<b>1,058</b>	<b>708</b>	<b>12,866</b>

Auxiliary Generator Post-Pumping

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
87.0	Aframax	400,000	Dist at 0.2	0.20	3,600	28%	1.0	3,356	266	97	67	65	52	220
<b>TOTAL</b>								<b>3,356</b>	<b>266</b>	<b>97</b>	<b>67</b>	<b>65</b>	<b>52</b>	<b>220</b>



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**Table H.2.NFA/NPA.Un.Ts.2025-5. 2025 No Federal Action/No Project Alternative Tesoro Summary of Average Daily Unmitigated Vessel Emissions.**

Mode	Equipment	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Cruising	Main Engines	129,365	10,654	4,566	2,207	2,207	2,030	5,919
Cruising	Aux Generator	23,509	1,860	677	472	453	362	1,541
Maneuvering	Main Engines	1,851	152	65	32	32	29	85
Maneuvering	Aux Generator	11,747	930	338	236	226	181	770
Boiler Warm-up	Boiler	1,417	354	20	234	164	110	1,995
Berth Operations	Boiler	12,349	2,579	545	1,707	1,195	799	14,529
Berth Operations	Aux Generator	112,433	8,898	3,235	2,257	2,166	1,733	7,370
Propulsion	TOTAL	166,472	13,596	5,646	2,946	2,918	2,603	8,314
Non-Propulsion	TOTAL	126,199	11,831	3,800	4,198	3,526	2,642	23,894
		292,671	25,427	9,446	7,144	6,443	5,245	32,208

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Cruising	Main Engines	354.4	29.2	12.5	6.0	6.0	5.6	16.2
Cruising	Aux Generator	64.4	5.1	1.9	1.3	1.2	1.0	4.2
Maneuvering	Main Engines	5.1	0.4	0.2	0.1	0.1	0.1	0.2
Maneuvering	Aux Generator	32.2	2.5	0.9	0.6	0.6	0.5	2.1
Boiler Warm-up	Boiler	3.9	1.0	0.1	0.6	0.4	0.3	5.5
Berth Operations	Boiler	33.8	7.1	1.5	4.7	3.3	2.2	39.8
Berth Operations	Aux Generator	308.0	24.4	8.9	6.2	5.9	4.7	20.2
Propulsion	TOTAL	456.1	37.2	15.5	8.1	8.0	7.1	22.8
Non-Propulsion	TOTAL	345.8	32.4	10.4	11.5	9.7	7.2	65.5
Total Emissions		802	70	26	20	18	14	88

**Table H.2.NFA/NPA.Un.Ts.2025-6. 2025 No Federal Action/No Project Alternative Tesoro Tug Main Engines Average Daily Unmitigated Emissions.**

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Shipcalls (vessels/yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
AFRAMAX	Maneuvering - Pilot to Berth	1.00	2	4,800	0.50	MGO	87.0	9,578	2,150	402	414	381	7
	Maneuvering - Berth to Pilot	1.00	2	4,800	0.50	MGO	87.0	9,578	2,150	402	414	381	7
<b>TOTAL</b>								<b>19,155</b>	<b>4,300</b>	<b>805</b>	<b>828</b>	<b>762</b>	<b>14</b>

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Table H.2.NFA/NPA.Un.Ts.2025-7. 2025 No Federal Action/No Project Alternative Tesoro Tug Auxiliary Generator Engines Average Daily Unmitigated Emissions.

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Shipcalls (vessels/yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
AFRAMAX	Maneuvering - Pilot to Berth	1.00	2	300	1.00	MGO	87.0	1,078	240	39	46	42	1
	Maneuvering - Berth to Pilot	1.00	2	300	1.00	MGO	87.0	1,078	240	39	46	42	1
<b>TOTAL</b>								<b>2,156</b>	<b>480</b>	<b>78</b>	<b>92</b>	<b>85</b>	<b>1</b>

**Table H.2.NFA/NPA.Un.Ts.2025-8. 2025 No Federal Action/No Project Alternative Tesoro Summary of Tug Average Daily Unmitigated Emissions.**

Mode	Equipment	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Tug Assist	Main Engines	19,155	4,300	805	828	762	14
Tug Assist	Aux Generator	2,156	480	78	92	85	1

**TOTAL 21,311 4,780 882 920 846 15**

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Tug Assist	Main Engines	52	11.8	2.2	2.3	2.1	0.0
Tug Assist	Aux Generator	6	1.3	0.2	0.3	0.2	0.0

**TOTAL 58 13.1 2.4 2.5 2.3 0.0**

Table H.2.NFA/NPA.Un.Ts.2025-9. 2025 No Federal Action/No Project Alternative Tesoro VDU Crude Average Daily Unmitigated Emissions.

Assumed Distribution based on tank storage volume:	
Site 1	12.5%
Site 2	87.5%

	Annual Vessel Calls	crude vapors from tanks(scft/call)	annual gas usage (mmscf/yr)	mw crude vapors	destruction efficiency
Aframax	87	224,000	19.5	50	98%
<b>TOTAL</b>	<b>87</b>		<b>19.5</b>		

Annual Average (lb/yr)

	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene
EF (lb/MMSCF)	130	35	7	7.5	0.38%	9.90%	0.017	0.0004	0.0003	0.0043	0.0027	0.731	0.0366	0.0272	0.0095
Panamax	1266.7	341.0	68.2	73.1	0.0	1.0	0.2	0.0	0.0	0.0	0.0	7.1	0.4	0.3	0.1
<b>TOTAL</b>	<b>1266.7</b>	<b>341.0</b>	<b>68.2</b>	<b>73.1</b>	<b>0.0</b>	<b>1.0</b>	<b>0.2</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>7.1</b>	<b>0.4</b>	<b>0.3</b>	<b>0.1</b>

Assumed a ratio of 500/1000 based on the corresponding Btu values with respect to natural gas combustion emission factors.

Annual Average (lb/yr)

	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene	SO <sub>x</sub>
Site 1	158	42.6	8.53	9.1	0.005	0.12	0.021	0.0005	0.0004	0.0052	0.0033	0.89	0.045	0.033	0.012	28
Site 2	1108	298	59.7	63.9	0.03	0.84	0.145	0.0034	0.0026	0.037	0.023	6.2	0.31	0.23	0.081	198

68.21

**Table H.2.NFA/NPA.Un.Ts.2025-10. 2025 No Federal Action/No Project Alternative Tesoro VDU Legs Average Daily Unmitigated Emissions.**

	tanks	crude vapors from tanks on legs(scf/yr)	annual gas usage (mmscf/yr)	mw crude vapors	destruction efficiency
Site 1	4	8640000	34.6	50	98%
Site 2	14	8640000	121.0	50	98%
<b>TOTAL</b>	<b>18</b>		<b>155.5</b>		

<b>48</b>	<b>hr/event</b>
<b>6</b>	<b>events/yr</b>
<b>500</b>	<b>ft3/min</b>

Annual Average (lb/yr)															
	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene
EF (lb/MMSCF)	130	35	7	7.5	0.38%	9.90%	0.017	0.0004	0.0003	0.0043	0.0027	0.731	0.0366	0.0272	0.0095
<b>TOTAL</b>	<b>10108.8</b>	<b>2721.6</b>	<b>544.3</b>	<b>583.2</b>	<b>2.1</b>	<b>53.9</b>	<b>1.3</b>	<b>0.0</b>	<b>0.0</b>	<b>0.3</b>	<b>0.2</b>	<b>56.8</b>	<b>2.8</b>	<b>2.1</b>	<b>0.7</b>

*Assumed a ratio of 500/1000 based on the corresponding Btu values with respect to natural gas combustion emission factors.*

Annual Average (lb/yr)																
	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene	SO <sub>x</sub>
Site 1	2246.4	604.8	121.0	129.6	0.46	11.98	0.29	0.007	0.005	0.074	0.05	12.63	0.63	0.47	0.16	402
Site 2	7862.4	2116.8	423.4	453.6	1.61	41.91	1.03	0.024	0.018	0.260	0.16	44.21	2.21	1.65	0.57	1407



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**Table H.2.NFA/NPA.Un.Ts.2025-12.**

**2025 No Federal Action/No Project Alternative Tesoro Berth Summary of Average Daily Unmitigated Emissions.**

<b>Operation</b>	<b>NO<sub>x</sub> Emissions (lb/yr)</b>	<b>CO Emissions (lb/yr)</b>	<b>ROG Emissions (lb/yr)</b>	<b>PM Emissions (lb/yr)</b>	<b>PM<sub>10</sub> Emissions (lb/yr)</b>	<b>PM<sub>2.5</sub> Emissions (lb/yr)</b>	<b>SO<sub>2</sub> Emissions (lb/yr)</b>
Tanker Cruising and Manuevering	166,472	13,596	5,646	2,946	2,918	2,603	8,314
Tanker Hoteling	112,433	8,898	3,235	2,257	2,166	1,733	7,370
Offloading Emissions	12,349	2,579	545	1,707	1,195	799	14,529
Transiting Operations	1,417	354	20	234	164	110	1,995
Tug Assistance	21,311	4,780	882	---	920	846	15
Tanks	---	---	3,660	---	---	---	---
Vapor Destruction Units	11,376	3,063	613	---	656	---	2,036
Valves, Flanges, Pumps	---	---	1,188	---	---	---	---
<b>TOTAL</b>	<b>325,357</b>	<b>33,270</b>	<b>15,789</b>	<b>7,144</b>	<b>8,019</b>	<b>6,091</b>	<b>34,259</b>

<b>Operation</b>	<b>NO<sub>x</sub> Emissions (lb/day)</b>	<b>CO Emissions (lb/day)</b>	<b>ROG Emissions (lb/day)</b>	<b>PM Emissions (lb/day)</b>	<b>PM<sub>10</sub> Emissions (lb/day)</b>	<b>PM<sub>2.5</sub> Emissions (lb/day)</b>	<b>SO<sub>2</sub> Emissions (lb/day)</b>
Tanker Cruising and Manuevering	456	37	15	8	8	7	23
Tanker Hoteling	308	24	9	6	6	5	20
Offloading Emissions	34	7	1	5	3	2	40
Transiting Operations	4	1.0	0.05	0.6	0.4	0.30	5
Tug Assistance	58	13	2.4	---	2.5	2.3	0.0
Tanks	---	---	10.0	---	---	---	---
Vapor Destruction Units	31	8	2	---	2	---	6
Valves, Flanges, Pumps	---	---	3	---	---	---	---
<b>TOTAL</b>	<b>891</b>	<b>91</b>	<b>43</b>	<b>20</b>	<b>22</b>	<b>17</b>	<b>94</b>



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**Table H.2.NFA/NPA.Un.Max.Ts.2025-1. 2025 No Federal Action/No Project Alternative Tesoro Main Engines Maximum Daily Unmitigated Emissions.**

Ship	Direction	Mode	Distance (nautical miles)	Ship speed (knots)	Activity (hours)	Maximum Speed (knots)	Load Factor	MCR (kW)	Energy (kW-hr)	Fuel Type	Maximum Daily Shipcalls (vessels/day)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)	
AFRAMAX	South In	Cruising - CW to VSR	23	12	1.92	16.1	0.414	12,477	9,902	Dist at 0.2	1.0	463	38	16	8	8	7	21	
		Cruising - VSR to PZ	11	12	0.92	16.1	0.414	12,477	4,736	Dist at 0.2	1.0	222	18	8	4	4	3	10	
		Cruising - PZ to Pilot	4.7	7	0.67	16.1	0.082	12,477	689	Dist at 0.2	1.0	32	3	1	1	1	1	1	
		Maneuvering - Pilot to Berth		3	1.00	16.1	0.006	12,477	81	Dist at 0.2	1.0	4	0.3	0.1	0.1	0.1	0.1	0	
			<b>TOTAL</b>								<b>721</b>	<b>59</b>	<b>25</b>	<b>12</b>	<b>12</b>	<b>11</b>	<b>33</b>		
	South Out	Maneuvering - Berth to Pilot			5	1.00	16.1	0.030	12,477	374	Dist at 0.2	1.0	17	1	1	0	0	0	1
		Cruising - Pilot to PZ	3.5	7	0.50	16.1	0.082	12,477	513	Dist at 0.2	1.0	24	2	1	0	0	0	1	
		Cruising - PZ to VSR	12.5	12	1.04	16.1	0.414	12,477	5,382	Dist at 0.2	1.0	252	21	9	4	4	4	12	
		Cruising - VSR to CW	24.5	12	2.04	16.1	0.414	12,477	10,548	Dist at 0.2	1.0	494	41	17	8	8	8	23	
				<b>TOTAL</b>								<b>787</b>	<b>65</b>	<b>28</b>	<b>13</b>	<b>13</b>	<b>12</b>	<b>36</b>	
		<b>MAXIMUM</b>									<b>787</b>	<b>65</b>	<b>28</b>	<b>13</b>	<b>13</b>	<b>12</b>	<b>36</b>		

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**Table H.2.NFA/NPA.Un.Max.Ts.2025-2. 2025 No Federal Action/No Project Alternative Tesoro Project Auxiliary Generator Maximum Daily Unmitigated Emissions.**

Ship	Direction	Mode	Activity (hours)	MCR (kW)	Load Factor	Energy (kW-hr)	Fuel Type	Maximum Daily Shipcalls (vessels/day)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)	
AFRAMAX	South In	Cruising	3.50	3,600	0.28	3,528	Dist at 0.2	1.0	135	11	4	3	3	2	9	
		Maneuvering	2.00	3,600	0.28	2,016	Dist at 0.2	1.0	77	6	2	2	2	1	5	
			<b>TOTAL</b>						<b>212</b>	<b>17</b>	<b>6</b>	<b>5</b>	<b>4</b>	<b>4</b>	<b>4</b>	<b>14</b>
	South Out	Maneuvering	1.5	3,600	0.28	1,512	Dist at 0.2	1.0	58	5	2	1	1	1	1	4
		Cruising	3.50	3,600	0.28	3,528	Dist at 0.2	1.0	135	11	4	3	3	3	2	9
			<b>TOTAL</b>						<b>193</b>	<b>15</b>	<b>6</b>	<b>4</b>	<b>4</b>	<b>4</b>	<b>3</b>	<b>13</b>
		<b>MAXIMUM</b>						<b>212</b>	<b>17</b>	<b>6</b>	<b>5</b>	<b>4</b>	<b>4</b>	<b>4</b>	<b>14</b>	

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**Table H.2.NFA/NPA.Un.Max.Ts.2025-3. 2025 No Federal Action/No Project Alternative Tesoro Summary of Maximum Daily Unmitigated Vessel Emissions.**

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)	
Cruising	Main Engines	770	63	27	13	13	12	35	
Cruising	Aux Generator	135	11	4	3	3	2	9	
Maneuvering	Main Engines	17	1	1	0	0	0	1	
Maneuvering	Aux Generator	77	6	2	2	2	1	5	
<b>Maneuvering</b>	<b>TOTAL</b>	<b>95</b>	<b>8</b>	<b>3</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>6</b>	
<b>Propulsion</b>	<b>TOTAL</b>	<b>999</b>	<b>82</b>	<b>34</b>	<b>18</b>	<b>18</b>	<b>16</b>	<b>50</b>	<b>1216.4</b>

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**Table H.2.NFA/NPA.Un.Max.Ts.2025-4. 2025 No Federal Action/No Project Alternative Tesoro Boiler Warm-Up Maximum Daily Unmitigated Emissions.**

Shipcalls (vessels/day)	Vessel Size	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	Dist at 0.2	0.20	102.17	30%	3	50,000	16	4	0.2	3	2	1	23
<b>MAXIMUM</b>								16	4	0	3	2	1	23

**Table H.2.NFA/NPA.Un.Max.Ts.2025-5. 2025 No Federal Action/No Project Alternative Tesoro Summary of Boiler Warm-Up Maximum Unmitigated Emissions.**

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Boiler Warm-up	Boiler	16	4	0	3	2	1	23

Table H.2.NFA/NPA.Un.Max.Ts.2025-6. 2025 No Federal Action/No Project Alternative Tesoro Berth Operations Maximum Daily Unmitigated Emissions.

Auxiliary Generator Pre-Pumping

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	400,000	Dist at 0.2	0.20	3,600	28%	2.5	96	8	3	2	2	2	6
MAXIMUM								96	8	3	2	2	2	6

Boiler Pre-Pumping

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	400,000	Dist at 0.2	0.20	102.17	30%	2.5	50,000	14	3	0	2	2	1	19
MAXIMUM									14	3	0	2	2	1	19

Auxiliary Generator Pumping

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	400,000	Dist at 0.2	0.20	3,600	56%	15.0	1,157	92	33	25	24	19	76
MAXIMUM								1,157	92	33	25	24	19	76

Boiler Pumping

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Inerting Fuel Consumption Savings (lb/1000 bbl offloaded)	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	400,000	Dist at 0.2	0.20	102.17	28.06	15.0	105	26	1	17	12	8	148
MAXIMUM								105	26	1	17	12	8	148

Auxiliary Generator Post-Pumping

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	400,000	Dist at 0.2	0.20	3,600	28%	1.0	39	3	1	1	1	1	3
MAXIMUM								39	3	1	1	1	1	3

**Table H.2.NFA/NPA.Un.Max.Ts.2025-7. 2025 No Federal Action/No Project Alternative Tesoro Summary of Berth Operations Maximum Daily Unmitigated Emissions.**

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Berth Operations	Boiler	119	30	2	20	14	9	167
Berth Operations	Aux Generator	1,292	102	37	28	27	21	85

**Table H.2.NFA/NPA.Un.Max.Ts.2025-8. 2025 No Federal Action/No Project Alternative Tesoro Tug Main Engines Maximum Daily Unmitigated Emissions.**

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Shipcalls (vessels/day)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
AFRAMAX	Maneuvering - Pilot to Berth	1.00	2	4,800	0.50	MGO	1.0	110	25	5	5	4	0
	Maneuvering - Berth to Pilot	1.00	2	4,800	0.50	MGO	1.0	110	25	5	5	4	0
<b>TOTAL</b>								<b>220</b>	<b>49</b>	<b>9</b>	<b>10</b>	<b>9</b>	<b>0</b>
<b>MAXIMUM</b>								<b>220</b>	<b>49</b>	<b>9</b>	<b>10</b>	<b>9</b>	<b>0</b>



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Table H.2.NFA/NPA.Un.Max.Ts.2025-9. 2025 No Federal Action/No Project Alternative Tesoro Tug Auxiliary Generator Engines Maximum Daily Unmitigated Emissions.

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Shipcalls (vessels/day)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
AFRAMAX	Maneuvering - Pilot to Berth	1.00	2	300	1.00	MGO	1.0	12	3	0	1	0	0
	Maneuvering - Berth to Pilot	1.00	2	300	1.00	MGO	1.0	12	3	0	1	0	0
<b>TOTAL</b>								<b>25</b>	<b>6</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>0</b>
<b>MAXIMUM</b>								<b>25</b>	<b>6</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>0</b>

**Table H.2.NFA/NPA.Un.Max.Ts.2025-10. 2025 No Federal Action/No Project Alternative Tesoro Summary of Tug Maximum Daily Unmitigated Emissions.**

Mode	Equipment	Maximum Daily NO <sub>x</sub> Emissions (lb/day)	Maximum Daily CO Emissions (lb/day)	Maximum Daily ROG Emissions (lb/day)	Maximum Daily PM <sub>10</sub> Emissions (lb/day)	Maximum Daily PM <sub>2.5</sub> Emissions (lb/day)	Maximum Daily SO <sub>2</sub> Emissions (lb/day)
Tug Assist	Main Engines	220	49	9	10	9	0
Tug Assist	Aux Generator	25	6	1	1	1	0
<b>TOTAL</b>		<b>245</b>	<b>55</b>	<b>10</b>	<b>11</b>	<b>10</b>	<b>0</b>

Table H.2.NFA/NPA.Un.Max.Ts.2025-11. 2025 No Federal Action/No Project Alternative Tesoro VDU Crude Maximum Daily Unmitigated Emissions.

	Maximum Daily Vessel Calls	crude vapors from tanks(scf/call)	daily gas usage (mmscf/day)	mw crude vapors	destruction efficiency
Aframax	1	224,000	0.2	50	98%
<b>TOTAL</b>	<b>1</b>		<b>0.2</b>		

Assumed Distribution based on tank storage volume:

**Site 1 12.5%**  
**Site 2 87.5%**

Maximum Daily Emissions (lb/day)

	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylylene	ethylbenzene
EF (lb/MMSCF)	130	35	7	7.5	0.38%	9.90%	0.017	0.0004	0.0003	0.0043	0.0027	0.731	0.0366	0.0272	0.0095
Panamax	14.6	3.9	0.8	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0
<b>MAXIMUM</b>	<b>14.6</b>	<b>3.9</b>	<b>0.8</b>	<b>0.8</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.1</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>

Assumed a ratio of 500/1000 based on the corresponding Btu values with respect to natural gas combustion emission factors.

Maximum Daily Emissions (lb/day)

	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylylene	ethylbenzene	SO <sub>x</sub>
Site 1	2	0.5	0.10	0.1	0.000	0.00	0.000	0.0000	0.0000	0.0001	0.0000	0.01	0.001	0.000	0.000	0
Site 2	13	3	0.7	0.7	0.00	0.01	0.002	0.0000	0.0000	0.000	0.000	0.1	0.00	0.00	0.001	2

0.78

**Table H.2.NFA/NPA.Un.Max.Ts.2025-12. 2025 No Federal Action/No Project Alternative Tesoro VDU Legs Maximum Daily Unmitigated Emissions.**

	tanks	crude vapors from tanks on legs(sc/d)	daily gas usage (mmscf/day)	mw crude vapors	destruction efficiency
Site 1	4	23671.23	0.09	50	98%
Site 2	14	23671.23	0.3	50	98%
<b>TOTAL</b>	<b>18</b>		<b>0.4</b>		

48	hr/event
6	events/yr
500	ft3/min

Maximum Daily Emissions (lb/day)															
	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene
EF (lb/MMSCF)	130	35	7	7.5	0.38%	9.90%	0.017	0.0004	0.0003	0.0043	0.0027	0.731	0.0366	0.0272	0.0095
<b>TOTAL</b>	<b>27.7</b>	<b>7.5</b>	<b>1.5</b>	<b>1.6</b>	<b>0.0</b>	<b>0.1</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.2</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>

*Assumed a ratio of 500/1000 based on the corresponding Btu values with respect to natural gas combustion emission factors.*

Maximum Daily Emissions (lb/day)																
	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene	SO <sub>x</sub>
Site 1	6.2	1.7	0.3	0.4	0.00	0.03	0.00	0.000	0.000	0.000	0.00	0.03	0.00	0.00	0.00	1
Site 2	21.5	5.8	1.2	1.2	0.00	0.11	0.00	0.000	0.000	0.001	0.00	0.12	0.01	0.00	0.00	4



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Table H.2.NFA/NPA.Un.Max.Ts.2025-14.

2025 No Federal Action/No Project Alternative Tesoro Berth Summary of Maximum Daily Unmitigated Emissions.

Scenario	Operation	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Vessel Arrival/Departure	Cruising and maneuvering	999	82	34	18	18	16	50
	Boiler Warm-Up	16	4	0	3	2	1	23
	Tug Assistance	245	55	10	---	11	10	0
	Tanks	---	---	86	---	---	---	---
	Vapor Destruction Units	42.3	11.4	2.3	---	2.4	---	7.6
	Valves, Flanges, Pumps	---	---	3.25	---	---	---	---
	<b>TOTAL</b>	<b>1,303</b>	<b>152</b>	<b>136</b>	<b>21</b>	<b>33</b>	<b>27</b>	<b>81</b>
Vessel Offloading	Tanker Hoteling	1,292	102	37	28	27	21	85
	Offloading	119	30	2	20	14	9	167
	Tanks	---	---	86	---	---	---	---
	Vapor Destruction Units	42.3	11.4	2.3	---	2.4	---	7.6
	Valves, Flanges, Pumps	---	---	3.25	---	---	---	---
	<b>TOTAL</b>	<b>1,453</b>	<b>143</b>	<b>130</b>	<b>48</b>	<b>43</b>	<b>31</b>	<b>259</b>
No Vessel/Empty Berth	Vapor Destruction Units	42.3	11.4	2.3	---	2.4	---	7.6
	Tanks	---	---	86	---	---	---	---
	Valves, Flanges, Pumps	---	---	3.25	---	---	---	---
	<b>TOTAL</b>	<b>42</b>	<b>11</b>	<b>91</b>	<b>0</b>	<b>2</b>	<b>0</b>	<b>8</b>

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Table H.2.NFA/NPA.Un.Max.Ts.2025-14.

2025 No Federal Action/No Project Alternative Tesoro Berth Summary of Maximum Daily Unmitigated Emissions.

Scenario	Operation	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Vessel Arrival/Departure	Cruising and maneuvering	999	82	34	18	18	16	50
	Boiler Warm-Up	16	4	0	3	2	1	23
	Tug Assistance	245	55	10	---	11	10	0
	Tanks	---	---	86	---	---	---	---
	Vapor Destruction Units	42.3	11.4	2.3	---	2.4	---	7.6
	Valves, Flanges, Pumps	---	---	3.25	---	---	---	---
	<b>TOTAL</b>	<b>1,303</b>	<b>152</b>	<b>136</b>	<b>21</b>	<b>33</b>	<b>27</b>	<b>81</b>
Vessel Offloading	Tanker Hoteling	1,292	102	37	28	27	21	85
	Offloading	119	30	2	20	14	9	167
	Tanks	---	---	86	---	---	---	---
	Vapor Destruction Units	42.3	11.4	2.3	---	2.4	---	7.6
	Valves, Flanges, Pumps	---	---	3.25	---	---	---	---
		<b>TOTAL</b>	<b>1,453</b>	<b>143</b>	<b>130</b>	<b>48</b>	<b>43</b>	<b>31</b>
No Vessel/Empty Berth	Vapor Destruction Units	42.3	11.4	2.3	---	2.4	---	7.6
	Tanks	---	---	86	---	---	---	---
	Valves, Flanges, Pumps	---	---	3.25	---	---	---	---
		<b>TOTAL</b>	<b>42</b>	<b>11</b>	<b>91</b>	<b>0</b>	<b>2</b>	<b>0</b>

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**Table H.2.NFA/NPA.Un.Ex.2025-1. 2025 No Federal Action/No Project Alternative Exxon Mobil Main Engines Average Daily Unmitigated Emissions.**

Ship	Direction	Mode	Distance (nautical miles)	Ship speed (knots)	Activity (hours)	Maximum Speed (knots)	Load Factor	MCR (kW)	Energy (kW-hr)	Fuel Type	Shipcalls (vessels/ yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)	
PANAMAX	South In	Cruising - CW to VSR	23	12	1.92	15.8	0.438	10,300	8,649	Dist at 0.2	146	59,103	4,867	2,086	1,008	1,008	928	2,704	
		Cruising - VSR to PZ	11	12	0.92	15.8	0.438	10,300	4,136	Dist at 0.2	146	28,267	2,328	998	482	482	444	1,293	
		Cruising - PZ to Pilot	4.7	7	0.67	15.8	0.087	10,300	601	Dist at 0.2	146	4,110	338	145	70	70	64	188	
	South Out	Maneuvering - Pilot to Berth			3	1.00	15.8	0.007	10,300	71	Dist at 0.2	146	482	40	17	8	8	8	22
		Maneuvering - Berth to Pilot			5	1.00	15.8	0.032	10,300	326	Dist at 0.2	146	2,231	184	79	38	38	35	102
		Cruising - Pilot to PZ		3.5	7	0.50	15.8	0.087	10,300	448	Dist at 0.2	146	3,060	252	108	52	52	48	140
		Cruising - PZ to VSR		12.5	12	1.04	15.8	0.438	10,300	4,700	Dist at 0.2	146	32,121	2,645	1,134	548	548	504	1,470
		Cruising - VSR to CW		24.5	12	2.04	15.8	0.438	10,300	9,213	Dist at 0.2	146	62,958	5,185	2,222	1,074	1,074	988	2,880
		<b>TOTAL</b>											<b>192,332</b>	<b>15,839</b>	<b>6,788</b>	<b>3,281</b>	<b>3,281</b>	<b>3,018</b>	<b>8,800</b>



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**Table H.2.NFA/NPA.Un.Ex.2025-2. 2025 No Federal Action/No Project Alternative Exxon Mobil Project Auxiliary Generator Average Daily Unmitigated Emissions**

Ship	Direction	Mode	Activity (hours)	MCR (kW)	Load Factor	Energy (kW-hr)	Fuel Type	Shipcalls (vessels/yr)	NO <sub>x</sub> Emission (lb/yr)	CO Emission (lb/yr)	ROG Emission (lb/yr)	PM Emission (lb/yr)	PM <sub>10</sub> Emission (lb/yr)	PM <sub>2.5</sub> Emission (lb/yr)	SO <sub>2</sub> Emission (lb/yr)
PANAMAX	South In	Cruising	3.50	3,600	0.28	3,533	Dist at 0.2	146	19,740	1,562	568	396	380	304	1,294
		Maneuvering	2.00	3,600	0.28	2,016	Dist at 0.2	146	11,265	891	324	226	217	174	738
	South Out	Maneuvering	1.5	3,600	0.28	1,512	Dist at 0.2	146	8,448	669	243	170	163	130	554
		Cruising	3.58	3,600	0.28	3,612	Dist at 0.2	146	20,182	1,597	581	405	389	311	1,323
<b>TOTAL</b>									<b>59,635</b>	<b>4,719</b>	<b>1,716</b>	<b>1,197</b>	<b>1,149</b>	<b>919</b>	<b>3,909</b>

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**Table H.2.NFA/NPA.Un.Ex.2025-3. 2025 No Federal Action/No Project Alternative Exxon Mobil Boiler Warm-Up Average Daily Unmitigated Emissions.**

Shipcalls (vessels/yr)	Vessel Size	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
146.0	Panamax	Dist at 0.2	0.20	59.91	30%	3	35,000	976	244	14	162	113	76	1,375
<b>TOTAL</b>								<b>976</b>	<b>244</b>	<b>14</b>	<b>162</b>	<b>113</b>	<b>76</b>	<b>1,375</b>

Table H.2.NFA/NPA.Un.Ex.2025-4. 2025 No Federal Action/No Project Alternative Exxon Mobil Berth Operations Average Daily Unmitigated Emissions.

**Auxiliary Generator Pre-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
146.0	Panamax	300,000	Dist at 0.2	0.20	3,600	28%	2.5	14,081	1,114	405	283	271	217	923

AMP Reduction 70% TOTAL 4,224 334 122 85 81 65 277

**Boiler Pre-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
146.0	Panamax	300,000	Dist at 0.2	0.20	59.91	30%	2.5	35,000	974	203	43	135	94	63	1,145

TOTAL 974 203 43 135 94 63 1,145

**Auxiliary Generator Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
146.0	Panamax	300,000	Dist at 0.2	0.20	3,600	56%	11.0	123,910	9,806	3,566	2,487	2,388	1,910	8,122

AMP Reduction 70% TOTAL 37,173 2,942 1,070 746 716 573 2,437

**Boiler Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Inerting Fuel Consumption Savings (lb/1000 bbl offloaded)	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
146.0	Panamax	300,000	Dist at 0.2	0.20	59.91	28.06	11.0	5,915	1,235	261	818	572	383	6,959

TOTAL 5,915 1,235 261 818 572 383 6,959

**Auxiliary Generator Post-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
146.0	Panamax	300,000	Dist at 0.2	0.20	3,600	28%	1.0	5,632	446	162	113	109	87	369

AMP Reduction 70% TOTAL 1,690 134 49 34 33 26 111

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Table H.2.NFA/NPA.Un.Ex.2025-5. 2025 No Federal Action/No Project Alternative Exxon Mobil Summary of Average Daily Unmitigated Vessel Emissions.

Mode	Equipment	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Cruising	Main Engines	189,620	15,616	6,692	3,235	3,235	2,976	8,675
Cruising	Aux Generator	39,922	3,159	1,149	801	769	615	2,617
Maneuvering	Main Engines	2,712	223	96	46	46	43	124
Maneuvering	Aux Generator	19,713	1,560	567	396	380	304	1,292
Boiler Warm-up	Boiler	976	244	14	162	113	76	1,375
Berth Operations	Boiler	6,889	1,439	304	952	667	446	8,105
Berth Operations	Aux Generator	43,087	3,410	1,240	865	830	664	2,824
Propulsion	TOTAL	251,967	20,558	8,504	4,478	4,430	3,938	12,708
Non-Propulsion	TOTAL	50,952	5,092	1,558	1,979	1,610	1,186	12,303
<b>Total Emissions</b>		<b>302,919</b>	<b>25,651</b>	<b>10,062</b>	<b>6,457</b>	<b>6,040</b>	<b>5,123</b>	<b>25,012</b>

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Cruising	Main Engines	519.5	42.8	18.3	8.9	8.9	8.2	23.8
Cruising	Aux Generator	109.4	8.7	3.1	2.2	2.1	1.7	7.2
Maneuvering	Main Engines	7.4	0.6	0.3	0.1	0.1	0.1	0.3
Maneuvering	Aux Generator	54.0	4.3	1.6	1.1	1.0	0.8	3.5
Boiler Warm-up	Boiler	2.7	0.7	0.0	0.4	0.3	0.2	3.8
Berth Operations	Boiler	18.9	3.9	0.8	2.6	1.8	1.2	22.2
Berth Operations	Aux Generator	118.0	9.3	3.4	2.4	2.3	1.8	7.7
Propulsion	TOTAL	690.3	56.3	23.3	12.3	12.1	10.8	34.8
Non-Propulsion	TOTAL	139.6	14.0	4.3	5.4	4.4	3.2	33.7
<b>Total Emissions</b>		<b>830</b>	<b>70</b>	<b>28</b>	<b>18</b>	<b>17</b>	<b>14</b>	<b>69</b>

**Table H.2.NFA/NPA.Un.Ex.2025-6. 2025 No Federal Action/No Project Alternative Exxon Mobil Tug Main Engines Average Daily Unmitigated Emissions.**

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Shipcalls (vessels/yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
PANAMAX	Maneuvering - Pilot to Berth	1.00	2	4,800	0.50	MGO	146.0	16,073	3,608	675	695	639	12
	Maneuvering - Berth to Pilot	1.00	2	4,800	0.50	MGO	146.0	16,073	3,608	675	695	639	12
<b>TOTAL</b>								<b>32,146</b>	<b>7,216</b>	<b>1,351</b>	<b>1,389</b>	<b>1,278</b>	<b>23</b>

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**Table H.2.NFA/NPA.Un.Ex.2025-7. 2025 No Federal Action/No Project Alternative Exxon Mobil Tug Auxiliary Generator Engines Average Daily Unmitigated Emissions.**

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Shipcalls (vessels/yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
PANAMAX	Maneuvering - Pilot to Berth	1.00	2	300	1.00	MGO	146.0	1,809	403	65	77	71	1
	Maneuvering - Berth to Pilot	1.00	2	300	1.00	MGO	146.0	1,809	403	65	77	71	1
<b>TOTAL</b>								<b>3,618</b>	<b>806</b>	<b>130</b>	<b>154</b>	<b>142</b>	<b>2</b>

**Table H.2.NFA/NPA.Un.Ex.2025-8. 2025 No Federal Action/No Project Alternative Exxon Mobil Summary of Tug Average Daily Unmitigated Emissions.**

Mode	Equipment	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Tug Assist	Main Engines	32,146	7,216	1,351	1,389	1,278	23
Tug Assist	Aux Generator	3,618	806	130	154	142	2
<b>TOTAL</b>		<b>35,764</b>	<b>8,022</b>	<b>1,481</b>	<b>1,544</b>	<b>1,420</b>	<b>25</b>

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Tug Assist	Main Engines	88	19.8	3.7	3.8	3.5	0.1
Tug Assist	Aux Generator	10	2.2	0.4	0.4	0.4	0.0
<b>TOTAL</b>		<b>98</b>	<b>22.0</b>	<b>4.1</b>	<b>4.2</b>	<b>3.9</b>	<b>0.1</b>

Table H.2.NFA/NPA.Un.Ex.2025-9. 2025 No Federal Action/No Project Alternative Exxon Mobil VDU Crude Average Daily Unmitigated Emissions.

Assumed Distribution based on tank storage volume:	
Site 1	12.5%
Site 2	87.5%

	Annual Vessel Calls	crude vapors from tanks(scf/call)	annual gas usage (mmscf/yr)	mw crude vapors	destruction efficiency
Panamax	146	116,667	17.0	50	98%
<b>TOTAL</b>	<b>146</b>		<b>17.0</b>		

Annual Average (lb/yr)

	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene
EF (lb/MMSCF)	130	35	7	7.5	0.38%	9.90%	0.017	0.0004	0.0003	0.0043	0.0027	0.731	0.0366	0.0272	0.0095
Panamax	1107.2	298.1	59.6	63.9	0.0	0.8	0.1	0.0	0.0	0.0	0.0	6.2	0.3	0.2	0.1
<b>TOTAL</b>	<b>1107.2</b>	<b>298.1</b>	<b>59.6</b>	<b>63.9</b>	<b>0.0</b>	<b>0.8</b>	<b>0.1</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>6.2</b>	<b>0.3</b>	<b>0.2</b>	<b>0.1</b>

Assumed a ratio of 500/1000 based on the corresponding Btu values with respect to natural gas combustion emission factors.

Annual Average (lb/yr)

	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene	SO <sub>x</sub>
Site 1	138	37.3	7.45	8.0	0.004	0.11	0.018	0.0004	0.0003	0.0046	0.0029	0.78	0.039	0.029	0.010	25
Site 2	969	261	52.2	55.9	0.03	0.74	0.127	0.0030	0.0022	0.032	0.020	5.4	0.27	0.20	0.071	173

59.62



**Table H.2.NFA/NPA.Un.Ex.2025-10. 2025 No Federal Action/No Project Alternative Exxon Mobil VDU Legs Average Daily Unmitigated Emissions.**

	tanks	crude vapors from tanks on legs(scf/yr)	annual gas usage (mmscf/yr)	mw crude vapors	destruction efficiency
Site 1	4	8640000	34.6	50	98%
Site 2	14	8640000	121.0	50	98%
<b>TOTAL</b>	<b>18</b>		<b>155.5</b>		

<b>48</b>	<b>hr/event</b>
<b>6</b>	<b>events/yr</b>
<b>500</b>	<b>ft3/min</b>

Annual Average (lb/yr)															
	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene
EF (lb/MMSCF)	130	35	7	7.5	0.38%	9.90%	0.017	0.0004	0.0003	0.0043	0.0027	0.731	0.0366	0.0272	0.0095
<b>TOTAL</b>	<b>10108.8</b>	<b>2721.6</b>	<b>544.3</b>	<b>583.2</b>	<b>2.1</b>	<b>53.9</b>	<b>1.3</b>	<b>0.0</b>	<b>0.0</b>	<b>0.3</b>	<b>0.2</b>	<b>56.8</b>	<b>2.8</b>	<b>2.1</b>	<b>0.7</b>

*Assumed a ratio of 500/1000 based on the corresponding Btu values with respect to natural gas combustion emission factors.*

Annual Average (lb/yr)																
	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene	SO <sub>x</sub>
Site 1	2246.4	604.8	121.0	129.6	0.46	11.98	0.29	0.007	0.005	0.074	0.05	12.63	0.63	0.47	0.16	402
Site 2	7862.4	2116.8	423.4	453.6	1.61	41.91	1.03	0.024	0.018	0.260	0.16	44.21	2.21	1.65	0.57	1407



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Table H.2.NFA/NPA.Un.Ex.2025-12.

2025 No Federal Action/No Project Alternative Exxon Mobil Berth Summary of Average Daily Unmitigated Emissions.

Operation	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Tanker Cruising and Maneuvering	251,967	20,558	8,504	4,478	4,430	3,938	12,708
Tanker Hoteling	43,087	3,410	1,240	865	830	664	2,824
Offloading Emissions	6,889	1,439	304	952	667	446	8,105
Transiting Operations	976	244	14	162	113	76	1,375
Tug Assistance	35,764	8,022	1,481	---	1,544	1,420	25
Tanks	---	---	3,660	---	---	---	---
Vapor Destruction Units	11,216	3,020	604	---	647	---	2,007
Valves, Flanges, Pumps	---	---	1,188	---	---	---	---
<b>TOTAL</b>	<b>349,898</b>	<b>36,692</b>	<b>16,995</b>	<b>6,457</b>	<b>8,231</b>	<b>6,543</b>	<b>27,044</b>

Operation	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Tanker Cruising and Maneuvering	690	56	23	12	12	11	35
Tanker Hoteling	118	9	3	2	2	2	8
Offloading Emissions	19	4	1	3	2	1	22
Transiting Operations	3	1	0.04	0.4	0.3	0.2	4
Tug Assistance	98	22	4.1	---	4.2	3.9	0.1
Tanks	---	---	10.0	---	---	---	---
Vapor Destruction Units	31	8	2	---	2	---	5
Valves, Flanges, Pumps	---	---	3	---	---	---	---
<b>TOTAL</b>	<b>959</b>	<b>101</b>	<b>47</b>	<b>18</b>	<b>23</b>	<b>18</b>	<b>74</b>

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Table H.2.NFA/NPA.Un.Max.Ex.2025-1. 2025 No Federal Action/No Project Alternative Exxon Mobil Main Engines Maximum Daily Unmitigated Emissions.

Ship	Direction	Mode	Distance (nautical miles)	Ship speed (knots)	Activity (hours)	Maximum Speed (knots)	Load Factor	MCR (kW)	Energy (kW-hr)	Fuel Type	Maximum Daily Shipcalls (vessels/day)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)	
PANAMAX	South In	Cruising - CW to VSR	23	12	1.92	15.8	0.438	10,300	8,649	Dist at 0.2	1.0	405	33	14	7	7	6	19	
		Cruising - VSR to PZ	11	12	0.92	15.8	0.438	10,300	4,136	Dist at 0.2	1.0	194	16	7	3	3	3	9	
		Cruising - PZ to Pilot	4.7	7	0.67	15.8	0.087	10,300	601	Dist at 0.2	1.0	28	2	1	0	0	0	1	
		Maneuvering - Pilot to Berth		3	1.00	15.8	0.007	10,300	71	Dist at 0.2	1.0	3	0.3	0.1	0.1	0.1	0.1	0	
	<b>TOTAL</b>											<b>630</b>	<b>52</b>	<b>22</b>	<b>11</b>	<b>11</b>	<b>10</b>	<b>29</b>	
	South Out	Maneuvering - Berth to Pilot			5	1.00	15.8	0.032	10,300	326	Dist at 0.2	1.0	15	1	1	0	0	0	1
		Cruising - Pilot to PZ	3.5	7	0.50	15.8	0.087	10,300	448	Dist at 0.2	1.0	21	2	1	0	0	0	1	
		Cruising - PZ to VSR	12.5	12	1.04	15.8	0.438	10,300	4,700	Dist at 0.2	1.0	220	18	8	4	4	3	10	
		Cruising - VSR to CW	24.5	12	2.04	15.8	0.438	10,300	9,213	Dist at 0.2	1.0	431	36	15	7	7	7	20	
		<b>TOTAL</b>											<b>687</b>	<b>57</b>	<b>24</b>	<b>12</b>	<b>12</b>	<b>11</b>	<b>31</b>
<b>MAXIMUM</b>											<b>687</b>	<b>57</b>	<b>24</b>	<b>12</b>	<b>12</b>	<b>11</b>	<b>31</b>		

**Table H.2.NFA/NPA.Un.Max.Ex.2025-2. 2025 No Federal Action/No Project Alternative Exxon Mobil Project Auxiliary Generator Maximum Daily Unmitigated Emissions.**

Ship	Direction	Mode	Activity (hours)	MCR (kW)	Load Factor	Energy (kW-hr)	Fuel Type	Maximum Daily Shipcalls (vessels/day)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
PANAMAX	South In	Cruising	3.15	3,600	0.28	3,178	Dist at 0.2	1.0	122	10	3	3	3	2	8
		Maneuvering	2.00	3,600	0.28	2,016	Dist at 0.2	1.0	77	6	2	2	2	1	5
	<b>TOTAL</b>								<b>199</b>	<b>16</b>	<b>6</b>	<b>4</b>	<b>4</b>	<b>3</b>	<b>13</b>
	South Out	Maneuvering	1.5	3,600	0.28	1,512	Dist at 0.2	1.0	58	5	2	1	1	1	4
		Cruising	3.21	3,600	0.28	3,234	Dist at 0.2	1.0	124	10	4	3	3	2	8
	<b>TOTAL</b>								<b>182</b>	<b>14</b>	<b>5</b>	<b>4</b>	<b>4</b>	<b>3</b>	<b>12</b>
<b>MAXIMUM</b>								<b>199</b>	<b>16</b>	<b>6</b>	<b>4</b>	<b>4</b>	<b>3</b>	<b>13</b>	

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Table H.2.NFA/NPA.Un.Max.Ex.2025-3. 2025 No Federal Action/No Project Alternative Exxon Mobil Summary of Maximum Daily Unmitigated Vessel Emissions.

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Cruising	Main Engines	672	55	24	11	11	11	31
Cruising	Aux Generator	122	10	3	3	3	2	8
Maneuvering	Main Engines	15	1	1	0	0	0	1
Maneuvering	Aux Generator	77	6	2	2	2	1	5
<b>Maneuvering</b>	<b>TOTAL</b>	<b>92</b>	<b>7</b>	<b>3</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>6</b>
<b>Propulsion</b>	<b>TOTAL</b>	<b>886</b>	<b>72</b>	<b>30</b>	<b>16</b>	<b>16</b>	<b>14</b>	<b>44</b>

1079.00

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**Table H.2.NFA/NPA.Un.Max.Ex.2025-4. 2025 No Federal Action/No Project Alternative Exxon Mobil Boiler Warm-Up Maximum Daily Unmitigated Emissions.**

Shipcalls (vessels/day)	Vessel Size	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Panamax	Dist at 0.2	0.20	59.91	30%	3	35,000	7	2	0.1	1	1	1	9
MAXIMUM								7	2	0	1	1	1	9

Table H.2.NFA/NPA.Un.Max.Ex.2025-5. 2025 No Federal Action/No Project Alternative Exxon Mobil Summary of Boiler Warm-Up Maximum Unmitigated Emissions.

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Boiler Warm-up	Boiler	7	2	0	1	1	1	9



Table H.2.NFA/NPA.Un.Max.Ex.2025-6. 2025 No Federal Action/No Project Alternative Exxon Mobil Berth Operations Maximum Daily Unmitigated Emissions.

**Auxiliary Generator Pre-Pumping**

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Panamax	300,000	Dist at 0.2	0.20	3,600	28%	2.5	96	8	3	2	2	2	6

AMP Reduction 70%  
**MAXIMUM** 29 2 1 1 1 0.5 2

**Boiler Pre-Pumping**

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Panamax	300,000	Dist at 0.2	0.20	59.91	30%	2.5	35,000	6	1	0	1	1	0	8

**MAXIMUM** 6 1 0 1 1 0 8

**Auxiliary Generator Pumping**

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Panamax	300,000	Dist at 0.2	0.20	3,600	56%	11.0	849	67	24	18	18	14	56

AMP Reduction 70%  
**MAXIMUM** 255 20 7 5 5 4 17

**Boiler Pumping**

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Inerting Fuel Consumption Savings (lb/1000 bbl offloaded)	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Panamax	300,000	Dist at 0.2	0.20	59.91	28.06	11.0	34	8	0	6	4	3	48

**MAXIMUM** 34 8 0 6 4 3 48

**Auxiliary Generator Post-Pumping**

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Panamax	300,000	Dist at 0.2	0.20	3,600	28%	1.0	39	3	1	1	1	1	3

AMP Reduction 70%  
**MAXIMUM** 12 1 0 0 0 0 1

**Table H.2.NFA/NPA.Un.Max.Ex.2025-7. 2025 No Federal Action/No Project Alternative Exxon Mobil Summary of Berth Operations Maximum Daily Unmitigated Emissions.**

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Berth Operations	Boiler	39	10	1	7	5	3	56
Berth Operations	Aux Generator	295	23	8	6	6	5	19

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**Table H.2.NFA/NPA.Un.Max.Ex.2025-8. 2025 No Federal Action/No Project Alternative Exxon Mobil Tug Main Engines Maximum Daily Unmitigated Emissions.**

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Shipcalls (vessels/day)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
PANAMAX	Maneuvering - Pilot to Berth	1.00	2	4,800	0.50	MGO	1.0	110	25	5	5	4	0
	Maneuvering - Berth to Pilot	1.00	2	4,800	0.50	MGO	1.0	110	25	5	5	4	0
<b>TOTAL</b>								<b>220</b>	<b>49</b>	<b>9</b>	<b>10</b>	<b>9</b>	<b>0</b>
<b>MAXIMUM</b>								<b>220</b>	<b>49</b>	<b>9</b>	<b>10</b>	<b>9</b>	<b>0</b>

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**Table H.2.NFA/NPA.Un.Max.Ex.2025-9. 2025 No Federal Action/No Project Alternative Exxon Mobil Tug Auxiliary Generator Engines Maximum Daily Unmitigated Emissions.**

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Shipcalls (vessels/day)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
PANAMAX	Maneuvering - Pilot to Berth	1.00	2	300	1.00	MGO	1.0	12	3	0	1	0	0
	Maneuvering - Berth to Pilot	1.00	2	300	1.00	MGO	1.0	12	3	0	1	0	0
<b>TOTAL</b>								<b>25</b>	<b>6</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>0</b>
<b>MAXIMUM</b>								<b>25</b>	<b>6</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>0</b>

**Table H.2.NFA/NPA.Un.Max.Ex.2025-10. 2025 No Federal Action/No Project Alternative Exxon Mobil Summary of Tug Maximum Daily Unmitigated Emissions.**

<b>Mode</b>	<b>Equipment</b>	<b>Maximum Daily NO<sub>x</sub> Emissions (lb/day)</b>	<b>Maximum Daily CO Emissions (lb/day)</b>	<b>Maximum Daily ROG Emissions (lb/day)</b>	<b>Maximum Daily PM<sub>10</sub> Emissions (lb/day)</b>	<b>Maximum Daily PM<sub>2.5</sub> Emissions (lb/day)</b>	<b>Maximum Daily SO<sub>2</sub> Emissions (lb/day)</b>
Tug Assist	Main Engines	220	49	9	10	9	0
Tug Assist	Aux Generator	25	6	1	1	1	0
<b>TOTAL</b>		<b>245</b>	<b>55</b>	<b>10</b>	<b>11</b>	<b>10</b>	<b>0</b>

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Table H.2.NFA/NPA.Un.Max.Ex.2025-11. 2025 No Federal Action/No Project Alternative Exxon Mobil VDU Crude Maximum Daily Unmitigated Emissions.

	Maximum Daily Vessel Calls	crude vapors from tanks(scf/call)	daily gas usage (mmscf/day)	mw crude vapors	destruction efficiency
Panamax	1	116,667	0.1	50	98%
<b>TOTAL</b>	<b>1</b>		<b>0.1</b>		

Assumed Distribution based on tank storage volume:

Site 1 12.5%  
Site 2 87.5%

Maximum Daily Emissions (lb/day)

	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene
EF (lb/MMSCF)	130	35	7	7.5	0.38%	9.90%	0.017	0.0004	0.0003	0.0043	0.0027	0.731	0.0366	0.0272	0.0095
Panamax	7.6	2.0	0.4	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>MAXIMUM</b>	<b>7.6</b>	<b>2.0</b>	<b>0.4</b>	<b>0.4</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>

Assumed a ratio of 500/1000 based on the corresponding Btu values with respect to natural gas combustion emission factors.

Maximum Daily Emissions (lb/day)

	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene	SO <sub>x</sub>
Site 1	1	0.3	0.05	0.1	0.000	0.00	0.000	0.0000	0.0000	0.0000	0.0000	0.01	0.000	0.000	0.000	0
Site 2	7	2	0.4	0.4	0.00	0.01	0.001	0.0000	0.0000	0.000	0.000	0.0	0.00	0.00	0.000	1

0.41

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**Table H.2.NFA/NPA.Un.Max.Ex.2025-12. 2025 No Federal Action/No Project Alternative Exxon Mobil VDU Legs Maximum Daily Unmitigated Emissions.**

	tanks	crude vapors from tanks on legs(scfd/day)	daily gas usage (mmscf/day)	mw crude vapors	destruction efficiency		
Site 1	4	23671.23	0.09	50	98%		
Site 2	14	23671.23	0.3	50	98%		
<b>TOTAL</b>	<b>18</b>		<b>0.4</b>				

  

<b>48</b>	<b>hr/event</b>
<b>6</b>	<b>events/yr</b>
<b>500</b>	<b>ft3/min</b>

Maximum Daily Emissions (lb/day)															
	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene
EF (lb/MMSCF)	130	35	7	7.5	0.38%	9.90%	0.017	0.0004	0.0003	0.0043	0.0027	0.731	0.0366	0.0272	0.0095
<b>TOTAL</b>	<b>27.7</b>	<b>7.5</b>	<b>1.5</b>	<b>1.6</b>	<b>0.0</b>	<b>0.1</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.2</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>

*Assumed a ratio of 500/1000 based on the corresponding Btu values with respect to natural gas combustion emission factors.*

Maximum Daily Emissions (lb/day)																
	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene	SO <sub>x</sub>
Site 1	6.2	1.7	0.3	0.4	0.00	0.03	0.00	0.000	0.000	0.000	0.00	0.03	0.00	0.00	0.00	1
Site 2	21.5	5.8	1.2	1.2	0.00	0.11	0.00	0.000	0.000	0.001	0.00	0.12	0.01	0.00	0.00	4





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Table H.2.NFA/NPA.Un.Max.Ex.2025-14.

2025 No Federal Action/No Project Alternative Exxon Mobil Berth Summary of Maximum Daily Unmitigated Emissions.

Scenario	Operation	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Vessel Arrival/Departure	Cruising and maneuvering	886	72	30	16	16	14	44
	Boiler Warm-Up	7	2	0	1	1	1	9
	Tug Assistance	245	55	10	---	11	10	0
	Tanks	---	---	86	---	---	---	---
	Vapor Destruction Units	35.3	9.5	1.9	---	2.0	---	6.3
	Valves, Flanges, Pumps	---	---	3.25	---	---	---	---
	<b>TOTAL</b>	<b>1,173</b>	<b>138</b>	<b>131</b>	<b>17</b>	<b>29</b>	<b>24</b>	<b>60</b>
Vessel Offloading	Tanker Hoteling	295	23	8	6	6	5	19
	Offloading	39	10	1	7	5	3	56
	Tanks	---	---	86	---	---	---	---
	Vapor Destruction Units	35.3	9.5	1.9	---	2.0	---	6.3
	Valves, Flanges, Pumps	---	---	3.25	---	---	---	---
	<b>TOTAL</b>	<b>370</b>	<b>43</b>	<b>100</b>	<b>13</b>	<b>13</b>	<b>8</b>	<b>81</b>
No Vessel/Empty Berth	Vapor Destruction Units	35.3	9.5	1.9	---	2.0	---	6.3
	Tanks	---	---	86	---	---	---	---
	Valves, Flanges, Pumps	---	---	3.25	---	---	---	---
	<b>TOTAL</b>	<b>35</b>	<b>9</b>	<b>91</b>	<b>0</b>	<b>2</b>	<b>0</b>	<b>6</b>

Table H.2.NFA/NPA.Un.BP.2040-1. 2040 No Federal Action/No Project Alternative BP Main Engines Average Daily Unmitigated Emissions

Ship	Direction	Mode	Distance (nautical miles)	Ship speed (knots)	Activity (hours)	Maximum Speed (knots)	Load Factor	MCR (kW)	Energy (kW-hr)	Fuel Type	Shipscalls (vessels/ yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)		
AFRAMAX	South In	Cruising - CW to VSR	23	12	1.92	16.1	0.414	12,477	9,902	Dist at 0.2	34	15,758	1,298	556	269	269	247	721		
		Cruising - VSR to PZ	11	12	0.92	16.1	0.414	12,477	4,736	Dist at 0.2	34	7,537	621	266	129	129	118	345		
		Cruising - PZ to Pilot	4.7	7	0.67	16.1	0.082	12,477	689	Dist at 0.2	34	1,096	90	39	19	19	17	50		
	South Out	Maneuvering - Pilot to Berth			3	1.00	16.1	0.006	12,477	81	Dist at 0.2	34	128	11	5	2	2	2	6	
		Maneuvering - Berth to Pilot			5	1.00	16.1	0.030	12,477	374	Dist at 0.2	34	595	49	21	10	10	9	27	
		Cruising - Pilot to PZ			3.5	7	0.50	16.1	0.082	12,477	513	Dist at 0.2	34	816	67	29	14	14	13	37
		Cruising - PZ to VSR			12.5	12	1.04	16.1	0.414	12,477	5,382	Dist at 0.2	34	8,564	705	302	146	146	134	392
		Cruising - VSR to CW			24.5	12	2.04	16.1	0.414	12,477	10,548	Dist at 0.2	34	16,786	1,382	592	286	286	263	768
		<b>TOTAL</b>											<b>51,280</b>	<b>4,223</b>	<b>1,810</b>	<b>875</b>	<b>875</b>	<b>805</b>	<b>2,346</b>	

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**Table H.2.NFA/NPA.Un.BP.2040-2. 2040 No Federal Action/No Project Alternative BP Project Auxiliary Generator Average Daily Unmitigated Emissions.**

Ship	Direction	Mode	Activity (hours)	MCR (kW)	Load Factor	Energy (kW-hr)	Fuel Type	Shipcalls (vessels/yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
AFRAMAX	South In	Cruising	3.50	3,600	0.28	3,533	Dist at 0.2	34	4,597	364	132	92	89	71	301
		Maneuvering	2.00	3,600	0.28	2,016	Dist at 0.2	34	2,623	208	75	53	51	40	172
	South Out	Maneuvering	1.5	3,600	0.28	1,512	Dist at 0.2	34	1,967	156	57	39	38	30	129
		Cruising	3.50	3,600	0.28	3,528	Dist at 0.2	34	4,591	363	132	92	88	71	301
<b>TOTAL</b>									<b>13,778</b>	<b>1,090</b>	<b>396</b>	<b>277</b>	<b>265</b>	<b>212</b>	<b>903</b>

**Table H.2.NFA/NPA.Un.BP.2040-3. 2040 No Federal Action/No Project Alternative BP Boiler Warm-Up Average Daily Unmitigated Emissions.**

Shipcalls (vessels/yr)	Vessel Size	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
34.0	Aframax	Dist at 0.2	0.20	102.17	30%	3	50,000	554	138	8	92	64	43	780
<b>TOTAL</b>								<b>554</b>	<b>138</b>	<b>8</b>	<b>92</b>	<b>64</b>	<b>43</b>	<b>780</b>

Table H.2.NFA/NPA.Un.BP.2040-4. 2040 No Federal Action/No Project Alternative BP Berth Operations Average Daily Unmitigated Emissions.

Auxiliary Generator Pre-Pumping

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
34.0	Aframax	400,000	Dist at 0.2	0.20	3,600	28%	2.5	3,279	259	94	66	63	51	215

TOTAL 3,279 259 94 66 63 51 215

Boiler Pre-Pumping

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
34.0	Aframax	400,000	Dist at 0.2	0.20	102.17	30%	2.5	50,000	552	115	24	76	53	36	650

TOTAL 552 115 24 76 53 36 650

Auxiliary Generator Pumping

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
34.0	Aframax	400,000	Dist at 0.2	0.20	3,600	56%	15.0	39,349	3,114	1,132	790	758	607	2,579

TOTAL 39,349 3,114 1,132 790 758 607 2,579

Boiler Pumping

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Inerting Fuel Consumption Savings (lb/1000 bbl offloaded)	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
34.0	Aframax	400,000	Dist at 0.2	0.20	102.17	28.06	15.0	4,274	892	189	591	414	277	5,028

TOTAL 4,274 892 189 591 414 277 5,028

Auxiliary Generator Post-Pumping

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
34.0	Aframax	400,000	Dist at 0.2	0.20	3,600	28%	1.0	1,312	104	38	26	25	20	86

TOTAL 1,312 104 38 26 25 20 86

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Table H.2.NFA/NPA.Un.BP.2040-5. 2040 No Federal Action/No Project Alternative BP Summary of Average Daily Unmitigated Vessel Emissions.

Mode	Equipment	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Cruising	Main Engines	50,556	4,163	1,784	862	862	793	2,313
Cruising	Aux Generator	9,188	727	264	184	177	142	602
Maneuvering	Main Engines	723	60	26	12	12	11	33
Maneuvering	Aux Generator	4,591	363	132	92	88	71	301
Boiler Warm-up	Boiler	554	138	8	92	64	43	780
Berth Operations	Boiler	4,826	1,008	213	667	467	312	5,678
Berth Operations	Aux Generator	43,939	3,477	1,264	882	847	677	2,880
Propulsion	TOTAL	65,058	5,313	2,206	1,151	1,140	1,017	3,249
Non-Propulsion	TOTAL	49,319	4,623	1,485	1,641	1,378	1,033	9,338
<b>Total Emissions</b>		<b>114,377</b>	<b>9,937</b>	<b>3,692</b>	<b>2,792</b>	<b>2,518</b>	<b>2,050</b>	<b>12,587</b>

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Cruising	Main Engines	138.5	11.4	4.9	2.4	2.4	2.2	6.3
Cruising	Aux Generator	25.2	2.0	0.7	0.5	0.5	0.4	1.6
Maneuvering	Main Engines	2.0	0.2	0.1	0.0	0.0	0.0	0.1
Maneuvering	Aux Generator	12.6	1.0	0.4	0.3	0.2	0.2	0.8
Boiler Warm-up	Boiler	1.5	0.4	0.0	0.3	0.2	0.1	2.1
Berth Operations	Boiler	13.2	2.8	0.6	1.8	1.3	0.9	15.6
Berth Operations	Aux Generator	120.4	9.5	3.5	2.4	2.3	1.9	7.9
Propulsion	TOTAL	178.2	14.6	6.0	3.2	3.1	2.8	8.9
Non-Propulsion	TOTAL	135.1	12.7	4.1	4.5	3.8	2.8	25.6
<b>Total Emissions</b>		<b>313</b>	<b>27</b>	<b>10</b>	<b>8</b>	<b>7</b>	<b>6</b>	<b>34</b>

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**Table H.2.NFA/NPA.Un.BP.2040-6. 2040 No Federal Action/No Project Alternative BP Tug Main Engines Average Daily Unmitigated Emissions.**

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Shipcalls (vessels/yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
AFRAMAX	Maneuvering - Pilot to Berth	1.00	2	4,800	0.50	MGO	34.0	3,357	840	157	148	136	3
	Maneuvering - Berth to Pilot	1.00	2	4,800	0.50	MGO	34.0	3,357	840	157	148	136	3
<b>TOTAL</b>								<b>6,713</b>	<b>1,681</b>	<b>315</b>	<b>297</b>	<b>273</b>	<b>5</b>

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Table H.2.NFA/NPA.Un.BP.2040-7. 2040 No Federal Action/No Project Alternative BP Tug Auxiliary Generator Engines Average Daily Unmitigated Emissions.

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Shipcalls (vessels/yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
AFRAMAX	Maneuvering - Pilot to Berth	1.00	2	300	1.00	MGO	34.0	382	94	15	16	14	0
	Maneuvering - Berth to Pilot	1.00	2	300	1.00	MGO	34.0	382	94	15	16	14	0
<b>TOTAL</b>								<b>764</b>	<b>188</b>	<b>30</b>	<b>31</b>	<b>29</b>	<b>0</b>



**Table H.2.NFA/NPA.Un.BP.2040-8. 2040 No Federal Action/No Project Alternative BP Summary of Tug Average Daily Unmitigated Emissions.**

Mode	Equipment	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Tug Assist	Main Engines	6,713	1,681	315	297	273	5
Tug Assist	Aux Generator	764	188	30	31	29	0
<b>TOTAL</b>		<b>7,477</b>	<b>1,868</b>	<b>345</b>	<b>328</b>	<b>302</b>	<b>6</b>

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Tug Assist	Main Engines	18	4.6	0.9	0.8	0.7	0.0
Tug Assist	Aux Generator	2	0.5	0.1	0.1	0.1	0.0
<b>TOTAL</b>		<b>20</b>	<b>5.1</b>	<b>0.9</b>	<b>0.9</b>	<b>0.8</b>	<b>0.0</b>

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Table H.2.NFA/NPA.Un.BP.2040-9. 2040 No Federal Action/No Project Alternative BP VDU Crude Average Daily Unmitigated Emissions.

Assumed Distribution based on tank storage volume:	
Site 1	12.5%
Site 2	87.5%

	Annual Vessel Calls	crude vapors from tanks(scf/call)	annual gas usage (mmscf/yr)	mw crude vapors	destruction efficiency
Aframax	34	224,000	7.6	50	98%
<b>TOTAL</b>	<b>34</b>		<b>7.6</b>		

Annual Average (lb/yr)

	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene
EF (lb/MMSCF)	130	35	7	7.5	0.38%	9.90%	0.017	0.0004	0.0003	0.0043	0.0027	0.731	0.0366	0.0272	0.0095
Panamax	495.0	133.3	26.7	28.6	0.0	0.4	0.1	0.0	0.0	0.0	0.0	2.8	0.1	0.1	0.0
<b>TOTAL</b>	<b>495.0</b>	<b>133.3</b>	<b>26.7</b>	<b>28.6</b>	<b>0.0</b>	<b>0.4</b>	<b>0.1</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>2.8</b>	<b>0.1</b>	<b>0.1</b>	<b>0.0</b>

Assumed a ratio of 500/1000 based on the corresponding Btu values with respect to natural gas combustion emission factors.

Annual Average (lb/yr)

	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene	SO <sub>x</sub>
Site 1	62	16.7	3.33	3.6	0.002	0.05	0.008	0.0002	0.0001	0.0020	0.0013	0.35	0.017	0.013	0.005	11
Site 2	433	117	23.3	25.0	0.01	0.33	0.057	0.0013	0.0010	0.014	0.009	2.4	0.12	0.09	0.032	78

26.66

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**Table H.2.NFA/NPA.Un.BP.2040-10. 2040 No Federal Action/No Project Alternative BP VDU Legs Average Daily Unmitigated Emissions.**

	tanks	crude vapors from tanks on legs(scf/yr)	annual gas usage (mmscf/yr)	mw crude vapors	destruction efficiency
Site 1	4	8640000	34.6	50	98%
Site 2	14	8640000	121.0	50	98%
<b>TOTAL</b>	<b>18</b>		<b>155.5</b>		

  

48	hr/event
6	events/yr
500	ft3/min

Annual Average (lb/yr)		NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene
EF (lb/MMSCF)		130	35	7	7.5	0.38%	9.90%	0.017	0.0004	0.0003	0.0043	0.0027	0.731	0.0366	0.0272	0.0095
<b>TOTAL</b>		<b>10108.8</b>	<b>2721.6</b>	<b>544.3</b>	<b>583.2</b>	<b>2.1</b>	<b>53.9</b>	<b>1.3</b>	<b>0.0</b>	<b>0.0</b>	<b>0.3</b>	<b>0.2</b>	<b>56.8</b>	<b>2.8</b>	<b>2.1</b>	<b>0.7</b>

*Assumed a ratio of 500/1000 based on the corresponding Btu values with respect to natural gas combustion emission factors.*

Annual Average (lb/yr)		NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene	SO <sub>x</sub>
Site 1		2246.4	604.8	121.0	129.6	0.46	11.98	0.29	0.007	0.005	0.074	0.05	12.63	0.63	0.47	0.16	402
Site 2		7862.4	2116.8	423.4	453.6	1.61	41.91	1.03	0.024	0.018	0.260	0.16	44.21	2.21	1.65	0.57	1407



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Table H.2.NFA/NPA.Un.BP.2040-12.

2040 No Federal Action/No Project Alternative BP Berth Summary of Average Daily Unmitigated Emissions.

Operation	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Tanker Cruising and Manuevering	65,058	5,313	2,206	1,151	1,140	1,017	3,249
Tanker Hoteling	43,939	3,477	1,264	882	847	677	2,880
Offloading Emissions	4,826	1,008	213	667	467	312	5,678
Transiting Operations	554	138	8	92	64	43	780
Tug Assistance	7,477	1,868	345	---	328	302	6
Tanks	---	---	3,660	---	---	---	---
Vapor Destruction Units	10,604	2,855	571	---	612	---	1,898
Valves, Flanges, Pumps	---	---	1,188	---	---	---	---
<b>TOTAL</b>	<b>132,458</b>	<b>14,660</b>	<b>9,455</b>	<b>2,792</b>	<b>3,458</b>	<b>2,351</b>	<b>14,491</b>

Operation	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Tanker Cruising and Manuevering	178	15	6	3	3	3	9
Tanker Hoteling	120	10	3	2	2	2	8
Offloading Emissions	13	3	1	2	1	1	16
Transiting Operations	2	0.4	0.02	0.3	0.2	0.12	2
Tug Assistance	20	5	0.9	---	0.9	0.8	0.0
Tanks	---	---	10.0	---	---	---	---
Vapor Destruction Units	29	8	2	---	2	---	5
Valves, Flanges, Pumps	---	---	3	---	---	---	---
<b>TOTAL</b>	<b>363</b>	<b>40</b>	<b>26</b>	<b>8</b>	<b>9</b>	<b>6</b>	<b>40</b>

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**Table H.2.NFA/NPA.Un.Max.BP.2040-1. 2040 No Federal Action/No Project Alternative BP Main Engines Maximum Daily Unmitigated Emissions.**

Ship	Direction	Mode	Distance (nautical miles)	Ship speed (knots)	Activity (hours)	Maximum Speed (knots)	Load Factor	MCR (kW)	Energy (kW-hr)	Fuel Type	Maximum Daily Shipcalls (vessels/day)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)	
AFRAMAX	South In	Cruising - CW to VSR	23	12	1.92	16.1	0.414	12,477	9,902	Dist at 0.2	1.0	463	38	16	8	8	7	21	
		Cruising - VSR to PZ	11	12	0.92	16.1	0.414	12,477	4,736	Dist at 0.2	1.0	222	18	8	4	4	3	10	
		Cruising - PZ to Pilot	4.7	7	0.67	16.1	0.082	12,477	689	Dist at 0.2	1.0	32	3	1	1	1	1	1	
		Maneuvering - Pilot to Berth		3	1.00	16.1	0.006	12,477	81	Dist at 0.2	1.0	4	0.3	0.1	0.1	0.1	0.1	0	
	South Out	Maneuvering - Berth to Pilot			5	1.00	16.1	0.030	12,477	374	Dist at 0.2	1.0	17	1	1	0	0	0	1
		Cruising - Pilot to PZ	3.5	7	0.50	16.1	0.082	12,477	513	Dist at 0.2	1.0	24	2	1	0	0	0	1	
		Cruising - PZ to VSR	12.5	12	1.04	16.1	0.414	12,477	5,382	Dist at 0.2	1.0	252	21	9	4	4	4	12	
		Cruising - VSR to CW	24.5	12	2.04	16.1	0.414	12,477	10,548	Dist at 0.2	1.0	494	41	17	8	8	8	23	
		<b>TOTAL</b>										<b>721</b>	<b>721</b>	<b>59</b>	<b>25</b>	<b>12</b>	<b>12</b>	<b>11</b>	<b>33</b>
		<b>TOTAL</b>										<b>787</b>	<b>65</b>	<b>28</b>	<b>13</b>	<b>13</b>	<b>12</b>	<b>12</b>	<b>36</b>
<b>MAXIMUM</b>												<b>787</b>	<b>65</b>	<b>28</b>	<b>13</b>	<b>13</b>	<b>12</b>	<b>36</b>	

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Table H.2.NFA/NPA.Un.Max.BP.2040-2. 2040 No Federal Action/No Project Alternative BP Project Auxiliary Generator Maximum Daily Unmitigated Emissions.

Ship	Direction	Mode	Activity (hours)	MCR (kW)	Load Factor	Energy (kW-hr)	Fuel Type	Maximum Daily Shipcalls (vessels/day)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)	
AFRAMAX	South In	Cruising	3.50	3,600	0.28	3,528	Dist at 0.2	1.0	135	11	4	3	3	2	9	
		Maneuvering	2.00	3,600	0.28	2,016	Dist at 0.2	1.0	77	6	2	2	2	1	5	
			<b>TOTAL</b>						<b>212</b>	<b>17</b>	<b>6</b>	<b>5</b>	<b>4</b>	<b>4</b>	<b>4</b>	<b>14</b>
	South Out	Maneuvering	1.5	3,600	0.28	1,512	Dist at 0.2	1.0	58	5	2	1	1	1	4	
		Cruising	3.50	3,600	0.28	3,528	Dist at 0.2	1.0	135	11	4	3	3	2	9	
			<b>TOTAL</b>						<b>193</b>	<b>15</b>	<b>6</b>	<b>4</b>	<b>4</b>	<b>3</b>	<b>13</b>	
		<b>MAXIMUM</b>						<b>212</b>	<b>17</b>	<b>6</b>	<b>5</b>	<b>4</b>	<b>4</b>	<b>4</b>	<b>14</b>	

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Table H.2.NFA/NPA.Un.Max.BP.2040-3. 2040 No Federal Action/No Project Alternative BP Summary of Maximum Daily Unmitigated Vessel Emissions.

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Cruising	Main Engines	770	63	27	13	13	12	35
Cruising	Aux Generator	135	11	4	3	3	2	9
Maneuvering	Main Engines	17	1	1	0	0	0	1
Maneuvering	Aux Generator	77	6	2	2	2	1	5
<b>Maneuvering</b>	<b>TOTAL</b>	<b>95</b>	<b>8</b>	<b>3</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>6</b>
<b>Propulsion</b>	<b>TOTAL</b>	<b>999</b>	<b>82</b>	<b>34</b>	<b>18</b>	<b>18</b>	<b>16</b>	<b>50</b>

1216.4



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**Table H.2.NFA/NPA.Un.Max.BP.2040-4. 2040 No Federal Action/No Project Alternative BP Boiler Warm-Up Maximum Daily Unmitigated Emissions.**

Shipcalls (vessels/day)	Vessel Size	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	Dist at 0.2	0.20	102.17	30%	3	50,000	16	4	0.2	3	2	1	23
<b>MAXIMUM</b>								<b>16</b>	<b>4</b>	<b>0</b>	<b>3</b>	<b>2</b>	<b>1</b>	<b>23</b>

**Table H.2.NFA/NPA.Un.Max.BP.2040-5. 2040 No Federal Action/No Project Alternative BP Summary of Boiler Warm-Up Maximum Unmitigated Emissions.**

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Boiler Warm-up	Boiler	16	4	0	3	2	1	23

Table H.2.NFA/NPA.Un.Max.BP.2040-6. 2040 No Federal Action/No Project Alternative BP Berth Operations Maximum Daily Unmitigated Emissions.

**Auxiliary Generator Pre-Pumping**

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	400,000	Dist at 0.2	0.20	3,600	28%	2.5	96	8	3	2	2	2	6
MAXIMUM								96	8	3	2	2	2	6

**Boiler Pre-Pumping**

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	400,000	Dist at 0.2	0.20	102.17	30%	2.5	50,000	14	3	0	2	2	1	19
MAXIMUM									14	3	0	2	2	1	19

**Auxiliary Generator Pumping**

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	400,000	Dist at 0.2	0.20	3,600	56%	15.0	1,157	92	33	25	24	19	76
MAXIMUM								1,157	92	33	25	24	19	76

**Boiler Pumping**

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Inerting Fuel Consumption Savings (lb/1000 bbl offloaded)	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	400,000	Dist at 0.2	0.20	102.17	28.06	15.0	105	26	1	17	12	8	148
MAXIMUM								105	26	1	17	12	8	148

**Auxiliary Generator Post-Pumping**

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	400,000	Dist at 0.2	0.20	3,600	28%	1.0	39	3	1	1	1	1	3
MAXIMUM								39	3	1	1	1	1	3

**Table H.2.NFA/NPA.Un.Max.BP.2040-7. 2040 No Federal Action/No Project Alternative BP Summary of Berth Operations Maximum Daily Unmitigated Emissions.**

<b>Mode</b>	<b>Equipment</b>	<b>NO<sub>x</sub> Emissions (lb/day)</b>	<b>CO Emissions (lb/day)</b>	<b>ROG Emissions (lb/day)</b>	<b>PM Emissions (lb/day)</b>	<b>PM<sub>10</sub> Emissions (lb/day)</b>	<b>PM<sub>2.5</sub> Emissions (lb/day)</b>	<b>SO<sub>2</sub> Emissions (lb/day)</b>
Berth Operations	Boiler	119	30	2	20	14	9	167
Berth Operations	Aux Generator	1,292	102	37	28	27	21	85

**Table H.2.NFA/NPA.Un.Max.BP.2040-8. 2040 No Federal Action/No Project Alternative BP Tug Main Engines Maximum Daily Unmitigated Emissions.**

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Shipcalls (vessels/day)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
AFRAMAX	Maneuvering - Pilot to Berth	1.00	2	4,800	0.50	MGO	1.0	99	25	5	4	4	0
	Maneuvering - Berth to Pilot	1.00	2	4,800	0.50	MGO	1.0	99	25	5	4	4	0
<b>TOTAL</b>								<b>197</b>	<b>49</b>	<b>9</b>	<b>9</b>	<b>8</b>	<b>0</b>
<b>MAXIMUM</b>								<b>197</b>	<b>49</b>	<b>9</b>	<b>9</b>	<b>8</b>	<b>0</b>

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**Table H.2.NFA/NPA.Un.Max.BP.2040-9. 2040 No Federal Action/No Project Alternative BP Tug Auxiliary Generator Engines Maximum Daily Unmitigated Emissions.**

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Shipcalls (vessels/day)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
AFRAMAX	Maneuvering - Pilot to Berth	1.00	2	300	1.00	MGO	1.0	11	3	0	0	0	0
	Maneuvering - Berth to Pilot	1.00	2	300	1.00	MGO	1.0	11	3	0	0	0	0
<b>TOTAL</b>								<b>22</b>	<b>6</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>0</b>
<b>MAXIMUM</b>								<b>22</b>	<b>6</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>0</b>

**Table H.2.NFA/NPA.Un.Max.BP.2040-10. 2040 No Federal Action/No Project Alternative BP Summary of Tug Maximum Daily Unmitigated Emissions.**

<b>Mode</b>	<b>Equipment</b>	<b>Maximum Daily NO<sub>x</sub> Emissions (lb/day)</b>	<b>Maximum Daily CO Emissions (lb/day)</b>	<b>Maximum Daily ROG Emissions (lb/day)</b>	<b>Maximum Daily PM<sub>10</sub> Emissions (lb/day)</b>	<b>Maximum Daily PM<sub>2.5</sub> Emissions (lb/day)</b>	<b>Maximum Daily SO<sub>2</sub> Emissions (lb/day)</b>
Tug Assist	Main Engines	197	49	9	9	8	0
Tug Assist	Aux Generator	22	6	1	1	1	0
<b>TOTAL</b>		<b>220</b>	<b>55</b>	<b>10</b>	<b>10</b>	<b>9</b>	<b>0</b>

Table H.2.NFA/NPA.Un.Max.BP.2040-11. 2040 No Federal Action/No Project Alternative BP VDU Crude Maximum Daily Unmitigated Emissions.

	Maximum Daily Vessel Calls	crude vapors from tanks(scf/call)	daily gas usage (mmscf/day)	mw crude vapors	destruction efficiency
Aframax	1	224,000	0.2	50	98%
<b>TOTAL</b>	<b>1</b>		<b>0.2</b>		

Assumed Distribution based on tank storage volume:	
Site 1	12.5%
Site 2	87.5%

Maximum Daily Emissions (lb/day)

	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene
EF (lb/MMSCF)	130	35	7	7.5	0.38%	9.90%	0.017	0.0004	0.0003	0.0043	0.0027	0.731	0.0366	0.0272	0.0095
Panamax	14.6	3.9	0.8	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0
<b>MAXIMUM</b>	<b>14.6</b>	<b>3.9</b>	<b>0.8</b>	<b>0.8</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.1</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>

Assumed a ratio of 500/1000 based on the corresponding Btu values with respect to natural gas combustion emission factors.

Maximum Daily Emissions (lb/day)

	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene	SO <sub>x</sub>
Site 1	2	0.5	0.10	0.1	0.000	0.00	0.000	0.0000	0.0000	0.0001	0.0000	0.01	0.001	0.000	0.000	0
Site 2	13	3	0.7	0.7	0.00	0.01	0.002	0.0000	0.0000	0.000	0.000	0.1	0.00	0.00	0.001	2

0.78



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**Table H.2.NFA/NPA.Un.Max.BP.2040-12. 2040 No Federal Action/No Project Alternative BP VDU Legs Maximum Daily Unmitigated Emissions.**

	tanks	crude vapors from tanks on legs(scf/day)	daily gas usage (mmscf/day)	mw crude vapors	destruction efficiency		
Site 1	4	23671.23	0.09	50	98%		
Site 2	14	23671.23	0.3	50	98%		
<b>TOTAL</b>	<b>18</b>		<b>0.4</b>				

  

<b>48</b>	<b>hr/event</b>
<b>6</b>	<b>events/yr</b>
<b>500</b>	<b>ft3/min</b>

Maximum Daily Emissions (lb/day)															
	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene
EF (lb/MMSCF)	130	35	7	7.5	0.38%	9.90%	0.017	0.0004	0.0003	0.0043	0.0027	0.731	0.0366	0.0272	0.0095
<b>TOTAL</b>	<b>27.7</b>	<b>7.5</b>	<b>1.5</b>	<b>1.6</b>	<b>0.0</b>	<b>0.1</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.2</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>

*Assumed a ratio of 500/1000 based on the corresponding Btu values with respect to natural gas combustion emission factors.*

Maximum Daily Emissions (lb/day)																
	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene	SO <sub>x</sub>
Site 1	6.2	1.7	0.3	0.4	0.00	0.03	0.00	0.000	0.000	0.000	0.00	0.03	0.00	0.00	0.00	1
Site 2	21.5	5.8	1.2	1.2	0.00	0.11	0.00	0.000	0.000	0.001	0.00	0.12	0.01	0.00	0.00	4



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Table H.2.NFA/NPA.Un.Max.BP.2040-14.

2040 No Federal Action/No Project Alternative BP Berth Summary of Maximum Daily Unmitigated Emissions.

Scenario	Operation	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Vessel Arrival/Departure	Cruising and maneuvering	999	82	34	18	18	16	50
	Boiler Warm-Up	16	4	0	3	2	1	23
	Tug Assistance	220	55	10	---	10	9	0
	Tanks	---	---	86	---	---	---	---
	Vapor Destruction Units	42.3	11.4	2.3	---	2.4	---	7.6
	Valves, Flanges, Pumps	---	---	3.25	---	---	---	---
	<b>TOTAL</b>	<b>1,278</b>	<b>152</b>	<b>136</b>	<b>21</b>	<b>32</b>	<b>26</b>	<b>81</b>
Vessel Offloading	Tanker Hoteling	1,292	102	37	28	27	21	85
	Offloading	119	30	2	20	14	9	167
	Tanks	---	---	86	---	---	---	---
	Vapor Destruction Units	42.3	11.4	2.3	---	2.4	---	7.6
	Valves, Flanges, Pumps	---	---	3.25	---	---	---	---
	<b>TOTAL</b>	<b>1,453</b>	<b>143</b>	<b>130</b>	<b>48</b>	<b>43</b>	<b>31</b>	<b>259</b>
No Vessel/Empty Berth	Vapor Destruction Units	42.3	11.4	2.3	---	2.4	---	7.6
	Tanks	---	---	86	---	---	---	---
	Valves, Flanges, Pumps	---	---	3.25	---	---	---	---
	<b>TOTAL</b>	<b>42</b>	<b>11</b>	<b>91</b>	<b>0</b>	<b>2</b>	<b>0</b>	<b>8</b>

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Table H.2.NFA/NPA.Un.Ts.2040-1. 2040 No Federal Action/No Project Alternative Tesoro Main Engines Average Daily Unmitigated Emissions.

Ship	Direction	Mode	Distance (nautical miles)	Ship speed (knots)	Activity (hours)	Maximum Speed (knots)	Load Factor	MCR (kW)	Energy (kW-hr)	Fuel Type	Shipcalls (vessels/ yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)		
AFRAMAX	South In	Cruising - CW to VSR	23	12	1.92	16.1	0.414	12,477	9,902	Dist at 0.2	87	40,322	3,321	1,423	688	688	633	1,845		
		Cruising - VSR to PZ	11	12	0.92	16.1	0.414	12,477	4,736	Dist at 0.2	87	19,285	1,588	681	329	329	303	882		
		Cruising - PZ to Pilot	4.7	7	0.67	16.1	0.082	12,477	689	Dist at 0.2	87	2,804	231	99	48	48	44	128		
	South Out	Maneuvering - Pilot to Berth			3	1.00	16.1	0.006	12,477	81	Dist at 0.2	87	329	27	12	6	6	5	15	
		Maneuvering - Berth to Pilot			5	1.00	16.1	0.030	12,477	374	Dist at 0.2	87	1,522	125	54	26	26	24	70	
		Cruising - Pilot to PZ			3.5	7	0.50	16.1	0.082	12,477	513	Dist at 0.2	87	2,088	172	74	36	36	33	96
		Cruising - PZ to VSR			12.5	12	1.04	16.1	0.414	12,477	5,382	Dist at 0.2	87	21,914	1,805	773	374	374	344	1,003
		Cruising - VSR to CW			24.5	12	2.04	16.1	0.414	12,477	10,548	Dist at 0.2	87	42,952	3,537	1,516	733	733	674	1,965
<b>TOTAL</b>												<b>131,215</b>	<b>10,806</b>	<b>4,631</b>	<b>2,238</b>	<b>2,238</b>	<b>2,059</b>	<b>6,003</b>		

**Table H.2.NFA/NPA.Un.Ts.2040-2. 2040 No Federal Action/No Project Alternative Tesoro Project Auxiliary Generator Average Daily Unmitigated Emissions.**

Ship	Direction	Mode	Activity (hours)	MCR (kW)	Load Factor	Energy (kW-hr)	Fuel Type	Shipcalls (vessels/yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
AFRAMAX	South In	Cruising	3.50	3,600	0.28	3,533	Dist at 0.2	87	11,763	931	338	236	227	181	771
		Maneuvering	2.00	3,600	0.28	2,016	Dist at 0.2	87	6,712	531	193	135	129	103	440
	South Out	Maneuvering	1.5	3,600	0.28	1,512	Dist at 0.2	87	5,034	398	145	101	97	78	330
		Cruising	3.50	3,600	0.28	3,528	Dist at 0.2	87	11,747	930	338	236	226	181	770
<b>TOTAL</b>									<b>35,256</b>	<b>2,790</b>	<b>1,015</b>	<b>708</b>	<b>679</b>	<b>543</b>	<b>2,311</b>

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**Table H.2.NFA/NPA.Un.Ts.2040-3. 2040 No Federal Action/No Project Alternative Tesoro Boiler Warm-Up Average Daily Unmitigated Emissions.**

Shipcalls (vessels/yr)	Vessel Size	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
87.0	Aframax	Dist at 0.2	0.20	102.17	30%	3	50,000	1,417	354	20	234	164	110	1,995
<b>TOTAL</b>								<b>1,417</b>	<b>354</b>	<b>20</b>	<b>234</b>	<b>164</b>	<b>110</b>	<b>1,995</b>

Table H.2.NFA/NPA.Un.Ts.2040-4. 2040 No Federal Action/No Project Alternative Tesoro Berth Operations Average Daily Unmitigated Emissions.

Auxiliary Generator Pre-Pumping

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
87.0	Aframax	400,000	Dist at 0.2	0.20	3,600	28%	2.5	8,391	664	241	168	162	129	550
<b>TOTAL</b>								<b>8,391</b>	<b>664</b>	<b>241</b>	<b>168</b>	<b>162</b>	<b>129</b>	<b>550</b>

Boiler Pre-Pumping

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
87.0	Aframax	400,000	Dist at 0.2	0.20	102.17	30%	2.5	50,000	1,413	295	62	195	137	91	1,663
<b>TOTAL</b>									<b>1,413</b>	<b>295</b>	<b>62</b>	<b>195</b>	<b>137</b>	<b>91</b>	<b>1,663</b>

Auxiliary Generator Pumping

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
87.0	Aframax	400,000	Dist at 0.2	0.20	3,600	56%	15.0	100,686	7,968	2,897	2,021	1,940	1,552	6,600
<b>TOTAL</b>								<b>100,686</b>	<b>7,968</b>	<b>2,897</b>	<b>2,021</b>	<b>1,940</b>	<b>1,552</b>	<b>6,600</b>

Boiler Pumping

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Inerting Fuel Consumption Savings (lb/1000 bbl offloaded)	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
87.0	Aframax	400,000	Dist at 0.2	0.20	102.17	28.06	15.0	10,936	2,284	482	1,512	1,058	708	12,866
<b>TOTAL</b>								<b>10,936</b>	<b>2,284</b>	<b>482</b>	<b>1,512</b>	<b>1,058</b>	<b>708</b>	<b>12,866</b>

Auxiliary Generator Post-Pumping

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
87.0	Aframax	400,000	Dist at 0.2	0.20	3,600	28%	1.0	3,356	266	97	67	65	52	220
<b>TOTAL</b>								<b>3,356</b>	<b>266</b>	<b>97</b>	<b>67</b>	<b>65</b>	<b>52</b>	<b>220</b>

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Table H.2.NFA/NPA.Un.Ts.2040-5. 2040 No Federal Action/No Project Alternative Tesoro Summary of Average Daily Unmitigated Vessel Emissions.

Mode	Equipment	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Cruising	Main Engines	129,365	10,654	4,566	2,207	2,207	2,030	5,919
Cruising	Aux Generator	23,509	1,860	677	472	453	362	1,541
Maneuvering	Main Engines	1,851	152	65	32	32	29	85
Maneuvering	Aux Generator	11,747	930	338	236	226	181	770
Boiler Warm-up	Boiler	1,417	354	20	234	164	110	1,995
Berth Operations	Boiler	12,349	2,579	545	1,707	1,195	799	14,529
Berth Operations	Aux Generator	112,433	8,898	3,235	2,257	2,166	1,733	7,370
Propulsion	TOTAL	166,472	13,596	5,646	2,946	2,918	2,603	8,314
Non-Propulsion	TOTAL	126,199	11,831	3,800	4,198	3,526	2,642	23,894
<b>Total Emissions</b>		<b>292,671</b>	<b>25,427</b>	<b>9,446</b>	<b>7,144</b>	<b>6,443</b>	<b>5,245</b>	<b>32,208</b>

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Cruising	Main Engines	354.4	29.2	12.5	6.0	6.0	5.6	16.2
Cruising	Aux Generator	64.4	5.1	1.9	1.3	1.2	1.0	4.2
Maneuvering	Main Engines	5.1	0.4	0.2	0.1	0.1	0.1	0.2
Maneuvering	Aux Generator	32.2	2.5	0.9	0.6	0.6	0.5	2.1
Boiler Warm-up	Boiler	3.9	1.0	0.1	0.6	0.4	0.3	5.5
Berth Operations	Boiler	33.8	7.1	1.5	4.7	3.3	2.2	39.8
Berth Operations	Aux Generator	308.0	24.4	8.9	6.2	5.9	4.7	20.2
Propulsion	TOTAL	456.1	37.2	15.5	8.1	8.0	7.1	22.8
Non-Propulsion	TOTAL	345.8	32.4	10.4	11.5	9.7	7.2	65.5
<b>Total Emissions</b>		<b>802</b>	<b>70</b>	<b>26</b>	<b>20</b>	<b>18</b>	<b>14</b>	<b>88</b>



Table H.2.NFA/NPA.Un.Ts.2040-6. 2040 No Federal Action/No Project Alternative Tesoro Tug Main Engines Average Daily Unmitigated Emissions.

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Shipcalls (vessels/yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
AFRAMAX	Maneuvering - Pilot to Berth	1.00	2	4,800	0.50	MGO	87.0	8,589	2,150	402	379	349	7
	Maneuvering - Berth to Pilot	1.00	2	4,800	0.50	MGO	87.0	8,589	2,150	402	379	349	7
<b>TOTAL</b>								<b>17,178</b>	<b>4,300</b>	<b>805</b>	<b>759</b>	<b>698</b>	<b>14</b>

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Table H.2.NFA/NPA.Un.Ts.2040-7. 2040 No Federal Action/No Project Alternative Tesoro Tug Auxiliary Generator Engines Average Daily Unmitigated Emissions.

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Shipcalls (vessels/yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
AFRAMAX	Maneuvering - Pilot to Berth	1.00	2	300	1.00	MGO	87.0	977	240	39	40	37	1
	Maneuvering - Berth to Pilot	1.00	2	300	1.00	MGO	87.0	977	240	39	40	37	1
<b>TOTAL</b>								<b>1,955</b>	<b>480</b>	<b>78</b>	<b>80</b>	<b>74</b>	<b>1</b>

**Table H.2.NFA/NPA.Un.Ts.2040-8. 2040 No Federal Action/No Project Alternative Tesoro Summary of Tug Average Daily Unmitigated Emissions.**

Mode	Equipment	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Tug Assist	Main Engines	17,178	4,300	805	759	698	14
Tug Assist	Aux Generator	1,955	480	78	80	74	1

**TOTAL            19,132        4,780        882        839        772        15**

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Tug Assist	Main Engines	47	11.8	2.2	2.1	1.9	0.0
Tug Assist	Aux Generator	5	1.3	0.2	0.2	0.2	0.0

**TOTAL            52            13.1        2.4        2.3        2.1        0.0**

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Table H.2.NFA/NPA.Un.Ts.2040-9. 2040 No Federal Action/No Project Alternative Tesoro VDU Crude Average Daily Unmitigated Emissions.

Assumed Distribution based on tank storage volume:	
Site 1	12.5%
Site 2	87.5%

	Annual Vessel Calls	crude vapors from tanks(scf/call)	annual gas usage (mmscf/yr)	mw crude vapors	destruction efficiency
Aframax	87	224,000	19.5	50	98%
<b>TOTAL</b>	<b>87</b>		<b>19.5</b>		

Annual Average (lb/yr)

	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene
EF (lb/MMSCF)	130	35	7	7.5	0.38%	9.90%	0.017	0.0004	0.0003	0.0043	0.0027	0.731	0.0366	0.0272	0.0095
Panamax	1266.7	341.0	68.2	73.1	0.0	1.0	0.2	0.0	0.0	0.0	0.0	7.1	0.4	0.3	0.1
<b>TOTAL</b>	<b>1266.7</b>	<b>341.0</b>	<b>68.2</b>	<b>73.1</b>	<b>0.0</b>	<b>1.0</b>	<b>0.2</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>7.1</b>	<b>0.4</b>	<b>0.3</b>	<b>0.1</b>

Assumed a ratio of 500/1000 based on the corresponding Btu values with respect to natural gas combustion emission factors.

Annual Average (lb/yr)

	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene	SO <sub>x</sub>
Site 1	158	42.6	8.53	9.1	0.005	0.12	0.021	0.0005	0.0004	0.0052	0.0033	0.89	0.045	0.033	0.012	28
Site 2	1108	298	59.7	63.9	0.03	0.84	0.145	0.0034	0.0026	0.037	0.023	6.2	0.31	0.23	0.081	198

68.21

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**Table H.2.NFA/NPA.Un.Ts.2040-10. 2040 No Federal Action/No Project Alternative Tesoro VDU Legs Average Daily Unmitigated Emissions.**

	tanks	crude vapors from tanks on legs(scf/yr)	annual gas usage (mmscf/yr)	mw crude vapors	destruction efficiency		
Site 1	4	8640000	34.6	50	98%	48	hr/event
Site 2	14	8640000	121.0	50	98%	6	events/yr
<b>TOTAL</b>	<b>18</b>		<b>155.5</b>			500	ft3/min

		Annual Average (lb/yr)													
	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene
EF (lb/MMSCF)	130	35	7	7.5	0.38%	9.90%	0.017	0.0004	0.0003	0.0043	0.0027	0.731	0.0366	0.0272	0.0095
<b>TOTAL</b>	<b>10108.8</b>	<b>2721.6</b>	<b>544.3</b>	<b>583.2</b>	<b>2.1</b>	<b>53.9</b>	<b>1.3</b>	<b>0.0</b>	<b>0.0</b>	<b>0.3</b>	<b>0.2</b>	<b>56.8</b>	<b>2.8</b>	<b>2.1</b>	<b>0.7</b>

*Assumed a ratio of 500/1000 based on the corresponding Btu values with respect to natural gas combustion emission factors.*

		Annual Average (lb/yr)														
	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene	SO <sub>x</sub>
Site 1	2246.4	604.8	121.0	129.6	0.46	11.98	0.29	0.007	0.005	0.074	0.05	12.63	0.63	0.47	0.16	402
Site 2	7862.4	2116.8	423.4	453.6	1.61	41.91	1.03	0.024	0.018	0.260	0.16	44.21	2.21	1.65	0.57	1407



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Table H.2.NFA/NPA.Un.Ts.2040-12.

2040 No Federal Action/No Project Alternative Tesoro Berth Summary of Average Daily Unmitigated Emissions.

Operation	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Tanker Cruising and Manuevering	166,472	13,596	5,646	2,946	2,918	2,603	8,314
Tanker Hoteling	112,433	8,898	3,235	2,257	2,166	1,733	7,370
Offloading Emissions	12,349	2,579	545	1,707	1,195	799	14,529
Transiting Operations	1,417	354	20	234	164	110	1,995
Tug Assistance	19,132	4,780	882	---	839	772	15
Tanks	---	---	3,660	---	---	---	---
Vapor Destruction Units	11,376	3,063	613	---	656	---	2,036
Valves, Flanges, Pumps	---	---	1,188	---	---	---	---
<b>TOTAL</b>	<b>323,179</b>	<b>33,270</b>	<b>15,789</b>	<b>7,144</b>	<b>7,939</b>	<b>6,017</b>	<b>34,259</b>

Operation	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Tanker Cruising and Manuevering	456	37	15	8	8	7	23
Tanker Hoteling	308	24	9	6	6	5	20
Offloading Emissions	34	7	1	5	3	2	40
Transiting Operations	4	1.0	0.05	0.6	0.4	0.30	5
Tug Assistance	52	13	2.4	---	2.3	2.1	0.0
Tanks	---	---	10.0	---	---	---	---
Vapor Destruction Units	31	8	2	---	2	---	6
Valves, Flanges, Pumps	---	---	3	---	---	---	---
<b>TOTAL</b>	<b>885</b>	<b>91</b>	<b>43</b>	<b>20</b>	<b>22</b>	<b>16</b>	<b>94</b>

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Table H.2.NFA/NPA.Un.Max.Ts.2040-1. 2040 No Federal Action/No Project Alternative Tesoro Main Engines Maximum Daily Unmitigated Emissions.

Ship	Direction	Mode	Distance (nautical miles)	Ship speed (knots)	Activity (hours)	Maximum Speed (knots)	Load Factor	MCR (kW)	Energy (kW-hr)	Fuel Type	Maximum Daily Shipcalls (vessels/day)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)	
AFRAMAX	South In	Cruising - CW to VSR	23	12	1.92	16.1	0.414	12,477	9,902	Dist at 0.2	1.0	463	38	16	8	8	7	21	
		Cruising - VSR to PZ	11	12	0.92	16.1	0.414	12,477	4,736	Dist at 0.2	1.0	222	18	8	4	4	3	10	
		Cruising - PZ to Pilot	4.7	7	0.67	16.1	0.082	12,477	689	Dist at 0.2	1.0	32	3	1	1	1	1	1	
		Maneuvering - Pilot to Berth		3	1.00	16.1	0.006	12,477	81	Dist at 0.2	1.0	4	0.3	0.1	0.1	0.1	0.1	0	
	South Out	Maneuvering - Berth to Pilot			5	1.00	16.1	0.030	12,477	374	Dist at 0.2	1.0	17	1	1	0	0	0	1
		Cruising - Pilot to PZ		3.5	7	0.50	16.1	0.082	12,477	513	Dist at 0.2	1.0	24	2	1	0	0	0	1
		Cruising - PZ to VSR		12.5	12	1.04	16.1	0.414	12,477	5,382	Dist at 0.2	1.0	252	21	9	4	4	4	12
		Cruising - VSR to CW		24.5	12	2.04	16.1	0.414	12,477	10,548	Dist at 0.2	1.0	494	41	17	8	8	8	23
		<b>TOTAL</b>											<b>721</b>	<b>59</b>	<b>25</b>	<b>12</b>	<b>12</b>	<b>11</b>	<b>33</b>
													<b>1.0</b>	<b>17</b>	<b>1</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>TOTAL</b>												<b>787</b>	<b>65</b>	<b>28</b>	<b>13</b>	<b>13</b>	<b>12</b>	<b>36</b>	
<b>MAXIMUM</b>												<b>787</b>	<b>65</b>	<b>28</b>	<b>13</b>	<b>13</b>	<b>12</b>	<b>36</b>	



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**Table H.2.NFA/NPA.Un.Max.Ts.2040-2. 2040 No Federal Action/No Project Alternative Tesoro Project Auxiliary Generator Maximum Daily Unmitigated Emissions.**

Ship	Direction	Mode	Activity (hours)	MCR (kW)	Load Factor	Energy (kW-hr)	Fuel Type	Maximum Daily Shipcalls (vessels/day)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)	
AFRAMAX	South In	Cruising	3.50	3,600	0.28	3,528	Dist at 0.2	1.0	135	11	4	3	3	2	9	
		Maneuvering	2.00	3,600	0.28	2,016	Dist at 0.2	1.0	77	6	2	2	2	1	5	
			<b>TOTAL</b>						<b>212</b>	<b>17</b>	<b>6</b>	<b>5</b>	<b>4</b>	<b>4</b>	<b>4</b>	<b>14</b>
	South Out	Maneuvering	1.5	3,600	0.28	1,512	Dist at 0.2	1.0	58	5	2	1	1	1	1	4
		Cruising	3.50	3,600	0.28	3,528	Dist at 0.2	1.0	135	11	4	3	3	3	2	9
			<b>TOTAL</b>						<b>193</b>	<b>15</b>	<b>6</b>	<b>4</b>	<b>4</b>	<b>4</b>	<b>3</b>	<b>13</b>
		<b>MAXIMUM</b>						<b>212</b>	<b>17</b>	<b>6</b>	<b>5</b>	<b>4</b>	<b>4</b>	<b>4</b>	<b>14</b>	

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Table H.2.NFA/NPA.Un.Max.Ts.2040-3. 2040 No Federal Action/No Project Alternative Tesoro Summary of Maximum Daily Unmitigated Vessel Emissions.

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Cruising	Main Engines	770	63	27	13	13	12	35
Cruising	Aux Generator	135	11	4	3	3	2	9
Maneuvering	Main Engines	17	1	1	0	0	0	1
Maneuvering	Aux Generator	77	6	2	2	2	1	5
<b>Maneuvering</b>	<b>TOTAL</b>	<b>95</b>	<b>8</b>	<b>3</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>6</b>

Propulsion TOTAL 999 82 34 18 18 16 50 1216.37

**Table H.2.NFA/NPA.Un.Max.Ts.2040-4. 2040 No Federal Action/No Project Alternative Tesoro Boiler Warm-Up Maximum Daily Unmitigated Emissions.**

Shipcalls (vessels/day)	Vessel Size	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	Dist at 0.2	0.20	102.17	30%	3	50,000	16	4	0.2	3	2	1	23

MAXIMUM      16            4            0            3            2            1            23

Table H.2.NFA/NPA.Un.Max.Ts.2040-5. 2040 No Federal Action/No Project Alternative Tesoro Summary of Boiler Warm-Up Maximum Unmitigated Emissions.

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Boiler Warm-up	Boiler	16	4	0	3	2	1	23

Table H.2.NFA/NPA.Un.Max.Ts.2040-6. 2040 No Federal Action/No Project Alternative Tesoro Berth Operations Maximum Daily Unmitigated Emissions.

**Auxiliary Generator Pre-Pumping**

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	400,000	Dist at 0.2	0.20	3,600	28%	2.5	96	8	3	2	2	2	6
MAXIMUM								96	8	3	2	2	2	6

**Boiler Pre-Pumping**

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	400,000	Dist at 0.2	0.20	102.17	30%	2.5	50,000	14	3	0	2	2	1	19
MAXIMUM									14	3	0	2	2	1	19

**Auxiliary Generator Pumping**

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	400,000	Dist at 0.2	0.20	3,600	56%	15.0	1,157	92	33	25	24	19	76
MAXIMUM								1,157	92	33	25	24	19	76

**Boiler Pumping**

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Inerting Fuel Consumption Savings (lb/1000 bbl offloaded)	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	400,000	Dist at 0.2	0.20	102.17	28.06	15.0	105	26	1	17	12	8	148
MAXIMUM								105	26	1	17	12	8	148

**Auxiliary Generator Post-Pumping**

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	400,000	Dist at 0.2	0.20	3,600	28%	1.0	39	3	1	1	1	1	3
MAXIMUM								39	3	1	1	1	1	3

Table H.2.NFA/NPA.Un.Max.Ts.2040-7. 2040 No Federal Action/No Project Alternative Tesoro Summary of Berth Operations Maximum Daily Unmitigated Emissions.

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Berth Operations	Boiler	119	30	2	20	14	9	167
Berth Operations	Aux Generator	1,292	102	37	28	27	21	85

**Table H.2.NFA/NPA.Un.Max.Ts.2040-8. 2040 No Federal Action/No Project Alternative Tesoro Tug Main Engines Maximum Daily Unmitigated Emissions.**

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Shipcalls (vessels/day)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
AFRAMAX	Maneuvering - Pilot to Berth	1.00	2	4,800	0.50	MGO	1.0	99	25	5	4	4	0
	Maneuvering - Berth to Pilot	1.00	2	4,800	0.50	MGO	1.0	99	25	5	4	4	0
<b>TOTAL</b>								<b>197</b>	<b>49</b>	<b>9</b>	<b>9</b>	<b>8</b>	<b>0</b>
<b>MAXIMUM</b>								<b>197</b>	<b>49</b>	<b>9</b>	<b>9</b>	<b>8</b>	<b>0</b>

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**Table H.2.NFA/NPA.Un.Max.Ts.2040-9. 2040 No Federal Action/No Project Alternative Tesoro Tug Auxiliary Generator Engines Maximum Daily Unmitigated Emissions.**

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Shipcalls (vessels/day)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
AFRAMAX	Maneuvering - Pilot to Berth	1.00	2	300	1.00	MGO	1.0	11	3	0	0	0	0
	Maneuvering - Berth to Pilot	1.00	2	300	1.00	MGO	1.0	11	3	0	0	0	0
<b>TOTAL</b>								<b>22</b>	<b>6</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>0</b>
<b>MAXIMUM</b>								<b>22</b>	<b>6</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>0</b>



Table H.2.NFA/NPA.Un.Max.Ts.2040-10. 2040 No Federal Action/No Project Alternative Tesoro Summary of Tug Maximum Daily Unmitigated Emissions.

Mode	Equipment	Maximum Daily NO <sub>x</sub> Emissions (lb/day)	Maximum Daily CO Emissions (lb/day)	Maximum Daily ROG Emissions (lb/day)	Maximum Daily PM <sub>10</sub> Emissions (lb/day)	Maximum Daily PM <sub>2.5</sub> Emissions (lb/day)	Maximum Daily SO <sub>2</sub> Emissions (lb/day)
Tug Assist	Main Engines	197	49	9	9	8	0
Tug Assist	Aux Generator	22	6	1	1	1	0
<b>TOTAL</b>		<b>220</b>	<b>55</b>	<b>10</b>	<b>10</b>	<b>9</b>	<b>0</b>

Table H.2.NFA/NPA.Un.Max.Ts.2040-11. 2040 No Federal Action/No Project Alternative Tesoro VDU Crude Maximum Daily Unmitigated Emissions.

	Maximum Daily Vessel Calls	crude vapors from tanks(scf/call)	daily gas usage (mmscf/day)	mw crude vapors	destruction efficiency
Aframax	1	224,000	0.2	50	98%
<b>TOTAL</b>	<b>1</b>		<b>0.2</b>		

Assumed Distribution based on tank storage volume:

Site 1 12.5%  
Site 2 87.5%

Maximum Daily Emissions (lb/day)

	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene
EF (lb/MMSCF)	130	35	7	7.5	0.38%	9.90%	0.017	0.0004	0.0003	0.0043	0.0027	0.731	0.0366	0.0272	0.0095
Panamax	14.6	3.9	0.8	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0
<b>MAXIMUM</b>	<b>14.6</b>	<b>3.9</b>	<b>0.8</b>	<b>0.8</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.1</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>

Assumed a ratio of 500/1000 based on the corresponding Btu values with respect to natural gas combustion emission factors.

Maximum Daily Emissions (lb/day)

	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene	SO <sub>x</sub>
Site 1	2	0.5	0.10	0.1	0.000	0.00	0.000	0.0000	0.0000	0.0001	0.0000	0.01	0.001	0.000	0.000	0
Site 2	13	3	0.7	0.7	0.00	0.01	0.002	0.0000	0.0000	0.000	0.000	0.1	0.00	0.00	0.001	2

0.78

**Table H.2.NFA/NPA.Un.Max.Ts.2040-12. 2040 No Federal Action/No Project Alternative Tesoro VDU Legs Maximum Daily Unmitigated Emissions.**

	tanks	crude vapors from tanks on legs(scfd/day)	daily gas usage (mmscf/day)	mw crude vapors	destruction efficiency
Site 1	4	23671.23	0.09	50	98%
Site 2	14	23671.23	0.3	50	98%
<b>TOTAL</b>	<b>18</b>		<b>0.4</b>		

<b>48</b>	<b>hr/event</b>
<b>6</b>	<b>events/yr</b>
<b>500</b>	<b>ft3/min</b>

Maximum Daily Emissions (lb/day)															
	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene
EF (lb/MMSCF)	130	35	7	7.5	0.38%	9.90%	0.017	0.0004	0.0003	0.0043	0.0027	0.731	0.0366	0.0272	0.0095
<b>TOTAL</b>	<b>27.7</b>	<b>7.5</b>	<b>1.5</b>	<b>1.6</b>	<b>0.0</b>	<b>0.1</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.2</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>

*Assumed a ratio of 500/1000 based on the corresponding Btu values with respect to natural gas combustion emission factors.*

Maximum Daily Emissions (lb/day)																
	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene	SO <sub>x</sub>
Site 1	6.2	1.7	0.3	0.4	0.00	0.03	0.00	0.000	0.000	0.000	0.00	0.03	0.00	0.00	0.00	1
Site 2	21.5	5.8	1.2	1.2	0.00	0.11	0.00	0.000	0.000	0.001	0.00	0.12	0.01	0.00	0.00	4



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Table H.2.NFA/NPA.Un.Max.Ts.2040-14.

2040 No Federal Action/No Project Alternative Tesoro Berth Summary of Maximum Daily Unmitigated Emissions.

Scenario	Operation	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Vessel Arrival/Departure	Cruising and maneuvering	999	82	34	18	18	16	50
	Boiler Warm-Up	16	4	0	3	2	1	23
	Tug Assistance	220	55	10	---	10	9	0
	Tanks	---	---	86	---	---	---	---
	Vapor Destruction Units	42.3	11.4	2.3	---	2.4	---	7.6
	Valves, Flanges, Pumps	---	---	3.25	---	---	---	---
	<b>TOTAL</b>	<b>1,278</b>	<b>152</b>	<b>136</b>	<b>21</b>	<b>32</b>	<b>26</b>	<b>81</b>
Vessel Offloading	Tanker Hoteling	1,292	102	37	28	27	21	85
	Offloading	119	30	2	20	14	9	167
	Tanks	---	---	86	---	---	---	---
	Vapor Destruction Units	42.3	11.4	2.3	---	2.4	---	7.6
	Valves, Flanges, Pumps	---	---	3.25	---	---	---	---
	<b>TOTAL</b>	<b>1,453</b>	<b>143</b>	<b>130</b>	<b>48</b>	<b>43</b>	<b>31</b>	<b>259</b>
No Vessel/Empty Berth	Vapor Destruction Units	42.3	11.4	2.3	---	2.4	---	7.6
	Tanks	---	---	86	---	---	---	---
	Valves, Flanges, Pumps	---	---	3.25	---	---	---	---
	<b>TOTAL</b>	<b>42</b>	<b>11</b>	<b>91</b>	<b>0</b>	<b>2</b>	<b>0</b>	<b>8</b>

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Table H.2.NFA/NPA.Un.Ex.2040-1. 2040 No Federal Action/No Project Alternative Exxon Mobil Main Engines Average Daily Unmitigated Emissions.

Ship	Direction	Mode	Distance (nautical miles)	Ship speed (knots)	Activity (hours)	Maximum Speed (knots)	Load Factor	MCR (kW)	Energy (kW-hr)	Fuel Type	Shipcalls (vessels/ yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)		
PANAMAX	South In	Cruising - CW to VSR	23	12	1.92	15.8	0.438	10,300	8,649	Dist at 0.2	146	59,103	4,867	2,086	1,008	1,008	928	2,704		
		Cruising - VSR to PZ	11	12	0.92	15.8	0.438	10,300	4,136	Dist at 0.2	146	28,267	2,328	998	482	482	444	1,293		
		Cruising - PZ to Pilot	4.7	7	0.67	15.8	0.087	10,300	601	Dist at 0.2	146	4,110	338	145	70	70	64	188		
	South Out	Maneuvering - Pilot to Berth			3	1.00	15.8	0.007	10,300	71	Dist at 0.2	146	482	40	17	8	8	8	22	
		Maneuvering - Berth to Pilot			5	1.00	15.8	0.032	10,300	326	Dist at 0.2	146	2,231	184	79	38	38	35	102	
		Cruising - Pilot to PZ			3.5	7	0.50	15.8	0.087	10,300	448	Dist at 0.2	146	3,060	252	108	52	52	48	140
		Cruising - PZ to VSR			12.5	12	1.04	15.8	0.438	10,300	4,700	Dist at 0.2	146	32,121	2,645	1,134	548	548	504	1,470
		Cruising - VSR to CW			24.5	12	2.04	15.8	0.438	10,300	9,213	Dist at 0.2	146	62,958	5,185	2,222	1,074	1,074	988	2,880
		<b>TOTAL</b>											<b>192,332</b>	<b>15,839</b>	<b>6,788</b>	<b>3,281</b>	<b>3,281</b>	<b>3,018</b>	<b>8,800</b>	

Table H.2.NFA/NPA.Un.Ex.2040-2. 2040 No Federal Action/No Project Alternative Exxon Mobil Project Auxiliary Generator Average Daily Unmitigated Emissions.

Ship	Direction	Mode	Activity (hours)	MCR (kW)	Load Factor	Energy (kW-hr)	Fuel Type	Shipcalls (vessels/yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
PANAMAX	South In	Cruising	3.50	3,600	0.28	3,533	Dist at 0.2	146	19,740	1,562	568	396	380	304	1,294
		Maneuvering	2.00	3,600	0.28	2,016	Dist at 0.2	146	11,265	891	324	226	217	174	738
	South Out	Maneuvering	1.5	3,600	0.28	1,512	Dist at 0.2	146	8,448	669	243	170	163	130	554
		Cruising	3.58	3,600	0.28	3,612	Dist at 0.2	146	20,182	1,597	581	405	389	311	1,323
<b>TOTAL</b>									<b>59,635</b>	<b>4,719</b>	<b>1,716</b>	<b>1,197</b>	<b>1,149</b>	<b>919</b>	<b>3,909</b>

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**Table H.2.NFA/NPA.Un.Ex.2040-3. 2040 No Federal Action/No Project Alternative Exxon Mobil Boiler Warm-Up Average Daily Unmitigated Emissions.**

Shipcalls (vessels/yr)	Vessel Size	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
146.0	Panamax	Dist at 0.2	0.20	59.91	30%	3	35,000	976	244	14	162	113	76	1,375
<b>TOTAL</b>								<b>976</b>	<b>244</b>	<b>14</b>	<b>162</b>	<b>113</b>	<b>76</b>	<b>1,375</b>



Table H.2.NFA/NPA.Un.Ex.2040-4. 2040 No Federal Action/No Project Alternative Exxon Mobil Berth Operations Average Daily Unmitigated Emissions.

**Auxiliary Generator Pre-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
146.0	Panamax	300,000	Dist at 0.2	0.20	3,600	28%	2.5	14,081	1,114	405	283	271	217	923

AMP Reduction 70% TOTAL 4,224 334 122 85 81 65 277

**Boiler Pre-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
146.0	Panamax	300,000	Dist at 0.2	0.20	59.91	30%	2.5	35,000	974	203	43	135	94	63	1,145

TOTAL 974 203 43 135 94 63 1,145

**Auxiliary Generator Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
146.0	Panamax	300,000	Dist at 0.2	0.20	3,600	56%	11.0	123,910	9,806	3,566	2,487	2,388	1,910	8,122

AMP Reduction 70% TOTAL 37,173 2,942 1,070 746 716 573 2,437

**Boiler Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Inerting Fuel Consumption Savings (lb/1000 bbl offloaded)	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
146.0	Panamax	300,000	Dist at 0.2	0.20	59.91	28.06	11.0	5,915	1,235	261	818	572	383	6,959

TOTAL 5,915 1,235 261 818 572 383 6,959

**Auxiliary Generator Post-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
146.0	Panamax	300,000	Dist at 0.2	0.20	3,600	28%	1.0	5,632	446	162	113	109	87	369

AMP Reduction 70% TOTAL 1,690 134 49 34 33 26 111

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Table H.2.NFA/NPA.Un.Ex.2040-5. 2040 No Federal Action/No Project Alternative Exxon Mobil Summary of Average Daily Unmitigated Vessel Emissions.

Mode	Equipment	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Cruising	Main Engines	189,620	15,616	6,692	3,235	3,235	2,976	8,675
Cruising	Aux Generator	39,922	3,159	1,149	801	769	615	2,617
Maneuvering	Main Engines	2,712	223	96	46	46	43	124
Maneuvering	Aux Generator	19,713	1,560	567	396	380	304	1,292
Boiler Warm-up	Boiler	976	244	14	162	113	76	1,375
Berth Operations	Boiler	6,889	1,439	304	952	667	446	8,105
Berth Operations	Aux Generator	43,087	3,410	1,240	865	830	664	2,824
Propulsion	TOTAL	251,967	20,558	8,504	4,478	4,430	3,938	12,708
Non-Propulsion	TOTAL	50,952	5,092	1,558	1,979	1,610	1,186	12,303
		302,919	25,651	10,062	6,457	6,040	5,123	25,012

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Cruising	Main Engines	519.5	42.8	18.3	8.9	8.9	8.2	23.8
Cruising	Aux Generator	109.4	8.7	3.1	2.2	2.1	1.7	7.2
Maneuvering	Main Engines	7.4	0.6	0.3	0.1	0.1	0.1	0.3
Maneuvering	Aux Generator	54.0	4.3	1.6	1.1	1.0	0.8	3.5
Boiler Warm-up	Boiler	2.7	0.7	0.0	0.4	0.3	0.2	3.8
Berth Operations	Boiler	18.9	3.9	0.8	2.6	1.8	1.2	22.2
Berth Operations	Aux Generator	118.0	9.3	3.4	2.4	2.3	1.8	7.7
Propulsion	TOTAL	690.3	56.3	23.3	12.3	12.1	10.8	34.8
Non-Propulsion	TOTAL	139.6	14.0	4.3	5.4	4.4	3.2	33.7
Total Emissions		830	70	28	18	17	14	69

**Table H.2.NFA/NPA.Un.Ex.2040-6. 2040 No Federal Action/No Project Alternative Exxon Mobil Tug Main Engines Average Daily Unmitigated Emissions.**

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Shipcalls (vessels/yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
PANAMAX	Maneuvering - Pilot to Berth	1.00	2	4,800	0.50	MGO	146.0	14,413	3,608	675	637	586	12
	Maneuvering - Berth to Pilot	1.00	2	4,800	0.50	MGO	146.0	14,413	3,608	675	637	586	12
<b>TOTAL</b>								<b>28,827</b>	<b>7,216</b>	<b>1,351</b>	<b>1,273</b>	<b>1,172</b>	<b>23</b>

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**Table H.2.NFA/NPA.Un.Ex.2040-7. 2040 No Federal Action/No Project Alternative Exxon Mobil Tug Auxiliary Generator Engines Average Daily Unmitigated Emissions.**

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Shipcalls (vessels/yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
PANAMAX	Maneuvering - Pilot to Berth	1.00	2	300	1.00	MGO	146.0	1,640	403	65	68	62	1
	Maneuvering - Berth to Pilot	1.00	2	300	1.00	MGO	146.0	1,640	403	65	68	62	1
<b>TOTAL</b>								<b>3,280</b>	<b>806</b>	<b>130</b>	<b>135</b>	<b>124</b>	<b>2</b>

**Table H.2.NFA/NPA.Un.Ex.2040-8. 2040 No Federal Action/No Project Alternative Exxon Mobil Summary of Tug Average Daily Unmitigated Emissions.**

Mode	Equipment	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Tug Assist	Main Engines	28,827	7,216	1,351	1,273	1,172	23
Tug Assist	Aux Generator	3,280	806	130	135	124	2
<b>TOTAL</b>		<b>32,107</b>	<b>8,022</b>	<b>1,481</b>	<b>1,409</b>	<b>1,296</b>	<b>25</b>

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Tug Assist	Main Engines	79	19.8	3.7	3.5	3.2	0.1
Tug Assist	Aux Generator	9	2.2	0.4	0.4	0.3	0.0
<b>TOTAL</b>		<b>88</b>	<b>22.0</b>	<b>4.1</b>	<b>3.9</b>	<b>3.6</b>	<b>0.1</b>



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**Table H.2.NFA/NPA.Un.Ex.2040-10. 2040 No Federal Action/No Project Alternative Exxon Mobil VDU Legs Average Daily Unmitigated Emissions.**

	tanks	crude vapors from tanks on legs(sc/yr)	annual gas usage (mmscf/yr)	mw crude vapors	destruction efficiency	48 hr/event 6 events/yr 500 ft3/min
Site 1	4	8640000	34.6	50	98%	
Site 2	14	8640000	121.0	50	98%	
<b>TOTAL</b>	<b>18</b>		<b>155.5</b>			

		Annual Average (lb/yr)														
		NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene
EF (lb/MMSCF)		130	35	7	7.5	0.38%	9.90%	0.017	0.0004	0.0003	0.0043	0.0027	0.731	0.0366	0.0272	0.0095
<b>TOTAL</b>		<b>10108.8</b>	<b>2721.6</b>	<b>544.3</b>	<b>583.2</b>	<b>2.1</b>	<b>53.9</b>	<b>1.3</b>	<b>0.0</b>	<b>0.0</b>	<b>0.3</b>	<b>0.2</b>	<b>56.8</b>	<b>2.8</b>	<b>2.1</b>	<b>0.7</b>

*Assumed a ratio of 500/1000 based on the corresponding Btu values with respect to natural gas combustion emission factors.*

		Annual Average (lb/yr)															
		NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene	SO <sub>x</sub>
Site 1		2246.4	604.8	121.0	129.6	0.46	11.98	0.29	0.007	0.005	0.074	0.05	12.63	0.63	0.47	0.16	402
Site 2		7862.4	2116.8	423.4	453.6	1.61	41.91	1.03	0.024	0.018	0.260	0.16	44.21	2.21	1.65	0.57	1407





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**Table H.2.NFA/NPA.Un.Ex.2040-12.**

**2040 No Federal Action/No Project Alternative Exxon Mobil Berth Summary of Average Daily Unmitigated Emissions.**

<b>Operation</b>	<b>NO<sub>x</sub> Emissions (lb/yr)</b>	<b>CO Emissions (lb/yr)</b>	<b>ROG Emissions (lb/yr)</b>	<b>PM Emissions (lb/yr)</b>	<b>PM<sub>10</sub> Emissions (lb/yr)</b>	<b>PM<sub>2.5</sub> Emissions (lb/yr)</b>	<b>SO<sub>2</sub> Emissions (lb/yr)</b>
Tanker Cruising and Manuevering	251,967	20,558	8,504	4,478	4,430	3,938	12,708
Tanker Hoteling	43,087	3,410	1,240	865	830	664	2,824
Offloading Emissions	6,889	1,439	304	952	667	446	8,105
Transiting Operations	976	244	14	162	113	76	1,375
Tug Assistance	32,107	8,022	1,481	---	1,409	1,296	25
Tanks	---	---	3,660	---	---	---	---
Vapor Destruction Units	11,216	3,020	604	---	647	---	2,007
Valves, Flanges, Pumps	---	---	1,188	---	---	---	---
<b>TOTAL</b>	<b>346,242</b>	<b>36,692</b>	<b>16,995</b>	<b>6,457</b>	<b>8,096</b>	<b>6,419</b>	<b>27,044</b>

<b>Operation</b>	<b>NO<sub>x</sub> Emissions (lb/day)</b>	<b>CO Emissions (lb/day)</b>	<b>ROG Emissions (lb/day)</b>	<b>PM Emissions (lb/day)</b>	<b>PM<sub>10</sub> Emissions (lb/day)</b>	<b>PM<sub>2.5</sub> Emissions (lb/day)</b>	<b>SO<sub>2</sub> Emissions (lb/day)</b>
Tanker Cruising and Manuevering	690	56	23	12	12	11	35
Tanker Hoteling	118	9	3	2	2	2	8
Offloading Emissions	19	4	1	3	2	1	22
Transiting Operations	3	1	0.04	0.4	0.3	0.2	4
Tug Assistance	88	22	4.1	---	3.9	3.6	0.1
Tanks	---	---	10.0	---	---	---	---
Vapor Destruction Units	31	8	2	---	2	---	5
Valves, Flanges, Pumps	---	---	3	---	---	---	---
<b>TOTAL</b>	<b>949</b>	<b>101</b>	<b>47</b>	<b>18</b>	<b>22</b>	<b>18</b>	<b>74</b>

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Table H.2.NFA/NPA.Un.Max.Ex.2040-1. 2040 No Federal Action/No Project Alternative Exxon Mobil Main Engines Maximum Daily Unmitigated Emissions.

Ship	Direction	Mode	Distance (nautical miles)	Ship speed (knots)	Activity (hours)	Maximum Speed (knots)	Load Factor	MCR (kW)	Energy (kW-hr)	Fuel Type	Maximum Daily Shipcalls (vessels/day)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)	
PANAMAX	South In	Cruising - CW to VSR	23	12	1.92	15.8	0.438	10,300	8,649	Dist at 0.2	1.0	405	33	14	7	7	6	19	
		Cruising - VSR to PZ	11	12	0.92	15.8	0.438	10,300	4,136	Dist at 0.2	1.0	194	16	7	3	3	3	9	
		Cruising - PZ to Pilot	4.7	7	0.67	15.8	0.087	10,300	601	Dist at 0.2	1.0	28	2	1	0	0	0	1	
		Maneuvering - Pilot to Berth		3	1.00	15.8	0.007	10,300	71	Dist at 0.2	1.0	3	0.3	0.1	0.1	0.1	0.1	0	
	<b>TOTAL</b>											<b>630</b>	<b>52</b>	<b>22</b>	<b>11</b>	<b>11</b>	<b>10</b>	<b>29</b>	
	South Out	Maneuvering - Berth to Pilot			5	1.00	15.8	0.032	10,300	326	Dist at 0.2	1.0	15	1	1	0	0	0	1
		Cruising - Pilot to PZ	3.5	7	0.50	15.8	0.087	10,300	448	Dist at 0.2	1.0	21	2	1	0	0	0	1	
		Cruising - PZ to VSR	12.5	12	1.04	15.8	0.438	10,300	4,700	Dist at 0.2	1.0	220	18	8	4	4	3	10	
		Cruising - VSR to CW	24.5	12	2.04	15.8	0.438	10,300	9,213	Dist at 0.2	1.0	431	36	15	7	7	7	20	
		<b>TOTAL</b>											<b>687</b>	<b>57</b>	<b>24</b>	<b>12</b>	<b>12</b>	<b>11</b>	<b>31</b>
<b>MAXIMUM</b>											<b>687</b>	<b>57</b>	<b>24</b>	<b>12</b>	<b>12</b>	<b>11</b>	<b>31</b>		

**Table H.2.NFA/NPA.Un.Max.Ex.2040-2. 2040 No Federal Action/No Project Alternative Exxon Mobil Project Auxiliary Generator Maximum Daily Unmitigated Emissions.**

Ship	Direction	Mode	Activity (hours)	MCR (kW)	Load Factor	Energy (kW-hr)	Fuel Type	Maximum Daily Shipcalls (vessels/day)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
PANAMAX	South In	Cruising	3.15	3,600	0.28	3,178	Dist at 0.2	1.0	122	10	3	3	3	2	8
		Maneuvering	2.00	3,600	0.28	2,016	Dist at 0.2	1.0	77	6	2	2	2	1	5
	<b>TOTAL</b>								<b>199</b>	<b>16</b>	<b>6</b>	<b>4</b>	<b>4</b>	<b>3</b>	<b>13</b>
	South Out	Maneuvering	1.5	3,600	0.28	1,512	Dist at 0.2	1.0	58	5	2	1	1	1	4
		Cruising	3.21	3,600	0.28	3,234	Dist at 0.2	1.0	124	10	4	3	3	2	8
	<b>TOTAL</b>								<b>182</b>	<b>14</b>	<b>5</b>	<b>4</b>	<b>4</b>	<b>3</b>	<b>12</b>
<b>MAXIMUM</b>								<b>199</b>	<b>16</b>	<b>6</b>	<b>4</b>	<b>4</b>	<b>3</b>	<b>13</b>	

**Table H.2.NFA/NPA.Un.Max.Ex.2040-3. 2040 No Federal Action/No Project Alternative Exxon Mobil Summary of Maximum Daily Unmitigated Vessel Emissions.**

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Cruising	Main Engines	672	55	24	11	11	11	31
Cruising	Aux Generator	122	10	3	3	3	2	8
Maneuvering	Main Engines	15	1	1	0	0	0	1
Maneuvering	Aux Generator	77	6	2	2	2	1	5
<b>Maneuvering</b>	<b>TOTAL</b>	<b>92</b>	<b>7</b>	<b>3</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>6</b>

**Propulsion TOTAL 886 72 30 16 16 14 44 1079**

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**Table H.2.NFA/NPA.Un.Max.Ex.2040-4. 2040 No Federal Action/No Project Alternative Exxon Mobil Boiler Warm-Up Maximum Daily Unmitigated Emissions.**

Shipcalls (vessels/day)	Vessel Size	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Panamax	Dist at 0.2	0.20	59.91	30%	3	35,000	7	2	0.1	1	1	1	9
MAXIMUM								7	2	0	1	1	1	9

Table H.2.NFA/NPA.Un.Max.Ex.2040-5. 2040 No Federal Action/No Project Alternative Exxon Mobil Summary of Boiler Warm-Up Maximum Unmitigated Emissions.

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Boiler Warm-up	Boiler	7	2	0	1	1	1	9

Table H.2.NFA/NPA.Un.Max.Ex.2040-6. 2040 No Federal Action/No Project Alternative Exxon Mobil Berth Operations Maximum Daily Unmitigated Emissions.

**Auxiliary Generator Pre-Pumping**

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Panamax	300,000	Dist at 0.2	0.20	3,600	28%	2.5	96	8	3	2	2	2	6

AMP Reduction 70%  
**MAXIMUM** 29 2 1 1 1 0.5 2

**Boiler Pre-Pumping**

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Panamax	300,000	Dist at 0.2	0.20	59.91	30%	2.5	35,000	6	1	0	1	1	0	8

**MAXIMUM** 6 1 0 1 1 0 8

**Auxiliary Generator Pumping**

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Panamax	300,000	Dist at 0.2	0.20	3,600	56%	11.0	849	67	24	18	18	14	56

AMP Reduction 70%  
**MAXIMUM** 255 20 7 5 5 4 17

**Boiler Pumping**

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Inerting Fuel Consumption Savings (lb/1000 bbl offloaded)	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Panamax	300,000	Dist at 0.2	0.20	59.91	28.06	11.0	34	8	0	6	4	3	48

**MAXIMUM** 34 8 0 6 4 3 48

**Auxiliary Generator Post-Pumping**

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Panamax	300,000	Dist at 0.2	0.20	3,600	28%	1.0	39	3	1	1	1	1	3

AMP Reduction 70%  
**MAXIMUM** 12 1 0 0 0 0 1

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.NFA/NPA.Un.Max.Ex.2040-7. 2040 No Federal Action/No Project Alternative Exxon Mobil Summary of Berth Operations Maximum Daily Unmitigated Emissions.

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Berth Operations	Boiler	39	10	1	7	5	3	56
Berth Operations	Aux Generator	295	23	8	6	6	5	19



**Table H.2.NFA/NPA.Un.Max.Ex.2040-8. 2040 No Federal Action/No Project Alternative Exxon Mobil Tug Main Engines Maximum Daily Unmitigated Emissions.**

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Shipcalls (vessels/day)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
PANAMAX	Maneuvering - Pilot to Berth	1.00	2	4,800	0.50	MGO	1.0	99	25	5	4	4	0
	Maneuvering - Berth to Pilot	1.00	2	4,800	0.50	MGO	1.0	99	25	5	4	4	0
<b>TOTAL</b>								<b>197</b>	<b>49</b>	<b>9</b>	<b>9</b>	<b>8</b>	<b>0</b>
<b>MAXIMUM</b>								<b>197</b>	<b>49</b>	<b>9</b>	<b>9</b>	<b>8</b>	<b>0</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.NFA/NPA.Un.Max.Ex.2040-9. 2040 No Federal Action/No Project Alternative Exxon Mobil Tug Auxiliary Generator Engines Maximum Daily Unmitigated Emissions.

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Shipcalls (vessels/day)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
PANAMAX	Maneuvering - Pilot to Berth	1.00	2	300	1.00	MGO	1.0	11	3	0	0	0	0
	Maneuvering - Berth to Pilot	1.00	2	300	1.00	MGO	1.0	11	3	0	0	0	0
<b>TOTAL</b>								<b>22</b>	<b>6</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>0</b>
<b>MAXIMUM</b>								<b>22</b>	<b>6</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>0</b>

**Table H.2.NFA/NPA.Un.Max.Ex.2040-10. 2040 No Federal Action/No Project Alternative Exxon Mobil Summary of Tug Maximum Daily Unmitigated Emissions.**

<b>Mode</b>	<b>Equipment</b>	<b>Maximum Daily NO<sub>x</sub> Emissions (lb/day)</b>	<b>Maximum Daily CO Emissions (lb/day)</b>	<b>Maximum Daily ROG Emissions (lb/day)</b>	<b>Maximum Daily PM<sub>10</sub> Emissions (lb/day)</b>	<b>Maximum Daily PM<sub>2.5</sub> Emissions (lb/day)</b>	<b>Maximum Daily SO<sub>2</sub> Emissions (lb/day)</b>
Tug Assist	Main Engines	197	49	9	9	8	0
Tug Assist	Aux Generator	22	6	1	1	1	0
<b>TOTAL</b>		<b>220</b>	<b>55</b>	<b>10</b>	<b>10</b>	<b>9</b>	<b>0</b>

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Table H.2.NFA/NPA.Un.Max.Ex.2040-11. 2040 No Federal Action/No Project Alternative Exxon Mobil VDU Crude Maximum Daily Unmitigated Emissions.

	Maximum Daily Vessel Calls	crude vapors from tanks(scf/call)	daily gas usage (mmscf/day)	mw crude vapors	destruction efficiency
Panamax	1	116,667	0.1	50	98%
<b>TOTAL</b>	<b>1</b>		<b>0.1</b>		

Assumed Distribution based on tank storage volume:	
Site 1	12.5%
Site 2	87.5%

Maximum Daily Emissions (lb/day)

	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene
EF (lb/MMSCF)	130	35	7	7.5	0.38%	9.90%	0.017	0.0004	0.0003	0.0043	0.0027	0.731	0.0366	0.0272	0.0095
Panamax	7.6	2.0	0.4	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>MAXIMUM</b>	<b>7.6</b>	<b>2.0</b>	<b>0.4</b>	<b>0.4</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>

Assumed a ratio of 500/1000 based on the corresponding Btu values with respect to natural gas combustion emission factors.

Maximum Daily Emissions (lb/day)

	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene	SO <sub>x</sub>
Site 1	1	0.3	0.05	0.1	0.000	0.00	0.000	0.0000	0.0000	0.0000	0.0000	0.01	0.000	0.000	0.000	0
Site 2	7	2	0.4	0.4	0.00	0.01	0.001	0.0000	0.0000	0.000	0.000	0.0	0.00	0.00	0.000	1

0.41

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**Table H.2.NFA/NPA.Un.Max.Ex.2040-12. 2040 No Federal Action/No Project Alternative Exxon Mobil VDU Legs Maximum Daily Unmitigated Emissions.**

	tanks	crude vapors from tanks on legs(scfd/day)	daily gas usage (mmscf/day)	mw crude vapors	destruction efficiency		
Site 1	4	23671.23	0.09	50	98%		
Site 2	14	23671.23	0.3	50	98%		
<b>TOTAL</b>	<b>18</b>		<b>0.4</b>				

  

<b>48</b>	<b>hr/event</b>
<b>6</b>	<b>events/yr</b>
<b>500</b>	<b>ft3/min</b>

Maximum Daily Emissions (lb/day)															
	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene
EF (lb/MMSCF)	130	35	7	7.5	0.38%	9.90%	0.017	0.0004	0.0003	0.0043	0.0027	0.731	0.0366	0.0272	0.0095
<b>TOTAL</b>	<b>27.7</b>	<b>7.5</b>	<b>1.5</b>	<b>1.6</b>	<b>0.0</b>	<b>0.1</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.2</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>

*Assumed a ratio of 500/1000 based on the corresponding Btu values with respect to natural gas combustion emission factors.*

Maximum Daily Emissions (lb/day)																
	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene	SO <sub>x</sub>
Site 1	6.2	1.7	0.3	0.4	0.00	0.03	0.00	0.000	0.000	0.000	0.00	0.03	0.00	0.00	0.00	1
Site 2	21.5	5.8	1.2	1.2	0.00	0.11	0.00	0.000	0.000	0.001	0.00	0.12	0.01	0.00	0.00	4



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Table H.2.NFA/NPA.Un.Max.Ex.2040-14.

2040 No Federal Action/No Project Alternative Exxon Mobil Berth Summary of Maximum Daily Unmitigated Emissions.

Scenario	Operation	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Vessel Arrival/Departure	Cruising and maneuvering	886	72	30	16	16	14	44
	Boiler Warm-Up	7	2	0	1	1	1	9
	Tug Assistance	220	55	10	---	10	9	0
	Tanks	---	---	86	---	---	---	---
	Vapor Destruction Units	35.3	9.5	1.9	---	2.0	---	6.3
	Valves, Flanges, Pumps	---	---	3.25	---	---	---	---
	<b>TOTAL</b>	<b>1,148</b>	<b>138</b>	<b>131</b>	<b>17</b>	<b>28</b>	<b>23</b>	<b>60</b>
Vessel Offloading	Tanker Hoteling	295	23	8	6	6	5	19
	Offloading	39	10	1	7	5	3	56
	Tanks	---	---	86	---	---	---	---
	Vapor Destruction Units	35.3	9.5	1.9	---	2.0	---	6.3
	Valves, Flanges, Pumps	---	---	3.25	---	---	---	---
	<b>TOTAL</b>	<b>370</b>	<b>43</b>	<b>100</b>	<b>13</b>	<b>13</b>	<b>8</b>	<b>81</b>
No Vessel/Empty Berth	Vapor Destruction Units	35.3	9.5	1.9	---	2.0	---	6.3
	Tanks	---	---	86	---	---	---	---
	Valves, Flanges, Pumps	---	---	3.25	---	---	---	---
	<b>TOTAL</b>	<b>35</b>	<b>9</b>	<b>91</b>	<b>0</b>	<b>2</b>	<b>0</b>	<b>6</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Un.2010-1. 2010 Reduced Project Alternative Main Engines Average Daily Unmitigated Emissions.

Ship	Direction	Mode	Distance (nautical miles)	Ship speed (knots)	Activity (hours)	Maximum Speed (knots)	Load Factor	MCR (kW)	Energy (kW-hr)	Fuel Type	Shipcalls (vessels/ yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)		
VLCC	North In	Cruising - CW to VSR	22	15.54	1.42	16.9	0.777	25,400	27,957	HFO	26.0	36,225	2,802	1,201	3,122	3,122	2,872	21,014		
		Cruising - VSR to PZ	21	12	1.75	16.9	0.358	25,400	15,913	HFO	26.0	20,619	1,595	683	1,777	1,777	1,635	11,961		
		Cruising - PZ to Pilot	4.7	7	0.67	16.9	0.071	25,400	1,212	HFO	26.0	2,223	342	246	234	234	215	911		
	North Out	Maneuvering - Pilot to Berth	3	1.00	1.00	16.9	0.006	25,400	142	HFO	26.0	2,966	509	1,303	432	432	398	107		
		Maneuvering - Berth to Pilot	5	1.00	1.00	16.9	0.026	25,400	658	HFO	26.0	2,558	509	606	328	328	302	494		
		Cruising - Pilot to PZ	3.8	7	0.54	16.9	0.071	25,400	980	HFO	26.0	1,798	276	199	189	189	174	736		
		Cruising - PZ to VSR	21	12	1.75	16.9	0.358	25,400	15,913	HFO	26.0	20,619	1,595	683	1,777	1,777	1,635	11,961		
		Cruising - VSR to CW	22	15.54	1.42	16.9	0.777	25,400	27,957	HFO	26.0	36,225	2,802	1,201	3,122	3,122	2,872	21,014		
		AFRAMAX	South In	Cruising - CW to VSR	23	14.7	1.56	16.1	0.761	12,477	14,859	HFO	32.0	23,696	1,833	786	2,042	2,042	1,879	13,746
AFRAMAX	South In	Cruising - VSR to PZ	11	12	0.92	16.1	0.414	12,477	4,736	HFO	32.0	7,552	584	250	651	651	599	4,381		
		Cruising - PZ to Pilot	4.7	7	0.67	16.1	0.082	12,477	689	HFO	32.0	1,450	207	138	148	148	136	637		
		Maneuvering - Pilot to Berth	3	1.00	1.00	16.1	0.006	12,477	81	HFO	32.0	1,945	308	733	283	283	260	75		
	South Out	Maneuvering - Berth to Pilot	5	1.00	1.00	16.1	0.030	12,477	374	HFO	32.0	1,738	308	341	222	222	204	346		
		Cruising - Pilot to PZ	3.5	7	0.50	16.1	0.082	12,477	513	HFO	32.0	1,080	154	103	110	110	101	474		
		Cruising - PZ to VSR	12.5	12	1.04	16.1	0.414	12,477	5,382	HFO	32.0	8,582	664	284	740	740	680	4,978		
		Cruising - VSR to CW	24.5	14.7	1.67	16.1	0.761	12,477	15,828	HFO	32.0	25,242	1,952	837	2,176	2,176	2,001	14,643		
		PANAMAX	South In	Cruising - CW to VSR	23	14.7	1.56	15.8	0.805	10,300	12,979	HFO	26	16,816	1,301	557	1,449	1,449	1,333	9,755
		PANAMAX	South In	Cruising - VSR to PZ	11	12	0.92	15.8	0.438	10,300	4,136	HFO	26	5,360	415	178	462	462	425	3,109
Cruising - PZ to Pilot	4.7			7	0.67	15.8	0.087	10,300	601	HFO	26	779	60	26	67	67	62	452		
Maneuvering - Pilot to Berth	3			1.00	1.00	15.8	0.007	10,300	71	HFO	26	91	7	3	8	8	7	53		
South Out	Maneuvering - Berth to Pilot		5	1.00	1.00	15.8	0.032	10,300	326	HFO	26	423	33	14	36	36	34	245		
	Cruising - Pilot to PZ		3.5	7	0.50	15.8	0.087	10,300	448	HFO	26	580	45	19	50	50	46	337		
	Cruising - PZ to VSR		12.5	12	1.04	15.8	0.438	10,300	4,700	HFO	26	6,090	471	202	525	525	483	3,533		
	Cruising - VSR to CW		24.5	14.7	1.67	15.8	0.805	10,300	13,825	HFO	26	17,913	1,386	594	1,544	1,544	1,420	10,392		
	SUEZMAX		North In	Cruising - CW to VSR	22	15.54	1.42	17	0.764	16,000	17,302	HFO	45	38,801	3,001	1,286	3,344	3,344	3,077	22,509
	SUEZMAX		North In	Cruising - VSR to PZ	21	12	1.75	17	0.352	16,000	9,848	HFO	45	22,085	1,708	732	1,903	1,903	1,751	12,812
Cruising - PZ to Pilot		4.7		7	0.67	17	0.070	16,000	750	HFO	45	1,682	130	56	145	145	133	976		
Maneuvering - Pilot to Berth		3		1.00	1.00	17	0.005	16,000	88	HFO	45	197	15	7	17	17	16	114		
North Out		Maneuvering - Berth to Pilot	5	1.00	1.00	17	0.025	16,000	407	HFO	45	913	71	30	79	79	72	530		
		Cruising - Pilot to PZ	3.8	7	0.54	17	0.070	16,000	606	HFO	45	1,360	105	45	117	117	108	789		
		Cruising - PZ to VSR	21	12	1.75	17	0.352	16,000	9,848	HFO	45	22,085	1,708	732	1,903	1,903	1,751	12,812		
		Cruising - VSR to CW	22	15.54	1.42	17	0.764	16,000	17,302	HFO	45	38,801	3,001	1,286	3,344	3,344	3,077	22,509		
		<b>TOTAL</b>												<b>368,494</b>	<b>29,897</b>	<b>15,361</b>	<b>32,347</b>	<b>32,347</b>	<b>29,759</b>	<b>208,406</b>



Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Un.2010-2. 2010 Reduced Project Alternative Auxiliary Generator Average Daily Unmit Emissions

Ship	Direction	Mode	Activity (hours)	MCR (kW)	Load Factor	Energy (kW-hr)	Fuel Type	Shipcalls (vessels/yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
VLCC	North In	Cruising	3.84	3,600	0.278	3,840	HFO	26.0	4,041	302	110	412	396	317	3,381
		Maneuvering	2.00	3,600	0.278	2,002	HFO	26.0	2,106	158	57	215	206	165	1,762
	North Out	Maneuvering	1.50	3,600	0.278	1,501	HFO	26.0	1,580	118	43	161	155	124	1,322
		Cruising	3.71	3,600	0.278	3,712	HFO	26.0	3,906	292	106	399	383	306	3,268
AFRAMAX	South In	Cruising	3.15	3,600	0.278	3,155	HFO	32.0	4,087	306	111	417	400	320	3,419
		Maneuvering	2.00	3,600	0.278	2,002	HFO	32.0	2,592	194	71	265	254	203	2,169
	South Out	Maneuvering	1.50	3,600	0.278	1,501	HFO	32.0	1,944	145	53	198	190	152	1,627
		Cruising	3.21	3,600	0.278	3,211	HFO	32.0	4,159	311	113	424	407	326	3,480
PANAMAX	South In	Cruising	3.15	3,600	0.278	3,155	HFO	26	3,320	248	90	339	325	260	2,778
		Maneuvering	2.00	3,600	0.278	2,002	HFO	26	2,106	158	57	215	206	165	1,762
	South Out	Maneuvering	1.5	3,600	0.278	1,501	HFO	26	1,580	118	43	161	155	124	1,322
		Cruising	3.21	3,600	0.278	3,211	HFO	26	3,379	253	92	345	331	265	2,827
SUEZMAX	North In	Cruising	3.84	3,600	0.278	3,840	HFO	45	6,994	523	190	714	685	548	5,852
		Maneuvering	2.00	3,600	0.278	2,002	HFO	45	3,646	273	99	372	357	286	3,050
	North Out	Maneuvering	1.5	3,600	0.278	1,501	HFO	45	2,734	205	74	279	268	214	2,288
		Cruising	3.71	3,600	0.278	3,712	HFO	45	6,760	506	184	690	662	530	5,656
<b>TOTAL</b>									<b>54,934</b>	<b>4,111</b>	<b>1,495</b>	<b>5,605</b>	<b>5,381</b>	<b>4,305</b>	<b>45,965</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Un.2010-3. 2010 Reduced Project Alternative Boiler Warm-Up Average Daily Unmitigated Emissions.

Shipcalls (vessels/yr)	Vessel Size	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
32.0	Aframax	HFO	2.70	107.96	30%	3	50,000	1,353	122	31	283	243	159	10,470
26.0	VLCC	HFO	2.70	84.93	30%	3	90,000	1,330	141	29	836	719	182	12,046
26.0	Panamax	HFO	2.70	63.30	30%	3	35,000	451	41	10	94	81	53	3,491
45.0	Suezmax	HFO	2.70	87.54	30%	3	70,000	2,160	195	50	452	389	253	16,714
<b>TOTAL</b>								<b>5,295</b>	<b>498</b>	<b>120</b>	<b>1,665</b>	<b>1,432</b>	<b>647</b>	<b>42,721</b>

Table H.2.RPA.Un.2010-4. 2010 Reduced Project Alternative Berth Operations Average Daily Unmitigated Emissions.

Auxiliary Generator Pre-Pumpin

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
32.0	Aframax	700,000	HFO	2.70	3,600	27.8%	2.5	3,240	242	88	331	317	254	2,711
26.0	VLCC	2,000,000	HFO	2.70	3,600	27.8%	2.5	2,633	197	72	269	258	206	2,203
26.0	Panamax	350,000	HFO	2.70	3,600	27.8%	2.5	2,633	197	72	269	258	206	2,203
45.0	Suezmax	1,000,000	HFO	2.70	3,600	27.8%	2.5	4,557	341	124	465	446	357	3,813
TOTAL								13,063	978	355	1,333	1,280	1,024	10,930

Boiler Pre-Pumpin

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
32.0	Aframax	700,000	HFO	2.70	107.96	30.0%	2.5	50,000	1,128	102	26	236	203	132	8,725
26.0	VLCC	2,000,000	HFO	2.70	84.93	30.0%	2.5	90,000	1,108	117	24	697	599	390	10,038
26.0	Panamax	350,000	HFO	2.70	63.30	30.0%	2.5	35,000	376	34	9	79	68	44	2,910
45.0	Suezmax	1,000,000	HFO	2.70	87.54	30.0%	2.5	70,000	1,800	162	41	377	324	211	13,928
TOTAL									4,412	415	100	1,388	1,194	777	35,601

Auxiliary Generator Pumpin

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
32.0	Aframax	700,000	MDO	0.52	3,600	55.6%	15.0	36,789	2,910	1,058	794	762	609	6,266
26.0	VLCC	2,000,000	MDO	0.52	3,600	55.6%	23.2	46,251	3,660	1,331	998	958	767	7,882
26.0	Panamax	350,000	MDO	0.52	3,600	55.6%	11.0	21,908	1,734	630	473	454	363	3,734
45.0	Suezmax	1,000,000	MDO	0.52	3,600	55.6%	15.3	52,741	4,174	1,518	1,138	1,093	874	8,988
TOTAL								157,670	12,478	4,537	3,403	3,267	2,613	26,871

Boiler Pumpin

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Inerting Fuel Consumption Savings (lb/1000 bbl offloaded)	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
32.0	Aframax	700,000	MDO	0.52	102.17	28.06	15.0	5,880	1,470	83	973	681	455	21,532
26.0	VLCC	2,000,000	MDO	0.52	80.38	28.06	23.2	11,536	2,409	509	1,595	1,116	746	35,286
26.0	Panamax	350,000	MDO	0.52	59.91	28.06	11.0	1,027	257	14	170	119	80	3,759
45.0	Suezmax	1,000,000	MDO	0.52	82.85	28.06	15.3	8,733	2,183	123	1,445	1,012	676	31,979
TOTAL								27,175	6,319	729	4,183	2,928	1,958	92,558

Auxiliary Generator Post-Pumpin

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
32.0	Aframax	700,000	HFO	2.70	3,600	27.8%	1.0	1,296	97	35	132	127	102	1,085
26.0	VLCC	2,000,000	HFO	2.70	3,600	27.8%	1.0	1,053	79	29	107	103	83	881
26.0	Panamax	350,000	HFO	2.70	3,600	27.8%	1.0	1,053	79	29	107	103	83	881
45.0	Suezmax	1,000,000	HFO	2.70	3,600	27.8%	1.0	1,823	136	50	186	179	143	1,525
TOTAL								5,225	391	142	533	512	409	4,372

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Un.2010-5. 2010 Reduced Project Alternative Summary of Average Daily Unmitigated Vessel Emissions.

Mode	Equipment	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Cruising	Main Engines	357,663	28,137	12,325	30,942	30,942	28,466	206,442
Cruising	Aux Generator	36,645	2,742	997	3,739	3,590	2,872	30,662
Maneuvering	Main Engines	10,831	1,760	3,037	1,405	1,405	1,293	1,964
Maneuvering	Aux Generator	18,288	1,369	498	1,866	1,792	1,433	15,303
Boiler Warm-up	Boiler	5,295	498	120	1,665	1,432	647	42,721
Berth Operations	Boiler	31,587	6,734	829	5,571	4,122	2,735	128,158
Berth Operations	Aux Generator	175,959	13,846	5,035	5,269	5,058	4,047	42,173
Propulsion	TOTAL	423,427	34,008	16,856	37,952	37,728	34,064	254,371
Non-Propulsion	TOTAL	212,841	21,079	5,984	12,505	10,612	7,429	213,053
<b>Total Emissions</b>		636,268	55,086	22,840	50,458	48,340	41,493	467,424

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Cruising	Main Engines	979.9	77.1	33.8	84.8	84.8	78.0	565.6
Cruising	Aux Generator	100.4	7.5	2.7	10.2	9.8	7.9	84.0
Maneuvering	Main Engines	29.7	4.8	8.3	3.8	3.8	3.5	5.4
Maneuvering	Aux Generator	50.1	3.7	1.4	5.1	4.9	3.9	41.9
Boiler Warm-up	Boiler	14.5	1.4	0.3	4.6	3.9	1.8	117.0
Berth Operations	Boiler	86.5	18.4	2.3	15.3	11.3	7.5	351.1
Berth Operations	Aux Generator	482.1	37.9	13.8	14.4	13.9	11.1	115.5
Propulsion	TOTAL	1,160.1	93.2	46.2	104.0	103.4	93.3	696.9
Non-Propulsion	TOTAL	583.1	57.7	16.4	34.3	29.1	20.4	583.7
<b>Total Emissions</b>		1,743	151	63	138	132	114	1,281

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Un.2010-6. 2010 Reduced Project Alternative Tug Main Engines Average Daily Unmitigated Emissions.

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Shipcalls (vessels/yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
VLCC	Maneuvering - Pilot to Berth	1.00	4	4,800	0.50	MGO	26.0	8,075	1,285	254	330	303	4
	Maneuvering - Berth to Pilot	1.00	2	4,800	0.50	MGO	26.0	4,037	643	127	165	152	2
AFRAMAX	Maneuvering - Pilot to Berth	1.00	2	4,800	0.50	MGO	32.0	4,969	791	156	203	187	3
	Maneuvering - Berth to Pilc	1.00	2	4,800	0.50	MGO	32.0	4,969	791	156	203	187	3
PANAMAX	Maneuvering - Pilot to Berth	1.00	2	4,800	0.50	MGO	26.0	4,037	643	127	165	152	2
	Maneuvering - Berth to Pilot	1.00	2	4,800	0.50	MGO	26.0	4,037	643	127	165	152	2
SUEZMAX	Maneuvering - Pilot to Berth	1.00	3	4,800	0.50	MGO	45.0	10,482	1,668	330	428	394	5
	Maneuvering - Berth to Pilc	1.00	2	4,800	0.50	MGO	45.0	6,988	1,112	220	285	263	4
<b>TOTAL</b>								<b>47,595</b>	<b>7,575</b>	<b>1,499</b>	<b>1,944</b>	<b>1,789</b>	<b>24</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Un.2010-7. 2010 Reduced Project Alternative Tug Auxiliary Generator Engines Average Daily Unmitigated Emissions.

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Shipcalls (vessels/yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
VLCC	Maneuvering - Pilot to Berth	1.00	4	300	1.00	MGO	26.0	828	143	23	39	36	0
	Maneuvering - Berth to Pilot	1.00	2	300	1.00	MGO	26.0	414	72	12	19	18	0
AFRAMAX	Maneuvering - Pilot to Berth	1.00	2	300	1.00	MGO	32.0	510	88	14	24	22	0
	Maneuvering - Berth to Pilo	1.00	2	300	1.00	MGO	32.0	510	88	14	24	22	0
PANAMAX	Maneuvering - Pilot to Berth	1.00	2	300	1.00	MGO	26.0	414	72	12	19	18	0
	Maneuvering - Berth to Pilot	1.00	2	300	1.00	MGO	26.0	414	72	12	19	18	0
SUEZMAX	Maneuvering - Pilot to Berth	1.00	3	300	1.00	MGO	45.0	1,075	186	30	50	46	0
	Maneuvering - Berth to Pilo	1.00	2	300	1.00	MGO	45.0	717	124	20	33	31	0
<b>TOTAL</b>								<b>4,881</b>	<b>846</b>	<b>137</b>	<b>228</b>	<b>210</b>	<b>2</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Un.2010-8. 2010 Reduced Project Alternative Summary of Tug Average Daily Unmitigated Emissions.

Mode	Equipment	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Tug Assist	Main Engines	47,595	7,575	1,499	1,944	1,789	24
Tug Assist	Aux Generator	4,881	846	137	228	210	2

**TOTAL            52,476            8,420            1,635            2,172            1,998            26**

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Tug Assist	Main Engines	130	20.8	4.1	5.3	4.9	0.1
Tug Assist	Aux Generator	13	2.3	0.4	0.6	0.6	0.0

**TOTAL            144            23.1            4.5            6.0            5.5            0.1**

Table H.2.RPA.Un.2010-9. 2010 Reduced Project Alternative VDU Crude Average Daily Unmitigated Emissions.

	Annual Vessel Calls	crude vapors from tanks(scf/call)	annual gas usage (mmscf/yr)	mw crude vapors	destruction efficiency
Aframax	32	224000	7.2	50	98%
VLCC	26	596,313	15.5	50	98%
Panamax	26	116,667	3.0	50	98%
Suezmax	45	333,333	15.0	50	98%
<b>TOTAL</b>	<b>129</b>		<b>40.7</b>		

<b>Assumed Distribution based on tank storage volume:</b>	
<b>Site 1</b>	<b>12.5%</b>
<b>Site 2</b>	<b>87.5%</b>

Annual Average (lb/yr)

	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene
EF (lb/MMSCF)	130	35	7	7.5	0.38%	9.90%	0.017	0.0004	0.0003	0.0043	0.0027	0.731	0.0366	0.0272	0.0095
Aframax	465.9	125.4	25.1	26.9	0.10	2.48	0.1	0.001	0.001	0.015	0.010	2.6	0.1	0.1	0.0
VLCC	1007.8	271.3	54.3	58.1	0.21	5.37	0.1	0.003	0.002	0.033	0.021	5.7	0.3	0.2	0.1
Panamax	197.2	53.1	10.6	11.4	0.0	0.2	0.0	0.0	0.0	0.0	0.0	1.1	0.1	0.0	0.0
Suezmax	975.0	262.5	52.5	56.2	0.0	0.7	0.1	0.0	0.0	0.0	0.0	5.5	0.3	0.2	0.1
<b>TOTAL</b>	<b>2645.9</b>	<b>712.3</b>	<b>142.5</b>	<b>152.6</b>	<b>0.3</b>	<b>8.7</b>	<b>0.3</b>	<b>0.0</b>	<b>0.0</b>	<b>0.1</b>	<b>0.1</b>	<b>14.9</b>	<b>0.7</b>	<b>0.6</b>	<b>0.2</b>

Assumed a ratio of 500/1000 based on the corresponding Btu values with respect to natural gas combustion emission factors.

Annual Average (lb/yr)

	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene	SO <sub>x</sub>
Site 1	331	89.0	17.81	19.1	0.042	1.09	0.043	0.0010	0.0008	0.0109	0.0069	1.86	0.093	0.069	0.024	59
Site 2	2315	623	124.7	133.6	0.29	7.65	0.303	0.0071	0.0053	0.077	0.048	13.0	0.65	0.48	0.169	414

142.47



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Table H.2.RPA.Un.2010-10. 2010 Reduced Project Alternative VDU Legs Average Daily Unmitigated Emissions.

	tanks	crude vapors from tanks on legs(scf/yr)	annual gas usage (mmscf/yr)	mw crude vapors	destruction efficiency
Site 1	2	8640000	17.3	50	98%
Site 2	14	8640000	121.0	50	98%
<b>TOTAL</b>	<b>16</b>		<b>138.2</b>		

<b>48</b>	<b>hr/event</b>
<b>6</b>	<b>events/yr</b>
<b>500</b>	<b>ft3/min</b>

		Annual Average (lb/yr)													
	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene
EF (lb/MMSCF)	130	35	7	7.5	0.38%	9.90%	0.017	0.0004	0.0003	0.0043	0.0027	0.731	0.0366	0.0272	0.0095
<b>TOTAL</b>	<b>8985.6</b>	<b>2419.2</b>	<b>483.8</b>	<b>518.4</b>	<b>1.8</b>	<b>47.9</b>	<b>1.2</b>	<b>0.0</b>	<b>0.0</b>	<b>0.3</b>	<b>0.2</b>	<b>50.5</b>	<b>2.5</b>	<b>1.9</b>	<b>0.7</b>

Assumed a ratio of 500/1000 based on the corresponding Btu values with respect to natural gas combustion emission factors.

		Annual Average (lb/yr)														
	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene	SO <sub>x</sub>
Site 1	1123.2	302.4	60.5	64.8	0.23	5.99	0.15	0.003	0.003	0.037	0.02	6.32	0.32	0.24	0.08	201
Site 2	7862.4	2116.8	423.4	453.6	1.61	41.91	1.03	0.024	0.018	0.260	0.16	44.21	2.21	1.65	0.57	1407



Table H.2.RPA.Un.Bar.2010-1. 2010 Reduced Project Alternative Main Engines Average Daily Unmitigated Emissions from Barge Fuel Deliveries for OGV.

Ship	Direction	Mode	Distance (nautical miles)	Ship speed (knots)	Activity (hours)	Maximum Speed (knots)	Load Factor	MCR (kW)	Energy (kW-hr)	Fuel Type	Shipcalls (vessels/ yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Barge	North In	Volpak to Berth 408	5	3	1.67	3	0.50	4,800	4,000.00	MGO	6.0	872	73	33	48	48	48	54
Barge	North Out	Volpak to Berth 408	5	3	1.67	3.0	0.50	4,800	4,000.00	MGO	6.0	872	73	33	48	48	48	54
<b>TOTAL</b>												<b>1,744</b>	<b>145</b>	<b>66</b>	<b>95</b>	<b>95</b>	<b>95</b>	<b>107</b>

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Table H.2.RPA.Un.Bar.2010-2. 2010 Reduced Project Alternative Tug Main Engines Average Daily Unmitigated Emissions from Barge Fuel Deliveries for OGV.

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Shipcalls (vessels/yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Barge	Maneuvering - Pilot to Berth	1.00	1	4,800	0.50	MGO	6.0	523	44	20	29	26	32
	Maneuvering - Berth to Pilot	1.00	1	4,800	0.50	MGO	6.0	523	44	20	29	26	32
TOTAL								1,047	87	40	57	53	64

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Table H.2.RPA.Un.Bar.2010-3. 2010 Reduced Project Alternative Tug Auxiliary Generator Engines Average Daily Unmitigated Emissions from Barge Fuel Deliveries for OGV.

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Shipcalls (vessels/yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Barge	Maneuvering - Pilot to Berth	1.00	1	300	1.00	MGO	6.0	50	8	1	2	2	4
	Maneuvering - Berth to Pilot	1.00	1	300	1.00	MGO	6.0	50	8	1	2	2	4
<b>TOTAL</b>								<b>99</b>	<b>17</b>	<b>3</b>	<b>4</b>	<b>4</b>	<b>8</b>

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Table H.2.RPA.Un.Bar.2010-4. 2010 Reduced Project Alternative Summary of Tug Average Daily Unmitigated Emissions from Barge Fuel Deliveries for OGV.

Mode	Equipment	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Tug Assist	Main Engines	1,047	87	40	57	53	64
Tug Assist	Aux Generator	99	17	3	4	4	8
<b>TOTAL</b>		<b>1,146</b>	<b>104</b>	<b>42</b>	<b>61</b>	<b>56</b>	<b>72</b>

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Tug Assist	Main Engines	3	0.2	0.1	0.2	0.1	0.2
Tug Assist	Aux Generator	0.27	0.05	0.01	0.01	0.01	0.02
<b>TOTAL</b>		<b>3</b>	<b>0.3</b>	<b>0.1</b>	<b>0.2</b>	<b>0.2</b>	<b>0.2</b>

Table H.2.RPA.Un.Bar.2010-5. 2010 Reduced Project Alternative Summary of Average Daily Unmitigated Vessel Emissions from Barge Fuel Deliveries for OGV.

Operation	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Barge	1,744	145	66	95	95	107
Tug Assistance	1,146	104	42	61	56	72
<b>TOTAL</b>	<b>2,890</b>	<b>249</b>	<b>108</b>	<b>156</b>	<b>151</b>	<b>179</b>

Operation	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Barge	4.78	0.40	0.18	0.26	0.26	0.29
Tug Assistance	3.14	0.29	0.12	0.17	0.15	0.20
<b>TOTAL</b>	<b>7.92</b>	<b>0.68</b>	<b>0.30</b>	<b>0.43</b>	<b>0.41</b>	<b>0.49</b>

Table H.2.RPA.Un.Max.2010-1. 2010 Reduced Project Alternative Main Engines Maximum Daily Unmitigated Emissions.

Ship	Direction	Mode	Distance (nautical miles)	Ship speed (knots)	Activity (hours)	Maximum Speed (knots)	Load Factor	MCR (KW)	Energy (kW-hr)	Fuel Type	Maximum Daily Shipcalls (vessels/day)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
VLCC	North In	Cruising - CW to VSR	22	15.54	1.42	16.9	0.777	25,400	27,957	HFO	1.0	1,393	108	46	120	120	110	808
		Cruising - VSR to PZ	21	12	1.75	16.9	0.358	25,400	15,913	HFO	1.0	793	61	26	68	68	63	460
		Cruising - PZ to Pilot	4.7	7	0.67	16.9	0.071	25,400	1,212	HFO	1.0	86	13	9	9	9	8	35
	North Out	Maneuvering - Pilot to Berth	3	1.00	16.9	0.006	25,400	142	HFO	1.0	114	20	50	17	17	15	4	4
		Maneuvering - Berth to Pilot	5	1.00	16.9	0.026	25,400	658	HFO	1.0	98	20	23	13	13	12	19	19
		Cruising - Pilot to PZ	3.8	7	0.54	16.9	0.071	25,400	980	HFO	1.0	69	11	8	7	7	7	28
		Cruising - PZ to VSR	21	12	1.75	16.9	0.358	25,400	15,913	HFO	1.0	793	61	26	68	68	63	460
		Cruising - VSR to CW	22	15.54	1.42	16.9	0.777	25,400	27,957	HFO	1.0	1,393	108	46	120	120	110	808
		<b>TOTAL</b>											<b>4,740</b>	<b>401</b>	<b>235</b>	<b>422</b>	<b>422</b>	<b>389</b>
AFRAMAX	South In	Cruising - CW to VSR	23	14.7	1.56	16.1	0.761	12,477	14,859	HFO	1.0	741	57	25	64	64	59	430
		Cruising - VSR to PZ	11	12	0.92	16.1	0.414	12,477	4,736	HFO	1.0	236	18	8	20	20	19	137
		Cruising - PZ to Pilot	4.7	7	0.67	16.1	0.082	12,477	689	HFO	1.0	45	6	4	5	5	4	20
	South Out	Maneuvering - Pilot to Berth	3	1.00	16.1	0.006	12,477	81	HFO	1.0	61	10	23	9	9	8	2	2
		Maneuvering - Berth to Pilot	5	1.00	16.1	0.030	12,477	374	HFO	1.0	54	10	11	7	7	6	11	11
		Cruising - Pilot to PZ	3.5	7	0.50	16.1	0.082	12,477	513	HFO	1.0	34	5	3	3	3	3	15
		Cruising - PZ to VSR	12.5	12	1.04	16.1	0.414	12,477	5,382	HFO	1.0	268	21	9	23	23	21	156
		Cruising - VSR to CW	24.5	14.7	1.67	16.1	0.761	12,477	15,828	HFO	1.0	799	61	26	68	68	63	458
		<b>TOTAL</b>											<b>2,228</b>	<b>188</b>	<b>108</b>	<b>199</b>	<b>199</b>	<b>183</b>
PANAMAX	South In	Cruising - CW to VSR	23	14.7	1.56	15.8	0.805	10,300	12,979	HFO	1.0	647	50	21	56	56	51	375
		Cruising - VSR to PZ	11	12	0.92	15.8	0.438	10,300	4,136	HFO	1.0	206	16	7	18	18	16	120
		Cruising - PZ to Pilot	4.7	7	0.67	15.8	0.087	10,300	601	HFO	1.0	30	2	1	3	3	2	17
	South Out	Maneuvering - Pilot to Berth	3	1.00	15.8	0.007	10,300	71	HFO	1.0	4	0.3	0.1	0.3	0.3	0.3	2	2
		Maneuvering - Berth to Pilot	5	1.00	15.8	0.032	10,300	326	HFO	1.0	16	1	1	1	1	1	9	9
		Cruising - Pilot to PZ	3.5	7	0.50	15.8	0.087	10,300	448	HFO	1.0	22	2	1	2	2	2	13
		Cruising - PZ to VSR	12.5	12	1.04	15.8	0.438	10,300	4,700	HFO	1.0	234	18	8	20	20	19	136
		Cruising - VSR to CW	24.5	14.7	1.67	15.8	0.805	10,300	13,825	HFO	1.0	689	53	23	59	59	55	400
		<b>TOTAL</b>											<b>1,848</b>	<b>143</b>	<b>61</b>	<b>159</b>	<b>159</b>	<b>147</b>
SUEZMAX	North In	Cruising - CW to VSR	22	15.54	1.42	17	0.764	16,000	17,302	HFO	1.0	862	67	29	74	74	68	500
		Cruising - VSR to PZ	21	12	1.75	17	0.352	16,000	9,848	HFO	1.0	491	38	16	42	42	39	285
		Cruising - PZ to Pilot	4.7	7	0.67	17	0.070	16,000	750	HFO	1.0	37	3	1	3	3	3	22
	North Out	Maneuvering - Pilot to Berth	3	1.00	17	0.005	16,000	88	HFO	1.0	4	0.3	0.1	0	0.4	0.3	3	3
		Maneuvering - Berth to Pilot	5	1.00	17	0.025	16,000	407	HFO	1.0	20	2	1	2	2	2	12	12
		Cruising - Pilot to PZ	3.8	7	0.54	17	0.070	16,000	606	HFO	1.0	30	2	1	3	3	2	18
		Cruising - PZ to VSR	21	12	1.75	17	0.352	16,000	9,848	HFO	1.0	491	38	16	42	42	39	285
		Cruising - VSR to CW	22	15.54	1.42	17	0.764	16,000	17,302	HFO	1.0	862	67	29	74	74	68	500
		<b>TOTAL</b>											<b>2,798</b>	<b>216</b>	<b>93</b>	<b>241</b>	<b>241</b>	<b>222</b>
<b>MAXIMUM</b>												<b>4,740</b>	<b>401</b>	<b>235</b>	<b>422</b>	<b>422</b>	<b>389</b>	<b>2,623</b>



Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Un.Max.2010-2. 2010 Reduced Project Alternative Auxiliary Generator Maximum Daily Unmit Emissions

Ship	Direction	Mode	Activity (hours)	MCR (kW)	Load Factor	Energy (kW-hr)	Fuel Type	Maximum Daily Shipcalls (vessels/day)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
VLCC	North In	Cruising	3.84	3,600	0.278	3,840	HFO	1.0	155	12	4	16	15	12	130
		Maneuvering	2.00	3,600	0.278	2,002	HFO	1.0	81	6	2	8	8	6	68
	North Out	Maneuvering	1.50	3,600	0.278	1,501	HFO	1.0	61	5	2	6	6	5	51
		Cruising	3.71	3,600	0.278	3,712	HFO	1.0	150	11	4	15	15	12	126
<b>TOTAL</b>								<b>447</b>	<b>33</b>	<b>12</b>	<b>46</b>	<b>44</b>	<b>35</b>	<b>374</b>	
AFRAMAX	South In	Cruising	3.15	3,600	0.278	3,155	HFO	1.0	128	10	3	13	13	10	107
		Maneuvering	2.00	3,600	0.278	2,002	HFO	1.0	81	6	2	8	8	6	68
	South Out	Maneuvering	1.50	3,600	0.278	1,501	HFO	1.0	61	5	2	6	6	5	51
		Cruising	3.21	3,600	0.278	3,211	HFO	1.0	130	10	4	13	13	10	109
<b>TOTAL</b>								<b>399</b>	<b>30</b>	<b>11</b>	<b>41</b>	<b>39</b>	<b>31</b>	<b>334</b>	
PANAMAX	South In	Cruising	3.15	3,600	0.278	3,155	HFO	1.0	128	10	3	13	13	10	107
		Maneuvering	2.00	3,600	0.278	2,002	HFO	1.0	81	6	2	8	8	6	68
	South Out	Maneuvering	1.5	3,600	0.278	1,501	HFO	1.0	61	5	2	6	6	5	51
		Cruising	3.21	3,600	0.278	3,211	HFO	1.0	130	10	4	13	13	10	109
<b>TOTAL</b>								<b>399</b>	<b>30</b>	<b>11</b>	<b>41</b>	<b>39</b>	<b>31</b>	<b>334</b>	
SUEZMAX	North In	Cruising	3.84	3,600	0.278	3,840	HFO	1.0	155	12	4	16	15	12	130
		Maneuvering	2.00	3,600	0.278	2,002	HFO	1.0	81	6	2	8	8	6	68
	North Out	Maneuvering	1.5	3,600	0.278	1,501	HFO	1.0	61	5	2	6	6	5	51
		Cruising	3.71	3,600	0.278	3,712	HFO	1.0	150	11	4	15	15	12	126
<b>TOTAL</b>								<b>447</b>	<b>33</b>	<b>12</b>	<b>46</b>	<b>44</b>	<b>35</b>	<b>374</b>	
<b>MAXIMUM</b>								<b>447</b>	<b>33</b>	<b>12</b>	<b>46</b>	<b>44</b>	<b>35</b>	<b>374</b>	

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Un.Max.2010-3. Reduced Project Alternative Summary of Maximum Daily Unmitigated Vessel Emissions.

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Cruising	Main Engines	4,527	362	162	393	393	362	2,600
Cruising	Aux Generator	306	23	8	31	30	24	256
Maneuvering	Main Engines	212	39	73	29	29	27	23
Maneuvering	Aux Generator	142	11	4	14	14	11	119
<b>Cruising and Maneuvering</b>	<b>TOTAL</b>	<b>5,187</b>	<b>435</b>	<b>248</b>	<b>468</b>	<b>466</b>	<b>424</b>	<b>2,997</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Un.Max.2010-4. 2010 Reduced Project Alternative Boiler Warm-Up Maximum Daily Unmitigated Emissions.

Shipcalls (vessels/day)	Vessel Size	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	HFO	2.70	107.96	30%	3	50,000	42	4	1	9	8	5	327
1.0	VLCC	HFO	2.70	84.93	30%	3	90,000	51	5	1	32	28	18	463
1.0	Panamax	HFO	2.70	63.30	30%	3	35,000	17	2	0.4	4	3	2	134
1.0	Suezmax	HFO	2.70	87.54	30%	3	70,000	48	4	1	10	9	6	371
<b>MAXIMUM</b>								<b>51</b>	<b>5</b>	<b>1</b>	<b>32</b>	<b>28</b>	<b>18</b>	<b>463</b>

Table H.2.RPA.Un.Max.2010-5. 2010 Reduced Project Alternative Summary of Boiler Warm-Up Maximum Unmitigated Emissions.

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Boiler Warm-up	Boiler	51	5	1	32	28	18	463

Table H.2.RPA.Un.Max.2010-6. 2010 Reduced Project Alternative Berth Operations Maximum Daily Unmitigated Emissions.

Auxiliary Generator Pre-Pumpin

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	700,000	HFO	2.70	3,600	27.8%	2.5	101	8	3	10	10	8	85
1.0	VLCC	2,000,000	HFO	2.70	3,600	27.8%	2.5	101	8	3	10	10	8	85
1.0	Panamax	350,000	HFO	2.70	3,600	27.8%	2.5	101	8	3	10	10	8	85
1.0	Suezmax	1,000,000	HFO	2.70	3,600	27.8%	2.5	101	8	3	10	10	8	85
MAXIMUM								101	8	3	10	10	8	85

Boiler Pre-Pumpin

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	700,000	HFO	2.70	107.96	30.0%	2.5	50,000	35	3	1	7	6	4	273
1.0	VLCC	2,000,000	HFO	2.70	84.93	30.0%	2.5	90,000	43	5	1	27	23	15	386
1.0	Panamax	350,000	HFO	2.70	63.30	30.0%	2.5	35,000	14	1	0	3	3	2	112
1.0	Suezmax	1,000,000	HFO	2.70	87.54	30.0%	2.5	70,000	40	4	1	8	7	5	310
MAXIMUM									43	5	1	27	23	15	386

Auxiliary Generator Pumpin

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	700,000	MDO	0.52	3,600	55.6%	15.0	1,149	91	33	25	24	19	196
1.0	VLCC	2,000,000	MDO	0.52	3,600	55.6%	23.2	1,777	141	51	38	37	29	303
1.0	Panamax	350,000	MDO	0.52	3,600	55.6%	11.0	843	67	24	18	17	14	144
1.0	Suezmax	1,000,000	MDO	0.52	3,600	55.6%	15.3	1,172	93	34	25	24	19	200
MAXIMUM								1,777	141	51	38	37	29	303

Boiler Pumpin

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Inerting Fuel Consumption Savings (lb/1000 bbl offloaded)	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	700,000	MDO	0.52	102.17	28.06	15.0	184	46	3	30	21	14	673
1.0	VLCC	2,000,000	MDO	0.52	80.38	28.06	23.2	444	93	20	61	43	29	1,357
1.0	Panamax	350,000	MDO	0.52	59.91	28.06	11.0	39	10	1	7	5	3	145
1.0	Suezmax	1,000,000	MDO	0.52	82.85	28.06	15.3	194	49	3	32	22	15	711
MAXIMUM								444	93	20	61	43	29	1,357

Auxiliary Generator Post-Pumpin

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	700,000	HFO	2.70	3,600	27.8%	1.0	41	3	1	4	4	3	34
1.0	VLCC	2,000,000	HFO	2.70	3,600	27.8%	1.0	41	3	1	4	4	3	34
1.0	Panamax	350,000	HFO	2.70	3,600	27.8%	1.0	41	3	1	4	4	3	34
1.0	Suezmax	1,000,000	HFO	2.70	3,600	27.8%	1.0	41	3	1	4	4	3	34
MAXIMUM								41	3	1	4	4	3	34

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Un.Max.2010-7. 2010 Reduced Project Alternative Summary of Berth Operations Maximum Daily Unmitigated Emissions.

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Berth Operations	Boiler	486	97	21	88	66	44	1,743
Berth Operations	Aux Generator	1,919	151	55	53	51	41	422

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Un.Max.2010-8. 2010 Reduced Project Alternative Tug Main Engines Maximum Daily Unmitigated Emissions.

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Shipcalls (vessels/day)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
VLCC	Maneuvering - Pilot to Berth	1.00	4	4,800	0.50	MGO	1.0	311	49	10	13	12	0
	Maneuvering - Berth to Pilot	1.00	2	4,800	0.50	MGO	1.0	155	25	5	6	6	0
							<b>TOTAL</b>	<b>466</b>	<b>74</b>	<b>15</b>	<b>19</b>	<b>18</b>	<b>0</b>
AFRAMAX	Maneuvering - Pilot to Berth	1.00	2	4,800	0.50	MGO	1.0	155	25	5	6	6	0
	Maneuvering - Berth to Pilot	1.00	2	4,800	0.50	MGO	1.0	155	25	5	6	6	0
							<b>TOTAL</b>	<b>311</b>	<b>49</b>	<b>10</b>	<b>13</b>	<b>12</b>	<b>0</b>
PANAMAX	Maneuvering - Pilot to Berth	1.00	2	4,800	0.50	MGO	1.0	155	25	5	6	6	0
	Maneuvering - Berth to Pilot	1.00	2	4,800	0.50	MGO	1.0	155	25	5	6	6	0
							<b>TOTAL</b>	<b>311</b>	<b>49</b>	<b>10</b>	<b>13</b>	<b>12</b>	<b>0</b>
SUEZMAX	Maneuvering - Pilot to Berth	1.00	3	4,800	0.50	MGO	1.0	233	37	7	10	9	0
	Maneuvering - Berth to Pilot	1.00	2	4,800	0.50	MGO	1.0	155	25	5	6	6	0
							<b>TOTAL</b>	<b>388</b>	<b>62</b>	<b>12</b>	<b>16</b>	<b>15</b>	<b>0</b>
							<b>MAXIMUM</b>	<b>466</b>	<b>74</b>	<b>15</b>	<b>19</b>	<b>18</b>	<b>0</b>

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Table H.2.RPA.Un.Max.2010-9. 2010 Reduced Project Alternative Tug Auxiliary Generator Engines Maximum Daily Unmit Emissions.

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Shipcalls (vessels/day)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
VLCC	Maneuvering - Pilot to Berth	1.00	4	300	1.00	MGO	1.0	32	6	1	1	1	0
	Maneuvering - Berth to Pilot	1.00	2	300	1.00	MGO	1.0	16	3	0	1	1	0
							<b>TOTAL</b>	<b>48</b>	<b>8</b>	<b>1</b>	<b>2</b>	<b>2</b>	<b>0</b>
AFRAMAX	Maneuvering - Pilot to Berth	1.00	2	300	1.00	MGO	1.0	16	3	0	1	1	0
	Maneuvering - Berth to Pilot	1.00	2	300	1.00	MGO	1.0	16	3	0	1	1	0
							<b>TOTAL</b>	<b>32</b>	<b>6</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>0</b>
PANAMAX	Maneuvering - Pilot to Berth	1.00	2	300	1.00	MGO	1.0	16	3	0	1	1	0
	Maneuvering - Berth to Pilot	1.00	2	300	1.00	MGO	1.0	16	3	0	1	1	0
							<b>TOTAL</b>	<b>32</b>	<b>6</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>0</b>
SUEZMAX	Maneuvering - Pilot to Berth	1.00	3	300	1.00	MGO	1.0	24	4	1	1	1	0
	Maneuvering - Berth to Pilot	1.00	2	300	1.00	MGO	1.0	16	3	0	1	1	0
							<b>TOTAL</b>	<b>40</b>	<b>7</b>	<b>1</b>	<b>2</b>	<b>2</b>	<b>0</b>
							<b>MAXIMUM</b>	<b>48</b>	<b>8</b>	<b>1</b>	<b>2</b>	<b>2</b>	<b>0</b>



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Table H.2.RPA.Un.Max.2010-10. 2010 Reduced Project Alternative Summary of Tug Maximum Daily Unmitigated Emissions.

<b>Mode</b>	<b>Equipment</b>	<b>Maximum Daily NO<sub>x</sub> Emissions (lb/day)</b>	<b>Maximum Daily CO Emissions (lb/day)</b>	<b>Maximum Daily ROG Emissions (lb/day)</b>	<b>Maximum Daily PM<sub>10</sub> Emissions (lb/day)</b>	<b>Maximum Daily PM<sub>2.5</sub> Emissions (lb/day)</b>	<b>Maximum Daily SO<sub>2</sub> Emissions (lb/day)</b>
Tug Assist	Main Engines	466	74	15	19	18	0
Tug Assist	Aux Generator	48	8	1	2	2	0
<b>TOTAL</b>		<b>514</b>	<b>82</b>	<b>16</b>	<b>21</b>	<b>20</b>	<b>0</b>

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Table H.2.RPA.Un.Max.2010-11. 2010 Reduced Project Alternative VDU Crude Maximum Daily Unmitigated Emissions.

	Maximum Daily Vessel Calls	crude vapors from tanks(scf/call)	daily gas usage (mmscf/day)	mw crude vapors	destruction efficiency
Aframax	1	224000	0.2	50	98%
VLCC	1	596,313	0.6	50	98%
Panamax	1	116,667	0.1	50	98%
Suezmax	1	333,333	0.3	50	98%
<b>TOTAL</b>	<b>4</b>		<b>1.3</b>		

<b>Assumed Distribution based on tank storage volume:</b>	
<b>Site 1</b>	<b>12.5%</b>
<b>Site 2</b>	<b>87.5%</b>

Maximum Daily Emissions (lb/day)

	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene
EF (lb/MMSCF)	130	35	7	7.5	0.38%	9.90%	0.017	0.0004	0.0003	0.0043	0.0027	0.731	0.0366	0.0272	0.0095
Aframax	14.6	3.9	0.8	0.8	0.00	0.08	0.0	0.000	0.000	0.000	0.000	0.1	0.0	0.0	0.0
VLCC	38.8	10.4	2.1	2.2	0.01	0.21	0.0	0.000	0.000	0.001	0.001	0.2	0.0	0.0	0.0
Panamax	7.6	2.0	0.4	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Suezmax	21.7	5.8	1.2	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0
<b>MAXIMUM</b>	<b>38.8</b>	<b>10.4</b>	<b>2.1</b>	<b>2.2</b>	<b>0.0</b>	<b>0.2</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.2</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>

Assumed a ratio of 500/1000 based on the corresponding Btu values with respect to natural gas combustion emission factors.

Maximum Daily Emissions (lb/day)

	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene	SO <sub>x</sub>
Site 1	5	1.3	0.26	0.3	0.001	0.03	0.001	0.0000	0.0000	0.0002	0.0001	0.03	0.001	0.001	0.000	2
Site 2	34	9	1.8	2.0	0.01	0.18	0.004	0.0001	0.0001	0.001	0.001	0.2	0.01	0.01	0.002	13

2.09

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Table H.2.RPA.Un.Max.2010-12. 2010 Reduced Project Alternative VDU Legs Maximum Daily Unmitigated Emissions.

	tanks	crude vapors from tanks on legs(scfd/day)	daily gas usage (mmscf/day)	mw crude vapors	destruction efficiency
Site 1	2	23671.23	0.05	50	98%
Site 2	14	23671.23	0.3	50	98%
<b>TOTAL</b>	<b>16</b>		<b>0.4</b>		

<b>48</b>	<b>hr/event</b>
<b>6</b>	<b>events/yr</b>
<b>500</b>	<b>ft3/min</b>

Maximum Daily Emissions (lb/day)															
	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene
EF (lb/MMSCF)	130	35	7	7.5	0.38%	9.90%	0.017	0.0004	0.0003	0.0043	0.0027	0.731	0.0366	0.0272	0.0095
<b>TOTAL</b>	<b>24.6</b>	<b>6.6</b>	<b>1.3</b>	<b>1.4</b>	<b>0.0</b>	<b>0.1</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.1</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>

Assumed a ratio of 500/1000 based on the corresponding Btu values with respect to natural gas combustion emission factors.

Maximum Daily Emissions (lb/day)																
	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene	SO <sub>x</sub>
Site 1	3.1	0.8	0.2	0.2	0.00	0.02	0.00	0.000	0.000	0.000	0.00	0.02	0.00	0.00	0.00	1
Site 2	21.5	5.8	1.2	1.2	0.00	0.11	0.00	0.000	0.000	0.001	0.00	0.12	0.01	0.00	0.00	4



Table H.2.RPA.Un.Max.Bar.2010-1. 2010 Reduced Project Alternative Main Engines Maximum Daily Unmitigated Emissions from Barge Fuel Deliveries for OGV.

Ship	Direction	Mode	Distance (nautical miles)	Ship speed (knots)	Activity (hours)	Maximum Speed (knots)	Load Factor	MCR (kW)	Energy (kW-hr)	Fuel Type	Shipcalls (vessels/ yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Barge	North In	Volpak to Berth 408	5	3	1.67	3	1.00	4,800	8,000.00	MGO	1.0	291	24	11	16	16	16	18
Barge	North Out	Volpak to Berth 408	5	3	1.67	3.0	1.00	4,800	8,000.00	MGO	1.0	291	24	11	16	16	16	18
<b>TOTAL</b>												<b>581</b>	<b>48</b>	<b>22</b>	<b>32</b>	<b>32</b>	<b>32</b>	<b>36</b>

Table H.2.RPA.Un.Max.Bar.2010-2. 2010 Reduced Project Alternative Tug Main Engines Maximum Daily Unmitigated Emissions from Barge Fuel Deliveries for OGV.

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Shipcalls (vessels/day)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Barge	Maneuvering - Pilot to Berth	1.00	1	4,800	0.50	MGO	1.0	87	7	3	5	4	5
	Maneuvering - Berth to Pilot	1.00	1	4,800	0.50	MGO	1.0	87	7	3	5	4	5
<b>TOTAL</b>								<b>174</b>	<b>15</b>	<b>7</b>	<b>10</b>	<b>9</b>	<b>11</b>
<b>MAXIMUM</b>								<b>174</b>	<b>15</b>	<b>7</b>	<b>10</b>	<b>9</b>	<b>11</b>

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Table H.2.RPA.Un.Max.Bar.2010-3. 2010 Reduced Project Alternative Tug Auxiliary Generator Engines Maximum Daily Unmitigated Emissions from Barge Fuel Deliveries for OGV.

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Shipcalls (vessels/day)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Barge	Maneuvering - Pilot to Berth	1.00	1	300	1.00	MGO	1.0	8	1	0	0	0	1
	Maneuvering - Berth to Pilot	1.00	1	300	1.00	MGO	1.0	8	1	0	0	0	1
<b>TOTAL</b>								<b>17</b>	<b>3</b>	<b>0</b>	<b>1</b>	<b>1</b>	<b>1</b>
<b>MAXIMUM</b>								<b>17</b>	<b>3</b>	<b>0</b>	<b>1</b>	<b>1</b>	<b>1</b>

Table H.2.RPA.Un.Max.Bar.2010-4. 2010 Reduced Project Alternative Summary of Tug Maximum Daily Unmitigated Emissions from Barge Fuel Deliveries for OGV.

Mode	Equipment	Maximum Daily NO <sub>x</sub> Emissions (lb/day)	Maximum Daily CO Emissions (lb/day)	Maximum Daily ROG Emissions (lb/day)	Maximum Daily PM <sub>10</sub> Emissions (lb/day)	Maximum Daily PM <sub>2.5</sub> Emissions (lb/day)	Maximum Daily SO <sub>2</sub> Emissions (lb/day)
Tug Assist	Main Engines	174	15	7	10	9	11
Tug Assist	Aux Generator	17	3	0	1	1	1
<b>TOTAL</b>		<b>191</b>	<b>17</b>	<b>7</b>	<b>10</b>	<b>9</b>	<b>12</b>



Table H.2.RPA.Un.Max.Bar.2010-5. 2010 Reduced Project Alternative Summary of Maximum Daily Unmitigated Vessel Emissions from Barge Fuel Deliveries for OGV.

Operation	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Barge	581	48	22	32	32	36
Tug Assistance	191	17	7	10	9	12
<b>TOTAL</b>	<b>772</b>	<b>66</b>	<b>29</b>	<b>42</b>	<b>41</b>	<b>48</b>

Operation	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Barge	1.59	0.13	0.06	0.09	0.09	0.10
Tug Assistance	0.52	0.05	0.02	0.03	0.03	0.03
<b>TOTAL</b>	<b>2.12</b>	<b>0.18</b>	<b>0.08</b>	<b>0.11</b>	<b>0.11</b>	<b>0.13</b>

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Table H.2.RPA.Un.2015-1. 2015 Reduced Project Alternative Main Engines Average Daily Unmitigated Emissions.

Ship	Direction	Mode	Distance (nautical miles)	Ship speed (knots)	Activity (hours)	Maximum Speed (knots)	Load Factor	MCR (kW)	Energy (kW-hr)	Fuel Type	Shipcalls (vessels/ yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)		
VLCC	North In	Cruising - CW to VSR	22	15.54	1.42	16.9	0.777	25,400	27,957	HFO	46.0	64,090	4,957	2,125	5,524	5,524	5,082	37,179		
		Cruising - VSR to PZ	21	12	1.75	16.9	0.358	25,400	15,913	HFO	46.0	36,479	2,822	1,209	3,144	3,144	2,893	21,162		
		Cruising - PZ to Pilot	4.7	7	0.67	16.9	0.071	25,400	1,212	HFO	46.0	3,934	605	435	413	413	380	1,612		
	North Out	Maneuvering - Pilot to Berth			3	1.00	16.9	0.006	25,400	142	HFO	46.0	5,248	901	2,306	765	765	703	189	
		Maneuvering - Berth to Pilot			5	1.00	16.9	0.026	25,400	658	HFO	46.0	4,525	901	1,072	580	580	534	875	
		Cruising - Pilot to PZ			7	0.54	16.9	0.071	25,400	980	HFO	46.0	3,180	489	352	334	334	307	1,303	
		Cruising - PZ to VSR			21	1.75	16.9	0.358	25,400	15,913	HFO	46.0	36,479	2,822	1,209	3,144	3,144	2,893	21,162	
		Cruising - VSR to CW			22	15.54	1.42	16.9	0.777	25,400	27,957	HFO	46.0	64,090	4,957	2,125	5,524	5,524	5,082	37,179
		AFRAMAX	South In	Cruising - CW to VSR	23	14.7	1.56	16.1	0.761	12,477	14,859	HFO	24.0	17,772	1,375	589	1,532	1,532	1,409	10,310
		Cruising - VSR to PZ	11	12	0.92	16.1	0.414	12,477	4,736	HFO	24.0	5,664	438	188	488	488	449	3,286		
		Cruising - PZ to Pilot	4.7	7	0.67	16.1	0.082	12,477	689	HFO	24.0	1,088	155	104	111	111	102	478		
	South Out	Maneuvering - Pilot to Berth			3	1.00	16.1	0.006	12,477	81	HFO	24.0	1,459	231	550	212	212	195	56	
		Maneuvering - Berth to Pilot			5	1.00	16.1	0.030	12,477	374	HFO	24.0	1,303	231	256	167	167	153	259	
		Cruising - Pilot to PZ			3.5	7	0.50	16.1	0.082	12,477	513	HFO	24.0	810	115	77	83	83	76	356
		Cruising - PZ to VSR			12.5	12	1.04	16.1	0.414	12,477	5,382	HFO	24.0	6,436	498	213	555	555	510	3,734
		Cruising - VSR to CW			24.5	14.7	1.67	16.1	0.761	12,477	15,828	HFO	24.0	18,931	1,464	628	1,632	1,632	1,501	10,982
PANAMAX	South In	Cruising - CW to VSR	23	14.7	1.56	15.8	0.805	10,300	12,979	HFO	10	6,468	500	214	557	557	513	3,752		
		Cruising - VSR to PZ	11	12	0.92	15.8	0.438	10,300	4,136	HFO	10	2,061	159	68	178	178	163	1,196		
		Cruising - PZ to Pilot	4.7	7	0.67	15.8	0.087	10,300	601	HFO	10	300	23	10	26	26	24	174		
	South Out	Maneuvering - Pilot to Berth			3	1.00	15.8	0.007	10,300	71	HFO	10	35	3	1	3	3	3	20	
		Maneuvering - Berth to Pilot			5	1.00	15.8	0.032	10,300	326	HFO	10	163	13	5	14	14	13	94	
		Cruising - Pilot to PZ			3.5	7	0.50	15.8	0.087	10,300	448	HFO	10	223	17	7	19	19	18	129
		Cruising - PZ to VSR			12.5	12	1.04	15.8	0.438	10,300	4,700	HFO	10	2,342	181	78	202	202	186	1,359
		Cruising - VSR to CW			24.5	14.7	1.67	15.8	0.805	10,300	13,825	HFO	10	6,890	533	228	594	594	546	3,997
		SUEZMAX	North In	Cruising - CW to VSR	22	15.54	1.42	17	0.764	16,000	17,302	HFO	52	44,837	3,468	1,486	3,864	3,864	3,555	26,010
		Cruising - VSR to PZ	21	12	1.75	17	0.352	16,000	9,848	HFO	52	25,521	1,974	846	2,200	2,200	2,024	14,805		
		Cruising - PZ to Pilot	4.7	7	0.67	17	0.070	16,000	750	HFO	52	1,944	150	64	168	168	154	1,127		
	North Out	Maneuvering - Pilot to Berth			3	1.00	17	0.005	16,000	88	HFO	52	228	18	8	20	20	18	132	
		Maneuvering - Berth to Pilot			5	1.00	17	0.025	16,000	407	HFO	52	1,055	82	35	91	91	84	612	
		Cruising - Pilot to PZ			3.8	7	0.54	17	0.070	16,000	606	HFO	52	1,571	122	52	135	135	125	912
		Cruising - PZ to VSR			21	1.75	17	0.352	16,000	9,848	HFO	52	25,521	1,974	846	2,200	2,200	2,024	14,805	
		Cruising - VSR to CW			22	15.54	1.42	17	0.764	16,000	17,302	HFO	52	44,837	3,468	1,486	3,864	3,864	3,555	26,010
<b>TOTAL</b>												<b>435,483</b>	<b>35,646</b>	<b>18,872</b>	<b>38,340</b>	<b>38,340</b>	<b>35,273</b>	<b>245,256</b>		

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Table H.2.RPA.Un.2015-2. 2015 Reduced Project Alternative Auxiliary Generator Average Daily Unmitigated Emissions.

Ship	Direction	Mode	Activity (hours)	MCR (kW)	Load Factor	Energy (kW-hr)	Fuel Type	Shipcalls (vessels/yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
VLCC	North In	Cruising	3.84	3,600	0.278	3,840	HFO	46.0	7,150	535	195	730	700	560	5,982
		Maneuvering	2.00	3,600	0.278	2,002	HFO	46.0	3,727	279	101	380	365	292	3,118
	North Out	Maneuvering	1.50	3,600	0.278	1,501	HFO	46.0	2,795	209	76	285	274	219	2,339
		Cruising	3.71	3,600	0.278	3,712	HFO	46.0	6,910	517	188	705	677	542	5,782
AFRAMAX	South In	Cruising	3.15	3,600	0.278	3,155	HFO	24.0	3,065	229	83	313	300	240	2,565
		Maneuvering	2.00	3,600	0.278	2,002	HFO	24.0	1,944	145	53	198	190	152	1,627
	South Out	Maneuvering	1.50	3,600	0.278	1,501	HFO	24.0	1,458	109	40	149	143	114	1,220
		Cruising	3.21	3,600	0.278	3,211	HFO	24.0	3,119	233	85	318	306	244	2,610
PANAMAX	South In	Cruising	3.15	3,600	0.278	3,155	HFO	10	1,277	96	35	130	125	100	1,069
		Maneuvering	2.00	3,600	0.278	2,002	HFO	10	810	61	22	83	79	63	678
	South Out	Maneuvering	1.5	3,600	0.278	1,501	HFO	10	608	45	17	62	60	48	508
		Cruising	3.21	3,600	0.278	3,211	HFO	10	1,300	97	35	133	127	102	1,087
SUEZMAX	North In	Cruising	3.84	3,600	0.278	3,840	HFO	52	8,082	605	220	825	792	633	6,763
		Maneuvering	2.00	3,600	0.278	2,002	HFO	52	4,213	315	115	430	413	330	3,525
	North Out	Maneuvering	1.5	3,600	0.278	1,501	HFO	52	3,159	236	86	322	309	248	2,644
		Cruising	3.71	3,600	0.278	3,712	HFO	52	7,811	585	213	797	765	612	6,536
<b>TOTAL</b>									<b>57,427</b>	<b>4,297</b>	<b>1,563</b>	<b>5,860</b>	<b>5,626</b>	<b>4,500</b>	<b>48,052</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Un.2015-3. 2015 Reduced Project Alternative Boiler Warm-Up Average Daily Unmitigated Emissions.

Shipcalls (vessels/yr)	Vessel Size	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
24.0	Aframax	HFO	2.70	107.96	30%	3	50,000	1,015	92	23	212	183	119	7,852
46.0	VLCC	HFO	2.70	84.93	30%	3	90,000	2,352	249	51	1,479	1,272	323	21,312
10.0	Panamax	HFO	2.70	63.30	30%	3	35,000	174	16	4	36	31	20	1,343
52.0	Suezmax	HFO	2.70	87.54	30%	3	70,000	2,496	225	57	522	449	292	19,314
<b>TOTAL</b>								<b>6,037</b>	<b>581</b>	<b>136</b>	<b>2,250</b>	<b>1,935</b>	<b>754</b>	<b>49,821</b>

Table H.2.RPA.Un.2015-4. 2015 Reduced Project Alternative Berth Operations Average Daily Unmitigated Emissions.

Auxiliary Generator Pre-Pumpin

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
24.0	Aframax	700,000	HFO	2.70	3,600	27.8%	2.5	2,430	182	66	248	238	190	2,034
46.0	VLCC	2,000,000	HFO	2.70	3,600	27.8%	2.5	4,658	349	127	475	456	365	3,898
10.0	Panamax	350,000	HFO	2.70	3,600	27.8%	2.5	1,013	76	28	103	99	79	847
52.0	Suezmax	1,000,000	HFO	2.70	3,600	27.8%	2.5	5,266	394	143	537	516	413	4,406
TOTAL								13,367	1,000	364	1,364	1,309	1,048	11,185

Boiler Pre-Pumping

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
24.0	Aframax	700,000	HFO	2.70	107.96	30.0%	2.5	50,000	846	76	19	177	152	99	6,544
46.0	VLCC	2,000,000	HFO	2.70	84.93	30.0%	2.5	90,000	1,960	207	43	1,233	1,060	690	17,760
10.0	Panamax	350,000	HFO	2.70	63.30	30.0%	2.5	35,000	145	13	3	30	26	17	1,119
52.0	Suezmax	1,000,000	HFO	2.70	87.54	30.0%	2.5	70,000	2,080	188	48	435	374	244	16,095
TOTAL									5,031	484	113	1,875	1,613	1,050	41,517

Auxiliary Generator Pumpin

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
24.0	Aframax	700,000	MDO	0.52	3,600	55.6%	15.0	27,577	2,182	794	595	571	457	4,700
46.0	VLCC	2,000,000	MDO	0.52	3,600	55.6%	23.2	81,829	6,476	2,355	1,766	1,695	1,356	13,946
10.0	Panamax	350,000	MDO	0.52	3,600	55.6%	11.0	8,426	667	242	182	175	140	1,436
52.0	Suezmax	1,000,000	MDO	0.52	3,600	55.6%	15.3	60,945	4,823	1,754	1,315	1,263	1,010	10,387
TOTAL								178,778	14,148	5,145	3,859	3,704	2,963	30,468

Boiler Pumping

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Inerting Fuel Consumption Savings (lb/1000 bbl offloaded)	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
24.0	Aframax	700,000	MDO	0.52	102.17	28.06	15.0	4,410	1,102	62	730	511	342	16,149
46.0	VLCC	2,000,000	MDO	0.52	80.38	28.06	23.2	20,410	4,262	900	2,821	1,975	1,321	62,430
10.0	Panamax	350,000	MDO	0.52	59.91	28.06	11.0	395	99	6	65	46	31	1,446
52.0	Suezmax	1,000,000	MDO	0.52	82.85	28.06	15.3	10,091	2,523	142	1,670	1,169	782	36,954
TOTAL								35,306	7,986	1,110	5,287	3,701	2,475	116,979

Auxiliary Generator Post-Pumpin

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
24.0	Aframax	700,000	HFO	2.70	3,600	27.8%	1.0	972	73	26	99	95	76	813
46.0	VLCC	2,000,000	HFO	2.70	3,600	27.8%	1.0	1,863	139	51	190	183	146	1,559
10.0	Panamax	350,000	HFO	2.70	3,600	27.8%	1.0	405	30	11	41	40	32	339
52.0	Suezmax	1,000,000	HFO	2.70	3,600	27.8%	1.0	2,106	158	57	215	206	165	1,762
TOTAL								5,347	400	145	546	524	419	4,474

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Un.2015-5. 2015 Reduced Project Alternative Summary of Average Daily Unmitigated Vessel Emissions.

Mode	Equipment	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Cruising	Main Engines	421,467	33,267	14,640	36,489	36,489	33,570	243,018
Cruising	Aux Generator	38,714	2,897	1,053	3,950	3,792	3,034	32,393
Maneuvering	Main Engines	14,016	2,379	4,233	1,851	1,851	1,703	2,238
Maneuvering	Aux Generator	18,714	1,400	509	1,910	1,833	1,467	15,658
Boiler Warm-up	Boiler	6,037	581	136	2,250	1,935	754	49,821
Berth Operations	Boiler	40,337	8,470	1,223	7,162	5,313	3,525	158,496
Berth Operations	Aux Generator	197,492	15,548	5,654	5,768	5,537	4,430	46,126
Propulsion	TOTAL	492,911	39,943	20,435	44,200	43,966	39,774	293,308
Non-Propulsion	TOTAL	243,866	24,600	7,013	15,180	12,785	8,709	254,444
<b>Total Emissions</b>		<b>736,776</b>	<b>64,543</b>	<b>27,448</b>	<b>59,380</b>	<b>56,751</b>	<b>48,482</b>	<b>547,751</b>

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Cruising	Main Engines	1,154.7	91.1	40.1	100.0	100.0	92.0	665.8
Cruising	Aux Generator	106.1	7.9	2.9	10.8	10.4	8.3	88.7
Maneuvering	Main Engines	38.4	6.5	11.6	5.1	5.1	4.7	6.1
Maneuvering	Aux Generator	51.3	3.8	1.4	5.2	5.0	4.0	42.9
Boiler Warm-up	Boiler	16.5	1.6	0.4	6.2	5.3	2.1	136.5
Berth Operations	Boiler	110.5	23.2	3.4	19.6	14.6	9.7	434.2
Berth Operations	Aux Generator	541.1	42.6	15.5	15.8	15.2	12.1	126.4
Propulsion	TOTAL	1,350.4	109.4	56.0	121.1	120.5	109.0	803.6
Non-Propulsion	TOTAL	668.1	67.4	19.2	41.6	35.0	23.9	697.1
<b>Total Emissions</b>		<b>2,019</b>	<b>177</b>	<b>75</b>	<b>163</b>	<b>155</b>	<b>133</b>	<b>1,501</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Un.2015-6. 2015 Reduced Project Alternative Tug Main Engines Average Daily Unmitigated Emissions.

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Shipcalls (vessels/yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
VLCC	Maneuvering - Pilot to Berth	1.00	4	4,800	0.50	MGO	46.0	12,207	2,274	438	523	481	7
	Maneuvering - Berth to Pilot	1.00	2	4,800	0.50	MGO	46.0	6,104	1,137	219	261	240	4
AFRAMAX	Maneuvering - Pilot to Berth	1.00	2	4,800	0.50	MGO	24.0	3,184	593	114	136	125	2
	Maneuvering - Berth to Pilc	1.00	2	4,800	0.50	MGO	24.0	3,184	593	114	136	125	2
PANAMAX	Maneuvering - Pilot to Berth	1.00	2	4,800	0.50	MGO	10.0	1,327	247	48	57	52	1
	Maneuvering - Berth to Pilot	1.00	2	4,800	0.50	MGO	10.0	1,327	247	48	57	52	1
SUEZMAX	Maneuvering - Pilot to Berth	1.00	3	4,800	0.50	MGO	52.0	10,350	1,928	371	443	408	6
	Maneuvering - Berth to Pilc	1.00	2	4,800	0.50	MGO	52.0	6,900	1,285	247	296	272	4
<b>TOTAL</b>								<b>44,583</b>	<b>8,304</b>	<b>1,599</b>	<b>1,909</b>	<b>1,757</b>	<b>27</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Un.2015-7. 2015 Reduced Project Alternative Tug Auxiliary Generator Engines Average Daily Unmit Emissions

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Shipcalls (vessels/yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
VLCC	Maneuvering - Pilot to Berth	1.00	4	300	1.00	MGO	46.0	1,354	254	41	61	56	1
	Maneuvering - Berth to Pilot	1.00	2	300	1.00	MGO	46.0	677	127	21	30	28	0
AFRAMAX	Maneuvering - Pilot to Berth	1.00	2	300	1.00	MGO	24.0	353	66	11	16	15	0
	Maneuvering - Berth to Pilot	1.00	2	300	1.00	MGO	24.0	353	66	11	16	15	0
PANAMAX	Maneuvering - Pilot to Berth	1.00	2	300	1.00	MGO	10.0	147	28	4	7	6	0
	Maneuvering - Berth to Pilot	1.00	2	300	1.00	MGO	10.0	147	28	4	7	6	0
SUEZMAX	Maneuvering - Pilot to Berth	1.00	3	300	1.00	MGO	52.0	1,148	215	35	52	47	1
	Maneuvering - Berth to Pilot	1.00	2	300	1.00	MGO	52.0	765	143	23	34	32	0
<b>TOTAL</b>								<b>4,946</b>	<b>927</b>	<b>150</b>	<b>222</b>	<b>204</b>	<b>2</b>



Table H.2.RPA.Un.2015-8. 2015 Reduced Project Alternative Summary of Tug Average Daily Unmitigated Emission

Mode	Equipment	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Tug Assist	Main Engines	44,583	8,304	1,599	1,909	1,757	27
Tug Assist	Aux Generator	4,946	927	150	222	204	2
<b>TOTAL</b>		<b>49,529</b>	<b>9,231</b>	<b>1,748</b>	<b>2,131</b>	<b>1,961</b>	<b>29</b>

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Tug Assist	Main Engines	122	22.8	4.4	5.2	4.8	0.1
Tug Assist	Aux Generator	14	2.5	0.4	0.6	0.6	0.0
<b>TOTAL</b>		<b>136</b>	<b>25.3</b>	<b>4.8</b>	<b>5.8</b>	<b>5.4</b>	<b>0.1</b>

Table H.2.RPA.Un.2015-9. 2015 Reduced Project Alternative VDU Crude Average Daily Unmitigated Emissions.

	Annual Vessel Calls	crude vapors from tanks(scf/call)	annual gas usage (mmscf/yr)	mw crude vapors	destruction efficiency
Aframax	24	224000	5.4	50	98%
VLCC	46	596,313	27.4	50	98%
Panamax	10	116,667	1.2	50	98%
Suezmax	52	333,333	17.3	50	98%
<b>TOTAL</b>	<b>132</b>		<b>51.3</b>		

<b>Assumed Distribution based on tank storage volume:</b>	
<b>Site 1</b>	<b>12.5%</b>
<b>Site 2</b>	<b>87.5%</b>

Annual Average (lb/yr)

	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene
EF (lb/MMSCF)	130	35	7	7.5	0.38%	9.90%	0.017	0.0004	0.0003	0.0043	0.0027	0.731	0.0366	0.0272	0.0095
Aframax	349.4	94.1	18.8	20.2	0.07	1.86	0.0	0.001	0.001	0.012	0.007	2.0	0.1	0.1	0.0
VLCC	1783.0	480.0	96.0	102.9	0.36	9.50	0.2	0.005	0.004	0.059	0.037	10.0	0.5	0.4	0.1
Panamax	75.8	20.4	4.1	4.4	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0
Suezmax	1126.7	303.3	60.7	65.0	0.0	0.9	0.1	0.0	0.0	0.0	0.0	6.3	0.3	0.2	0.1
<b>TOTAL</b>	<b>3334.9</b>	<b>897.9</b>	<b>179.6</b>	<b>192.4</b>	<b>0.5</b>	<b>12.3</b>	<b>0.4</b>	<b>0.0</b>	<b>0.0</b>	<b>0.1</b>	<b>0.1</b>	<b>18.8</b>	<b>0.9</b>	<b>0.7</b>	<b>0.2</b>

Assumed a ratio of 500/1000 based on the corresponding Btu values with respect to natural gas combustion emission factors.

Annual Average (lb/yr)

	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene	SO <sub>x</sub>
Site 1	417	112.2	22.45	24.0	0.059	1.54	0.055	0.0013	0.0010	0.0138	0.0087	2.34	0.117	0.087	0.030	75
Site 2	2918	786	157.1	168.3	0.41	10.75	0.382	0.0090	0.0067	0.097	0.061	16.4	0.82	0.61	0.213	522

179.57

Table H.2.RPA.Un.2015-10. 2015 Reduced Project Alternative VDU Legs Average Daily Unmitigated Emissions.

	tanks	crude vapors from tanks on legs(scf/yr)	annual gas usage (mmscf/yr)	mw crude vapors	destruction efficiency
Site 1	4	8640000	34.6	50	98%
Site 2	14	8640000	121.0	50	98%
<b>TOTAL</b>	<b>18</b>		<b>155.5</b>		

<b>48</b>	<b>hr/event</b>
<b>6</b>	<b>events/yr</b>
<b>500</b>	<b>ft3/min</b>

		Annual Average (lb/yr)													
	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene
EF (lb/MMSCF)	130	35	7	7.5	0.38%	9.90%	0.017	0.0004	0.0003	0.0043	0.0027	0.731	0.0366	0.0272	0.0095
<b>TOTAL</b>	<b>10108.8</b>	<b>2721.6</b>	<b>544.3</b>	<b>583.2</b>	<b>2.1</b>	<b>53.9</b>	<b>1.3</b>	<b>0.0</b>	<b>0.0</b>	<b>0.3</b>	<b>0.2</b>	<b>56.8</b>	<b>2.8</b>	<b>2.1</b>	<b>0.7</b>

Assumed a ratio of 500/1000 based on the corresponding Btu values with respect to natural gas combustion emission factors.

		Annual Average (lb/yr)														
	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene	SO <sub>x</sub>
Site 1	2246.4	604.8	121.0	129.6	0.46	11.98	0.29	0.007	0.005	0.074	0.05	12.63	0.63	0.47	0.16	402
Site 2	7862.4	2116.8	423.4	453.6	1.61	41.91	1.03	0.024	0.018	0.260	0.16	44.21	2.21	1.65	0.57	1407



Table H.2.RPA.Un.Bar.2015-1. 2015 Reduced Project Alternative Main Engines Average Daily Unmitigated Emissions from Barge Fuel Deliveries for OGV.

Ship	Direction	Mode	Distance (nautical miles)	Ship speed (knots)	Activity (hours)	Maximum Speed (knots)	Load Factor	MCR (kW)	Energy (kW-hr)	Fuel Type	Shipcalls (vessels/ yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Barge	North In	Volpak to Berth 408	5	3	1.67	3	0.50	4,800	4,000.00	MGO	8.0	1,163	97	44	63	63	63	71
Barge	North Out	Volpak to Berth 408	5	3	1.67	3.0	0.50	4,800	4,000.00	MGO	8.0	1,163	97	44	63	63	63	71
<b>TOTAL</b>												<b>2,326</b>	<b>194</b>	<b>88</b>	<b>127</b>	<b>127</b>	<b>127</b>	<b>143</b>

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Table H.2.RPA.Un.Bar.2015-2. 2015 Reduced Project Alternative Tug Main Engines Average Daily Unmitigated Emissions from Barge Fuel Deliveries for OGV.

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Shipcalls (vessels/yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Barge	Maneuvering - Pilot to Berth	1.00	1	4,800	0.50	MGO	8.0	698	58	26	38	35	43
	Maneuvering - Berth to Pilot	1.00	1	4,800	0.50	MGO	8.0	698	58	26	38	35	43
TOTAL								1,396	116	53	76	70	86

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Table H.2.RPA.Un.Bar.2015-3. 2015 Reduced Project Alternative Tug Auxiliary Generator Engines Average Daily Unmitigated Emissions from Barge Fuel Deliveries for OGV.

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Shipcalls (vessels/yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Barge	Maneuvering - Pilot to Berth	1.00	1	300	1.00	MGO	8.0	66	11	2	3	2	5
	Maneuvering - Berth to Pilot	1.00	1	300	1.00	MGO	8.0	66	11	2	3	2	5
<b>TOTAL</b>								<b>132</b>	<b>22</b>	<b>4</b>	<b>5</b>	<b>5</b>	<b>11</b>

Table H.2.RPA.Un.Bar.2015-4. 2015 Reduced Project Alternative Summary of Tug Average Daily Unmitigated Emissions from Barge Fuel Deliveries for OGV.

Mode	Equipment	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Tug Assist	Main Engines	1,396	116	53	76	70	86
Tug Assist	Aux Generator	132	22	4	5	5	11
<b>TOTAL</b>		<b>1,528</b>	<b>139</b>	<b>56</b>	<b>81</b>	<b>75</b>	<b>96</b>

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Tug Assist	Main Engines	4	0.3	0.1	0.2	0.2	0.2
Tug Assist	Aux Generator	0.36	0.06	0.01	0.01	0.01	0.03
<b>TOTAL</b>		<b>4</b>	<b>0.4</b>	<b>0.2</b>	<b>0.2</b>	<b>0.2</b>	<b>0.3</b>



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Table H.2.RPA.Un.Bar.2015-5. 2015 Reduced Project Alternative Summary of Average Daily Unmitigated Vessel Emissions from Barge Fuel Deliveries for OGV.

Operation	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Barge	2,326	194	88	127	127	143
Tug Assistance	1,528	139	56	81	75	96
<b>TOTAL</b>	<b>3,854</b>	<b>333</b>	<b>145</b>	<b>208</b>	<b>202</b>	<b>239</b>

Operation	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Barge	6.37	0.53	0.24	0.35	0.35	0.39
Tug Assistance	4.19	0.38	0.15	0.22	0.21	0.26
<b>TOTAL</b>	<b>10.56</b>	<b>0.91</b>	<b>0.40</b>	<b>0.57</b>	<b>0.55</b>	<b>0.65</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Un.Max.2015-1. 2015 Reduced Project Alternative Main Engines Maximum Daily Unmitigated Emissions.

Ship	Direction	Mode	Distance (nautical miles)	Ship speed (knots)	Activity (hours)	Maximum Speed (knots)	Load Factor	MCR (kW)	Energy (kW-hr)	Fuel Type	Maximum Daily Shipcalls (vessels/day)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)		
VLCC	North In	Cruising - CW to VSR	22	15.54	1.42	16.9	0.777	25,400	27,957	HFO	1.0	1,393	108	46	120	120	110	808		
		Cruising - VSR to PZ	21	12	1.75	16.9	0.358	25,400	15,913	HFO	1.0	793	61	26	68	68	63	460		
		Cruising - PZ to Pilot	4.7	7	0.67	16.9	0.071	25,400	1,212	HFO	1.0	86	13	9	9	9	8	35		
	North Out	Maneuvering - Pilot to Berth			3	1.00	16.9	0.006	25,400	142	HFO	1.0	114	20	50	17	17	15	4	
		Maneuvering - Berth to Pilot			5	1.00	16.9	0.026	25,400	658	HFO	1.0	98	20	23	13	13	12	19	
		Cruising - Pilot to PZ			3.8	7	0.54	16.9	0.071	25,400	980	HFO	1.0	69	11	8	7	7	28	
		Cruising - PZ to VSR			21	12	1.75	16.9	0.358	25,400	15,913	HFO	1.0	793	61	26	68	68	63	460
		Cruising - VSR to CW			22	15.54	1.42	16.9	0.777	25,400	27,957	HFO	1.0	1,393	108	46	120	120	110	808
		<b>TOTAL</b>											<b>4,740</b>	<b>401</b>	<b>235</b>	<b>422</b>	<b>422</b>	<b>389</b>	<b>2,623</b>	
AFRAMAX	South In	Cruising - CW to VSR	23	14.7	1.56	16.1	0.761	12,477	14,859	HFO	1.0	741	57	25	64	64	59	430		
		Cruising - VSR to PZ	11	12	0.92	16.1	0.414	12,477	4,736	HFO	1.0	236	18	8	20	20	19	137		
		Cruising - PZ to Pilot	4.7	7	0.67	16.1	0.082	12,477	689	HFO	1.0	45	6	4	5	5	4	20		
	South Out	Maneuvering - Pilot to Berth			3	1.00	16.1	0.006	12,477	81	HFO	1.0	61	10	23	9	9	8	2	
		Maneuvering - Berth to Pilot			5	1.00	16.1	0.030	12,477	374	HFO	1.0	54	10	11	7	7	6	11	
		Cruising - Pilot to PZ			3.5	7	0.50	16.1	0.082	12,477	513	HFO	1.0	34	5	3	3	3	15	
		Cruising - PZ to VSR			12.5	12	1.04	16.1	0.414	12,477	5,382	HFO	1.0	268	21	9	23	23	21	156
		Cruising - VSR to CW			24.5	14.7	1.67	16.1	0.761	12,477	15,828	HFO	1.0	789	61	26	68	68	63	458
		<b>TOTAL</b>											<b>2,228</b>	<b>188</b>	<b>108</b>	<b>199</b>	<b>199</b>	<b>183</b>	<b>1,228</b>	
PANAMAX	South In	Cruising - CW to VSR	23	14.7	1.56	15.8	0.805	10,300	12,979	HFO	1.0	647	50	21	56	56	51	375		
		Cruising - VSR to PZ	11	12	0.92	15.8	0.438	10,300	4,136	HFO	1.0	206	16	7	18	18	16	120		
		Cruising - PZ to Pilot	4.7	7	0.67	15.8	0.087	10,300	601	HFO	1.0	30	2	1	3	3	2	17		
	South Out	Maneuvering - Pilot to Berth			3	1.00	15.8	0.007	10,300	71	HFO	1.0	4	0.3	0.1	0.3	0.3	0.3	2	
		Maneuvering - Berth to Pilot			5	1.00	15.8	0.032	10,300	326	HFO	1.0	16	1	1	1	1	1	9	
		Cruising - Pilot to PZ			3.5	7	0.50	15.8	0.087	10,300	448	HFO	1.0	22	2	1	2	2	2	13
		Cruising - PZ to VSR			12.5	12	1.04	15.8	0.438	10,300	4,700	HFO	1.0	234	18	8	20	20	19	136
		Cruising - VSR to CW			24.5	14.7	1.67	15.8	0.805	10,300	13,825	HFO	1.0	689	53	23	59	59	55	400
		<b>TOTAL</b>											<b>1,848</b>	<b>143</b>	<b>61</b>	<b>159</b>	<b>159</b>	<b>147</b>	<b>1,072</b>	
SUEZMAX	North In	Cruising - CW to VSR	22	15.54	1.42	17	0.764	16,000	17,302	HFO	1.0	862	67	29	74	74	68	500		
		Cruising - VSR to PZ	21	12	1.75	17	0.352	16,000	9,848	HFO	1.0	491	38	16	42	42	39	285		
		Cruising - PZ to Pilot	4.7	7	0.67	17	0.070	16,000	750	HFO	1.0	37	3	1	3	3	3	22		
	North Out	Maneuvering - Pilot to Berth			3	1.00	17	0.005	16,000	88	HFO	1.0	4	0.3	0.1	0	0.4	0.3	3	
		Maneuvering - Berth to Pilot			5	1.00	17	0.025	16,000	407	HFO	1.0	20	2	1	2	2	2	12	
		Cruising - Pilot to PZ			3.8	7	0.54	17	0.070	16,000	606	HFO	1.0	30	2	1	3	3	2	18
		Cruising - PZ to VSR			21	12	1.75	17	0.352	16,000	9,848	HFO	1.0	491	38	16	42	42	39	285
		Cruising - VSR to CW			22	15.54	1.42	17	0.764	16,000	17,302	HFO	1.0	862	67	29	74	74	68	500
		<b>TOTAL</b>											<b>2,798</b>	<b>216</b>	<b>93</b>	<b>241</b>	<b>241</b>	<b>222</b>	<b>1,623</b>	
<b>MAXIMUM</b>												<b>4,740</b>	<b>401</b>	<b>235</b>	<b>422</b>	<b>422</b>	<b>389</b>	<b>2,623</b>		

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Table H.2.RPA.Un.Max.2015-2. 2015 Reduced Project Alternative Auxiliary Generator Maximum Daily Unmit Emissions

Ship	Direction	Mode	Activity (hours)	MCR (kW)	Load Factor	Energy (kW-hr)	Fuel Type	Maximum Daily Shipcalls (vessels/day)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
VLCC	North In	Cruising	3.84	3,600	0.278	3,840	HFO	1.0	155	12	4	16	15	12	130
		Maneuvering	2.00	3,600	0.278	2,002	HFO	1.0	81	6	2	8	8	6	68
	North Out	Maneuvering	1.50	3,600	0.278	1,501	HFO	1.0	61	5	2	6	6	5	51
		Cruising	3.71	3,600	0.278	3,712	HFO	1.0	150	11	4	15	15	12	126
<b>TOTAL</b>								<b>447</b>	<b>33</b>	<b>12</b>	<b>46</b>	<b>44</b>	<b>35</b>	<b>374</b>	
AFRAMAX	South In	Cruising	3.15	3,600	0.278	3,155	HFO	1.0	128	10	3	13	13	10	107
		Maneuvering	2.00	3,600	0.278	2,002	HFO	1.0	81	6	2	8	8	6	68
	South Out	Maneuvering	1.50	3,600	0.278	1,501	HFO	1.0	61	5	2	6	6	5	51
		Cruising	3.21	3,600	0.278	3,211	HFO	1.0	130	10	4	13	13	10	109
<b>TOTAL</b>								<b>399</b>	<b>30</b>	<b>11</b>	<b>41</b>	<b>39</b>	<b>31</b>	<b>334</b>	
PANAMAX	South In	Cruising	3.15	3,600	0.278	3,155	HFO	1.0	128	10	3	13	13	10	107
		Maneuvering	2.00	3,600	0.278	2,002	HFO	1.0	81	6	2	8	8	6	68
	South Out	Maneuvering	1.5	3,600	0.278	1,501	HFO	1.0	61	5	2	6	6	5	51
		Cruising	3.21	3,600	0.278	3,211	HFO	1.0	130	10	4	13	13	10	109
<b>TOTAL</b>								<b>399</b>	<b>30</b>	<b>11</b>	<b>41</b>	<b>39</b>	<b>31</b>	<b>334</b>	
SUEZMAX	North In	Cruising	3.84	3,600	0.278	3,840	HFO	1.0	155	12	4	16	15	12	130
		Maneuvering	2.00	3,600	0.278	2,002	HFO	1.0	81	6	2	8	8	6	68
	North Out	Maneuvering	1.5	3,600	0.278	1,501	HFO	1.0	61	5	2	6	6	5	51
		Cruising	3.71	3,600	0.278	3,712	HFO	1.0	150	11	4	15	15	12	126
<b>TOTAL</b>								<b>447</b>	<b>33</b>	<b>12</b>	<b>46</b>	<b>44</b>	<b>35</b>	<b>374</b>	
<b>MAXIMUM</b>								<b>447</b>	<b>33</b>	<b>12</b>	<b>46</b>	<b>44</b>	<b>35</b>	<b>374</b>	

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Table H.2.RPA.Un.Max.2015-3. 2015 Reduced Project Alternative Summary of Maximum Daily Unmitigated Vessel Emissions.

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Cruising	Main Engines	4,527	362	162	393	393	362	2,600
Cruising	Aux Generator	306	23	8	31	30	24	256
Maneuvering	Main Engines	212	39	73	29	29	27	23
Maneuvering	Aux Generator	142	11	4	14	14	11	119
<b>Cruising and Maneuvering</b>	<b>TOTAL</b>	<b>5,187</b>	<b>435</b>	<b>248</b>	<b>468</b>	<b>466</b>	<b>424</b>	<b>2,997</b>

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Table H.2.RPA.Un.Max.2015-4. 2015 Reduced Project Alternative Boiler Warm-Up Maximum Daily Unmitigated Emissions.

Shipcalls (vessels/day)	Vessel Size	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	HFO	2.70	107.96	30%	3	50,000	42	4	1	9	8	5	327
1.0	VLCC	HFO	2.70	84.93	30%	3	90,000	51	5	1	32	28	18	463
1.0	Panamax	HFO	2.70	63.30	30%	3	35,000	17	2	0.4	4	3	2	134
1.0	Suezmax	HFO	2.70	87.54	30%	3	70,000	48	4	1	10	9	6	371

**MAXIMUM      51                      5                      1                      32                      28                      18                      463**

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Table H.2.RPA.Un.Max.2015-5. 2015 Reduced Project Alternative Summary of Boiler Warm-Up Maximum Unmitigated Emissions.

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Boiler Warm-up	Boiler	51	5	1	32	28	18	463

Table H.2.RPA.Un.Max.2015-6. 2015 Reduced Project Alternative Berth Operations Maximum Daily Unmitigated Emissions.

Auxiliary Generator Pre-Pumpin

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	700,000	HFO	2.70	3,600	27.8%	2.5	101	8	3	10	10	8	85
1.0	VLCC	2,000,000	HFO	2.70	3,600	27.8%	2.5	101	8	3	10	10	8	85
1.0	Panamax	350,000	HFO	2.70	3,600	27.8%	2.5	101	8	3	10	10	8	85
1.0	Suezmax	1,000,000	HFO	2.70	3,600	27.8%	2.5	101	8	3	10	10	8	85
MAXIMUM								101	8	3	10	10	8	85

Boiler Pre-Pumpin

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	700,000	HFO	2.70	107.96	30.0%	2.5	50,000	35	3	1	7	6	4	273
1.0	VLCC	2,000,000	HFO	2.70	84.93	30.0%	2.5	90,000	43	5	1	27	23	15	386
1.0	Panamax	350,000	HFO	2.70	63.30	30.0%	2.5	35,000	14	1	0	3	3	2	112
1.0	Suezmax	1,000,000	HFO	2.70	87.54	30.0%	2.5	70,000	40	4	1	8	7	5	310
MAXIMUM									43	5	1	27	23	15	386

Auxiliary Generator Pumpin

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	700,000	MDO	0.52	3,600	55.6%	15.0	1,149	91	33	25	24	19	196
1.0	VLCC	2,000,000	MDO	0.52	3,600	55.6%	23.2	1,777	141	51	38	37	29	303
1.0	Panamax	350,000	MDO	0.52	3,600	55.6%	11.0	843	67	24	18	17	14	144
1.0	Suezmax	1,000,000	MDO	0.52	3,600	55.6%	15.3	1,172	93	34	25	24	19	200
MAXIMUM								1,777	141	51	38	37	29	303

Boiler Pumpin

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Inerting Fuel Consumption Savings (lb/1000 bbl offloaded)	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	700,000	MDO	0.52	102.17	28.06	15.0	184	46	3	30	21	14	673
1.0	VLCC	2,000,000	MDO	0.52	80.38	28.06	23.2	444	93	20	61	43	29	1,357
1.0	Panamax	350,000	MDO	0.52	59.91	28.06	11.0	39	10	1	7	5	3	145
1.0	Suezmax	1,000,000	MDO	0.52	82.85	28.06	15.3	194	49	3	32	22	15	711
MAXIMUM								444	93	20	61	43	29	1,357

Auxiliary Generator Post-Pumpin

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	700,000	HFO	2.70	3,600	27.8%	1.0	41	3	1	4	4	3	34
1.0	VLCC	2,000,000	HFO	2.70	3,600	27.8%	1.0	41	3	1	4	4	3	34
1.0	Panamax	350,000	HFO	2.70	3,600	27.8%	1.0	41	3	1	4	4	3	34
1.0	Suezmax	1,000,000	HFO	2.70	3,600	27.8%	1.0	41	3	1	4	4	3	34
MAXIMUM								41	3	1	4	4	3	34

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Table H.2.RPA.Un.Max.2015-7. 2015 Reduced Project Alternative Summary of Berth Operations Maximum Daily Unmitigated Emissions.

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Berth Operations	Boiler	486	97	21	88	66	44	1,743
Berth Operations	Aux Generator	1,919	151	55	53	51	41	422



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Table H.2.RPA.Un.Max.2015-8. 2015 Reduced Project Alternative Tug Main Engines Maximum Daily Unmitigated Emissions.

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Shipcalls (vessels/day)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
VLCC	Maneuvering - Pilot to Berth	1.00	4	4,800	0.50	MGO	1.0	265	49	10	11	10	0
	Maneuvering - Berth to Pilot	1.00	2	4,800	0.50	MGO	1.0	133	25	5	6	5	0
							<b>TOTAL</b>	<b>398</b>	<b>74</b>	<b>14</b>	<b>17</b>	<b>16</b>	<b>0</b>
AFRAMAX	Maneuvering - Pilot to Berth	1.00	2	4,800	0.50	MGO	1.0	133	25	5	6	5	0
	Maneuvering - Berth to Pilot	1.00	2	4,800	0.50	MGO	1.0	133	25	5	6	5	0
							<b>TOTAL</b>	<b>265</b>	<b>49</b>	<b>10</b>	<b>11</b>	<b>10</b>	<b>0</b>
PANAMAX	Maneuvering - Pilot to Berth	1.00	2	4,800	0.50	MGO	1.0	133	25	5	6	5	0
	Maneuvering - Berth to Pilot	1.00	2	4,800	0.50	MGO	1.0	133	25	5	6	5	0
							<b>TOTAL</b>	<b>265</b>	<b>49</b>	<b>10</b>	<b>11</b>	<b>10</b>	<b>0</b>
SUEZMAX	Maneuvering - Pilot to Berth	1.00	3	4,800	0.50	MGO	1.0	199	37	7	9	8	0
	Maneuvering - Berth to Pilot	1.00	2	4,800	0.50	MGO	1.0	133	25	5	6	5	0
							<b>TOTAL</b>	<b>332</b>	<b>62</b>	<b>12</b>	<b>14</b>	<b>13</b>	<b>0</b>
							<b>MAXIMUM</b>	<b>398</b>	<b>74</b>	<b>14</b>	<b>17</b>	<b>16</b>	<b>0</b>

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Table H.2.RPA.Un.Max.2015-9. 2015 Reduced Project Alternative Tug Auxiliary Generator Engines Maximum Daily Unmitigated Emissions.

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Shipcalls (vessels/day)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
VLCC	Maneuvering - Pilot to Berth	1.00	4	300	1.00	MGO	1.0	29	6	1	1	1	0
	Maneuvering - Berth to Pilot	1.00	2	300	1.00	MGO	1.0	15	3	0	1	1	0
AFRAMAX	Maneuvering - Pilot to Berth	1.00	2	300	1.00	MGO	<b>TOTAL</b> 1.0	<b>44</b> 15	<b>8</b> 3	<b>1</b> 0	<b>2</b> 1	<b>2</b> 1	<b>0</b> 0
	Maneuvering - Berth to Pilot	1.00	2	300	1.00	MGO	1.0	15	3	0	1	1	0
PANAMAX	Maneuvering - Pilot to Berth	1.00	2	300	1.00	MGO	<b>TOTAL</b> 1.0	<b>29</b> 15	<b>6</b> 3	<b>1</b> 0	<b>1</b> 1	<b>1</b> 1	<b>0</b> 0
	Maneuvering - Berth to Pilot	1.00	2	300	1.00	MGO	1.0	15	3	0	1	1	0
SUEZMAX	Maneuvering - Pilot to Berth	1.00	3	300	1.00	MGO	<b>TOTAL</b> 1.0	<b>29</b> 22	<b>6</b> 4	<b>1</b> 1	<b>1</b> 1	<b>1</b> 1	<b>0</b> 0
	Maneuvering - Berth to Pilot	1.00	2	300	1.00	MGO	1.0	15	3	0	1	1	0
<b>TOTAL</b>								<b>37</b>	<b>7</b>	<b>1</b>	<b>2</b>	<b>2</b>	<b>0</b>
<b>MAXIMUM</b>								<b>44</b>	<b>8</b>	<b>1</b>	<b>2</b>	<b>2</b>	<b>0</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Un.Max.2015-10. 2015 Reduced Project Alternative Summary of Tug Maximum Daily Unmitigated Emissions.

Mode	Equipment	Maximum Daily NO <sub>x</sub> Emissions (lb/day)	Maximum Daily CO Emissions (lb/day)	Maximum Daily ROG Emissions (lb/day)	Maximum Daily PM <sub>10</sub> Emissions (lb/day)	Maximum Daily PM <sub>2.5</sub> Emissions (lb/day)	Maximum Daily SO <sub>2</sub> Emissions (lb/day)
Tug Assist	Main Engines	398	74	14	17	16	0
Tug Assist	Aux Generator	44	8	1	2	2	0
<b>TOTAL</b>		<b>442</b>	<b>82</b>	<b>16</b>	<b>19</b>	<b>18</b>	<b>0</b>

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Table H.2.RPA.Un.Max.2015-11. 2015 Reduced Project Alternative VDU Crude Maximum Daily Unmitigated Emissions.

	Maximum Daily Vessel Calls	crude vapors from tanks(scf/call)	daily gas usage (mmscf/day)	mw crude vapors	destruction efficiency
Aframax	1	224000	0.2	50	98%
VLCC	1	596,313	0.6	50	98%
Panamax	1	116,667	0.1	50	98%
Suezmax	1	333,333	0.3	50	98%
<b>TOTAL</b>	<b>4</b>		<b>1.3</b>		

Assumed Distribution based on tank storage volume:	
Site 1	12.5%
Site 2	87.5%

Maximum Daily Emissions (lb/day)

	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene
EF (lb/MMSCF)	130	35	7	7.5	0.38%	9.90%	0.017	0.0004	0.0003	0.0043	0.0027	0.731	0.0366	0.0272	0.0095
Aframax	14.6	3.9	0.8	0.8	0.00	0.08	0.0	0.000	0.000	0.000	0.000	0.1	0.0	0.0	0.0
VLCC	38.8	10.4	2.1	2.2	0.01	0.21	0.0	0.000	0.000	0.001	0.001	0.2	0.0	0.0	0.0
Panamax	7.6	2.0	0.4	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Suezmax	21.7	5.8	1.2	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0
<b>MAXIMUM</b>	<b>38.8</b>	<b>10.4</b>	<b>2.1</b>	<b>2.2</b>	<b>0.0</b>	<b>0.2</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.2</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>

Assumed a ratio of 500/1000 based on the corresponding Btu values with respect to natural gas combustion emission factors.

Maximum Daily Emissions (lb/day)

	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene	SO <sub>x</sub>
Site 1	5	1.3	0.26	0.3	0.001	0.03	0.001	0.0000	0.0000	0.0002	0.0001	0.03	0.001	0.001	0.000	2
Site 2	34	9	1.8	2.0	0.01	0.18	0.004	0.0001	0.0001	0.001	0.001	0.2	0.01	0.01	0.002	13

2.09

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Table H.2.RPA.Un.Max.2015-12. 2015 Reduced Project Alternative VDU Legs Maximum Daily Unmitigated Emissions.

	tanks	crude vapors from tanks on legs(scfd/day)	daily gas usage (mmscf/day)	mw crude vapors	destruction efficiency
Site 1	4	23671.23	0.09	50	98%
Site 2	14	23671.23	0.3	50	98%
<b>TOTAL</b>	<b>18</b>		<b>0.4</b>		

<b>48</b>	<b>hr/event</b>
<b>6</b>	<b>events/yr</b>
<b>500</b>	<b>ft3/min</b>

Maximum Daily Emissions (lb/day)															
	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene
EF (lb/MMSCF)	130	35	7	7.5	0.38%	9.90%	0.017	0.0004	0.0003	0.0043	0.0027	0.731	0.0366	0.0272	0.0095
<b>TOTAL</b>	<b>27.7</b>	<b>7.5</b>	<b>1.5</b>	<b>1.6</b>	<b>0.0</b>	<b>0.1</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.2</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>

Assumed a ratio of 500/1000 based on the corresponding Btu values with respect to natural gas combustion emission factors.

Maximum Daily Emissions (lb/day)																
	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene	SO <sub>x</sub>
Site 1	6.2	1.7	0.3	0.4	0.00	0.03	0.00	0.000	0.000	0.000	0.00	0.03	0.00	0.00	0.00	1
Site 2	21.5	5.8	1.2	1.2	0.00	0.11	0.00	0.000	0.000	0.001	0.00	0.12	0.01	0.00	0.00	4



Table H.2.RPA.Un.Max.Bar.2015-1. 2015 Reduced Project Alternative Main Engines Maximum Daily Unmitigated Emissions from Barge Fuel Deliveries for OGV.

Ship	Direction	Mode	Distance (nautical miles)	Ship speed (knots)	Activity (hours)	Maximum Speed (knots)	Load Factor	MCR (kW)	Energy (kW-hr)	Fuel Type	Shipcalls (vessels/ yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Barge	North In	Volpak to Berth 408	5	3	1.67	3	1.00	4,800	8,000.00	MGO	1.0	291	24	11	16	16	16	18
Barge	North Out	Volpak to Berth 408	5	3	1.67	3.0	1.00	4,800	8,000.00	MGO	1.0	291	24	11	16	16	16	18
<b>TOTAL</b>												<b>581</b>	<b>48</b>	<b>22</b>	<b>32</b>	<b>32</b>	<b>32</b>	<b>36</b>

Table H.2.RPA.Un.Max.Bar.2015-2. 2015 Reduced Project Alternative Tug Main Engines Maximum Daily Unmitigated Emissions from Barge Fuel Deliveries for OGV.

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Shipcalls (vessels/day)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Barge	Maneuvering - Pilot to Berth	1.00	1	4,800	0.50	MGO	1.0	87	7	3	5	4	5
	Maneuvering - Berth to Pilot	1.00	1	4,800	0.50	MGO	1.0	87	7	3	5	4	5
<b>TOTAL</b>								<b>174</b>	<b>15</b>	<b>7</b>	<b>10</b>	<b>9</b>	<b>11</b>
<b>MAXIMUM</b>								<b>174</b>	<b>15</b>	<b>7</b>	<b>10</b>	<b>9</b>	<b>11</b>



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Table H.2.RPA.Un.Max.Bar.2015-3. 2015 Reduced Project Alternative Tug Auxiliary Generator Engines Maximum Daily Unmitigated Emissions from Barge Fuel Deliveries for OG

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Shipcalls (vessels/day)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Barge	Maneuvering - Pilot to Berth	1.00	1	300	1.00	MGO	1.0	8	1	0	0	0	1
	Maneuvering - Berth to Pilot	1.00	1	300	1.00	MGO	1.0	8	1	0	0	0	1
<b>TOTAL</b>								<b>17</b>	<b>3</b>	<b>0</b>	<b>1</b>	<b>1</b>	<b>1</b>

**MAXIMUM      17            3            0            1            1            1**

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Table H.2.RPA.Un.Max.Bar.2015-4. 2015 Reduced Project Alternative Summary of Tug Maximum Daily Unmitigated Emissions from Barge Fuel Deliveries for OGV.

Mode	Equipment	Maximum Daily NO <sub>x</sub> Emissions (lb/day)	Maximum Daily CO Emissions (lb/day)	Maximum Daily ROG Emissions (lb/day)	Maximum Daily PM <sub>10</sub> Emissions (lb/day)	Maximum Daily PM <sub>2.5</sub> Emissions (lb/day)	Maximum Daily SO <sub>2</sub> Emissions (lb/day)
Tug Assist	Main Engines	174	15	7	10	9	11
Tug Assist	Aux Generator	17	3	0	1	1	1
<b>TOTAL</b>		<b>191</b>	<b>17</b>	<b>7</b>	<b>10</b>	<b>9</b>	<b>12</b>

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Table H.2.RPA.Un.Max.Bar.2015-5. 2015 Reduced Project Alternative Summary of Maximum Daily Unmitigated Vessel Emissions from Barge Fuel Deliveries for OGV.

Operation	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Barge	581	48	22	32	32	36
Tug Assistance	191	17	7	10	9	12
<b>TOTAL</b>	<b>772</b>	<b>66</b>	<b>29</b>	<b>42</b>	<b>41</b>	<b>48</b>

Operation	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Barge	1.59	0.13	0.06	0.09	0.09	0.10
Tug Assistance	0.52	0.05	0.02	0.03	0.03	0.03
<b>TOTAL</b>	<b>2.12</b>	<b>0.18</b>	<b>0.08</b>	<b>0.11</b>	<b>0.11</b>	<b>0.13</b>

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Table H.2.RPA.Un.2025-1. 2025 Reduced Project Alternative Main Engines Average Daily Unmitigated Emissions.

Ship	Direction	Mode	Distance (nautical miles)	Ship speed (knots)	Activity (hours)	Maximum Speed (knots)	Load Factor	MCR (kW)	Energy (kW-hr)	Fuel Type	Shipcalls (vessels/yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)		
VLCC	North In	Cruising - CW to VSR	22	15.54	1.42	16.9	0.777	25,400	27,957	HFO	46.0	64,090	4,957	2,125	5,524	5,524	5,082	37,179		
		Cruising - VSR to PZ	21	12	1.75	16.9	0.358	25,400	15,913	HFO	46.0	36,479	2,822	1,209	3,144	3,144	2,893	21,162		
		Cruising - PZ to Pilot	4.7	7	0.67	16.9	0.071	25,400	1,212	HFO	46.0	3,934	605	435	413	413	380	1,612		
	North Out	Maneuvering - Pilot to Berth			3	1.00	16.9	0.006	25,400	142	HFO	46.0	5,248	901	2,306	765	765	703	189	
		Maneuvering - Berth to Pilot			5	1.00	16.9	0.026	25,400	658	HFO	46.0	4,525	901	1,072	580	580	534	875	
		Cruising - Pilot to PZ			3.8	7	0.54	16.9	0.071	25,400	980	HFO	46.0	3,180	489	352	334	334	307	1,303
		Cruising - PZ to VSR			21	12	1.75	16.9	0.358	25,400	15,913	HFO	46.0	36,479	2,822	1,209	3,144	3,144	2,893	21,162
		Cruising - VSR to CW			22	15.54	1.42	16.9	0.777	25,400	27,957	HFO	46.0	64,090	4,957	2,125	5,524	5,524	5,082	37,179
		AFRAMAX	South In	Cruising - CW to VSR	23	14.7	1.56	16.1	0.761	12,477	14,859	HFO	24.0	17,772	1,375	589	1,532	1,532	1,409	10,310
Cruising - VSR to PZ				11	12	0.92	16.1	0.414	12,477	4,736	HFO	24.0	5,664	438	188	488	488	449	3,286	
Cruising - PZ to Pilot				4.7	7	0.67	16.1	0.082	12,477	689	HFO	24.0	1,088	155	104	111	111	102	478	
Maneuvering - Pilot to Berth						3	1.00	16.1	0.006	12,477	81	HFO	24.0	1,459	231	550	212	212	195	56
Maneuvering - Berth to Pilot						5	1.00	16.1	0.030	12,477	374	HFO	24.0	1,303	231	256	167	167	153	259
Cruising - Pilot to PZ				3.5	7	0.50	16.1	0.082	12,477	513	HFO	24.0	810	115	77	83	83	76	356	
Cruising - PZ to VSR				12.5	12	1.04	16.1	0.414	12,477	5,382	HFO	24.0	6,436	498	213	555	555	510	3,734	
Cruising - VSR to CW				24.5	14.7	1.67	16.1	0.761	12,477	15,828	HFO	24.0	18,931	1,464	628	1,632	1,632	1,501	10,982	
PANAMAX	South In	Cruising - CW to VSR		23	14.7	1.56	15.8	0.805	10,300	12,979	HFO	10	6,468	500	214	557	557	513	3,752	
Cruising - VSR to PZ				11	12	0.92	15.8	0.438	10,300	4,136	HFO	10	2,061	159	68	178	178	163	1,196	
Cruising - PZ to Pilot				4.7	7	0.67	15.8	0.087	10,300	601	HFO	10	300	23	10	26	26	24	174	
Maneuvering - Pilot to Berth						3	1.00	15.8	0.007	10,300	71	HFO	10	35	3	1	3	3	20	
Maneuvering - Berth to Pilot						5	1.00	15.8	0.032	10,300	326	HFO	10	163	13	5	14	14	13	94
Cruising - Pilot to PZ				3.5	7	0.50	15.8	0.087	10,300	448	HFO	10	223	17	7	19	19	18	129	
Cruising - PZ to VSR				12.5	12	1.04	15.8	0.438	10,300	4,700	HFO	10	2,342	181	78	202	202	186	1,359	
Cruising - VSR to CW				24.5	14.7	1.67	15.8	0.805	10,300	13,825	HFO	10	6,890	533	228	594	594	546	3,997	
SUEZMAX		North In	Cruising - CW to VSR	22	15.54	1.42	17	0.764	16,000	17,302	HFO	52	44,837	3,468	1,486	3,864	3,864	3,555	26,010	
Cruising - VSR to PZ				21	12	1.75	17	0.352	16,000	9,848	HFO	52	25,521	1,974	846	2,200	2,200	2,024	14,805	
Cruising - PZ to Pilot				4.7	7	0.67	17	0.070	16,000	750	HFO	52	1,944	150	64	168	168	154	1,127	
Maneuvering - Pilot to Berth						3	1.00	17	0.005	16,000	88	HFO	52	228	18	8	20	18	132	
Maneuvering - Berth to Pilot						5	1.00	17	0.025	16,000	407	HFO	52	1,055	82	35	91	91	84	612
Cruising - Pilot to PZ				3.8	7	0.54	17	0.070	16,000	606	HFO	52	1,571	122	52	135	135	125	912	
Cruising - PZ to VSR				21	12	1.75	17	0.352	16,000	9,848	HFO	52	25,521	1,974	846	2,200	2,200	2,024	14,805	
Cruising - VSR to CW				22	15.54	1.42	17	0.764	16,000	17,302	HFO	52	44,837	3,468	1,486	3,864	3,864	3,555	26,010	
<b>TOTAL</b>												<b>435,483</b>	<b>35,646</b>	<b>18,872</b>	<b>38,340</b>	<b>38,340</b>	<b>35,273</b>	<b>245,256</b>		

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Un.2025-2. 2025 Reduced Project Alternative Auxiliary Generator Average Daily Unmit Emissions

Ship	Direction	Mode	Activity (hours)	MCR (kW)	Load Factor	Energy (kW-hr)	Fuel Type	Shipcalls (vessels/yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
VLCC	North In	Cruising	3.84	3,600	0.278	3,840	HFO	46.0	7,150	535	195	730	700	560	5,982
		Maneuvering	2.00	3,600	0.278	2,002	HFO	46.0	3,727	279	101	380	365	292	3,118
	North Out	Maneuvering	1.50	3,600	0.278	1,501	HFO	46.0	2,795	209	76	285	274	219	2,339
		Cruising	3.71	3,600	0.278	3,712	HFO	46.0	6,910	517	188	705	677	542	5,782
AFRAMAX	South In	Cruising	3.15	3,600	0.278	3,155	HFO	24.0	3,065	229	83	313	300	240	2,565
		Maneuvering	2.00	3,600	0.278	2,002	HFO	24.0	1,944	145	53	198	190	152	1,627
	South Out	Maneuvering	1.50	3,600	0.278	1,501	HFO	24.0	1,458	109	40	149	143	114	1,220
		Cruising	3.21	3,600	0.278	3,211	HFO	24.0	3,119	233	85	318	306	244	2,610
PANAMAX	South In	Cruising	3.15	3,600	0.278	3,155	HFO	10	1,277	96	35	130	125	100	1,069
		Maneuvering	2.00	3,600	0.278	2,002	HFO	10	810	61	22	83	79	63	678
	South Out	Maneuvering	1.5	3,600	0.278	1,501	HFO	10	608	45	17	62	60	48	508
		Cruising	3.21	3,600	0.278	3,211	HFO	10	1,300	97	35	133	127	102	1,087
SUEZMAX	North In	Cruising	3.84	3,600	0.278	3,840	HFO	52	8,082	605	220	825	792	633	6,763
		Maneuvering	2.00	3,600	0.278	2,002	HFO	52	4,213	315	115	430	413	330	3,525
	North Out	Maneuvering	1.5	3,600	0.278	1,501	HFO	52	3,159	236	86	322	309	248	2,644
		Cruising	3.71	3,600	0.278	3,712	HFO	52	7,811	585	213	797	765	612	6,536
<b>TOTAL</b>									<b>57,427</b>	<b>4,297</b>	<b>1,563</b>	<b>5,860</b>	<b>5,626</b>	<b>4,500</b>	<b>48,052</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Un.2025-3. 2025 Reduced Project Alternative Boiler Warm-Up Average Daily Unmitigated Emissions.

Shipcalls (vessels/yr)	Vessel Size	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
24.0	Aframax	HFO	2.70	107.96	30%	3	50,000	1,015	92	23	212	183	119	7,852
46.0	VLCC	HFO	2.70	84.93	30%	3	90,000	2,352	249	51	1,479	1,272	323	21,312
10.0	Panamax	HFO	2.70	63.30	30%	3	35,000	174	16	4	36	31	20	1,343
52.0	Suezmax	HFO	2.70	87.54	30%	3	70,000	2,496	225	57	522	449	292	19,314
<b>TOTAL</b>								<b>6,037</b>	<b>581</b>	<b>136</b>	<b>2,250</b>	<b>1,935</b>	<b>754</b>	<b>49,821</b>

Table H.2.RPA.Un.2025-4. 2025 Reduced Project Alternative Berth Operations Average Daily Unmitigated Emissions.

Auxiliary Generator Pre-Pumpin

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
24.0	Aframax	700,000	HFO	2.70	3,600	27.8%	2.5	2,430	182	66	248	238	190	2,034
46.0	VLCC	2,000,000	HFO	2.70	3,600	27.8%	2.5	4,658	349	127	475	456	365	3,898
10.0	Panamax	350,000	HFO	2.70	3,600	27.8%	2.5	1,013	76	28	103	99	79	847
52.0	Suezmax	1,000,000	HFO	2.70	3,600	27.8%	2.5	5,266	394	143	537	516	413	4,406
<b>TOTAL</b>								<b>13,367</b>	<b>1,000</b>	<b>364</b>	<b>1,364</b>	<b>1,309</b>	<b>1,048</b>	<b>11,185</b>

Boiler Pre-Pumpin

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
24.0	Aframax	700,000	HFO	2.70	107.96	30.0%	2.5	50,000	846	76	19	177	152	99	6,544
46.0	VLCC	2,000,000	HFO	2.70	84.93	30.0%	2.5	90,000	1,960	207	43	1,233	1,060	690	17,760
10.0	Panamax	350,000	HFO	2.70	63.30	30.0%	2.5	35,000	145	13	3	30	26	17	1,119
52.0	Suezmax	1,000,000	HFO	2.70	87.54	30.0%	2.5	70,000	2,080	188	48	435	374	244	16,095
<b>TOTAL</b>									<b>5,031</b>	<b>484</b>	<b>113</b>	<b>1,875</b>	<b>1,613</b>	<b>1,050</b>	<b>41,517</b>

Auxiliary Generator Pumpin

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
24.0	Aframax	700,000	MDO	0.52	3,600	55.6%	15.0	27,577	2,182	794	595	571	457	4,700
46.0	VLCC	2,000,000	MDO	0.52	3,600	55.6%	23.2	81,829	6,476	2,355	1,766	1,695	1,356	13,946
10.0	Panamax	350,000	MDO	0.52	3,600	55.6%	11.0	8,426	667	242	182	175	140	1,436
52.0	Suezmax	1,000,000	MDO	0.52	3,600	55.6%	15.3	60,945	4,823	1,754	1,315	1,263	1,010	10,387
<b>TOTAL</b>								<b>178,778</b>	<b>14,148</b>	<b>5,145</b>	<b>3,859</b>	<b>3,704</b>	<b>2,963</b>	<b>30,468</b>

Boiler Pumpin

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Inerting Fuel Consumption Savings (lb/1000 bbl offloaded)	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
24.0	Aframax	700,000	MDO	0.52	102.17	28.06	15.0	4,410	1,102	62	730	511	342	16,149
46.0	VLCC	2,000,000	MDO	0.52	80.38	28.06	23.2	20,410	4,262	900	2,821	1,975	1,321	62,430
10.0	Panamax	350,000	MDO	0.52	59.91	28.06	11.0	395	99	6	65	46	31	1,446
52.0	Suezmax	1,000,000	MDO	0.52	82.85	28.06	15.3	10,091	2,523	142	1,670	1,169	782	36,954
<b>TOTAL</b>								<b>35,306</b>	<b>7,986</b>	<b>1,110</b>	<b>5,287</b>	<b>3,701</b>	<b>2,475</b>	<b>116,979</b>

Auxiliary Generator Post-Pumpin

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
24.0	Aframax	700,000	HFO	2.70	3,600	27.8%	1.0	972	73	26	99	95	76	813
46.0	VLCC	2,000,000	HFO	2.70	3,600	27.8%	1.0	1,863	139	51	190	183	146	1,559
10.0	Panamax	350,000	HFO	2.70	3,600	27.8%	1.0	405	30	11	41	40	32	339
52.0	Suezmax	1,000,000	HFO	2.70	3,600	27.8%	1.0	2,106	158	57	215	206	165	1,762
<b>TOTAL</b>								<b>5,347</b>	<b>400</b>	<b>145</b>	<b>546</b>	<b>524</b>	<b>419</b>	<b>4,474</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Un.2025-5. 2025 Reduced Project Alternative Summary of Average Daily Unmitigated Vessel Emissions.

Mode	Equipment	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Cruising	Main Engines	421,467	33,267	14,640	36,489	36,489	33,570	243,018
Cruising	Aux Generator	38,714	2,897	1,053	3,950	3,792	3,034	32,393
Maneuvering	Main Engines	14,016	2,379	4,233	1,851	1,851	1,703	2,238
Maneuvering	Aux Generator	18,714	1,400	509	1,910	1,833	1,467	15,658
Boiler Warm-up	Boiler	6,037	581	136	2,250	1,935	754	49,821
Berth Operations	Boiler	40,337	8,470	1,223	7,162	5,313	3,525	158,496
Berth Operations	Aux Generator	197,492	15,548	5,654	5,768	5,537	4,430	46,126
Propulsion	TOTAL	492,911	39,943	20,435	44,200	43,966	39,774	293,308
Non-Propulsion	TOTAL	243,866	24,600	7,013	15,180	12,785	8,709	254,444
<b>Total Emissions</b>		<b>736,776</b>	<b>64,543</b>	<b>27,448</b>	<b>59,380</b>	<b>56,751</b>	<b>48,482</b>	<b>547,751</b>

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Cruising	Main Engines	1,154.7	91.1	40.1	100.0	100.0	92.0	665.8
Cruising	Aux Generator	106.1	7.9	2.9	10.8	10.4	8.3	88.7
Maneuvering	Main Engines	38.4	6.5	11.6	5.1	5.1	4.7	6.1
Maneuvering	Aux Generator	51.3	3.8	1.4	5.2	5.0	4.0	42.9
Boiler Warm-up	Boiler	16.5	1.6	0.4	6.2	5.3	2.1	136.5
Berth Operations	Boiler	110.5	23.2	3.4	19.6	14.6	9.7	434.2
Berth Operations	Aux Generator	541.1	42.6	15.5	15.8	15.2	12.1	126.4
Propulsion	TOTAL	1,350.4	109.4	56.0	121.1	120.5	109.0	803.6
Non-Propulsion	TOTAL	668.1	67.4	19.2	41.6	35.0	23.9	697.1
<b>Total Emissions</b>		<b>2,019</b>	<b>177</b>	<b>75</b>	<b>163</b>	<b>155</b>	<b>133</b>	<b>1,501</b>



Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Un.2025-6. 2025 Reduced Project Alternative Tug Main Engines Average Daily Unmitigated Emissions.

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Shipcalls (vessels/yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
VLCC	Maneuvering - Pilot to Berth	1.00	4	4,800	0.50	MGO	46.0	10,128	2,274	426	438	403	7
	Maneuvering - Berth to Pilot	1.00	2	4,800	0.50	MGO	46.0	5,064	1,137	213	219	201	4
AFRAMAX	Maneuvering - Pilot to Berth	1.00	2	4,800	0.50	MGO	24.0	2,642	593	111	114	105	2
	Maneuvering - Berth to Pilc	1.00	2	4,800	0.50	MGO	24.0	2,642	593	111	114	105	2
PANAMAX	Maneuvering - Pilot to Berth	1.00	2	4,800	0.50	MGO	10.0	1,101	247	46	48	44	1
	Maneuvering - Berth to Pilot	1.00	2	4,800	0.50	MGO	10.0	1,101	247	46	48	44	1
SUEZMAX	Maneuvering - Pilot to Berth	1.00	3	4,800	0.50	MGO	52.0	8,587	1,928	361	371	341	6
	Maneuvering - Berth to Pilc	1.00	2	4,800	0.50	MGO	52.0	5,725	1,285	241	247	228	4
<b>TOTAL</b>								<b>36,990</b>	<b>8,304</b>	<b>1,554</b>	<b>1,599</b>	<b>1,471</b>	<b>27</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Un.2025-7. 2025 Reduced Project Alternative Tug Auxiliary Generator Engines Average Daily Unmitigated Emissions.

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Shipcalls (vessels/yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
VLCC	Maneuvering - Pilot to Berth	1.00	4	300	1.00	MGO	46.0	1,140	254	41	49	45	1
	Maneuvering - Berth to Pilot	1.00	2	300	1.00	MGO	46.0	570	127	21	24	22	0
AFRAMAX	Maneuvering - Pilot to Berth	1.00	2	300	1.00	MGO	24.0	297	66	11	13	12	0
	Maneuvering - Berth to Pilot	1.00	2	300	1.00	MGO	24.0	297	66	11	13	12	0
PANAMAX	Maneuvering - Pilot to Berth	1.00	2	300	1.00	MGO	10.0	124	28	4	5	5	0
	Maneuvering - Berth to Pilot	1.00	2	300	1.00	MGO	10.0	124	28	4	5	5	0
SUEZMAX	Maneuvering - Pilot to Berth	1.00	3	300	1.00	MGO	52.0	966	215	35	41	38	1
	Maneuvering - Berth to Pilot	1.00	2	300	1.00	MGO	52.0	644	143	23	27	25	0
<b>TOTAL</b>								<b>4,163</b>	<b>927</b>	<b>150</b>	<b>178</b>	<b>163</b>	<b>2</b>

Table H.2.RPA.Un.2025-8. 2025 Reduced Project Alternative Summary of Tug Average Daily Unmitigated Emissions.

Mode	Equipment	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Tug Assist	Main Engines	36,990	8,304	1,554	1,599	1,471	27
Tug Assist	Aux Generator	4,163	927	150	178	163	2
<b>TOTAL</b>		<b>41,153</b>	<b>9,231</b>	<b>1,704</b>	<b>1,776</b>	<b>1,634</b>	<b>29</b>

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Tug Assist	Main Engines	101	22.8	4.3	4.4	4.0	0.1
Tug Assist	Aux Generator	11	2.5	0.4	0.5	0.4	0.0
<b>TOTAL</b>		<b>113</b>	<b>25.3</b>	<b>4.7</b>	<b>4.9</b>	<b>4.5</b>	<b>0.1</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Un.2025-9. 2025 Reduced Project Alternative VDU Crude Average Daily Unmitigated Emissions.

	Annual Vessel Calls	crude vapors from tanks(scf/call)	annual gas usage (mmscf/yr)	mw crude vapors	destruction efficiency
Aframax	24	224000	5.4	50	98%
VLCC	46	596,313	27.4	50	98%
Panamax	10	116,667	1.2	50	98%
Suezmax	52	333,333	17.3	50	98%
<b>TOTAL</b>	<b>132</b>		<b>51.3</b>		

<b>Assumed Distribution based on tank storage volume:</b>	
<b>Site 1</b>	<b>12.5%</b>
<b>Site 2</b>	<b>87.5%</b>

Annual Average (lb/yr)

	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene
EF (lb/MMSCF)	130	35	7	7.5	0.38%	9.90%	0.017	0.0004	0.0003	0.0043	0.0027	0.731	0.0366	0.0272	0.0095
Aframax	349.4	94.1	18.8	20.2	0.07	1.86	0.0	0.001	0.001	0.012	0.007	2.0	0.1	0.1	0.0
VLCC	1783.0	480.0	96.0	102.9	0.36	9.50	0.2	0.005	0.004	0.059	0.037	10.0	0.5	0.4	0.1
Panamax	75.8	20.4	4.1	4.4	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0
Suezmax	1126.7	303.3	60.7	65.0	0.0	0.9	0.1	0.0	0.0	0.0	0.0	6.3	0.3	0.2	0.1
<b>TOTAL</b>	<b>3334.9</b>	<b>897.9</b>	<b>179.6</b>	<b>192.4</b>	<b>0.5</b>	<b>12.3</b>	<b>0.4</b>	<b>0.0</b>	<b>0.0</b>	<b>0.1</b>	<b>0.1</b>	<b>18.8</b>	<b>0.9</b>	<b>0.7</b>	<b>0.2</b>

Assumed a ratio of 500/1000 based on the corresponding Btu values with respect to natural gas combustion emission factors.

Annual Average (lb/yr)

	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene	SO <sub>x</sub>
Site 1	417	112.2	22.45	24.0	0.059	1.54	0.055	0.0013	0.0010	0.0138	0.0087	2.34	0.117	0.087	0.030	75
Site 2	2918	786	157.1	168.3	0.41	10.75	0.382	0.0090	0.0067	0.097	0.061	16.4	0.82	0.61	0.213	522

Table H.2.RPA.Un.2025-10. 2025 Reduced Project Alternative VDU Legs Average Daily Unmitigated Emissions.

	tanks	crude vapors from tanks on legs(scf/yr)	annual gas usage (mmscf/yr)	mw crude vapors	destruction efficiency
Site 1	4	8640000	34.6	50	98%
Site 2	14	8640000	121.0	50	98%
<b>TOTAL</b>	<b>18</b>		<b>155.5</b>		

<b>48</b>	<b>hr/event</b>
<b>6</b>	<b>events/yr</b>
<b>500</b>	<b>ft3/min</b>

		Annual Average (lb/yr)													
	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene
EF (lb/MMSCF)	130	35	7	7.5	0.38%	9.90%	0.017	0.0004	0.0003	0.0043	0.0027	0.731	0.0366	0.0272	0.0095
<b>TOTAL</b>	<b>10108.8</b>	<b>2721.6</b>	<b>544.3</b>	<b>583.2</b>	<b>2.1</b>	<b>53.9</b>	<b>1.3</b>	<b>0.0</b>	<b>0.0</b>	<b>0.3</b>	<b>0.2</b>	<b>56.8</b>	<b>2.8</b>	<b>2.1</b>	<b>0.7</b>

Assumed a ratio of 500/1000 based on the corresponding Btu values with respect to natural gas combustion emission factors.

		Annual Average (lb/yr)														
	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene	SO <sub>x</sub>
Site 1	2246.4	604.8	121.0	129.6	0.46	11.98	0.29	0.007	0.005	0.074	0.05	12.63	0.63	0.47	0.16	402
Site 2	7862.4	2116.8	423.4	453.6	1.61	41.91	1.03	0.024	0.018	0.260	0.16	44.21	2.21	1.65	0.57	1407



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Table H.2.RPA.Un.2025-12. 2025 Reduced Project Alternative Main Engines Average Daily Unmitigated Emissions (BP).

Ship	Direction	Mode	Distance (nautical miles)	Ship speed (knots)	Activity (hours)	Maximum Speed (knots)	Load Factor	MCR (kW)	Energy (kW-hr)	Fuel Type	Shipcalls (vessels/ yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)	
AFRAMAX	South In	Cruising - CW to VSR	23	12	1.92	16.1	0.414	12,477	9,902	Dist at 0.2	27	12,514	1,031	442	213	213	196	573	
		Cruising - VSR to PZ	11	12	0.92	16.1	0.414	12,477	4,736	Dist at 0.2	27	5,985	493	211	102	102	94	274	
		Cruising - PZ to Pilot	4.7	7	0.67	16.1	0.082	12,477	689	Dist at 0.2	27	870	72	31	15	15	14	40	
	South Out	Maneuvering - Pilot to Berth			3	1.00	16.1	0.006	12,477	81	Dist at 0.2	27	102	8	4	2	2	2	5
		Maneuvering - Berth to Pilot			5	1.00	16.1	0.030	12,477	374	Dist at 0.2	27	472	39	17	8	8	7	22
		Cruising - Pilot to PZ	3.5	7	0.50	16.1	0.082	12,477	513	Dist at 0.2	27	648	53	23	11	11	10	30	
		Cruising - PZ to VSR	12.5	12	1.04	16.1	0.414	12,477	5,382	Dist at 0.2	27	6,801	560	240	116	116	107	311	
		Cruising - VSR to CW	24.5	12	2.04	16.1	0.414	12,477	10,548	Dist at 0.2	27	13,330	1,098	470	227	227	209	610	
		<b>TOTAL</b>											<b>40,722</b>	<b>3,354</b>	<b>1,437</b>	<b>695</b>	<b>695</b>	<b>639</b>	<b>1,863</b>

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Table H.2.RPA.Un.2025-13. 2025 Reduced Project Alternative Auxiliary Generator Average Daily Unmit Emissions (BP).

Ship	Direction	Mode	Activity (hours)	MCR (kW)	Load Factor	Energy (kW-hr)	Fuel Type	Shipcalls (vessels/yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
AFRAMAX	South In	Cruising	3.50	3,600	0.278	3,508	Dist at 0.2	27	3,624	287	104	73	70	56	238
		Maneuvering	2.00	3,600	0.278	2,002	Dist at 0.2	27	2,068	164	60	42	40	32	136
	South Out	Maneuvering	1.5	3,600	0.278	1,501	Dist at 0.2	27	1,551	123	45	31	30	24	102
		Cruising	3.50	3,600	0.278	3,503	Dist at 0.2	27	3,619	286	104	73	70	56	237
<b>TOTAL</b>									<b>10,863</b>	<b>860</b>	<b>313</b>	<b>218</b>	<b>209</b>	<b>167</b>	<b>712</b>



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Table H.2.RPA.Un.2025-14. 2025 Reduced Project Alternative Boiler Warm-Up Average Daily Unmitigated Emissions (BP).

Shipcalls (vessels/yr)	Vessel Size	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
27.0	Aframax	Dist at 0.2	0.20	102.17	30%	3	50,000	440	110	6	73	51	34	619
<b>TOTAL</b>								<b>440</b>	<b>110</b>	<b>6</b>	<b>73</b>	<b>51</b>	<b>34</b>	<b>619</b>

Table H.2.RPA.Un.2025-15. 2025 Reduced Project Alternative Berth Operations Average Daily Unmitigated Emissions (BP).

Auxiliary Generator Pre-Pumpin

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
27.0	Aframax	400,000	Dist at 0.2	0.20	3,600	27.8%	2.5	2,585	205	74	52	50	40	169
TOTAL								2,585	205	74	52	50	40	169

Boiler Pre-Pumping

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
27.0	Aframax	400,000	Dist at 0.2	0.20	102.17	30.0%	2.5	50,000	366	92	5	61	42	28	516
TOTAL									366	92	5	61	42	28	516

Auxiliary Generator Pumpin

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
27.0	Aframax	400,000	Dist at 0.2	0.20	3,600	55.6%	15.0	31,024	2,455	893	623	598	478	2,034
TOTAL								31,024	2,455	893	623	598	478	2,034

Boiler Pumping

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Inerting Fuel Consumption Savings (lb/1000 bbl offloaded)	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
27.0	Aframax	400,000	Dist at 0.2	0.20	102.17	28.06	15.0	2,835	709	40	469	328	220	3,993
TOTAL								2,835	709	40	469	328	220	3,993

Auxiliary Generator Post-Pumpin

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
27.0	Aframax	400,000	Dist at 0.2	0.20	3,600	27.8%	1.0	1,034	82	30	21	20	16	68
TOTAL								1,034	82	30	21	20	16	68

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**Table H.2.RPA.Un.2025-16.**

**2025 Reduced Project Alternative Summary of Average Daily Unmitigated Vessel Emissions (BP).**

<b>Mode</b>	<b>Equipment</b>	<b>NO<sub>x</sub> Emissions (lb/yr)</b>	<b>CO Emissions (lb/yr)</b>	<b>ROG Emissions (lb/yr)</b>	<b>PM Emissions (lb/yr)</b>	<b>PM<sub>10</sub> Emissions (lb/yr)</b>	<b>PM<sub>2.5</sub> Emissions (lb/yr)</b>	<b>SO<sub>2</sub> Emissions (lb/yr)</b>
Cruising	Main Engines	40,148	3,306	1,417	685	685	630	1,837
Cruising	Aux Generator	7,244	573	208	145	140	112	475
Maneuvering	Main Engines	574	47	20	10	10	9	26
Maneuvering	Aux Generator	3,619	286	104	73	70	56	237
Boiler Warm-up	Boiler	440	110	6	73	51	34	619
Berth Operations	Boiler	3,201	800	45	530	371	248	4,509
Berth Operations	Aux Generator	34,644	2,742	997	695	668	534	2,271
Propulsion	TOTAL	51,585	4,213	1,750	913	904	807	2,575
Non-Propulsion	TOTAL	38,285	3,652	1,048	1,298	1,089	816	7,399
<b>Total Emissions</b>		<b>89,870</b>	<b>7,865</b>	<b>2,798</b>	<b>2,211</b>	<b>1,993</b>	<b>1,623</b>	<b>9,974</b>

<b>Mode</b>	<b>Equipment</b>	<b>NO<sub>x</sub> Emissions (lb/day)</b>	<b>CO Emissions (lb/day)</b>	<b>ROG Emissions (lb/day)</b>	<b>PM Emissions (lb/day)</b>	<b>PM<sub>10</sub> Emissions (lb/day)</b>	<b>PM<sub>2.5</sub> Emissions (lb/day)</b>	<b>SO<sub>2</sub> Emissions (lb/day)</b>
Cruising	Main Engines	110.0	9.1	3.9	1.9	1.9	1.7	5.0
Cruising	Aux Generator	19.8	1.6	0.6	0.4	0.4	0.3	1.3
Maneuvering	Main Engines	1.6	0.1	0.1	0.0	0.0	0.0	0.1
Maneuvering	Aux Generator	9.9	0.8	0.3	0.2	0.2	0.2	0.6
Boiler Warm-up	Boiler	1.2	0.3	0.0	0.2	0.1	0.1	1.7
Berth Operations	Boiler	8.8	2.2	0.1	1.5	1.0	0.7	12.4
Berth Operations	Aux Generator	94.9	7.5	2.7	1.9	1.8	1.5	6.2
Propulsion	TOTAL	141.3	11.5	4.8	2.5	2.5	2.2	7.1
Non-Propulsion	TOTAL	104.9	10.0	2.9	3.6	3.0	2.2	20.3
<b>Total Emissions</b>		<b>246</b>	<b>22</b>	<b>8</b>	<b>6</b>	<b>5</b>	<b>4</b>	<b>27</b>

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Table H.2.RPA.Un.2025-17. 2025 Reduced Project Alternative Tug Main Engines Average Daily Unmitigated Emissions (BP).

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Shipcalls (vessels/yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
AFRAMAX	Maneuvering - Pilot to Berth	1.00	2	4,800	0.50	MGO	27.0	2,972	667	125	128	118	2
	Maneuvering - Berth to Pilc	1.00	2	4,800	0.50	MGO	27.0	2,972	667	125	128	118	2

**TOTAL      5,945      1,335      250      257      236      4**

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Table H.2.RPA.Un.2025-18. 2025 Reduced Project Alternative Tug Auxiliary Generator Engines Average Daily Unmit Emissions (BP).

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Shipcalls (vessels/yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
AFRAMAX	Maneuvering - Pilot to Berth	1.00	2	300	1.00	MGO	27.0	335	74	12	14	13	0
	Maneuvering - Berth to Pilc	1.00	2	300	1.00	MGO	27.0	335	74	12	14	13	0
<b>TOTAL</b>								<b>669</b>	<b>149</b>	<b>24</b>	<b>29</b>	<b>26</b>	<b>0</b>

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Table H.2.RPA.Un.2025-19. 2025 Reduced Project Alternative Summary of Tug Average Daily Unmitigated Emissions (BP).

Mode	Equipment	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Tug Assist	Main Engines	5,945	1,335	250	257	236	4
Tug Assist	Aux Generator	669	149	24	29	26	0
<b>TOTAL</b>		<b>6,614</b>	<b>1,484</b>	<b>274</b>	<b>285</b>	<b>263</b>	<b>5</b>

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Tug Assist	Main Engines	16	3.7	0.7	0.7	0.6	0.0
Tug Assist	Aux Generator	2	0.4	0.1	0.1	0.1	0.0
<b>TOTAL</b>		<b>18</b>	<b>4.1</b>	<b>0.8</b>	<b>0.8</b>	<b>0.7</b>	<b>0.0</b>

Table H.2.RPA.Un.2025-20. 2025 Reduced Project Alternative VDU Crude Average Daily Unmitigated Emissions (BP).

	Annual Vessel Calls	crude vapors from tanks(scf/call)	annual gas usage (mmscf/yr)	mw crude vapors	destruction efficiency
Aframax	27	224,000	6.0	50	98%
<b>TOTAL</b>	<b>27</b>		<b>6.0</b>		

<b>Assumed Distribution based on tank storage volume:</b>	
Site 1	12.5%
Site 2	87.5%

Annual Average (lb/yr)

	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene
EF (lb/MMSCF)	130	35	7	7.5	0.38%	9.90%	0.017	0.0004	0.0003	0.0043	0.0027	0.731	0.0366	0.0272	0.0095
Panamax	393.1	105.8	21.2	22.7	0.0	0.3	0.1	0.0	0.0	0.0	0.0	2.2	0.1	0.1	0.0
<b>TOTAL</b>	<b>393.1</b>	<b>105.8</b>	<b>21.2</b>	<b>22.7</b>	<b>0.0</b>	<b>0.3</b>	<b>0.1</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>2.2</b>	<b>0.1</b>	<b>0.1</b>	<b>0.0</b>

Assumed a ratio of 500/1000 based on the corresponding Btu values with respect to natural gas combustion emission factors.

Annual Average (lb/yr)

	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene	SO <sub>x</sub>
Site 1	49	13.2	2.65	2.8	0.001	0.04	0.006	0.0002	0.0001	0.0016	0.0010	0.28	0.014	0.010	0.004	9
Site 2	344	93	18.5	19.8	0.01	0.26	0.045	0.0011	0.0008	0.011	0.007	1.9	0.10	0.07	0.025	62

Table H.2.RPA.Un.2025-21. 2025 Reduced Project Alternative VDU Legs Average Daily Unmitigated Emissions (BP).

	tanks	crude vapors from tanks on legs(scf/yr)	annual gas usage (mmscf/yr)	mw crude vapors	destruction efficiency
Site 1	4	8640000	34.6	50	98%
Site 2	14	8640000	121.0	50	98%
<b>TOTAL</b>	<b>18</b>		<b>155.5</b>		

<b>48</b>	<b>hr/event</b>
<b>6</b>	<b>events/yr</b>
<b>500</b>	<b>ft3/min</b>

		Annual Average (lb/yr)													
	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene
EF (lb/MMSCF)	130	35	7	7.5	0.38%	9.90%	0.017	0.0004	0.0003	0.0043	0.0027	0.731	0.0366	0.0272	0.0095
<b>TOTAL</b>	<b>10108.8</b>	<b>2721.6</b>	<b>544.3</b>	<b>583.2</b>	<b>2.1</b>	<b>53.9</b>	<b>1.3</b>	<b>0.0</b>	<b>0.0</b>	<b>0.3</b>	<b>0.2</b>	<b>56.8</b>	<b>2.8</b>	<b>2.1</b>	<b>0.7</b>

Assumed a ratio of 500/1000 based on the corresponding Btu values with respect to natural gas combustion emission factors.

		Annual Average (lb/yr)														
	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene	SO <sub>x</sub>
Site 1	2246.4	604.8	121.0	129.6	0.46	11.98	0.29	0.007	0.005	0.074	0.05	12.63	0.63	0.47	0.16	402
Site 2	7862.4	2116.8	423.4	453.6	1.61	41.91	1.03	0.024	0.018	0.260	0.16	44.21	2.21	1.65	0.57	1407





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Table H.2.RPA.Un.2025-23. 2025 Reduced Project Alternative BP Berth Summary.

Operation	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Tanker Cruising and Maneuvering	51,585	4,213	1,750	913	904	807	2,575
Tanker Hoteling	34,644	2,742	997	695	668	534	2,271
Offloading Emissions	3,201	800	45	530	371	248	4,509
Transiting Operations	440	110	6	73	51	34	619
Tug Assistance	6,614	1,484	274	---	285	263	5
Tanks	---	---	2,876	---	---	---	---
Vapor Destruction Units	10,502	2,827	565	---	606	---	1,879
Valves, Flanges, Pumps	---	---	1,188	---	---	---	---
<b>TOTAL</b>	<b>106,986</b>	<b>12,176</b>	<b>7,701</b>	<b>2,211</b>	<b>2,885</b>	<b>1,885</b>	<b>11,858</b>

Operation	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Tanker Cruising and Maneuvering	141	12	5	3	2	2	7
Tanker Hoteling	95	8	3	2	2	1	6
Offloading Emissions	9	2	0	1	1	1	12
Transiting Operations	1	0.3	0.02	0.2	0.1	0.09	2
Tug Assistance	18	4	0.8	---	0.8	0.7	0.0
Tanks	---	---	7.9	---	---	---	---
Vapor Destruction Units	29	8	2	---	2	---	5
Valves, Flanges, Pumps	---	---	3	---	---	---	---
<b>TOTAL</b>	<b>293</b>	<b>33</b>	<b>21</b>	<b>6</b>	<b>8</b>	<b>5</b>	<b>32</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Un.2025-24. 2025 Reduced Project Alternative Main Engines Average Daily Unmitigated Emissions (Tesoro)

Ship	Direction	Mode	Distance (nautical miles)	Ship speed (knots)	Activity (hours)	Maximum Speed (knots)	Load Factor	MCR (kW)	Energy (kW-hr)	Fuel Type	Shipcalls (vessels/ yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)	
AFRAMAX	South In	Cruising - CW to VSR	23	12	1.92	16.1	0.414	12,477	9,902	Dist at 0.2	68	31,516	2,595	1,112	538	538	495	1,442	
		Cruising - VSR to PZ	11	12	0.92	16.1	0.414	12,477	4,736	Dist at 0.2	68	15,073	1,241	532	257	257	237	690	
		Cruising - PZ to Pilot	4.7	7	0.67	16.1	0.082	12,477	689	Dist at 0.2	68	2,191	180	77	37	37	34	100	
	South Out	Maneuvering - Pilot to Berth			3	1.00	16.1	0.006	12,477	81	Dist at 0.2	68	257	21	9	4	4	4	12
		Maneuvering - Berth to Pilot			5	1.00	16.1	0.030	12,477	374	Dist at 0.2	68	1,189	98	42	20	20	19	54
		Cruising - Pilot to PZ	3.5	7	0.50	16.1	0.082	12,477	513	Dist at 0.2	68	1,632	134	58	28	28	26	75	
		Cruising - PZ to VSR	12.5	12	1.04	16.1	0.414	12,477	5,382	Dist at 0.2	68	17,128	1,411	605	292	292	269	784	
		Cruising - VSR to CW	24.5	12	2.04	16.1	0.414	12,477	10,548	Dist at 0.2	68	33,572	2,765	1,185	573	573	527	1,536	
<b>TOTAL</b>												<b>102,559</b>	<b>8,446</b>	<b>3,620</b>	<b>1,750</b>	<b>1,750</b>	<b>1,610</b>	<b>4,692</b>	

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Un.2025-25. 2025 Reduced Project Alternative Auxiliary Generator Average Daily Unmit Emissions (Tesoro).

Ship	Direction	Mode	Activity (hours)	MCR (kW)	Load Factor	Energy (kW-hr)	Fuel Type	Shipcalls (vessels/yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
AFRAMAX	South In	Cruising	3.50	3,600	0.278	3,508	Dist at 0.2	68	9,128	722	263	183	176	141	598
		Maneuvering	2.00	3,600	0.278	2,002	Dist at 0.2	68	5,209	412	150	105	100	80	341
	South Out	Maneuvering	1.5	3,600	0.278	1,501	Dist at 0.2	68	3,907	309	112	78	75	60	256
		Cruising	3.50	3,600	0.278	3,503	Dist at 0.2	68	9,116	721	262	183	176	141	598
<b>TOTAL</b>									<b>27,360</b>	<b>2,165</b>	<b>787</b>	<b>549</b>	<b>527</b>	<b>422</b>	<b>1,793</b>

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Table H.2.RPA.Un.2025-26. 2025 Reduced Project Alternative Boiler Warm-Up Average Daily Unmitigated Emissions (Tesoro).

Shipcalls (vessels/yr)	Vessel Size	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
68.0	Aframax	Dist at 0.2	0.20	102.17	30%	3	50,000	1,107	277	16	183	128	86	1,560
<b>TOTAL</b>								<b>1,107</b>	<b>277</b>	<b>16</b>	<b>183</b>	<b>128</b>	<b>86</b>	<b>1,560</b>

Table H.2.RPA.Un.2025-27. 2025 Reduced Project Alternative Berth Operations Average Daily Unmitigated Emissions (Tesoro).

Auxiliary Generator Pre-Pumpin

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
68.0	Aframax	400,000	Dist at 0.2	0.20	3,600	27.8%	2.5	6,511	515	187	131	125	100	427
TOTAL								6,511	515	187	131	125	100	427

Boiler Pre-Pumpin

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (lb/hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
68.0	Aframax	400,000	Dist at 0.2	0.20	102.17	30.0%	2.5	50,000	923	231	13	153	107	71	1,300
TOTAL									923	231	13	153	107	71	1,300

Auxiliary Generator Pumpin

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
68.0	Aframax	400,000	Dist at 0.2	0.20	3,600	55.6%	15.0	78,135	6,183	2,248	1,568	1,506	1,204	5,122
TOTAL								78,135	6,183	2,248	1,568	1,506	1,204	5,122

Boiler Pumpin

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Inerting Fuel Consumption Savings (lb/1000 bbl offloaded)	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
68.0	Aframax	400,000	Dist at 0.2	0.20	102.17	28.06	15.0	7,140	1,785	101	1,182	827	553	10,056
TOTAL								7,140	1,785	101	1,182	827	553	10,056

Auxiliary Generator Post-Pumpin

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
68.0	Aframax	400,000	Dist at 0.2	0.20	3,600	27.8%	1.0	2,605	206	75	52	50	40	171
TOTAL								2,605	206	75	52	50	40	171

**Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR**

**Table H.2.RPA.Un.2025-28.**

**2025 Reduced Project Alternative Summary of Average Daily Unmitigated Vessel Emissions (Tesoro).**

<b>Mode</b>	<b>Equipment</b>	<b>NO<sub>x</sub> Emissions (lb/yr)</b>	<b>CO Emissions (lb/yr)</b>	<b>ROG Emissions (lb/yr)</b>	<b>PM Emissions (lb/yr)</b>	<b>PM<sub>10</sub> Emissions (lb/yr)</b>	<b>PM<sub>2.5</sub> Emissions (lb/yr)</b>	<b>SO<sub>2</sub> Emissions (lb/yr)</b>
Cruising	Main Engines	101,113	8,327	3,569	1,725	1,725	1,587	4,626
Cruising	Aux Generator	18,244	1,444	525	366	352	281	1,196
Maneuvering	Main Engines	1,446	119	51	25	25	23	66
Maneuvering	Aux Generator	9,116	721	262	183	176	141	598
Boiler Warm-up	Boiler	1,107	277	16	183	128	86	1,560
Berth Operations	Boiler	8,063	2,016	114	1,334	934	625	11,356
Berth Operations	Aux Generator	87,251	6,905	2,511	1,751	1,681	1,345	5,719
Propulsion	TOTAL	129,919	10,611	4,407	2,299	2,277	2,031	6,486
Non-Propulsion	TOTAL	96,421	9,197	2,640	3,269	2,744	2,055	18,635
<b>Total Emissions</b>		<b>226,340</b>	<b>19,808</b>	<b>7,047</b>	<b>5,568</b>	<b>5,020</b>	<b>4,087</b>	<b>25,120</b>

<b>Mode</b>	<b>Equipment</b>	<b>NO<sub>x</sub> Emissions (lb/day)</b>	<b>CO Emissions (lb/day)</b>	<b>ROG Emissions (lb/day)</b>	<b>PM Emissions (lb/day)</b>	<b>PM<sub>10</sub> Emissions (lb/day)</b>	<b>PM<sub>2.5</sub> Emissions (lb/day)</b>	<b>SO<sub>2</sub> Emissions (lb/day)</b>
Cruising	Main Engines	277.0	22.8	9.8	4.7	4.7	4.3	12.7
Cruising	Aux Generator	50.0	4.0	1.4	1.0	1.0	0.8	3.3
Maneuvering	Main Engines	4.0	0.3	0.1	0.1	0.1	0.1	0.2
Maneuvering	Aux Generator	25.0	2.0	0.7	0.5	0.5	0.4	1.6
Boiler Warm-up	Boiler	3.0	0.8	0.0	0.5	0.4	0.2	4.3
Berth Operations	Boiler	22.1	5.5	0.3	3.7	2.6	1.7	31.1
Berth Operations	Aux Generator	239.0	18.9	6.9	4.8	4.6	3.7	15.7
Propulsion	TOTAL	355.9	29.1	12.1	6.3	6.2	5.6	17.8
Non-Propulsion	TOTAL	264.2	25.2	7.2	9.0	7.5	5.6	51.1
<b>Total Emissions</b>		<b>620</b>	<b>54</b>	<b>19</b>	<b>15</b>	<b>14</b>	<b>11</b>	<b>69</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Un.2025-29. 2025 Reduced Project Alternative Tug Main Engines Average Daily Unmitigated Emissions (Tesoro).

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Shipcalls (vessels/yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
AFRAMAX	Maneuvering - Pilot to Berth	1.00	2	4,800	0.50	MGO	68.0	7,486	1,681	315	324	298	5
	Maneuvering - Berth to Pilc	1.00	2	4,800	0.50	MGO	68.0	7,486	1,681	315	324	298	5
<b>TOTAL</b>								<b>14,972</b>	<b>3,361</b>	<b>629</b>	<b>647</b>	<b>595</b>	<b>11</b>



Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Un.2025-30. 2025 Reduced Project Alternative Tug Auxiliary Generator Engines Average Daily Unmit Emissions (Tesoro).

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Shipcalls (vessels/yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
AFRAMAX	Maneuvering - Pilot to Berth	1.00	2	300	1.00	MGO	68.0	843	188	30	36	33	0
	Maneuvering - Berth to Pilc	1.00	2	300	1.00	MGO	68.0	843	188	30	36	33	0
<b>TOTAL</b>								<b>1,685</b>	<b>375</b>	<b>61</b>	<b>72</b>	<b>66</b>	<b>1</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Un.2025-31. 2025 Reduced Project Alternative Summary of Tug Average Daily Unmitigated Emissions (Tesoro).

Mode	Equipment	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Tug Assist	Main Engines	14,972	3,361	629	647	595	11
Tug Assist	Aux Generator	1,685	375	61	72	66	1
<b>TOTAL</b>		<b>16,657</b>	<b>3,736</b>	<b>690</b>	<b>719</b>	<b>661</b>	<b>12</b>

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Tug Assist	Main Engines	41	9.2	1.7	1.8	1.6	0.0
Tug Assist	Aux Generator	5	1.0	0.2	0.2	0.2	0.0
<b>TOTAL</b>		<b>46</b>	<b>10.2</b>	<b>1.9</b>	<b>2.0</b>	<b>1.8</b>	<b>0.0</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Un.2025-32. 2025 Reduced Project Alternative VDU Crude Average Daily Unmitigated Emissions (Tesoro).

	Annual Vessel Calls	crude vapors from tanks(scf/call)	annual gas usage (mmscf/yr)	mw crude vapors	destruction efficiency
Aframax	68	224,000	15.2	50	98%
<b>TOTAL</b>	<b>68</b>		<b>15.2</b>		

<b>Assumed Distribution based on tank storage volume:</b>	
Site 1	12.5%
Site 2	87.5%

Annual Average (lb/yr)

	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene
EF (lb/MMSCF)	130	35	7	7.5	0.38%	9.90%	0.017	0.0004	0.0003	0.0043	0.0027	0.731	0.0366	0.0272	0.0095
Panamax	990.1	266.6	53.3	57.1	0.0	0.8	0.1	0.0	0.0	0.0	0.0	5.6	0.3	0.2	0.1
<b>TOTAL</b>	<b>990.1</b>	<b>266.6</b>	<b>53.3</b>	<b>57.1</b>	<b>0.0</b>	<b>0.8</b>	<b>0.1</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>5.6</b>	<b>0.3</b>	<b>0.2</b>	<b>0.1</b>

Assumed a ratio of 500/1000 based on the corresponding Btu values with respect to natural gas combustion emission factors.

Annual Average (lb/yr)

	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene	SO <sub>x</sub>
Site 1	124	33.3	6.66	7.1	0.004	0.09	0.016	0.0004	0.0003	0.0041	0.0026	0.70	0.035	0.026	0.009	22
Site 2	866	233	46.6	50.0	0.03	0.66	0.113	0.0027	0.0020	0.029	0.018	4.9	0.24	0.18	0.063	155

Table H.2.RPA.Un.2025-33. 2025 Reduced Project Alternative VDU Legs Average Daily Unmitigated Emissions (Tesoro).

	tanks	crude vapors from tanks on legs(scf/yr)	annual gas usage (mmscf/yr)	mw crude vapors	destruction efficiency
Site 1	4	8640000	34.6	50	98%
Site 2	14	8640000	121.0	50	98%
<b>TOTAL</b>	<b>18</b>		<b>155.5</b>		

<b>48</b>	<b>hr/event</b>
<b>6</b>	<b>events/yr</b>
<b>500</b>	<b>ft3/min</b>

		Annual Average (lb/yr)													
	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene
EF (lb/MMSCF)	130	35	7	7.5	0.38%	9.90%	0.017	0.0004	0.0003	0.0043	0.0027	0.731	0.0366	0.0272	0.0095
<b>TOTAL</b>	<b>10108.8</b>	<b>2721.6</b>	<b>544.3</b>	<b>583.2</b>	<b>2.1</b>	<b>53.9</b>	<b>1.3</b>	<b>0.0</b>	<b>0.0</b>	<b>0.3</b>	<b>0.2</b>	<b>56.8</b>	<b>2.8</b>	<b>2.1</b>	<b>0.7</b>

Assumed a ratio of 500/1000 based on the corresponding Btu values with respect to natural gas combustion emission factors.

		Annual Average (lb/yr)														
	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene	SO <sub>x</sub>
Site 1	2246.4	604.8	121.0	129.6	0.46	11.98	0.29	0.007	0.005	0.074	0.05	12.63	0.63	0.47	0.16	402
Site 2	7862.4	2116.8	423.4	453.6	1.61	41.91	1.03	0.024	0.018	0.260	0.16	44.21	2.21	1.65	0.57	1407



**Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR**

**Table H.2.RPA.Un.2025-35. 2025 Reduced Project Alternative Tesoro Berth Summary.**

<b>Operation</b>	<b>NO<sub>x</sub> Emissions (lb/yr)</b>	<b>CO Emissions (lb/yr)</b>	<b>ROG Emissions (lb/yr)</b>	<b>PM Emissions (lb/yr)</b>	<b>PM<sub>10</sub> Emissions (lb/yr)</b>	<b>PM<sub>2.5</sub> Emissions (lb/yr)</b>	<b>SO<sub>2</sub> Emissions (lb/yr)</b>
Tanker Cruising and Manuevering	129,919	10,611	4,407	2,299	2,277	2,031	6,486
Tanker Hoteling	87,251	6,905	2,511	1,751	1,681	1,345	5,719
Offloading Emissions	8,063	2,016	114	1,334	934	625	11,356
Transiting Operations	1,107	277	16	183	128	86	1,560
Tug Assistance	16,657	3,736	690	---	719	661	12
Tanks	---	---	2,876	---	---	---	---
Vapor Destruction Units	11,099	2,988	598	---	640	---	1,986
Valves, Flanges, Pumps	---	---	1,188	---	---	---	---
<b>TOTAL</b>	<b>254,096</b>	<b>26,533</b>	<b>12,398</b>	<b>5,568</b>	<b>6,380</b>	<b>4,748</b>	<b>27,118</b>

<b>Operation</b>	<b>NO<sub>x</sub> Emissions (lb/day)</b>	<b>CO Emissions (lb/day)</b>	<b>ROG Emissions (lb/day)</b>	<b>PM Emissions (lb/day)</b>	<b>PM<sub>10</sub> Emissions (lb/day)</b>	<b>PM<sub>2.5</sub> Emissions (lb/day)</b>	<b>SO<sub>2</sub> Emissions (lb/day)</b>
Tanker Cruising and Manuevering	356	29	12	6	6	6	18
Tanker Hoteling	239	19	7	5	5	4	16
Offloading Emissions	22	6	0	4	3	2	31
Transiting Operations	3	0.8	0.04	0.5	0.4	0.24	4
Tug Assistance	46	10	1.9	---	2.0	1.8	0.0
Tanks	---	---	7.9	---	---	---	---
Vapor Destruction Units	30	8	2	---	2	---	5
Valves, Flanges, Pumps	---	---	3	---	---	---	---
<b>TOTAL</b>	<b>696</b>	<b>73</b>	<b>34</b>	<b>15</b>	<b>17</b>	<b>13</b>	<b>74</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Un.2025-36. 2025 Reduced Project Alternative Main Engines Average Daily Unmitigated Emissions (Exxon Mobil)

Ship	Direction	Mode	Distance (nautical miles)	Ship speed (knots)	Activity (hours)	Maximum Speed (knots)	Load Factor	MCR (kW)	Energy (kW-hr)	Fuel Type	Shipcalls (vessels/ yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)	
PANAMAX	South In	Cruising - CW to VSR	23	12	1.92	15.8	0.438	10,300	8,649	Dist at 0.2	114	46,149	3,801	1,629	787	787	724	2,111	
		Cruising - VSR to PZ	11	12	0.92	15.8	0.438	10,300	4,136	Dist at 0.2	114	22,071	1,818	779	377	377	346	1,010	
		Cruising - PZ to Pilot	4.7	7	0.67	15.8	0.087	10,300	601	Dist at 0.2	114	3,209	264	113	55	55	50	147	
	South Out	Maneuvering - Pilot to Berth			3	1.00	15.8	0.007	10,300	71	Dist at 0.2	114	376	31	13	6	6	6	17
		Maneuvering - Berth to Pilot			5	1.00	15.8	0.032	10,300	326	Dist at 0.2	114	1,742	143	61	30	30	27	80
		Cruising - Pilot to PZ	3.5	7	0.50	15.8	0.087	10,300	448	Dist at 0.2	114	2,390	197	84	41	41	38	109	
		Cruising - PZ to VSR	12.5	12	1.04	15.8	0.438	10,300	4,700	Dist at 0.2	114	25,081	2,066	885	428	428	394	1,148	
		Cruising - VSR to CW	24.5	12	2.04	15.8	0.438	10,300	9,213	Dist at 0.2	114	49,159	4,048	1,735	839	839	772	2,249	
		<b>TOTAL</b>											<b>150,177</b>	<b>12,368</b>	<b>5,300</b>	<b>2,562</b>	<b>2,562</b>	<b>2,357</b>	<b>6,871</b>

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Table H.2.RPA.Un.2025-37. 2025 Reduced Project Alternative Auxiliary Generator Average Daily Unmit Emissions (Exxon Mobil).

Ship	Direction	Mode	Activity (hours)	MCR (kW)	Load Factor	Energy (kW-hr)	Fuel Type	Shipcalls (vessels/yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
PANAMAX	South In	Cruising	3.50	3,600	0.278	3,508	Dist at 0.2	114	15,303	1,211	440	307	295	236	1,003
		Maneuvering	2.00	3,600	0.278	2,002	Dist at 0.2	114	8,733	691	251	175	168	135	572
	South Out	Maneuvering	1.5	3,600	0.278	1,501	Dist at 0.2	114	6,550	518	188	131	126	101	429
		Cruising	3.58	3,600	0.278	3,586	Dist at 0.2	114	15,646	1,238	450	314	301	241	1,026
<b>TOTAL</b>									<b>46,232</b>	<b>3,659</b>	<b>1,330</b>	<b>928</b>	<b>891</b>	<b>713</b>	<b>3,030</b>



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Table H.2.RPA.Un.2025-38. 2025 Reduced Project Alternative Boiler Warm-Up Average Daily Unmitigated Emissions (Exxon Mobil).

Shipcalls (vessels/yr)	Vessel Size	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
114.0	Panamax	Dist at 0.2	0.20	59.91	30%	3	35,000	762	191	11	126	88	59	1,073
<b>TOTAL</b>								<b>762</b>	<b>191</b>	<b>11</b>	<b>126</b>	<b>88</b>	<b>59</b>	<b>1,073</b>

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Table H.2.RPA.Un.2025-39. 2025 Reduced Project Alternative Berth Operations Average Daily Unmitigated Emissions (Exxon Mobil).

Auxiliary Generator Pre-Pumpin

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
114.0	Panamax	300,000	Dist at 0.2	0.20	3,600	27.8%	2.5	10,916	864	314	219	210	168	716

AMP Reduction 70%

TOTAL 3,275 259 94 66 63 50 215

Boiler Pre-Pumpin

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bb/hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
114.0	Panamax	300,000	Dist at 0.2	0.20	59.91	30.0%	2.5	35,000	635	159	9	105	74	49	894

TOTAL 635 159 9 105 74 49 894

Auxiliary Generator Pumpin

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
114.0	Panamax	300,000	Dist at 0.2	0.20	3,600	55.6%	11.0	96,060	7,602	2,764	1,928	1,851	1,481	6,297

AMP Reduction 70%

TOTAL 28,818 2,281 829 578 555 444 1,889

Boiler Pumpin

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Inerting Fuel Consumption Savings (lb/1000 bbl offloaded)	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
114.0	Panamax	300,000	Dist at 0.2	0.20	59.91	28.06	11.0	3,858	965	54	638	447	299	5,434

TOTAL 3,858 965 54 638 447 299 5,434

Auxiliary Generator Post-Pumpin

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
114.0	Panamax	300,000	Dist at 0.2	0.20	3,600	27.8%	1.0	4,366	346	126	88	84	67	286

AMP Reduction 70%

TOTAL 1,310 104 38 26 25 20 86

**Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR**

**Table H.2.RPA.Un.2025-40.**

**2025 Reduced Project Alternative Summary of Average Daily Unmitigated Vessel Emissions (Exxon Mobil).**

<b>Mode</b>	<b>Equipment</b>	<b>NO<sub>x</sub> Emissions (lb/yr)</b>	<b>CO Emissions (lb/yr)</b>	<b>ROG Emissions (lb/yr)</b>	<b>PM Emissions (lb/yr)</b>	<b>PM<sub>10</sub> Emissions (lb/yr)</b>	<b>PM<sub>2.5</sub> Emissions (lb/yr)</b>	<b>SO<sub>2</sub> Emissions (lb/yr)</b>
Cruising	Main Engines	148,059	12,193	5,226	2,526	2,526	2,324	6,774
Cruising	Aux Generator	30,949	2,449	891	621	596	477	2,029
Maneuvering	Main Engines	2,118	174	75	36	36	33	97
Maneuvering	Aux Generator	15,282	1,209	440	307	294	236	1,002
Boiler Warm-up	Boiler	762	191	11	126	88	59	1,073
Berth Operations	Boiler	4,493	1,123	63	744	521	348	6,328
Berth Operations	Aux Generator	33,403	2,643	961	670	644	515	2,189
Propulsion	TOTAL	196,409	16,026	6,631	3,490	3,453	3,070	9,901
Non-Propulsion	TOTAL	38,658	3,957	1,035	1,540	1,252	922	9,591
<b>Total Emissions</b>		<b>235,067</b>	<b>19,983</b>	<b>7,666</b>	<b>5,030</b>	<b>4,705</b>	<b>3,992</b>	<b>19,492</b>

<b>Mode</b>	<b>Equipment</b>	<b>NO<sub>x</sub> Emissions (lb/day)</b>	<b>CO Emissions (lb/day)</b>	<b>ROG Emissions (lb/day)</b>	<b>PM Emissions (lb/day)</b>	<b>PM<sub>10</sub> Emissions (lb/day)</b>	<b>PM<sub>2.5</sub> Emissions (lb/day)</b>	<b>SO<sub>2</sub> Emissions (lb/day)</b>
Cruising	Main Engines	405.6	33.4	14.3	6.9	6.9	6.4	18.6
Cruising	Aux Generator	84.8	6.7	2.4	1.7	1.6	1.3	5.6
Maneuvering	Main Engines	5.8	0.5	0.2	0.1	0.1	0.1	0.3
Maneuvering	Aux Generator	41.9	3.3	1.2	0.8	0.8	0.6	2.7
Boiler Warm-up	Boiler	2.1	0.5	0.0	0.3	0.2	0.2	2.9
Berth Operations	Boiler	12.3	3.1	0.2	2.0	1.4	1.0	17.3
Berth Operations	Aux Generator	91.5	7.2	2.6	1.8	1.8	1.4	6.0
Propulsion	TOTAL	538.1	43.9	18.2	9.6	9.5	8.4	27.1
Non-Propulsion	TOTAL	105.9	10.8	2.8	4.2	3.4	2.5	26.3
<b>Total Emissions</b>		<b>644</b>	<b>55</b>	<b>21</b>	<b>14</b>	<b>13</b>	<b>11</b>	<b>53</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Un.2025-41. 2025 Reduced Project Alternative Tug Main Engines Average Daily Unmitigated Emissions (Exxon Mobil).

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Shipcalls (vessels/yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
PANAMAX	Maneuvering - Pilot to Berth	1.00	2	4,800	0.50	MGO	114.0	12,550	2,817	527	542	499	9
	Maneuvering - Berth to Pilc	1.00	2	4,800	0.50	MGO	114.0	12,550	2,817	527	542	499	9
<b>TOTAL</b>								<b>25,100</b>	<b>5,635</b>	<b>1,055</b>	<b>1,085</b>	<b>998</b>	<b>18</b>

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Table H.2.RPA.Un.2025-42. 2025 Reduced Project Alternative Tug Auxiliary Generator Engines Average Daily Unmit Emissions (Exxon Mobil).

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Shipcalls (vessels/yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
PANAMAX	Maneuvering - Pilot to Berth	1.00	2	300	1.00	MGO	114.0	1,412	315	51	60	55	1
	Maneuvering - Berth to Pilc	1.00	2	300	1.00	MGO	114.0	1,412	315	51	60	55	1
<b>TOTAL</b>								<b>2,825</b>	<b>629</b>	<b>102</b>	<b>121</b>	<b>111</b>	<b>2</b>

Table H.2.RPA.Un.2025-43. 2025 Reduced Project Alternative Summary of Tug Average Daily Unmitigated Emissions (Exxon Mobil).

Mode	Equipment	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Tug Assist	Main Engines	25,100	5,635	1,055	1,085	998	18
Tug Assist	Aux Generator	2,825	629	102	121	111	2
<b>TOTAL</b>		<b>27,925</b>	<b>6,264</b>	<b>1,156</b>	<b>1,205</b>	<b>1,109</b>	<b>20</b>

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Tug Assist	Main Engines	69	15.4	2.9	3.0	2.7	0.0
Tug Assist	Aux Generator	8	1.7	0.3	0.3	0.3	0.0
<b>TOTAL</b>		<b>77</b>	<b>17.2</b>	<b>3.2</b>	<b>3.3</b>	<b>3.0</b>	<b>0.1</b>

Table H.2.RPA.Un.2025-44. 2025 Reduced Project Alternative VDU Crude Average Daily Unmitigated Emissions (Exxon Mobil).

	Annual Vessel Calls	crude vapors from tanks(scf/call)	annual gas usage (mmscf/yr)	mw crude vapors	destruction efficiency
Panamax	114	116,667	13.3	50	98%
<b>TOTAL</b>	<b>114</b>		<b>13.3</b>		

<b>Assumed Distribution based on tank storage volume:</b>	
Site 1	12.5%
Site 2	87.5%

Annual Average (lb/yr)

	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene
EF (lb/MMSCF)	130	35	7	7.5	0.38%	9.90%	0.017	0.0004	0.0003	0.0043	0.0027	0.731	0.0366	0.0272	0.0095
Panamax	864.5	232.8	46.6	49.9	0.0	0.7	0.1	0.0	0.0	0.0	0.0	4.9	0.2	0.2	0.1
<b>TOTAL</b>	<b>864.5</b>	<b>232.8</b>	<b>46.6</b>	<b>49.9</b>	<b>0.0</b>	<b>0.7</b>	<b>0.1</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>4.9</b>	<b>0.2</b>	<b>0.2</b>	<b>0.1</b>

Assumed a ratio of 500/1000 based on the corresponding Btu values with respect to natural gas combustion emission factors.

Annual Average (lb/yr)

	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene	SO <sub>x</sub>
Site 1	108	29.1	5.82	6.2	0.003	0.08	0.014	0.0003	0.0002	0.0036	0.0022	0.61	0.030	0.023	0.008	19
Site 2	756	204	40.7	43.6	0.02	0.58	0.099	0.0023	0.0017	0.025	0.016	4.3	0.21	0.16	0.055	135

Table H.2.RPA.Un.2025-45. 2025 Reduced Project Alternative VDU Legs Average Daily Unmitigated Emissions (Exxon Mobil).

	tanks	crude vapors from tanks on legs(scf/yr)	annual gas usage (mmscf/yr)	mw crude vapors	destruction efficiency
Site 1	4	8640000	34.6	50	98%
Site 2	14	8640000	121.0	50	98%
<b>TOTAL</b>	<b>18</b>		<b>155.5</b>		

<b>48</b>	<b>hr/event</b>
<b>6</b>	<b>events/yr</b>
<b>500</b>	<b>ft3/min</b>

		Annual Average (lb/yr)													
	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene
EF (lb/MMSCF)	130	35	7	7.5	0.38%	9.90%	0.017	0.0004	0.0003	0.0043	0.0027	0.731	0.0366	0.0272	0.0095
<b>TOTAL</b>	<b>10108.8</b>	<b>2721.6</b>	<b>544.3</b>	<b>583.2</b>	<b>2.1</b>	<b>53.9</b>	<b>1.3</b>	<b>0.0</b>	<b>0.0</b>	<b>0.3</b>	<b>0.2</b>	<b>56.8</b>	<b>2.8</b>	<b>2.1</b>	<b>0.7</b>

Assumed a ratio of 500/1000 based on the corresponding Btu values with respect to natural gas combustion emission factors.

		Annual Average (lb/yr)														
	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene	SO <sub>x</sub>
Site 1	2246.4	604.8	121.0	129.6	0.46	11.98	0.29	0.007	0.005	0.074	0.05	12.63	0.63	0.47	0.16	402
Site 2	7862.4	2116.8	423.4	453.6	1.61	41.91	1.03	0.024	0.018	0.260	0.16	44.21	2.21	1.65	0.57	1407





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Table H.2.RPA.Un.2025-47. 2025 Reduced Project Alternative Exxon Mobil Berth Summary.

Operation	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Tanker Cruising and Manuevering	196,409	16,026	6,631	3,490	3,453	3,070	9,901
Tanker Hoteling	33,403	2,643	961	670	644	515	2,189
Offloading Emissions	4,493	1,123	63	744	521	348	6,328
Transiting Operations	762	191	11	126	88	59	1,073
Tug Assistance	27,925	6,264	1,156	---	1,205	1,109	20
Tanks	---	---	2,876	---	---	---	---
Vapor Destruction Units	10,973	2,954	591	---	633	---	1,964
Valves, Flanges, Pumps	---	---	1,188	---	---	---	---
<b>TOTAL</b>	<b>273,965</b>	<b>29,201</b>	<b>13,477</b>	<b>5,030</b>	<b>6,543</b>	<b>5,100</b>	<b>21,476</b>

Operation	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Tanker Cruising and Manuevering	538	44	18	10	9	8	27
Tanker Hoteling	92	7	3	2	2	1	6
Offloading Emissions	12	3	0	2	1	1	17
Transiting Operations	2	1	0.03	0.3	0.2	0.2	3
Tug Assistance	77	17	3.2	---	3.3	3.0	0.1
Tanks	---	---	7.9	---	---	---	---
Vapor Destruction Units	30	8	2	---	2	---	5
Valves, Flanges, Pumps	---	---	3	---	---	---	---
<b>TOTAL</b>	<b>751</b>	<b>80</b>	<b>37</b>	<b>14</b>	<b>18</b>	<b>14</b>	<b>59</b>

Table H.2.RPA.Un.2025-48. 2025 Reduced Project Alternative Overall Berth Summary (BP, Tesoro and Exxon Mobil).

Operation	BP (lb/yr)	Tesoro (lb/yr)	Exxon (lb/yr)	Total (lb/yr)
<b>Tanker Cruising and Manuevering</b>				
NO <sub>x</sub>	51,585	129,919	196,409	377,913
CO	4,213	10,611	16,026	30,851
ROG	1,750	4,407	6,631	12,788
PM	913	2,299	3,490	6,701
PM <sub>10</sub>	904	2,277	3,453	6,633
PM <sub>2.5</sub>	807	2,031	3,070	5,907
SO <sub>2</sub>	2,575	6,486	9,901	18,962
<b>Tanker Hoteling</b>				
NO <sub>x</sub>	34,644	87,251	33,403	155,297
CO	2,742	6,905	2,643	12,290
ROG	997	2,511	961	4,469
PM	695	1,751	670	3,117
PM <sub>10</sub>	668	1,681	644	2,992
PM <sub>2.5</sub>	534	1,345	515	2,394
SO <sub>2</sub>	2,271	5,719	2,189	10,179
<b>Offloading Emissions</b>				
NO <sub>x</sub>	3,201	8,063	4,493	15,757
CO	800	2,016	1,123	3,939
ROG	45	114	63	222
PM	530	1,334	744	2,608
PM <sub>10</sub>	371	934	521	1,825
PM <sub>2.5</sub>	248	625	348	1,221
SO <sub>2</sub>	4,509	11,356	6,328	22,193
<b>Transiting Operations</b>				
NO <sub>x</sub>	440	1,107	762	2,309
CO	110	277	191	577
ROG	6	16	11	33
PM	73	183	126	382
PM <sub>10</sub>	51	128	88	267
PM <sub>2.5</sub>	34	86	59	179
SO <sub>2</sub>	619	1,560	1,073	3,252
<b>Tug Assistance</b>				
NO <sub>x</sub>	6,614	16,657	27,925	51,196
CO	1,484	3,736	6,264	11,483
ROG	274	690	1,156	2,120
PM	---	---	---	---
PM <sub>10</sub>	285	719	1,205	2,210
PM <sub>2.5</sub>	263	661	1,109	2,033
SO <sub>2</sub>	5	12	20	36
<b>Tanks</b>				
NO <sub>x</sub>	---	---	---	---
CO	---	---	---	---
ROG	2,876	2,876	2,876	8,627
PM	---	---	---	---
PM <sub>10</sub>	---	---	---	---
PM <sub>2.5</sub>	---	---	---	---
SO <sub>2</sub>	---	---	---	---
<b>Vapor Destruction Units</b>				
NO <sub>x</sub>	10,502	11,099	10,973	32,574
CO	2,827	2,988	2,954	8,770
ROG	565	598	591	1,754
PM	---	---	---	---
PM <sub>10</sub>	606	640	633	1,879
PM <sub>2.5</sub>	---	---	---	---
SO <sub>2</sub>	1,879	1,986	1,964	5,829
<b>Valves, Flanges, Pumps</b>				
NO <sub>x</sub>	---	---	---	---
CO	---	---	---	---
ROG	1,188	1,188	1,188	3,564
PM	---	---	---	---
PM <sub>10</sub>	---	---	---	---
PM <sub>2.5</sub>	---	---	---	---
SO <sub>2</sub>	---	---	---	---

Operation	BP	Tesoro	Exxon	Total (lb/yr)
<b>Tanker Cruising</b>				
NO <sub>x</sub>	21,548	54,269	83,700	159,517
CO	1,751	4,411	6,793	12,955
ROG	713	1,796	2,752	5,262
PM	389	981	1,521	2,891
PM <sub>10</sub>	384	966	1,496	2,846
PM <sub>2.5</sub>	336	847	1,305	2,488
SO <sub>2</sub>	1,129	2,844	4,442	8,415
<b>Tanker Manuevering</b>				
NO <sub>x</sub>	4,194	10,562	17,400	32,156
CO	334	841	1,384	2,558
ROG	124	313	515	952
PM	82	208	343	633
PM <sub>10</sub>	80	200	331	610
PM <sub>2.5</sub>	65	163	269	497
SO <sub>2</sub>	264	664	1,099	2,026

Table H.2.RPA.Un.Bar.2025-1. 2025 Reduced Project Alternative Main Engines Average Daily Unmitigated Emissions from Barge Fuel Deliveries for OGV.

Ship	Direction	Mode	Distance (nautical miles)	Ship speed (knots)	Activity (hours)	Maximum Speed (knots)	Load Factor	MCR (kW)	Energy (kW-hr)	Fuel Type	Shipcalls (vessels/ yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Barge	North In	Volpak to Berth 408	5	3	1.67	3	0.50	4,800	4,000.00	MGO	8.0	1,163	97	44	63	63	63	71
Barge	North Out	Volpak to Berth 408	5	3	1.67	3.0	0.50	4,800	4,000.00	MGO	8.0	1,163	97	44	63	63	63	71
TOTAL												2,326	194	88	127	127	127	143

Table H.2.RPA.Un.Bar.2025-2. 2025 Reduced Project Alternative Tug Main Engines Average Daily Unmitigated Emissions from Barge Fuel Deliveries for OGV.

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Shipcalls (vessels/yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Barge	Maneuvering - Pilot to Berth	1.00	1	4,800	0.50	MGO	8.0	698	58	26	38	35	43
	Maneuvering - Berth to Pilot	1.00	1	4,800	0.50	MGO	8.0	698	58	26	38	35	43
<b>TOTAL</b>								<b>1,396</b>	<b>116</b>	<b>53</b>	<b>76</b>	<b>70</b>	<b>86</b>

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Table H.2.RPA.Un.Bar.2025-3. 2025 Reduced Project Alternative Tug Auxiliary Generator Engines Average Daily Unmitigated Emissions from Barge Fuel Deliveries for OGV.

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Shipcalls (vessels/yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Barge	Maneuvering - Pilot to Berth	1.00	1	300	1.00	MGO	8.0	66	11	2	3	2	5
	Maneuvering - Berth to Pilot	1.00	1	300	1.00	MGO	8.0	66	11	2	3	2	5
<b>TOTAL</b>								<b>132</b>	<b>22</b>	<b>4</b>	<b>5</b>	<b>5</b>	<b>11</b>

Table H.2.RPA.Un.Bar.2025-4. 2025 Reduced Project Alternative Summary of Tug Average Daily Unmitigated Emissions from Barge Fuel Deliveries for OGV.

Mode	Equipment	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Tug Assist	Main Engines	1,396	116	53	76	70	86
Tug Assist	Aux Generator	132	22	4	5	5	11
<b>TOTAL</b>		<b>1,528</b>	<b>139</b>	<b>56</b>	<b>81</b>	<b>75</b>	<b>96</b>

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Tug Assist	Main Engines	4	0.3	0.1	0.2	0.2	0.2
Tug Assist	Aux Generator	0.36	0.06	0.01	0.01	0.01	0.03
<b>TOTAL</b>		<b>4</b>	<b>0.4</b>	<b>0.2</b>	<b>0.2</b>	<b>0.2</b>	<b>0.3</b>

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Table H.2.RPA.Un.Bar.2025-5. 2025 Reduced Project Alternative Summary of Average Daily Unmitigated Vessel Emissions from Barge Fuel Deliveries for OGV.

Operation	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Barge	2,326	194	88	127	127	143
Tug Assistance	1,528	139	56	81	75	96
<b>TOTAL</b>	<b>3,854</b>	<b>333</b>	<b>145</b>	<b>208</b>	<b>202</b>	<b>239</b>

Operation	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Barge	6.37	0.53	0.24	0.35	0.35	0.39
Tug Assistance	4.19	0.38	0.15	0.22	0.21	0.26
<b>TOTAL</b>	<b>10.56</b>	<b>0.91</b>	<b>0.40</b>	<b>0.57</b>	<b>0.55</b>	<b>0.65</b>



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Table H.2.RPA.Un.Max.2025-1. 2025 Reduced Project Alternative Main Engines Maximum Daily Unmitigated Emissions.

Ship	Direction	Mode	Distance (nautical miles)	Ship speed (knots)	Activity (hours)	Maximum Speed (knots)	Load Factor	MCR (kW)	Energy (kW-hr)	Fuel Type	Maximum Daily Shipcalls (vessels/day)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)	
VLCC	North In	Cruising - CW to VSR	22	15.54	1.42	16.9	0.777	25,400	27,957	HFO	1.0	1,393	108	46	120	120	110	808	
		Cruising - VSR to PZ	21	12	1.75	16.9	0.358	25,400	15,913	HFO	1.0	793	61	26	68	68	63	460	
		Cruising - PZ to Pilot	4.7	7	0.67	16.9	0.071	25,400	1,212	HFO	1.0	86	13	9	9	9	8	35	
	North Out	Maneuvering - Pilot to Berth			3	1.00	16.9	0.006	25,400	142	HFO	1.0	114	20	50	17	17	15	4
		Maneuvering - Berth to Pilot			5	1.00	16.9	0.026	25,400	658	HFO	1.0	98	20	23	13	13	12	19
		Cruising - Pilot to PZ	3.8	7	0.54	16.9	0.071	25,400	980	HFO	1.0	69	11	8	7	7	7	28	
		Cruising - PZ to VSR	21	12	1.75	16.9	0.358	25,400	15,913	HFO	1.0	793	61	26	68	68	63	460	
		Cruising - VSR to CW	22	15.54	1.42	16.9	0.777	25,400	27,957	HFO	1.0	1,393	108	46	120	120	110	808	
		<b>TOTAL</b>											<b>4,740</b>	<b>401</b>	<b>235</b>	<b>422</b>	<b>422</b>	<b>389</b>	<b>2,623</b>
AFRAMAX	South In	Cruising - CW to VSR	23	14.7	1.56	16.1	0.761	12,477	14,859	HFO	1.0	741	57	25	64	64	59	430	
		Cruising - VSR to PZ	11	12	0.92	16.1	0.414	12,477	4,736	HFO	1.0	236	18	8	20	20	19	137	
		Cruising - PZ to Pilot	4.7	7	0.67	16.1	0.082	12,477	689	HFO	1.0	45	6	4	5	5	4	20	
	South Out	Maneuvering - Pilot to Berth			3	1.00	16.1	0.006	12,477	81	HFO	1.0	61	10	23	9	9	8	2
		Maneuvering - Berth to Pilot			5	1.00	16.1	0.030	12,477	374	HFO	1.0	54	10	11	7	7	6	11
		Cruising - Pilot to PZ	3.5	7	0.50	16.1	0.082	12,477	513	HFO	1.0	34	5	3	3	3	3	15	
		Cruising - PZ to VSR	12.5	12	1.04	16.1	0.414	12,477	5,382	HFO	1.0	268	21	9	23	23	21	156	
		Cruising - VSR to CW	24.5	14.7	1.67	16.1	0.761	12,477	15,828	HFO	1.0	789	61	26	68	68	63	458	
		<b>TOTAL</b>											<b>2,228</b>	<b>188</b>	<b>108</b>	<b>199</b>	<b>199</b>	<b>183</b>	<b>1,228</b>
PANAMAX	South In	Cruising - CW to VSR	23	14.7	1.56	15.8	0.805	10,300	12,979	HFO	1.0	647	50	21	56	56	51	375	
		Cruising - VSR to PZ	11	12	0.92	15.8	0.438	10,300	4,136	HFO	1.0	206	16	7	18	18	16	120	
		Cruising - PZ to Pilot	4.7	7	0.67	15.8	0.087	10,300	601	HFO	1.0	30	2	1	3	3	2	17	
	South Out	Maneuvering - Pilot to Berth			3	1.00	15.8	0.007	10,300	71	HFO	1.0	4	0.3	0.1	0.3	0.3	0.3	2
		Maneuvering - Berth to Pilot			5	1.00	15.8	0.032	10,300	326	HFO	1.0	16	1	1	1	1	1	9
		Cruising - Pilot to PZ	3.5	7	0.50	15.8	0.087	10,300	448	HFO	1.0	22	2	1	2	2	2	13	
		Cruising - PZ to VSR	12.5	12	1.04	15.8	0.438	10,300	4,700	HFO	1.0	234	18	8	20	20	19	136	
		Cruising - VSR to CW	24.5	14.7	1.67	15.8	0.805	10,300	13,825	HFO	1.0	689	53	23	59	59	55	400	
		<b>TOTAL</b>											<b>1,848</b>	<b>143</b>	<b>61</b>	<b>159</b>	<b>159</b>	<b>147</b>	<b>1,072</b>
SUEZMAX	North In	Cruising - CW to VSR	22	15.54	1.42	17	0.764	16,000	17,302	HFO	1.0	862	67	29	74	74	68	500	
		Cruising - VSR to PZ	21	12	1.75	17	0.352	16,000	9,848	HFO	1.0	491	38	16	42	42	39	285	
		Cruising - PZ to Pilot	4.7	7	0.67	17	0.070	16,000	750	HFO	1.0	37	3	1	3	3	3	22	
	North Out	Maneuvering - Pilot to Berth			3	1.00	17	0.005	16,000	88	HFO	1.0	4	0.3	0.1	0	0.4	0.3	3
		Maneuvering - Berth to Pilot			5	1.00	17	0.025	16,000	407	HFO	1.0	20	2	1	2	2	2	12
		Cruising - Pilot to PZ	3.8	7	0.54	17	0.070	16,000	606	HFO	1.0	30	2	1	3	3	2	18	
		Cruising - PZ to VSR	21	12	1.75	17	0.352	16,000	9,848	HFO	1.0	491	38	16	42	42	39	285	
		Cruising - VSR to CW	22	15.54	1.42	17	0.764	16,000	17,302	HFO	1.0	862	67	29	74	74	68	500	
		<b>TOTAL</b>											<b>2,798</b>	<b>216</b>	<b>93</b>	<b>241</b>	<b>241</b>	<b>222</b>	<b>1,623</b>
<b>MAXIMUM</b>												<b>4,740</b>	<b>401</b>	<b>235</b>	<b>422</b>	<b>422</b>	<b>389</b>	<b>2,623</b>	

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Table H.2.RPA.Un.Max.2025-2. 2025 Reduced Project Alternative Auxiliary Generator Maximum Daily Unmitigated Emissions.

Ship	Direction	Mode	Activity (hours)	MCR (kW)	Load Factor	Energy (kW-hr)	Fuel Type	Maximum Daily Shipcalls (vessels/day)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
VLCC	North In	Cruising	3.84	3,600	0.278	3,840	HFO	1.0	155	12	4	16	15	12	130
		Maneuvering	2.00	3,600	0.278	2,002	HFO	1.0	81	6	2	8	8	6	68
	North Out	Maneuvering	1.50	3,600	0.278	1,501	HFO	1.0	61	5	2	6	6	5	51
		Cruising	3.71	3,600	0.278	3,712	HFO	1.0	150	11	4	15	15	12	126
<b>TOTAL</b>								<b>447</b>	<b>33</b>	<b>12</b>	<b>46</b>	<b>44</b>	<b>35</b>	<b>374</b>	
AFRAMAX	South In	Cruising	3.15	3,600	0.278	3,155	HFO	1.0	128	10	3	13	13	10	107
		Maneuvering	2.00	3,600	0.278	2,002	HFO	1.0	81	6	2	8	8	6	68
	South Out	Maneuvering	1.50	3,600	0.278	1,501	HFO	1.0	61	5	2	6	6	5	51
		Cruising	3.21	3,600	0.278	3,211	HFO	1.0	130	10	4	13	13	10	109
<b>TOTAL</b>								<b>399</b>	<b>30</b>	<b>11</b>	<b>41</b>	<b>39</b>	<b>31</b>	<b>334</b>	
PANAMAX	South In	Cruising	3.15	3,600	0.278	3,155	HFO	1.0	128	10	3	13	13	10	107
		Maneuvering	2.00	3,600	0.278	2,002	HFO	1.0	81	6	2	8	8	6	68
	South Out	Maneuvering	1.5	3,600	0.278	1,501	HFO	1.0	61	5	2	6	6	5	51
		Cruising	3.21	3,600	0.278	3,211	HFO	1.0	130	10	4	13	13	10	109
<b>TOTAL</b>								<b>399</b>	<b>30</b>	<b>11</b>	<b>41</b>	<b>39</b>	<b>31</b>	<b>334</b>	
SUEZMAX	North In	Cruising	3.84	3,600	0.278	3,840	HFO	1.0	155	12	4	16	15	12	130
		Maneuvering	2.00	3,600	0.278	2,002	HFO	1.0	81	6	2	8	8	6	68
	North Out	Maneuvering	1.5	3,600	0.278	1,501	HFO	1.0	61	5	2	6	6	5	51
		Cruising	3.71	3,600	0.278	3,712	HFO	1.0	150	11	4	15	15	12	126
<b>TOTAL</b>								<b>447</b>	<b>33</b>	<b>12</b>	<b>46</b>	<b>44</b>	<b>35</b>	<b>374</b>	
<b>MAXIMUM</b>								<b>447</b>	<b>33</b>	<b>12</b>	<b>46</b>	<b>44</b>	<b>35</b>	<b>374</b>	

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Table H.2.RPA.Un.Max.2025-3. 2025 Reduced Project Alternative Summary of Maximum Daily Unmitigated Vessel Emissions.

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Cruising	Main Engines	4,527	362	162	393	393	362	2,600
Cruising	Aux Generator	306	23	8	31	30	24	256
Maneuvering	Main Engines	212	39	73	29	29	27	23
Maneuvering	Aux Generator	142	11	4	14	14	11	119
<b>Cruising and Maneuvering</b>	<b>TOTAL</b>	<b>5,187</b>	<b>435</b>	<b>248</b>	<b>468</b>	<b>466</b>	<b>424</b>	<b>2,997</b>

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Table H.2.RPA.Un.Max.2025-4. 2025 Reduced Project Alternative Boiler Warm-Up Maximum Daily Unmitigated Emissions.

Shipcalls (vessels/day)	Vessel Size	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	HFO	2.70	107.96	30%	3	50,000	42	4	1	9	8	5	327
1.0	VLCC	HFO	2.70	84.93	30%	3	90,000	51	5	1	32	28	18	463
1.0	Panamax	HFO	2.70	63.30	30%	3	35,000	17	2	0.4	4	3	2	134
1.0	Suezmax	HFO	2.70	87.54	30%	3	70,000	48	4	1	10	9	6	371

**MAXIMUM      51                      5                      1                      32                      28                      18                      463**

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Table H.2.RPA.Un.Max.2025-5. 2025 Reduced Project Alternative Summary of Boiler Warm-Up Maximum Unmitigated Emissions.

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Boiler Warm-up	Boiler	51	5	1	32	28	18	463

Table H.2.RPA.Un.Max.2025-6. 2025 Reduced Project Alternative Berth Operations Maximum Daily Unmitigated Emissions.

Auxiliary Generator Pre-Pumpin

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	700,000	HFO	2.70	3,600	27.8%	2.5	101	8	3	10	10	8	85
1.0	VLCC	2,000,000	HFO	2.70	3,600	27.8%	2.5	101	8	3	10	10	8	85
1.0	Panamax	350,000	HFO	2.70	3,600	27.8%	2.5	101	8	3	10	10	8	85
1.0	Suezmax	1,000,000	HFO	2.70	3,600	27.8%	2.5	101	8	3	10	10	8	85
<b>MAXIMUM</b>								<b>101</b>	<b>8</b>	<b>3</b>	<b>10</b>	<b>10</b>	<b>8</b>	<b>85</b>

Boiler Pre-Pumping

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	700,000	HFO	2.70	107.96	30.0%	2.5	50,000	35	3	1	7	6	4	273
1.0	VLCC	2,000,000	HFO	2.70	84.93	30.0%	2.5	90,000	43	5	1	27	23	15	386
1.0	Panamax	350,000	HFO	2.70	63.30	30.0%	2.5	35,000	14	1	0	3	3	2	112
1.0	Suezmax	1,000,000	HFO	2.70	87.54	30.0%	2.5	70,000	40	4	1	8	7	5	310
<b>MAXIMUM</b>									<b>43</b>	<b>5</b>	<b>1</b>	<b>27</b>	<b>23</b>	<b>15</b>	<b>386</b>

Auxiliary Generator Pumpin

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	700,000	MDO	0.52	3,600	55.6%	15.0	1,149	91	33	25	24	19	196
1.0	VLCC	2,000,000	MDO	0.52	3,600	55.6%	23.2	1,777	141	51	38	37	29	303
1.0	Panamax	350,000	MDO	0.52	3,600	55.6%	11.0	843	67	24	18	17	14	144
1.0	Suezmax	1,000,000	MDO	0.52	3,600	55.6%	15.3	1,172	93	34	25	24	19	200
<b>MAXIMUM</b>								<b>1,777</b>	<b>141</b>	<b>51</b>	<b>38</b>	<b>37</b>	<b>29</b>	<b>303</b>

Boiler Pumping

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Inerting Fuel Consumption Savings (lb/1000 bbl offloaded)	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	700,000	MDO	0.52	102.17	28.06	15.0	184	46	3	30	21	14	673
1.0	VLCC	2,000,000	MDO	0.52	80.38	28.06	23.2	444	93	20	61	43	29	1,357
1.0	Panamax	350,000	MDO	0.52	59.91	28.06	11.0	39	10	1	7	5	3	145
1.0	Suezmax	1,000,000	MDO	0.52	82.85	28.06	15.3	194	49	3	32	22	15	711
<b>MAXIMUM</b>								<b>444</b>	<b>93</b>	<b>20</b>	<b>61</b>	<b>43</b>	<b>29</b>	<b>1,357</b>

Auxiliary Generator Post-Pumpin

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	700,000	HFO	2.70	3,600	27.8%	1.0	41	3	1	4	4	3	34
1.0	VLCC	2,000,000	HFO	2.70	3,600	27.8%	1.0	41	3	1	4	4	3	34
1.0	Panamax	350,000	HFO	2.70	3,600	27.8%	1.0	41	3	1	4	4	3	34
1.0	Suezmax	1,000,000	HFO	2.70	3,600	27.8%	1.0	41	3	1	4	4	3	34
<b>MAXIMUM</b>								<b>41</b>	<b>3</b>	<b>1</b>	<b>4</b>	<b>4</b>	<b>3</b>	<b>34</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Un.Max.2025-7. 2025 Reduced Project Alternative Summary of Berth Operations Maximum Daily Unmitigated Emissions.

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Berth Operations	Boiler	486	97	21	88	66	44	1,743
Berth Operations	Aux Generator	1,919	151	55	53	51	41	422

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Un.Max.2025-8. 2025 Reduced Project Alternative Tug Main Engines Maximum Daily Unmitigated Emissions.

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Shipcalls (vessels/day)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
VLCC	Maneuvering - Pilot to Berth	1.00	4	4,800	0.50	MGO	1.0	220	49	9	10	9	0
	Maneuvering - Berth to Pilot	1.00	2	4,800	0.50	MGO	1.0	110	25	5	5	4	0
							<b>TOTAL</b>	<b>330</b>	<b>74</b>	<b>14</b>	<b>14</b>	<b>13</b>	<b>0</b>
AFRAMAX	Maneuvering - Pilot to Berth	1.00	2	4,800	0.50	MGO	1.0	110	25	5	5	4	0
	Maneuvering - Berth to Pilot	1.00	2	4,800	0.50	MGO	1.0	110	25	5	5	4	0
							<b>TOTAL</b>	<b>220</b>	<b>49</b>	<b>9</b>	<b>10</b>	<b>9</b>	<b>0</b>
PANAMAX	Maneuvering - Pilot to Berth	1.00	2	4,800	0.50	MGO	1.0	110	25	5	5	4	0
	Maneuvering - Berth to Pilot	1.00	2	4,800	0.50	MGO	1.0	110	25	5	5	4	0
							<b>TOTAL</b>	<b>220</b>	<b>49</b>	<b>9</b>	<b>10</b>	<b>9</b>	<b>0</b>
SUEZMAX	Maneuvering - Pilot to Berth	1.00	3	4,800	0.50	MGO	1.0	165	37	7	7	7	0
	Maneuvering - Berth to Pilot	1.00	2	4,800	0.50	MGO	1.0	110	25	5	5	4	0
							<b>TOTAL</b>	<b>275</b>	<b>62</b>	<b>12</b>	<b>12</b>	<b>11</b>	<b>0</b>
							<b>MAXIMUM</b>	<b>330</b>	<b>74</b>	<b>14</b>	<b>14</b>	<b>13</b>	<b>0</b>



Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Un.Max.2025-9. 2025 Reduced Project Alternative Tug Auxiliary Generator Engines Maximum Daily Unmitigated Emissions.

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Shipcalls (vessels/day)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
VLCC	Maneuvering - Pilot to Berth	1.00	4	300	1.00	MGO	1.0	25	6	1	1	1	0
	Maneuvering - Berth to Pilot	1.00	2	300	1.00	MGO	1.0	12	3	0	1	0	0
AFRAMAX	Maneuvering - Pilot to Berth	1.00	2	300	1.00	MGO	1.0	12	3	0	1	0	0
		1.00	2	300	1.00	MGO	1.0	12	3	0	1	0	0
	TOTAL							37	8	1	2	1	0
PANAMAX	Maneuvering - Pilot to Berth	1.00	2	300	1.00	MGO	1.0	12	3	0	1	0	0
		1.00	2	300	1.00	MGO	1.0	12	3	0	1	0	0
	TOTAL							25	6	1	1	1	0
SUEZMAX	Maneuvering - Pilot to Berth	1.00	3	300	1.00	MGO	1.0	19	4	1	1	1	0
	Maneuvering - Berth to Pilot	1.00	2	300	1.00	MGO	1.0	12	3	0	1	0	0
<b>TOTAL</b>								<b>31</b>	<b>7</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>0</b>
<b>MAXIMUM</b>								<b>37</b>	<b>8</b>	<b>1</b>	<b>2</b>	<b>1</b>	<b>0</b>

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Table H.2.RPA.Un.Max.2025-10. 2025 Reduced Project Alternative Summary of Tug Maximum Daily Unmitigated Emissions.

<b>Mode</b>	<b>Equipment</b>	<b>Maximum Daily NO<sub>x</sub> Emissions (lb/day)</b>	<b>Maximum Daily CO Emissions (lb/day)</b>	<b>Maximum Daily ROG Emissions (lb/day)</b>	<b>Maximum Daily PM<sub>10</sub> Emissions (lb/day)</b>	<b>Maximum Daily PM<sub>2.5</sub> Emissions (lb/day)</b>	<b>Maximum Daily SO<sub>2</sub> Emissions (lb/day)</b>
Tug Assist	Main Engines	330	74	14	14	13	0
Tug Assist	Aux Generator	37	8	1	2	1	0
<b>TOTAL</b>		<b>367</b>	<b>82</b>	<b>15</b>	<b>16</b>	<b>15</b>	<b>0</b>

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Table H.2.RPA.Un.Max.2025-11. 2025 Reduced Project Alternative VDU Crude Maximum Daily Unmitigated Emissions.

	Maximum Daily Vessel Calls	crude vapors from tanks(scft/call)	daily gas usage (mmscf/day)	mw crude vapors	destruction efficiency
Aframax	1	224000	0.2	50	98%
VLCC	1	596,313	0.6	50	98%
Panamax	1	116,667	0.1	50	98%
Suezmax	1	333,333	0.3	50	98%
<b>TOTAL</b>	<b>4</b>		<b>1.3</b>		

Assumed Distribution based on tank storage volume:	
Site 1	12.5%
Site 2	87.5%

Maximum Daily Emissions (lb/day)

	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene
EF (lb/MMSCF)	130	35	7	7.5	0.38%	9.90%	0.017	0.0004	0.0003	0.0043	0.0027	0.731	0.0366	0.0272	0.0095
Aframax	14.6	3.9	0.8	0.8	0.00	0.08	0.0	0.000	0.000	0.000	0.000	0.1	0.0	0.0	0.0
VLCC	38.8	10.4	2.1	2.2	0.01	0.21	0.0	0.000	0.000	0.001	0.001	0.2	0.0	0.0	0.0
Panamax	7.6	2.0	0.4	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Suezmax	21.7	5.8	1.2	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0
<b>MAXIMUM</b>	<b>38.8</b>	<b>10.4</b>	<b>2.1</b>	<b>2.2</b>	<b>0.0</b>	<b>0.2</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.2</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>

Assumed a ratio of 500/1000 based on the corresponding Btu values with respect to natural gas combustion emission factors.

Maximum Daily Emissions (lb/day)

	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene	SO <sub>x</sub>
Site 1	5	1.3	0.26	0.3	0.001	0.03	0.001	0.0000	0.0000	0.0002	0.0001	0.03	0.001	0.001	0.000	2
Site 2	34	9	1.8	2.0	0.01	0.18	0.004	0.0001	0.0001	0.001	0.001	0.2	0.01	0.01	0.002	13

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Table H.2.RPA.Un.Max.2025-12. 2025 Reduced Project Alternative VDU Legs Maximum Daily Unmitigated Emissions.

	tanks	crude vapors from tanks on legs(scfd/day)	daily gas usage (mmscf/day)	mw crude vapors	destruction efficiency
Site 1	4	23671.23	0.09	50	98%
Site 2	14	23671.23	0.3	50	98%
<b>TOTAL</b>	<b>18</b>		<b>0.4</b>		

<b>48</b>	<b>hr/event</b>
<b>6</b>	<b>events/yr</b>
<b>500</b>	<b>ft3/min</b>

Maximum Daily Emissions (lb/day)															
	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene
EF (lb/MMSCF)	130	35	7	7.5	0.38%	9.90%	0.017	0.0004	0.0003	0.0043	0.0027	0.731	0.0366	0.0272	0.0095
<b>TOTAL</b>	<b>27.7</b>	<b>7.5</b>	<b>1.5</b>	<b>1.6</b>	<b>0.0</b>	<b>0.1</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.2</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>

Assumed a ratio of 500/1000 based on the corresponding Btu values with respect to natural gas combustion emission factors.

Maximum Daily Emissions (lb/day)																
	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene	SO <sub>x</sub>
Site 1	6.2	1.7	0.3	0.4	0.00	0.03	0.00	0.000	0.000	0.000	0.00	0.03	0.00	0.00	0.00	1
Site 2	21.5	5.8	1.2	1.2	0.00	0.11	0.00	0.000	0.000	0.001	0.00	0.12	0.01	0.00	0.00	4



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Table H.2.RPA.Un.Max.2025-14. 2025 Reduced Project Alternative Main Engines Maximum Daily Unmitigated Emissions (BP).

Ship	Direction	Mode	Distance (nautical miles)	Ship speed (knots)	Activity (hours)	Maximum Speed (knots)	Load Factor	MCR (kW)	Energy (kW-hr)	Fuel Type	Maximum Daily Shipcalls (vessels/day)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)	
AFRAMAX	South In	Cruising - CW to VSR	23	12	1.92	16.1	0.414	12,477	9,902	Dist at 0.2	1.0	463	38	16	8	8	7	21	
		Cruising - VSR to PZ	11	12	0.92	16.1	0.414	12,477	4,736	Dist at 0.2	1.0	222	18	8	4	4	3	10	
		Cruising - PZ to Pilot	4.7	7	0.67	16.1	0.082	12,477	689	Dist at 0.2	1.0	32	3	1	1	1	1	1	
	South Out	Maneuvering - Pilot to Berth		3	1.00	16.1	0.006	12,477	81	Dist at 0.2	1.0	4	0.3	0.1	0.1	0.1	0.1	0	
		Maneuvering - Berth to Pilot		5	1.00	16.1	0.030	12,477	374	Dist at 0.2	1.0	17	1	1	0	0	0	1	
		Cruising - Pilot to PZ		3.5	7	0.50	16.1	0.082	12,477	513	Dist at 0.2	1.0	24	2	1	0	0	0	1
		Cruising - PZ to VSR		12.5	12	1.04	16.1	0.414	12,477	5,382	Dist at 0.2	1.0	252	21	9	4	4	4	12
		Cruising - VSR to CW		24.5	12	2.04	16.1	0.414	12,477	10,548	Dist at 0.2	1.0	494	41	17	8	8	8	23
		<b>TOTAL</b>											<b>1,508</b>	<b>124</b>	<b>53</b>	<b>26</b>	<b>26</b>	<b>24</b>	<b>69</b>

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Table H.2.RPA.Un.Max.2025-15. 2025 Reduced Project Alternative Auxiliary Generator Maximum Daily Unmit Emissions (BP).

Ship	Direction	Mode	Activity (hours)	MCR (kW)	Load Factor	Energy (kW-hr)	Fuel Type	Maximum Daily Shipcalls (vessels/day)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
AFRAMAX	South In	Cruising	3.50	3,600	0.278	3,503	Dist at 0.2	1.0	134	11	4	3	3	2	9
		Maneuvering	2.00	3,600	0.278	2,002	Dist at 0.2	1.0	77	6	2	2	2	1	5
	South Out	Maneuvering	1.5	3,600	0.278	1,501	Dist at 0.2	1.0	57	5	2	1	1	1	4
		Cruising	3.50	3,600	0.278	3,503	Dist at 0.2	1.0	134	11	4	3	3	2	9
<b>TOTAL</b>									<b>402</b>	<b>32</b>	<b>12</b>	<b>9</b>	<b>8</b>	<b>7</b>	<b>26</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Un.Max.2025-16. 2025 Reduced Project Alternative Summary of Maximum Daily Unmitigated Vessel Emissions (BP).

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Cruising	Main Engines	1,487	122	52	25	25	23	68
Cruising	Aux Generator	268	21	8	6	6	4	18
Maneuvering	Main Engines	21	2	1	0	0	0	1
Maneuvering	Aux Generator	134	11	4	3	3	2	9
<b>Cruising and Maneuvering</b>	<b>TOTAL</b>	<b>1,910</b>	<b>156</b>	<b>65</b>	<b>34</b>	<b>34</b>	<b>30</b>	<b>95</b>



Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Un.Max.2025-17. 2025 Reduced Project Alternative Boiler Warm-Up Maximum Daily Unmitigated Emissions (BP).

Shipcalls (vessels/day)	Vessel Size	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	Dist at 0.2	0.20	102.17	30%	3	50,000	16	4	0.2	3	2	1	23
<b>MAXIMUM</b>								<b>16</b>	<b>4</b>	<b>0</b>	<b>3</b>	<b>2</b>	<b>1</b>	<b>23</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Un.Max.2025-18. 2025 Reduced Project Alternative Summary of Boiler Warm-Up Maximum Unmitigated Emissions (BP).

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Boiler Warm-up	Boiler	16	4	0	3	2	1	23

Table H.2.RPA.Un.Max.2025-19. 2025 Reduced Project Alternative Berth Operations Maximum Daily Unmitigated Emissions (BP).

Auxiliary Generator Pre-Pumpin

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	400,000	Dist at 0.2	0.20	3,600	27.8%	2.5	96	8	3	2	2	2	6

MAXIMUM 96 8 3 2 2 2 6

Boiler Pre-Pumping

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	400,000	Dist at 0.2	0.20	102.17	30.0%	2.5	50,000	14	3	0	2	2	1	19

MAXIMUM 14 3 0 2 2 1 19

Auxiliary Generator Pumpin

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	400,000	Dist at 0.2	0.20	3,600	55.6%	15.0	1,149	91	33	25	24	19	75

MAXIMUM 1,149 91 33 25 24 19 75

Boiler Pumping

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Inerting Fuel Consumption Savings (lb/1000 bbl offloaded)	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	400,000	Dist at 0.2	0.20	102.17	28.06	15.0	105	26	1	17	12	8	148

MAXIMUM 105 26 1 17 12 8 148

Auxiliary Generator Post-Pumpin

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	400,000	Dist at 0.2	0.20	3,600	27.8%	1.0	38	3	1	1	1	1	3

MAXIMUM 38 3 1 1 1 1 3

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Un.Max.2025-20. 2025 Reduced Project Alternative Summary of Berth Operations Maximum Daily Unmitigated Emissions (BP).

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Berth Operations	Boiler	119	30	2	20	14	9	167
Berth Operations	Aux Generator	1,283	102	37	28	27	21	84

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Un.Max.2025-21. 2025 Reduced Project Alternative Tug Main Engines Maximum Daily Unmitigated Emissions (BP).

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Shipcalls (vessels/day)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
AFRAMAX	Maneuvering - Pilot to Berth	1.00	2	4,800	0.50	MGO	1.0	110	25	5	5	4	0
	Maneuvering - Berth to Pilc	1.00	2	4,800	0.50	MGO	1.0	110	25	5	5	4	0
<b>TOTAL</b>								<b>220</b>	<b>49</b>	<b>9</b>	<b>10</b>	<b>9</b>	<b>0</b>
<b>MAXIMUM</b>								<b>220</b>	<b>49</b>	<b>9</b>	<b>10</b>	<b>9</b>	<b>0</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Un.Max.2025-22. 2025 Reduced Project Alternative Tug Auxiliary Generator Engines Maximum Daily Unmitigated Emissions (BP).

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Shipcalls (vessels/day)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
AFRAMAX	Maneuvering - Pilot to Berth	1.00	2	300	1.00	MGO	1.0	12	3	0	1	0	0
	Maneuvering - Berth to Pilc	1.00	2	300	1.00	MGO	1.0	12	3	0	1	0	0
<b>TOTAL</b>								<b>25</b>	<b>6</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>0</b>
<b>MAXIMUM</b>								<b>25</b>	<b>6</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>0</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Un.Max.2025-23. 2025 Reduced Project Alternative Summary of Tug Maximum Daily Unmitigated Emissions (BP).

<b>Mode</b>	<b>Equipment</b>	<b>Maximum Daily NO<sub>x</sub> Emissions (lb/day)</b>	<b>Maximum Daily CO Emissions (lb/day)</b>	<b>Maximum Daily ROG Emissions (lb/day)</b>	<b>Maximum Daily PM<sub>10</sub> Emissions (lb/day)</b>	<b>Maximum Daily PM<sub>2.5</sub> Emissions (lb/day)</b>	<b>Maximum Daily SO<sub>2</sub> Emissions (lb/day)</b>
Tug Assist	Main Engines	220	49	9	10	9	0
Tug Assist	Aux Generator	25	6	1	1	1	0
<b>TOTAL</b>		<b>245</b>	<b>55</b>	<b>10</b>	<b>11</b>	<b>10</b>	<b>0</b>

Table H.2.RPA.Un.Max.2025-24. 2025 Reduced Project Alternative VDU Crude Maximum Daily Unmitigated Emissions (BP).

	Maximum Daily Vessel Calls	crude vapors from tanks(scf/call)	daily gas usage (mmscf/day)	mw crude vapors	destruction efficiency
Aframax	1	224,000	0.2	50	98%
<b>TOTAL</b>	<b>1</b>		<b>0.2</b>		

<b>Assumed Distribution based on tank storage volume:</b>	
<b>Site 1</b>	<b>12.5%</b>
<b>Site 2</b>	<b>87.5%</b>

Maximum Daily Emissions (lb/day)

	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene
EF (lb/MMSCF)	130	35	7	7.5	0.38%	9.90%	0.017	0.0004	0.0003	0.0043	0.0027	0.731	0.0366	0.0272	0.0095
Panamax	14.6	3.9	0.8	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0
<b>MAXIMUM</b>	<b>14.6</b>	<b>3.9</b>	<b>0.8</b>	<b>0.8</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.1</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>

Assumed a ratio of 500/1000 based on the corresponding Btu values with respect to natural gas combustion emission factors.

Maximum Daily Emissions (lb/day)

	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene	SO <sub>x</sub>
Site 1	2	0.5	0.10	0.1	0.000	0.00	0.000	0.0000	0.0000	0.0001	0.0000	0.01	0.001	0.000	0.000	0
Site 2	13	3	0.7	0.7	0.00	0.01	0.002	0.0000	0.0000	0.000	0.000	0.1	0.00	0.00	0.001	2



Table H.2.RPA.Un.Max.2025-25. 2025 Reduced Project Alternative VDU Legs Maximum Daily Unmitigated Emissions (BP).

	tanks	crude vapors from tanks on legs(scfd/day)	daily gas usage (mmscf/day)	mw crude vapors	destruction efficiency
Site 1	4	23671.23	0.09	50	98%
Site 2	14	23671.23	0.3	50	98%
<b>TOTAL</b>	<b>18</b>		<b>0.4</b>		

<b>48</b>	<b>hr/event</b>
<b>6</b>	<b>events/yr</b>
<b>500</b>	<b>ft3/min</b>

Maximum Daily Emissions (lb/day)															
	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene
EF (lb/MMSCF)	130	35	7	7.5	0.38%	9.90%	0.017	0.0004	0.0003	0.0043	0.0027	0.731	0.0366	0.0272	0.0095
<b>TOTAL</b>	<b>27.7</b>	<b>7.5</b>	<b>1.5</b>	<b>1.6</b>	<b>0.0</b>	<b>0.1</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.2</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>

Assumed a ratio of 500/1000 based on the corresponding Btu values with respect to natural gas combustion emission factors.

Maximum Daily Emissions (lb/day)																
	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene	SO <sub>x</sub>
Site 1	6.2	1.7	0.3	0.4	0.00	0.03	0.00	0.000	0.000	0.000	0.00	0.03	0.00	0.00	0.00	1
Site 2	21.5	5.8	1.2	1.2	0.00	0.11	0.00	0.000	0.000	0.001	0.00	0.12	0.01	0.00	0.00	4



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Table H.2.RPA.Un.Max.2025-27. 2025 Reduced Project Alternative BP Berth Summary.

Scenario	Operation	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Vessel Arrival/Departure	Cruising and maneuvering	1,910	156	65	34	34	30	95
	Boiler Warm-Up	16	4	0	3	2	1	23
	Tug Assistance	245	55	10	---	11	10	0
	Tanks	---	---	86	---	---	---	---
	Vapor Destruction Units	42.3	11.4	2.3	---	2.4	---	7.6
	Valves, Flanges, Pumps	---	---	3.25	---	---	---	---
	<b>TOTAL</b>	<b>2,214</b>	<b>226</b>	<b>167</b>	<b>37</b>	<b>49</b>	<b>41</b>	<b>126</b>
Vessel Offloading	Tanker Hoteling	1,283	102	37	28	27	21	84
	Offloading	119	30	2	20	14	9	167
	Tanks	---	---	86	---	---	---	---
	Vapor Destruction Units	42.3	11.4	2.3	---	2.4	---	7.6
	Valves, Flanges, Pumps	---	---	3.25	---	---	---	---
	<b>TOTAL</b>	<b>1,444</b>	<b>143</b>	<b>130</b>	<b>47</b>	<b>43</b>	<b>30</b>	<b>259</b>
No Vessel/Empty Berth	Vapor Destruction Units	42.3	11.4	2.3	---	2.4	---	7.6
	Tanks	---	---	86	---	---	---	---
	Valves, Flanges, Pumps	---	---	3.25	---	---	---	---
	<b>TOTAL</b>	<b>42</b>	<b>11</b>	<b>91</b>	<b>0</b>	<b>2</b>	<b>0</b>	<b>8</b>

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Table H.2.RPA.Un.Max.2025-28. 2025 Reduced Project Alternative Main Engines Maximum Daily Unmitigated Emissions (Tesoro).

Ship	Direction	Mode	Distance (nautical miles)	Ship speed (knots)	Activity (hours)	Maximum Speed (knots)	Load Factor	MCR (kW)	Energy (kW-hr)	Fuel Type	Maximum Daily Shipcalls (vessels/day)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)	
AFRAMAX	South In	Cruising - CW to VSR	23	12	1.92	16.1	0.414	12,477	9,902	Dist at 0.2	1.0	463	38	16	8	8	7	21	
		Cruising - VSR to PZ	11	12	0.92	16.1	0.414	12,477	4,736	Dist at 0.2	1.0	222	18	8	4	4	3	10	
		Cruising - PZ to Pilot	4.7	7	0.67	16.1	0.082	12,477	689	Dist at 0.2	1.0	32	3	1	1	1	1	1	
	South Out	Maneuvering - Pilot to Berth			3	1.00	16.1	0.006	12,477	81	Dist at 0.2	1.0	4	0.3	0.1	0.1	0.1	0	0
		Maneuvering - Berth to Pilot			5	1.00	16.1	0.030	12,477	374	Dist at 0.2	1.0	17	1	1	0	0	0	1
		Cruising - Pilot to PZ			3.5	7	0.50	16.1	0.082	12,477	513	Dist at 0.2	1.0	24	2	1	0	0	1
		Cruising - PZ to VSR			12.5	12	1.04	16.1	0.414	12,477	5,382	Dist at 0.2	1.0	252	21	9	4	4	12
		Cruising - VSR to CW			24.5	12	2.04	16.1	0.414	12,477	10,548	Dist at 0.2	1.0	494	41	17	8	8	23
		<b>TOTAL</b>											<b>1,508</b>	<b>124</b>	<b>53</b>	<b>26</b>	<b>26</b>	<b>24</b>	<b>69</b>

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Table H.2.RPA.Un.Max.2025-29. 2025 Reduced Project Alternative Auxiliary Generator Maximum Daily Unmitigated Emissions (Tesoro).

Ship	Direction	Mode	Activity (hours)	MCR (kW)	Load Factor	Energy (kW-hr)	Fuel Type	Maximum Daily Shipcalls (vessels/day)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
AFRAMAX	South In	Cruising	3.50	3,600	0.278	3,503	Dist at 0.2	1.0	134	11	4	3	3	2	9
		Maneuvering	2.00	3,600	0.278	2,002	Dist at 0.2	1.0	77	6	2	2	2	1	5
	South Out	Maneuvering	1.5	3,600	0.278	1,501	Dist at 0.2	1.0	57	5	2	1	1	1	4
		Cruising	3.50	3,600	0.278	3,503	Dist at 0.2	1.0	134	11	4	3	3	2	9
<b>TOTAL</b>									<b>402</b>	<b>32</b>	<b>12</b>	<b>9</b>	<b>8</b>	<b>7</b>	<b>26</b>

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Table H.2.RPA.Un.Max.2025-30. 2025 Reduced Project Alternative Summary of Maximum Daily Unmitigated Vessel Emissions (Tesoro).

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Cruising	Main Engines	1,487	122	52	25	25	23	68
Cruising	Aux Generator	268	21	8	6	6	4	18
Maneuvering	Main Engines	21	2	1	0	0	0	1
Maneuvering	Aux Generator	134	11	4	3	3	2	9
<b>Cruising and Maneuvering</b>	<b>TOTAL</b>	<b>1,910</b>	<b>156</b>	<b>65</b>	<b>34</b>	<b>34</b>	<b>30</b>	<b>95</b>

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Table H.2.RPA.Un.Max.2025-31. 2025 Reduced Project Alternative Boiler Warm-Up Maximum Daily Unmitigated Emissions (Tesoro).

Shipcalls (vessels/day)	Vessel Size	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	Dist at 0.2	0.20	102.17	30%	3	50,000	16	4	0.2	3	2	1	23
<b>MAXIMUM</b>								<b>16</b>	<b>4</b>	<b>0</b>	<b>3</b>	<b>2</b>	<b>1</b>	<b>23</b>

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Table H.2.RPA.Un.Max.2025-32. 2025 Reduced Project Alternative Summary of Boiler Warm-Up Maximum Unmitigated Emissions (Tesoro).

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Boiler Warm-up	Boiler	16	4	0	3	2	1	23



Table H.2.RPA.Un.Max.2025-33. 2025 Reduced Project Alternative Berth Operations Maximum Daily Unmitigated Emissions (Tesoro).

Auxiliary Generator Pre-Pumpin

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	400,000	Dist at 0.2	0.20	3,600	27.8%	2.5	96	8	3	2	2	2	6

MAXIMUM 96 8 3 2 2 2 6

Boiler Pre-Pumping

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	400,000	Dist at 0.2	0.20	102.17	30.0%	2.5	50,000	14	3	0	2	2	1	19

MAXIMUM 14 3 0 2 2 1 19

Auxiliary Generator Pumpin

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	400,000	Dist at 0.2	0.20	3,600	55.6%	15.0	1,149	91	33	25	24	19	75

MAXIMUM 1,149 91 33 25 24 19 75

Boiler Pumping

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Inerting Fuel Consumption Savings (lb/1000 bbl offloaded)	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	400,000	Dist at 0.2	0.20	102.17	28.06	15.0	105	26	1	17	12	8	148

MAXIMUM 105 26 1 17 12 8 148

Auxiliary Generator Post-Pumpin

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	400,000	Dist at 0.2	0.20	3,600	27.8%	1.0	38	3	1	1	1	1	3

MAXIMUM 38 3 1 1 1 1 3

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Table H.2.RPA.Un.Max.2025-34. 2025 Reduced Project Alternative Summary of Berth Operations Maximum Daily Unmitigated Emissions (Tesoro).

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Berth Operations	Boiler	119	30	2	20	14	9	167
Berth Operations	Aux Generator	1,283	102	37	28	27	21	84

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Table H.2.RPA.Un.Max.2025-35. 2025 Reduced Project Alternative Tug Main Engines Maximum Daily Unmitigated Emissions (Tesoro).

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Shipcalls (vessels/day)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
AFRAMAX	Maneuvering - Pilot to Berth	1.00	2	4,800	0.50	MGO	1.0	110	25	5	5	4	0
	Maneuvering - Berth to Pilot	1.00	2	4,800	0.50	MGO	1.0	110	25	5	5	4	0
<b>TOTAL</b>								<b>220</b>	<b>49</b>	<b>9</b>	<b>10</b>	<b>9</b>	<b>0</b>
<b>MAXIMUM</b>								<b>220</b>	<b>49</b>	<b>9</b>	<b>10</b>	<b>9</b>	<b>0</b>

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Table H.2.RPA.Un.Max.2025-36. 2025 Reduced Project Alternative Tug Auxiliary Generator Engines Maximum Daily Unmit Emissions (Tesoro)

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Shipcalls (vessels/day)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
AFRAMAX	Maneuvering - Pilot to Berth	1.00	2	300	1.00	MGO	1.0	12	3	0	1	0	0
	Maneuvering - Berth to Pilot	1.00	2	300	1.00	MGO	1.0	12	3	0	1	0	0
<b>TOTAL</b>								<b>25</b>	<b>6</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>0</b>
<b>MAXIMUM</b>								<b>25</b>	<b>6</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>0</b>

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Table H.2.RPA.Un.Max.2025-37. 2025 Reduced Project Alternative Summary of Tug Maximum Daily Unmitigated Emissions (Tesoro).

<b>Mode</b>	<b>Equipment</b>	<b>Maximum Daily NO<sub>x</sub> Emissions (lb/day)</b>	<b>Maximum Daily CO Emissions (lb/day)</b>	<b>Maximum Daily ROG Emissions (lb/day)</b>	<b>Maximum Daily PM<sub>10</sub> Emissions (lb/day)</b>	<b>Maximum Daily PM<sub>2.5</sub> Emissions (lb/day)</b>	<b>Maximum Daily SO<sub>2</sub> Emissions (lb/day)</b>
Tug Assist	Main Engines	220	49	9	10	9	0
Tug Assist	Aux Generator	25	6	1	1	1	0
<b>TOTAL</b>		<b>245</b>	<b>55</b>	<b>10</b>	<b>11</b>	<b>10</b>	<b>0</b>

Table H.2.RPA.Un.Max.2025-38. 2025 Reduced Project Alternative VDU Crude Maximum Daily Unmitigated Emissions (Tesoro).

	Maximum Daily Vessel Calls	crude vapors from tanks(scf/call)	daily gas usage (mmscf/day)	mw crude vapors	destruction efficiency
Aframax	1	224,000	0.2	50	98%
<b>TOTAL</b>	<b>1</b>		<b>0.2</b>		

<b>Assumed Distribution based on tank storage volume:</b>	
<b>Site 1</b>	<b>12.5%</b>
<b>Site 2</b>	<b>87.5%</b>

Maximum Daily Emissions (lb/day)

	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene
EF (lb/MMSCF)	130	35	7	7.5	0.38%	9.90%	0.017	0.0004	0.0003	0.0043	0.0027	0.731	0.0366	0.0272	0.0095
Panamax	14.6	3.9	0.8	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0
<b>MAXIMUM</b>	<b>14.6</b>	<b>3.9</b>	<b>0.8</b>	<b>0.8</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.1</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>

Assumed a ratio of 500/1000 based on the corresponding Btu values with respect to natural gas combustion emission factors.

Maximum Daily Emissions (lb/day)

	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene	SO <sub>x</sub>
Site 1	2	0.5	0.10	0.1	0.000	0.00	0.000	0.0000	0.0000	0.0001	0.0000	0.01	0.001	0.000	0.000	0
Site 2	13	3	0.7	0.7	0.00	0.01	0.002	0.0000	0.0000	0.000	0.000	0.1	0.00	0.00	0.001	2

Table H.2.RPA.Un.Max.2025-39. 2025 Reduced Project Alternative VDU Legs Maximum Daily Unmitigated Emissions (Tesoro).

	tanks	crude vapors from tanks on legs(scfd/day)	daily gas usage (mmscf/day)	mw crude vapors	destruction efficiency
Site 1	4	23671.23	0.09	50	98%
Site 2	14	23671.23	0.3	50	98%
<b>TOTAL</b>	<b>18</b>		<b>0.4</b>		

<b>48</b>	<b>hr/event</b>
<b>6</b>	<b>events/yr</b>
<b>500</b>	<b>ft3/min</b>

Maximum Daily Emissions (lb/day)															
	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene
EF (lb/MMSCF)	130	35	7	7.5	0.38%	9.90%	0.017	0.0004	0.0003	0.0043	0.0027	0.731	0.0366	0.0272	0.0095
<b>TOTAL</b>	<b>27.7</b>	<b>7.5</b>	<b>1.5</b>	<b>1.6</b>	<b>0.0</b>	<b>0.1</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.2</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>

Assumed a ratio of 500/1000 based on the corresponding Btu values with respect to natural gas combustion emission factors.

Maximum Daily Emissions (lb/day)																
	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene	SO <sub>x</sub>
Site 1	6.2	1.7	0.3	0.4	0.00	0.03	0.00	0.000	0.000	0.000	0.00	0.03	0.00	0.00	0.00	1
Site 2	21.5	5.8	1.2	1.2	0.00	0.11	0.00	0.000	0.000	0.001	0.00	0.12	0.01	0.00	0.00	4





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Table H.2.RPA.Un.Max.2025-41. 2025 Reduced Project Alternative Tesoro Berth Summary.

Scenario	Operation	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Vessel Arrival/Departure	Cruising and maneuvering	1,910	156	65	34	34	30	95
	Boiler Warm-Up	16	4	0	3	2	1	23
	Tug Assistance	220	49	9	---	10	9	0
	Tanks	---	---	86	---	---	---	---
	Vapor Destruction Units	42.3	11.4	2.3	---	2.4	---	7.6
	Valves, Flanges, Pumps	---	---	3.25	---	---	---	---
	<b>TOTAL</b>	<b>2,189</b>	<b>221</b>	<b>166</b>	<b>37</b>	<b>48</b>	<b>40</b>	<b>126</b>
Vessel Offloading	Tanker Hoteling	1,283	102	37	28	27	21	84
	Offloading	119	30	2	20	14	9	167
	Tanks	---	---	86	---	---	---	---
	Vapor Destruction Units	42.3	11.4	2.3	---	2.4	---	7.6
	Valves, Flanges, Pumps	---	---	3.25	---	---	---	---
	<b>TOTAL</b>	<b>1,444</b>	<b>143</b>	<b>130</b>	<b>47</b>	<b>43</b>	<b>30</b>	<b>259</b>
No Vessel/Empty Berth	Vapor Destruction Units	42.3	11.4	2.3	---	2.4	---	7.6
	Tanks	---	---	86	---	---	---	---
	Valves, Flanges, Pumps	---	---	3.25	---	---	---	---
	<b>TOTAL</b>	<b>42</b>	<b>11</b>	<b>91</b>	<b>0</b>	<b>2</b>	<b>0</b>	<b>8</b>

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Table H.2.RPA.Un.Max.2025-42. 2025 Reduced Project Alternative Main Engines Maximum Daily Unmitigated Emissions (Exxon Mobil).

Ship	Direction	Mode	Distance (nautical miles)	Ship speed (knots)	Activity (hours)	Maximum Speed (knots)	Load Factor	MCR (kW)	Energy (kW-hr)	Fuel Type	Maximum Daily Shipcalls (vessels/day)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)	
PANAMAX	South In	Cruising - CW to VSR	23	12	1.92	15.8	0.438	10,300	8,649	Dist at 0.2	1.0	405	33	14	7	7	6	19	
		Cruising - VSR to PZ	11	12	0.92	15.8	0.438	10,300	4,136	Dist at 0.2	1.0	194	16	7	3	3	3	9	
		Cruising - PZ to Pilot	4.7	7	0.67	15.8	0.087	10,300	601	Dist at 0.2	1.0	28	2	1	0	0	0	1	
	South Out	Maneuvering - Pilot to Berth		3	1.00	15.8	0.007	10,300	71	Dist at 0.2	1.0	3	0.3	0.1	0.1	0.1	0.1	0	
		Maneuvering - Berth to Pilot		5	1.00	15.8	0.032	10,300	326	Dist at 0.2	1.0	15	1	1	0	0	0	1	
		Cruising - Pilot to PZ	3.5	7	0.50	15.8	0.087	10,300	448	Dist at 0.2	1.0	21	2	1	0	0	0	1	
		Cruising - PZ to VSR	12.5	12	1.04	15.8	0.438	10,300	4,700	Dist at 0.2	1.0	220	18	8	4	4	3	10	
		Cruising - VSR to CW	24.5	12	2.04	15.8	0.438	10,300	9,213	Dist at 0.2	1.0	431	36	15	7	7	7	20	
		<b>TOTAL</b>											<b>1,317</b>	<b>108</b>	<b>46</b>	<b>22</b>	<b>22</b>	<b>21</b>	<b>60</b>

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Table H.2.RPA.Un.Max.2025-43. 2025 Reduced Project Alternative Auxiliary Generator Maximum Daily Unmit Emissions (Exxon Mobil).

Ship	Direction	Mode	Activity (hours)	MCR (kW)	Load Factor	Energy (kW-hr)	Fuel Type	Maximum Daily Shipcalls (vessels/day)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
PANAMAX	South In	Cruising	3.15	3,600	0.278	3,155	Dist at 0.2	1.0	121	10	3	3	3	2	8
		Maneuvering	2.00	3,600	0.278	2,002	Dist at 0.2	1.0	77	6	2	2	2	1	5
	South Out	Maneuvering	1.5	3,600	0.278	1,501	Dist at 0.2	1.0	57	5	2	1	1	1	4
		Cruising	3.21	3,600	0.278	3,211	Dist at 0.2	1.0	123	10	4	3	3	2	8
<b>TOTAL</b>									<b>378</b>	<b>30</b>	<b>11</b>	<b>8</b>	<b>8</b>	<b>6</b>	<b>25</b>

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Table H.2.RPA.Un.Max.2025-44. 2025 Reduced Project Alternative Summary of Maximum Daily Unmitigated Vessel Emissions (Exxon Mobil).

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Cruising	Main Engines	1,299	107	46	22	22	20	59
Cruising	Aux Generator	244	19	7	5	5	4	16
Maneuvering	Main Engines	19	2	1	0	0	0	1
Maneuvering	Aux Generator	134	11	4	3	3	2	9
<b>Cruising and Maneuvering</b>	<b>TOTAL</b>	<b>1,695</b>	<b>138</b>	<b>57</b>	<b>31</b>	<b>30</b>	<b>27</b>	<b>85</b>

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Table H.2.RPA.Un.Max.2025-45. 2025 Reduced Project Alternative Boiler Warm-Up Maximum Daily Unmitigated Emissions (Exxon Mobil).

Shipcalls (vessels/day)	Vessel Size	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Panamax	Dist at 0.2	0.20	59.91	30%	3	35,000	7	2	0.1	1	1	1	9
<b>MAXIMUM</b>								<b>7</b>	<b>2</b>	<b>0</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>9</b>

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Table H.2.RPA.Un.Max.2025-46. 2025 Reduced Project Alternative Summary of Boiler Warm-Up Maximum Unmitigated Emissions (Exxon Mobil).

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Boiler Warm-up	Boiler	7	2	0	1	1	1	9

Table H.2.RPA.Un.Max.2025-47. 2025 Reduced Project Alternative Berth Operations Maximum Daily Unmitigated Emissions (Exxon Mobil).

**Auxiliary Generator Pre-Pumpin**

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bb/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Panamax	300,000	Dist at 0.2	0.20	3,600	27.8%	2.5	96	8	3	2	2	2	6

AMP Reduction 70%  
 MAXIMUM 29 2 1 1 1 0.5 2

**Boiler Pre-Pumping**

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bb/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bb/hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Panamax	300,000	Dist at 0.2	0.20	59.91	30.0%	2.5	35,000	6	1	0	1	1	0	8

MAXIMUM 6 1 0 1 1 0 8

**Auxiliary Generator Pumpin**

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bb/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Panamax	300,000	Dist at 0.2	0.20	3,600	55.6%	11.0	843	67	24	18	17	14	55

AMP Reduction 70%  
 MAXIMUM 253 20 7 5 5 4 17

**Boiler Pumping**

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bb/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Inerting Fuel Consumption Savings (lb/1000 bbl offloaded)	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Panamax	300,000	Dist at 0.2	0.20	59.91	28.06	11.0	34	8	0	6	4	3	48

MAXIMUM 34 8 0 6 4 3 48

**Auxiliary Generator Post-Pumpin**

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bb/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Panamax	300,000	Dist at 0.2	0.20	3,600	27.8%	1.0	38	3	1	1	1	1	3

AMP Reduction 70%  
 MAXIMUM 11 1 0 0 0 0 1

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Table H.2.RPA.Un.Max.2025-48. 2025 Reduced Project Alternative Summary of Berth Operations Maximum Daily Unmitigated Emissions (Exxon Mobil).

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Berth Operations	Boiler	39	10	1	7	5	3	56
Berth Operations	Aux Generator	293	23	8	6	6	5	19



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Table H.2.RPA.Un.Max.2025-49. 2025 Reduced Project Alternative Tug Main Engines Maximum Daily Unmitigated Emissions (Exxon Mobil).

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Shipcalls (vessels/day)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
PANAMAX	Maneuvering - Pilot to Berth	1.00	2	4,800	0.50	MGO	1.0	110	25	5	5	4	0
	Maneuvering - Berth to Pilot	1.00	2	4,800	0.50	MGO	1.0	110	25	5	5	4	0
<b>TOTAL</b>								<b>220</b>	<b>49</b>	<b>9</b>	<b>10</b>	<b>9</b>	<b>0</b>
<b>MAXIMUM</b>								<b>220</b>	<b>49</b>	<b>9</b>	<b>10</b>	<b>9</b>	<b>0</b>

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Table H.2.RPA.Un.Max.2025-50. 2025 Reduced Project Alternative Tug Auxiliary Generator Engines Maximum Daily Unmitigated Emissions (Exxon Mobil).

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Shipcalls (vessels/day)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
PANAMAX	Maneuvering - Pilot to Berth	1.00	2	300	1.00	MGO	1.0	12	3	0	1	0	0
	Maneuvering - Berth to Pilot	1.00	2	300	1.00	MGO	1.0	12	3	0	1	0	0
<b>TOTAL</b>								<b>25</b>	<b>6</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>0</b>
<b>MAXIMUM</b>								<b>25</b>	<b>6</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>0</b>

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Table H.2.RPA.Un.Max.2025-51. 2025 Reduced Project Alternative Summary of Tug Maximum Daily Unmitigated Emissions (Exxon Mobil).

Mode	Equipment	Maximum Daily NO <sub>x</sub> Emissions (lb/day)	Maximum Daily CO Emissions (lb/day)	Maximum Daily ROG Emissions (lb/day)	Maximum Daily PM <sub>10</sub> Emissions (lb/day)	Maximum Daily PM <sub>2.5</sub> Emissions (lb/day)	Maximum Daily SO <sub>2</sub> Emissions (lb/day)
Tug Assist	Main Engines	220	49	9	10	9	0
Tug Assist	Aux Generator	25	6	1	1	1	0
<b>TOTAL</b>		<b>245</b>	<b>55</b>	<b>10</b>	<b>11</b>	<b>10</b>	<b>0</b>

Table H.2.RPA.Un.Max.2025-52. 2025 Reduced Project Alternative VDU Crude Maximum Daily Unmitigated Emissions (Exxon Mobil).

	Maximum Daily Vessel Calls	crude vapors from tanks(scf/call)	daily gas usage (mmscf/day)	mw crude vapors	destruction efficiency
Panamax	1	116,667	0.1	50	98%
<b>TOTAL</b>	<b>1</b>		<b>0.1</b>		

<b>Assumed Distribution based on tank storage volume:</b>	
<b>Site 1</b>	<b>12.5%</b>
<b>Site 2</b>	<b>87.5%</b>

Maximum Daily Emissions (lb/day)

	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene
EF (lb/MMSCF)	130	35	7	7.5	0.38%	9.90%	0.017	0.0004	0.0003	0.0043	0.0027	0.731	0.0366	0.0272	0.0095
Panamax	7.6	2.0	0.4	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>MAXIMUM</b>	<b>7.6</b>	<b>2.0</b>	<b>0.4</b>	<b>0.4</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>

Assumed a ratio of 500/1000 based on the corresponding Btu values with respect to natural gas combustion emission factors.

Maximum Daily Emissions (lb/day)

	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene	SO <sub>x</sub>
Site 1	1	0.3	0.05	0.1	0.000	0.00	0.000	0.0000	0.0000	0.0000	0.0000	0.01	0.000	0.000	0.000	0
Site 2	7	2	0.4	0.4	0.00	0.01	0.001	0.0000	0.0000	0.000	0.000	0.0	0.00	0.00	0.000	1

Table H.2.RPA.Un.Max.2025-53. 2025 Reduced Project Alternative VDU Legs Maximum Daily Unmitigated Emissions (Exxon Mobil).

	tanks	crude vapors from tanks on legs(scfd/day)	daily gas usage (mmscf/day)	mw crude vapors	destruction efficiency
Site 1	4	23671.23	0.09	50	98%
Site 2	14	23671.23	0.3	50	98%
<b>TOTAL</b>	<b>18</b>		<b>0.4</b>		

<b>48</b>	<b>hr/event</b>
<b>6</b>	<b>events/yr</b>
<b>500</b>	<b>ft3/min</b>

Maximum Daily Emissions (lb/day)															
	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene
EF (lb/MMSCF)	130	35	7	7.5	0.38%	9.90%	0.017	0.0004	0.0003	0.0043	0.0027	0.731	0.0366	0.0272	0.0095
<b>TOTAL</b>	<b>27.7</b>	<b>7.5</b>	<b>1.5</b>	<b>1.6</b>	<b>0.0</b>	<b>0.1</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.2</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>

Assumed a ratio of 500/1000 based on the corresponding Btu values with respect to natural gas combustion emission factors.

Maximum Daily Emissions (lb/day)																
	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene	SO <sub>x</sub>
Site 1	6.2	1.7	0.3	0.4	0.00	0.03	0.00	0.000	0.000	0.000	0.00	0.03	0.00	0.00	0.00	1
Site 2	21.5	5.8	1.2	1.2	0.00	0.11	0.00	0.000	0.000	0.001	0.00	0.12	0.01	0.00	0.00	4



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Table H.2.RPA.Un.Max.2025-55. 2025 Reduced Project Alternative Exxon Mobil Berth Summary.

Scenario	Operation	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Vessel Arrival/Departure	Cruising and maneuvering	1,695	138	57	31	30	27	85
	Boiler Warm-Up	7	2	0	1	1	1	9
	Tug Assistance	245	55	10	---	11	10	0
	Tanks	---	---	86	---	---	---	---
	Vapor Destruction Units	35.3	9.5	1.9	---	2.0	---	6.3
	Valves, Flanges, Pumps	---	---	3.25	---	---	---	---
	<b>TOTAL</b>	<b>1,982</b>	<b>204</b>	<b>159</b>	<b>32</b>	<b>44</b>	<b>37</b>	<b>101</b>
Vessel Offloading	Tanker Hoteling	293	23	8	6	6	5	19
	Offloading	39	10	1	7	5	3	56
	Tanks	---	---	86	---	---	---	---
	Vapor Destruction Units	35.3	9.5	1.9	---	2.0	---	6.3
	Valves, Flanges, Pumps	---	---	3.25	---	---	---	---
	<b>TOTAL</b>	<b>368</b>	<b>43</b>	<b>100</b>	<b>13</b>	<b>13</b>	<b>8</b>	<b>81</b>
No Vessel/Empty Berth	Vapor Destruction Units	35.3	9.5	1.9	---	2.0	---	6.3
	Tanks	---	---	86	---	---	---	---
	Valves, Flanges, Pumps	---	---	3.25	---	---	---	---
	<b>TOTAL</b>	<b>35</b>	<b>9</b>	<b>91</b>	<b>0</b>	<b>2</b>	<b>0</b>	<b>6</b>

Table H.2.RPA.Un.Max.Bar.2025-1. 2025 Reduced Project Alternative Main Engines Maximum Daily Unmitigated Emissions from Barge Fuel Deliveries for OGV.

Ship	Direction	Mode	Distance (nautical miles)	Ship speed (knots)	Activity (hours)	Maximum Speed (knots)	Load Factor	MCR (kW)	Energy (kW-hr)	Fuel Type	Shipcalls (vessels/ yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Barge	North In	Volpak to Berth 408	5	3	1.67	3	1.00	4,800	8,000.00	MGO	1.0	291	24	11	16	16	16	18
Barge	North Out	Volpak to Berth 408	5	3	1.67	3.0	1.00	4,800	8,000.00	MGO	1.0	291	24	11	16	16	16	18
TOTAL												581	48	22	32	32	32	36



Table H.2.RPA.Un.Max.Bar.2025-2. 2025 Reduced Project Alternative Tug Main Engines Maximum Daily Unmitigated Emissions from Barge Fuel Deliveries for OGV.

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Shipcalls (vessels/day)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Barge	Maneuvering - Pilot to Berth	1.00	1	4,800	0.50	MGO	1.0	87	7	3	5	4	5
	Maneuvering - Berth to Pilot	1.00	1	4,800	0.50	MGO	1.0	87	7	3	5	4	5
<b>TOTAL</b>								<b>174</b>	<b>15</b>	<b>7</b>	<b>10</b>	<b>9</b>	<b>11</b>
<b>MAXIMUM</b>								<b>174</b>	<b>15</b>	<b>7</b>	<b>10</b>	<b>9</b>	<b>11</b>

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Table H.2.RPA.Un.Max.Bar.2025-3. 2025 Reduced Project Alternative Tug Auxiliary Generator Engines Maximum Daily Unmitigated Emissions from Barge Fuel Deliveries for OG

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Shipcalls (vessels/day)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Barge	Maneuvering - Pilot to Berth	1.00	1	300	1.00	MGO	1.0	8	1	0	0	0	1
	Maneuvering - Berth to Pilot	1.00	1	300	1.00	MGO	1.0	8	1	0	0	0	1
<b>TOTAL</b>							<b>17</b>	<b>17</b>	<b>3</b>	<b>0</b>	<b>1</b>	<b>1</b>	<b>1</b>

MAXIMUM 17 3 0 1 1 1

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Table H.2.RPA.Un.Max.Bar.2025-4. 2025 Reduced Project Alternative Summary of Tug Maximum Daily Unmitigated Emissions from Barge Fuel Deliveries for OGV.

Mode	Equipment	Maximum Daily NO <sub>x</sub> Emissions (lb/day)	Maximum Daily CO Emissions (lb/day)	Maximum Daily ROG Emissions (lb/day)	Maximum Daily PM <sub>10</sub> Emissions (lb/day)	Maximum Daily PM <sub>2.5</sub> Emissions (lb/day)	Maximum Daily SO <sub>2</sub> Emissions (lb/day)
Tug Assist	Main Engines	174	15	7	10	9	11
Tug Assist	Aux Generator	17	3	0	1	1	1
<b>TOTAL</b>		<b>191</b>	<b>17</b>	<b>7</b>	<b>10</b>	<b>9</b>	<b>12</b>

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Table H.2.RPA.Un.Max.Bar.2025-5. 2025 Reduced Project Alternative Summary of Maximum Daily Unmitigated Vessel Emissions from Barge Fuel Deliveries for OGV.

Operation	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Barge	581	48	22	32	32	36
Tug Assistance	191	17	7	10	9	12
<b>TOTAL</b>	<b>772</b>	<b>66</b>	<b>29</b>	<b>42</b>	<b>41</b>	<b>48</b>

Operation	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Barge	1.59	0.13	0.06	0.09	0.09	0.10
Tug Assistance	0.52	0.05	0.02	0.03	0.03	0.03
<b>TOTAL</b>	<b>2.12</b>	<b>0.18</b>	<b>0.08</b>	<b>0.11</b>	<b>0.11</b>	<b>0.13</b>

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Table H.2.RPA.Un.2040-1. 2040 Reduced Project Alternative Main Engines Average Daily Unmitigated Emissions.

Ship	Direction	Mode	Distance (nautical miles)	Ship speed (knots)	Activity (hours)	Maximum Speed (knots)	Load Factor	MCR (kW)	Energy (kW-hr)	Fuel Type	Shipcalls (vessels/yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)		
VLCC	North In	Cruising - CW to VSR	22	15.54	1.42	16.9	0.777	25,400	27,957	HFO	46.0	64,090	4,957	2,125	5,524	5,524	5,082	37,179		
		Cruising - VSR to PZ	21	12	1.75	16.9	0.358	25,400	15,913	HFO	46.0	36,479	2,822	1,209	3,144	3,144	2,893	21,162		
		Cruising - PZ to Pilot	4.7	7	0.67	16.9	0.071	25,400	1,212	HFO	46.0	3,934	605	435	413	413	380	1,612		
	North Out	Maneuvering - Pilot to Berth	3	1.00	16.9	0.006	25,400	142	HFO	46.0	5,248	901	2,306	765	765	765	703	189		
		Maneuvering - Berth to Pilot	5	1.00	16.9	0.026	25,400	658	HFO	46.0	4,525	901	1,072	580	580	534	875			
		Cruising - Pilot to PZ	3.8	7	0.54	16.9	0.071	25,400	980	HFO	46.0	3,180	489	352	334	334	307	1,303		
		Cruising - PZ to VSR	21	12	1.75	16.9	0.358	25,400	15,913	HFO	46.0	36,479	2,822	1,209	3,144	3,144	2,893	21,162		
		Cruising - VSR to CW	22	15.54	1.42	16.9	0.777	25,400	27,957	HFO	46.0	64,090	4,957	2,125	5,524	5,524	5,082	37,179		
		AFRAMAX	South In	Cruising - CW to VSR	23	14.7	1.56	16.1	0.761	12,477	14,859	HFO	24.0	17,772	1,375	589	1,532	1,532	1,409	10,310
AFRAMAX	South In	Cruising - VSR to PZ	11	12	0.92	16.1	0.414	12,477	4,736	HFO	24.0	5,664	438	188	488	488	449	3,286		
		Cruising - PZ to Pilot	4.7	7	0.67	16.1	0.082	12,477	689	HFO	24.0	1,088	155	104	111	111	102	478		
		Maneuvering - Pilot to Berth	3	1.00	16.1	0.006	12,477	81	HFO	24.0	1,459	231	550	212	212	195	56			
	South Out	Maneuvering - Berth to Pilot	5	1.00	16.1	0.030	12,477	374	HFO	24.0	1,303	231	256	167	167	153	259			
		Cruising - Pilot to PZ	3.5	7	0.50	16.1	0.082	12,477	513	HFO	24.0	810	115	77	83	83	76	356		
		Cruising - PZ to VSR	12.5	12	1.04	16.1	0.414	12,477	5,382	HFO	24.0	6,436	498	213	555	555	510	3,734		
		Cruising - VSR to CW	24.5	14.7	1.67	16.1	0.761	12,477	15,828	HFO	24.0	18,931	1,464	628	1,632	1,632	1,501	10,982		
		PANAMAX	South In	Cruising - CW to VSR	23	14.7	1.56	15.8	0.805	10,300	12,979	HFO	10	6,468	500	214	557	557	513	3,752
		PANAMAX	South In	Cruising - VSR to PZ	11	12	0.92	15.8	0.438	10,300	4,136	HFO	10	2,061	159	68	178	178	163	1,196
Cruising - PZ to Pilot	4.7			7	0.67	15.8	0.087	10,300	601	HFO	10	300	23	10	26	26	24	174		
Maneuvering - Pilot to Berth	3			1.00	15.8	0.007	10,300	71	HFO	10	35	3	1	3	3	3	20			
South Out	Maneuvering - Berth to Pilot		5	1.00	15.8	0.032	10,300	326	HFO	10	163	13	5	14	14	13	94			
	Cruising - Pilot to PZ		3.5	7	0.50	15.8	0.087	10,300	448	HFO	10	223	17	7	19	19	18	129		
	Cruising - PZ to VSR		12.5	12	1.04	15.8	0.438	10,300	4,700	HFO	10	2,342	181	78	202	202	186	1,359		
	Cruising - VSR to CW		24.5	14.7	1.67	15.8	0.805	10,300	13,825	HFO	10	6,890	533	228	594	594	546	3,997		
	SUEZMAX		North In	Cruising - CW to VSR	22	15.54	1.42	17	0.764	16,000	17,302	HFO	52	44,837	3,468	1,486	3,864	3,864	3,555	26,010
	SUEZMAX		North In	Cruising - VSR to PZ	21	12	1.75	17	0.352	16,000	9,848	HFO	52	25,521	1,974	846	2,200	2,200	2,024	14,805
Cruising - PZ to Pilot		4.7		7	0.67	17	0.070	16,000	750	HFO	52	1,944	150	64	168	168	154	1,127		
Maneuvering - Pilot to Berth		3		1.00	17	0.005	16,000	88	HFO	52	228	18	8	20	20	18	132			
North Out		Maneuvering - Berth to Pilot	5	1.00	17	0.025	16,000	407	HFO	52	1,055	82	35	91	91	84	612			
		Cruising - Pilot to PZ	3.8	7	0.54	17	0.070	16,000	606	HFO	52	1,571	122	52	135	135	125	912		
		Cruising - PZ to VSR	21	12	1.75	17	0.352	16,000	9,848	HFO	52	25,521	1,974	846	2,200	2,200	2,024	14,805		
		Cruising - VSR to CW	22	15.54	1.42	17	0.764	16,000	17,302	HFO	52	44,837	3,468	1,486	3,864	3,864	3,555	26,010		
		<b>TOTAL</b>											<b>435,483</b>	<b>35,646</b>	<b>18,872</b>	<b>38,340</b>	<b>38,340</b>	<b>35,273</b>	<b>245,256</b>	

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Table H.2.RPA.Un.2040-2. 2040 Reduced Project Alternative Auxiliary Generator Average Daily Unmitigated Emissions.

Ship	Direction	Mode	Activity (hours)	MCR (kW)	Load Factor	Energy (kW-hr)	Fuel Type	Shipcalls (vessels/yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
VLCC	North In	Cruising	3.84	3,600	0.278	3,840	HFO	46.0	7,150	535	195	730	700	560	5,982
		Maneuvering	2.00	3,600	0.278	2,002	HFO	46.0	3,727	279	101	380	365	292	3,118
	North Out	Maneuvering	1.50	3,600	0.278	1,501	HFO	46.0	2,795	209	76	285	274	219	2,339
		Cruising	3.71	3,600	0.278	3,712	HFO	46.0	6,910	517	188	705	677	542	5,782
AFRAMAX	South In	Cruising	3.15	3,600	0.278	3,155	HFO	24.0	3,065	229	83	313	300	240	2,565
		Maneuvering	2.00	3,600	0.278	2,002	HFO	24.0	1,944	145	53	198	190	152	1,627
	South Out	Maneuvering	1.50	3,600	0.278	1,501	HFO	24.0	1,458	109	40	149	143	114	1,220
		Cruising	3.21	3,600	0.278	3,211	HFO	24.0	3,119	233	85	318	306	244	2,610
PANAMAX	South In	Cruising	3.15	3,600	0.278	3,155	HFO	10	1,277	96	35	130	125	100	1,069
		Maneuvering	2.00	3,600	0.278	2,002	HFO	10	810	61	22	83	79	63	678
	South Out	Maneuvering	1.5	3,600	0.278	1,501	HFO	10	608	45	17	62	60	48	508
		Cruising	3.21	3,600	0.278	3,211	HFO	10	1,300	97	35	133	127	102	1,087
SUEZMAX	North In	Cruising	3.84	3,600	0.278	3,840	HFO	52	8,082	605	220	825	792	633	6,763
		Maneuvering	2.00	3,600	0.278	2,002	HFO	52	4,213	315	115	430	413	330	3,525
	North Out	Maneuvering	1.5	3,600	0.278	1,501	HFO	52	3,159	236	86	322	309	248	2,644
		Cruising	3.71	3,600	0.278	3,712	HFO	52	7,811	585	213	797	765	612	6,536
<b>TOTAL</b>									<b>57,427</b>	<b>4,297</b>	<b>1,563</b>	<b>5,860</b>	<b>5,626</b>	<b>4,500</b>	<b>48,052</b>

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Table H.2.RPA.Un.2040-3. 2040 Reduced Project Alternative Boiler Warm-Up Average Daily Unmitigated Emissions.

Shipcalls (vessels/yr)	Vessel Size	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
24.0	Aframax	HFO	2.70	107.96	30%	3	50,000	1,015	92	23	212	183	119	7,852
46.0	VLCC	HFO	2.70	84.93	30%	3	90,000	2,352	249	51	1,479	1,272	323	21,312
10.0	Panamax	HFO	2.70	63.30	30%	3	35,000	174	16	4	36	31	20	1,343
52.0	Suezmax	HFO	2.70	87.54	30%	3	70,000	2,496	225	57	522	449	292	19,314
<b>TOTAL</b>								<b>6,037</b>	<b>581</b>	<b>136</b>	<b>2,250</b>	<b>1,935</b>	<b>754</b>	<b>49,821</b>

Table H.2.RPA.Un.2040-4. 2040 Reduced Project Alternative Berth Operations Average Daily Unmitigated Emissions.

Auxiliary Generator Pre-Pumpin

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
24.0	Aframax	700,000	HFO	2.70	3,600	27.8%	2.5	2,430	182	66	248	238	190	2,034
46.0	VLCC	2,000,000	HFO	2.70	3,600	27.8%	2.5	4,658	349	127	475	456	365	3,898
10.0	Panamax	350,000	HFO	2.70	3,600	27.8%	2.5	1,013	76	28	103	99	79	847
52.0	Suezmax	1,000,000	HFO	2.70	3,600	27.8%	2.5	5,266	394	143	537	516	413	4,406
<b>TOTAL</b>								<b>13,367</b>	<b>1,000</b>	<b>364</b>	<b>1,364</b>	<b>1,309</b>	<b>1,048</b>	<b>11,185</b>

Boiler Pre-Pumping

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
24.0	Aframax	700,000	HFO	2.70	107.96	30.0%	2.5	50,000	846	76	19	177	152	99	6,544
46.0	VLCC	2,000,000	HFO	2.70	84.93	30.0%	2.5	90,000	1,960	207	43	1,233	1,060	690	17,760
10.0	Panamax	350,000	HFO	2.70	63.30	30.0%	2.5	35,000	145	13	3	30	26	17	1,119
52.0	Suezmax	1,000,000	HFO	2.70	87.54	30.0%	2.5	70,000	2,080	188	48	435	374	244	16,095
<b>TOTAL</b>									<b>5,031</b>	<b>484</b>	<b>113</b>	<b>1,875</b>	<b>1,613</b>	<b>1,050</b>	<b>41,517</b>

Auxiliary Generator Pumpin

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
24.0	Aframax	700,000	MDO	0.52	3,600	55.6%	15.0	27,577	2,182	794	595	571	457	4,700
46.0	VLCC	2,000,000	MDO	0.52	3,600	55.6%	23.2	81,829	6,476	2,355	1,766	1,695	1,356	13,946
10.0	Panamax	350,000	MDO	0.52	3,600	55.6%	11.0	8,426	667	242	182	175	140	1,436
52.0	Suezmax	1,000,000	MDO	0.52	3,600	55.6%	15.3	60,945	4,823	1,754	1,315	1,263	1,010	10,387
<b>TOTAL</b>								<b>178,778</b>	<b>14,148</b>	<b>5,145</b>	<b>3,859</b>	<b>3,704</b>	<b>2,963</b>	<b>30,468</b>

Boiler Pumping

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Inerting Fuel Consumption Savings (lb/1000 bbl offloaded)	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
24.0	Aframax	700,000	MDO	0.52	102.17	28.06	15.0	4,410	1,102	62	730	511	342	16,149
46.0	VLCC	2,000,000	MDO	0.52	80.38	28.06	23.2	20,410	4,262	900	2,821	1,975	1,321	62,430
10.0	Panamax	350,000	MDO	0.52	59.91	28.06	11.0	395	99	6	65	46	31	1,446
52.0	Suezmax	1,000,000	MDO	0.52	82.85	28.06	15.3	10,091	2,523	142	1,670	1,169	782	36,954
<b>TOTAL</b>								<b>35,306</b>	<b>7,986</b>	<b>1,110</b>	<b>5,287</b>	<b>3,701</b>	<b>2,475</b>	<b>116,979</b>

Auxiliary Generator Post-Pumpin

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
24.0	Aframax	700,000	HFO	2.70	3,600	27.8%	1.0	972	73	26	99	95	76	813
46.0	VLCC	2,000,000	HFO	2.70	3,600	27.8%	1.0	1,863	139	51	190	183	146	1,559
10.0	Panamax	350,000	HFO	2.70	3,600	27.8%	1.0	405	30	11	41	40	32	339
52.0	Suezmax	1,000,000	HFO	2.70	3,600	27.8%	1.0	2,106	158	57	215	206	165	1,762
<b>TOTAL</b>								<b>5,347</b>	<b>400</b>	<b>145</b>	<b>546</b>	<b>524</b>	<b>419</b>	<b>4,474</b>



Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Un.2040-5. 2040 Reduced Project Alternative Summary of Average Daily Unmitigated Vessel Emissions.

Mode	Equipment	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Cruising	Main Engines	421,467	33,267	14,640	36,489	36,489	33,570	243,018
Cruising	Aux Generator	38,714	2,897	1,053	3,950	3,792	3,034	32,393
Maneuvering	Main Engines	14,016	2,379	4,233	1,851	1,851	1,703	2,238
Maneuvering	Aux Generator	18,714	1,400	509	1,910	1,833	1,467	15,658
Boiler Warm-up	Boiler	6,037	581	136	2,250	1,935	754	49,821
Berth Operations	Boiler	40,337	8,470	1,223	7,162	5,313	3,525	158,496
Berth Operations	Aux Generator	197,492	15,548	5,654	5,768	5,537	4,430	46,126
Propulsion	TOTAL	492,911	39,943	20,435	44,200	43,966	39,774	293,308
Non-Propulsion	TOTAL	243,866	24,600	7,013	15,180	12,785	8,709	254,444
<b>Total Emissions</b>		<b>736,776</b>	<b>64,543</b>	<b>27,448</b>	<b>59,380</b>	<b>56,751</b>	<b>48,482</b>	<b>547,751</b>
Cruising		460,181	36,164	15,693	40,440	40,282	36,604	275,411
Maneuvering		32,730	3,779	4,742	3,761	3,684	3,170	17,896

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Cruising	Main Engines	1,154.7	91.1	40.1	100.0	100.0	92.0	665.8
Cruising	Aux Generator	106.1	7.9	2.9	10.8	10.4	8.3	88.7
Maneuvering	Main Engines	38.4	6.5	11.6	5.1	5.1	4.7	6.1
Maneuvering	Aux Generator	51.3	3.8	1.4	5.2	5.0	4.0	42.9
Boiler Warm-up	Boiler	16.5	1.6	0.4	6.2	5.3	2.1	136.5
Berth Operations	Boiler	110.5	23.2	3.4	19.6	14.6	9.7	434.2
Berth Operations	Aux Generator	541.1	42.6	15.5	15.8	15.2	12.1	126.4
Propulsion	TOTAL	1,350.4	109.4	56.0	121.1	120.5	109.0	803.6
Non-Propulsion	TOTAL	668.1	67.4	19.2	41.6	35.0	23.9	697.1
<b>Total Emissions</b>		<b>2,019</b>	<b>177</b>	<b>75</b>	<b>163</b>	<b>155</b>	<b>133</b>	<b>1,501</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Un.2040-6. 2040 Reduced Project Alternative Tug Main Engines Average Daily Unmitigated Emissions.

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Shipcalls (vessels/yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
VLCC	Maneuvering - Pilot to Berth	1.00	4	4,800	0.50	MGO	46.0	9,082	2,274	426	401	369	7
	Maneuvering - Berth to Pilot	1.00	2	4,800	0.50	MGO	46.0	4,541	1,137	213	201	185	4
AFRAMAX	Maneuvering - Pilot to Berth	1.00	2	4,800	0.50	MGO	24.0	2,369	593	111	105	96	2
	Maneuvering - Berth to Pilc	1.00	2	4,800	0.50	MGO	24.0	2,369	593	111	105	96	2
PANAMAX	Maneuvering - Pilot to Berth	1.00	2	4,800	0.50	MGO	10.0	987	247	46	44	40	1
	Maneuvering - Berth to Pilot	1.00	2	4,800	0.50	MGO	10.0	987	247	46	44	40	1
SUEZMAX	Maneuvering - Pilot to Berth	1.00	3	4,800	0.50	MGO	52.0	7,700	1,928	361	340	313	6
	Maneuvering - Berth to Pilc	1.00	2	4,800	0.50	MGO	52.0	5,134	1,285	241	227	209	4
<b>TOTAL</b>								<b>33,171</b>	<b>8,304</b>	<b>1,554</b>	<b>1,465</b>	<b>1,348</b>	<b>27</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Un.2040-7. 2040 Reduced Project Alternative Tug Auxiliary Generator Engines Average Daily Unmitigated Emissions.

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Shipcalls (vessels/yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
VLCC	Maneuvering - Pilot to Berth	1.00	4	300	1.00	MGO	46.0	1,033	254	41	43	39	1
	Maneuvering - Berth to Pilot	1.00	2	300	1.00	MGO	46.0	517	127	21	21	20	0
AFRAMAX	Maneuvering - Pilot to Berth	1.00	2	300	1.00	MGO	24.0	270	66	11	11	10	0
	Maneuvering - Berth to Pilot	1.00	2	300	1.00	MGO	24.0	270	66	11	11	10	0
PANAMAX	Maneuvering - Pilot to Berth	1.00	2	300	1.00	MGO	10.0	112	28	4	5	4	0
	Maneuvering - Berth to Pilot	1.00	2	300	1.00	MGO	10.0	112	28	4	5	4	0
SUEZMAX	Maneuvering - Pilot to Berth	1.00	3	300	1.00	MGO	52.0	876	215	35	36	33	1
	Maneuvering - Berth to Pilot	1.00	2	300	1.00	MGO	52.0	584	143	23	24	22	0
<b>TOTAL</b>								<b>3,774</b>	<b>927</b>	<b>150</b>	<b>155</b>	<b>143</b>	<b>2</b>

Table H.2.RPA.Un.2040-8. 2040 Reduced Project Alternative Summary of Tug Average Daily Unmitigated Emissions.

Mode	Equipment	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Tug Assist	Main Engines	33,171	8,304	1,554	1,465	1,348	27
Tug Assist	Aux Generator	3,774	927	150	155	143	2
<b>TOTAL</b>		<b>36,945</b>	<b>9,231</b>	<b>1,704</b>	<b>1,621</b>	<b>1,491</b>	<b>29</b>

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Tug Assist	Main Engines	91	22.8	4.3	4.0	3.7	0.1
Tug Assist	Aux Generator	10	2.5	0.4	0.4	0.4	0.0
<b>TOTAL</b>		<b>101</b>	<b>25.3</b>	<b>4.7</b>	<b>4.4</b>	<b>4.1</b>	<b>0.1</b>

Table H.2.RPA.Un.2040-9. 2040 Reduced Project Alternative VDU Crude Average Daily Unmitigated Emissions.

	Annual Vessel Calls	crude vapors from tanks(scf/call)	annual gas usage (mmscf/yr)	mw crude vapors	destruction efficiency
Aframax	24	224000	5.4	50	98%
VLCC	46	596,313	27.4	50	98%
Panamax	10	116,667	1.2	50	98%
Suezmax	52	333,333	17.3	50	98%
<b>TOTAL</b>	<b>132</b>		<b>51.3</b>		

<b>Assumed Distribution based on tank storage volume:</b>	
<b>Site 1</b>	<b>12.5%</b>
<b>Site 2</b>	<b>87.5%</b>

Annual Average (lb/yr)

	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene
EF (lb/MMSCF)	130	35	7	7.5	0.38%	9.90%	0.017	0.0004	0.0003	0.0043	0.0027	0.731	0.0366	0.0272	0.0095
Aframax	349.4	94.1	18.8	20.2	0.07	1.86	0.0	0.001	0.001	0.012	0.007	2.0	0.1	0.1	0.0
VLCC	1783.0	480.0	96.0	102.9	0.36	9.50	0.2	0.005	0.004	0.059	0.037	10.0	0.5	0.4	0.1
Panamax	75.8	20.4	4.1	4.4	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0
Suezmax	1126.7	303.3	60.7	65.0	0.0	0.9	0.1	0.0	0.0	0.0	0.0	6.3	0.3	0.2	0.1
<b>TOTAL</b>	<b>3334.9</b>	<b>897.9</b>	<b>179.6</b>	<b>192.4</b>	<b>0.5</b>	<b>12.3</b>	<b>0.4</b>	<b>0.0</b>	<b>0.0</b>	<b>0.1</b>	<b>0.1</b>	<b>18.8</b>	<b>0.9</b>	<b>0.7</b>	<b>0.2</b>

Assumed a ratio of 500/1000 based on the corresponding Btu values with respect to natural gas combustion emission factors.

Annual Average (lb/yr)

	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene	SO <sub>x</sub>
Site 1	417	112.2	22.45	24.0	0.059	1.54	0.055	0.0013	0.0010	0.0138	0.0087	2.34	0.117	0.087	0.030	75
Site 2	2918	786	157.1	168.3	0.41	10.75	0.382	0.0090	0.0067	0.097	0.061	16.4	0.82	0.61	0.213	522

Table H.2.RPA.Un.2040-10. 2040 Reduced Project Alternative VDU Legs Average Daily Unmitigated Emissions.

	tanks	crude vapors from tanks on legs(scf/yr)	annual gas usage (mmscf/yr)	mw crude vapors	destruction efficiency
Site 1	4	8640000	34.6	50	98%
Site 2	14	8640000	121.0	50	98%
<b>TOTAL</b>	<b>18</b>		<b>155.5</b>		

<b>48</b>	<b>hr/event</b>
<b>6</b>	<b>events/yr</b>
<b>500</b>	<b>ft3/min</b>

		Annual Average (lb/yr)													
	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene
EF (lb/MMSCF)	130	35	7	7.5	0.38%	9.90%	0.017	0.0004	0.0003	0.0043	0.0027	0.731	0.0366	0.0272	0.0095
<b>TOTAL</b>	<b>10108.8</b>	<b>2721.6</b>	<b>544.3</b>	<b>583.2</b>	<b>2.1</b>	<b>53.9</b>	<b>1.3</b>	<b>0.0</b>	<b>0.0</b>	<b>0.3</b>	<b>0.2</b>	<b>56.8</b>	<b>2.8</b>	<b>2.1</b>	<b>0.7</b>

Assumed a ratio of 500/1000 based on the corresponding Btu values with respect to natural gas combustion emission factors.

		Annual Average (lb/yr)														
	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene	SO <sub>x</sub>
Site 1	2246.4	604.8	121.0	129.6	0.46	11.98	0.29	0.007	0.005	0.074	0.05	12.63	0.63	0.47	0.16	402
Site 2	7862.4	2116.8	423.4	453.6	1.61	41.91	1.03	0.024	0.018	0.260	0.16	44.21	2.21	1.65	0.57	1407



Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Un.2040-12. 2040 Reduced Project Alternative Main Engines Average Daily Unmitigated Emissions (BP).

Ship	Direction	Mode	Distance (nautical miles)	Ship speed (knots)	Activity (hours)	Maximum Speed (knots)	Load Factor	MCR (kW)	Energy (kW-hr)	Fuel Type	Shipcalls (vessels/ yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)	
AFRAMAX	South In	Cruising - CW to VSR	23	12	1.92	16.1	0.414	12,477	9,902	Dist at 0.2	31	14,368	1,183	507	245	245	225	657	
		Cruising - VSR to PZ	11	12	0.92	16.1	0.414	12,477	4,736	Dist at 0.2	31	6,872	566	243	117	117	108	314	
		Cruising - PZ to Pilot	4.7	7	0.67	16.1	0.082	12,477	689	Dist at 0.2	31	999	82	35	17	17	16	46	
	South Out	Maneuvering - Pilot to Berth			3	1.00	16.1	0.006	12,477	81	Dist at 0.2	31	117	10	4	2	2	2	5
		Maneuvering - Berth to Pilot			5	1.00	16.1	0.030	12,477	374	Dist at 0.2	31	542	45	19	9	9	9	25
		Cruising - Pilot to PZ	3.5	7	0.50	16.1	0.082	12,477	513	Dist at 0.2	31	744	61	26	13	13	12	34	
		Cruising - PZ to VSR	12.5	12	1.04	16.1	0.414	12,477	5,382	Dist at 0.2	31	7,809	643	276	133	133	123	357	
		Cruising - VSR to CW	24.5	12	2.04	16.1	0.414	12,477	10,548	Dist at 0.2	31	15,305	1,260	540	261	261	240	700	
<b>TOTAL</b>												<b>46,755</b>	<b>3,850</b>	<b>1,650</b>	<b>798</b>	<b>798</b>	<b>734</b>	<b>2,139</b>	



Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Un.2040-13. 2040 Reduced Project Alternative Auxiliary Generator Average Daily Unmitigated Emissions (BP).

Ship	Direction	Mode	Activity (hours)	MCR (kW)	Load Factor	Energy (kW-hr)	Fuel Type	Shipcalls (vessels/yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
AFRAMAX	South In	Cruising	3.50	3,600	0.278	3,508	Dist at 0.2	31	4,161	329	120	84	80	64	273
		Maneuvering	2.00	3,600	0.278	2,002	Dist at 0.2	31	2,375	188	68	48	46	37	156
	South Out	Maneuvering	1.5	3,600	0.278	1,501	Dist at 0.2	31	1,781	141	51	36	34	27	117
		Cruising	3.50	3,600	0.278	3,503	Dist at 0.2	31	4,156	329	120	83	80	64	272
<b>TOTAL</b>									<b>12,473</b>	<b>987</b>	<b>359</b>	<b>250</b>	<b>240</b>	<b>192</b>	<b>818</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Un.2040-14. 2040 Reduced Project Alternative Boiler Warm-Up Average Daily Unmitigated Emissions (BP).

Shipcalls (vessels/yr)	Vessel Size	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
31.0	Aframax	Dist at 0.2	0.20	102.17	30%	3	50,000	505	126	7	84	58	39	711
<b>TOTAL</b>								<b>505</b>	<b>126</b>	<b>7</b>	<b>84</b>	<b>58</b>	<b>39</b>	<b>711</b>

Table H.2.RPA.Un.2040-15. 2040 Reduced Project Alternative Berth Operations Average Daily Unmitigated Emissions (BP).

Auxiliary Generator Pre-Pumpin

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
31.0	Aframax	400,000	Dist at 0.2	0.20	3,600	27.8%	2.5	2,968	235	85	60	57	46	195
TOTAL								2,968	235	85	60	57	46	195

Boiler Pre-Pumping

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
31.0	Aframax	400,000	Dist at 0.2	0.20	102.17	30.0%	2.5	50,000	421	105	6	70	49	33	593
TOTAL									421	105	6	70	49	33	593

Auxiliary Generator Pumpin

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
31.0	Aframax	400,000	Dist at 0.2	0.20	3,600	55.6%	15.0	35,620	2,819	1,025	715	686	549	2,335
TOTAL								35,620	2,819	1,025	715	686	549	2,335

Boiler Pumping

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Inerting Fuel Consumption Savings (lb/1000 bbl offloaded)	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
31.0	Aframax	400,000	Dist at 0.2	0.20	102.17	28.06	15.0	3,255	814	46	539	377	252	4,584
TOTAL								3,255	814	46	539	377	252	4,584

Auxiliary Generator Post-Pumpin

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
31.0	Aframax	400,000	Dist at 0.2	0.20	3,600	27.8%	1.0	1,187	94	34	24	23	18	78
TOTAL								1,187	94	34	24	23	18	78

**Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR**

**Table H.2.RPA.Un.2040-16.**

**2040 Reduced Project Alternative Summary of Average Daily Unmitigated Vessel Emissions (BP).**

<b>Mode</b>	<b>Equipment</b>	<b>NO<sub>x</sub> Emissions (lb/yr)</b>	<b>CO Emissions (lb/yr)</b>	<b>ROG Emissions (lb/yr)</b>	<b>PM Emissions (lb/yr)</b>	<b>PM<sub>10</sub> Emissions (lb/yr)</b>	<b>PM<sub>2.5</sub> Emissions (lb/yr)</b>	<b>SO<sub>2</sub> Emissions (lb/yr)</b>
Cruising	Main Engines	46,096	3,796	1,627	786	786	723	2,109
Cruising	Aux Generator	8,317	658	239	167	160	128	545
Maneuvering	Main Engines	659	54	23	11	11	10	30
Maneuvering	Aux Generator	4,156	329	120	83	80	64	272
Boiler Warm-up	Boiler	505	126	7	84	58	39	711
Berth Operations	Boiler	3,676	919	52	608	426	285	5,177
Berth Operations	Aux Generator	39,776	3,148	1,145	798	766	613	2,607
Propulsion	TOTAL	59,228	4,837	2,009	1,048	1,038	926	2,957
Non-Propulsion	TOTAL	43,957	4,193	1,204	1,490	1,251	937	8,495
<b>Total Emissions</b>		<b>103,184</b>	<b>9,030</b>	<b>3,213</b>	<b>2,538</b>	<b>2,289</b>	<b>1,863</b>	<b>11,452</b>

<b>Mode</b>	<b>Equipment</b>	<b>NO<sub>x</sub> Emissions (lb/day)</b>	<b>CO Emissions (lb/day)</b>	<b>ROG Emissions (lb/day)</b>	<b>PM Emissions (lb/day)</b>	<b>PM<sub>10</sub> Emissions (lb/day)</b>	<b>PM<sub>2.5</sub> Emissions (lb/day)</b>	<b>SO<sub>2</sub> Emissions (lb/day)</b>
Cruising	Main Engines	126.3	10.4	4.5	2.2	2.2	2.0	5.8
Cruising	Aux Generator	22.8	1.8	0.7	0.5	0.4	0.4	1.5
Maneuvering	Main Engines	1.8	0.1	0.1	0.0	0.0	0.0	0.1
Maneuvering	Aux Generator	11.4	0.9	0.3	0.2	0.2	0.2	0.7
Boiler Warm-up	Boiler	1.4	0.3	0.0	0.2	0.2	0.1	1.9
Berth Operations	Boiler	10.1	2.5	0.1	1.7	1.2	0.8	14.2
Berth Operations	Aux Generator	109.0	8.6	3.1	2.2	2.1	1.7	7.1
Propulsion	TOTAL	162.3	13.3	5.5	2.9	2.8	2.5	8.1
Non-Propulsion	TOTAL	120.4	11.5	3.3	4.1	3.4	2.6	23.3
<b>Total Emissions</b>		<b>283</b>	<b>25</b>	<b>9</b>	<b>7</b>	<b>6</b>	<b>5</b>	<b>31</b>

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Table H.2.RPA.Un.2040-17. 2040 Reduced Project Alternative Tug Main Engines Average Daily Unmitigated Emissions (BP).

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Shipcalls (vessels/yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
AFRAMAX	Maneuvering - Pilot to Berth	1.00	2	4,800	0.50	MGO	31.0	3,060	766	143	135	124	2
	Maneuvering - Berth to Pilc	1.00	2	4,800	0.50	MGO	31.0	3,060	766	143	135	124	2

**TOTAL      6,121      1,532      287      270      249      5**

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Table H.2.RPA.Un.2040-18. 2040 Reduced Project Alternative Tug Auxiliary Generator Engines Average Daily Unmitigated Emissions (BP).

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Shipcalls (vessels/yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
AFRAMAX	Maneuvering - Pilot to Berth	1.00	2	300	1.00	MGO	31.0	348	86	14	14	13	0
	Maneuvering - Berth to Pilc	1.00	2	300	1.00	MGO	31.0	348	86	14	14	13	0
<b>TOTAL</b>								<b>696</b>	<b>171</b>	<b>28</b>	<b>29</b>	<b>26</b>	<b>0</b>

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Table H.2.RPA.Un.2040-19. 2040 Reduced Project Alternative Summary of Tug Average Daily Unmitigated Emissions (BP).

Mode	Equipment	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Tug Assist	Main Engines	6,121	1,532	287	270	249	5
Tug Assist	Aux Generator	696	171	28	29	26	0
<b>TOTAL</b>		<b>6,817</b>	<b>1,703</b>	<b>314</b>	<b>299</b>	<b>275</b>	<b>5</b>

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Tug Assist	Main Engines	17	4.2	0.8	0.7	0.7	0.0
Tug Assist	Aux Generator	2	0.5	0.1	0.1	0.1	0.0
<b>TOTAL</b>		<b>19</b>	<b>4.7</b>	<b>0.9</b>	<b>0.8</b>	<b>0.8</b>	<b>0.0</b>

Table H.2.RPA.Un.2040-20. 2040 Reduced Project Alternative VDU Crude Average Daily Unmitigated Emissions (BP).

	Annual Vessel Calls	crude vapors from tanks(scf/call)	annual gas usage (mmscf/yr)	mw crude vapors	destruction efficiency
Aframax	31	224,000	6.9	50	98%
<b>TOTAL</b>	<b>31</b>		<b>6.9</b>		

<b>Assumed Distribution based on tank storage volume:</b>	
Site 1	12.5%
Site 2	87.5%

Annual Average (lb/yr)

	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene
EF (lb/MMSCF)	130	35	7	7.5	0.38%	9.90%	0.017	0.0004	0.0003	0.0043	0.0027	0.731	0.0366	0.0272	0.0095
Panamax	451.4	121.5	24.3	26.0	0.0	0.3	0.1	0.0	0.0	0.0	0.0	2.5	0.1	0.1	0.0
<b>TOTAL</b>	<b>451.4</b>	<b>121.5</b>	<b>24.3</b>	<b>26.0</b>	<b>0.0</b>	<b>0.3</b>	<b>0.1</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>2.5</b>	<b>0.1</b>	<b>0.1</b>	<b>0.0</b>

Assumed a ratio of 500/1000 based on the corresponding Btu values with respect to natural gas combustion emission factors.

Annual Average (lb/yr)

	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene	SO <sub>x</sub>
Site 1	56	15.2	3.04	3.3	0.002	0.04	0.007	0.0002	0.0001	0.0019	0.0012	0.32	0.016	0.012	0.004	10
Site 2	395	106	21.3	22.8	0.01	0.30	0.052	0.0012	0.0009	0.013	0.008	2.2	0.11	0.08	0.029	71



Table H.2.RPA.Un.2040-21. 2040 Reduced Project Alternative VDU Legs Average Daily Unmitigated Emissions (BP).

	tanks	crude vapors from tanks on legs(scf/yr)	annual gas usage (mmscf/yr)	mw crude vapors	destruction efficiency
Site 1	4	8640000	34.6	50	98%
Site 2	14	8640000	121.0	50	98%
<b>TOTAL</b>	<b>18</b>		<b>155.5</b>		

<b>48</b>	<b>hr/event</b>
<b>6</b>	<b>events/yr</b>
<b>500</b>	<b>ft3/min</b>

		Annual Average (lb/yr)													
	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene
EF (lb/MMSCF)	130	35	7	7.5	0.38%	9.90%	0.017	0.0004	0.0003	0.0043	0.0027	0.731	0.0366	0.0272	0.0095
<b>TOTAL</b>	<b>10108.8</b>	<b>2721.6</b>	<b>544.3</b>	<b>583.2</b>	<b>2.1</b>	<b>53.9</b>	<b>1.3</b>	<b>0.0</b>	<b>0.0</b>	<b>0.3</b>	<b>0.2</b>	<b>56.8</b>	<b>2.8</b>	<b>2.1</b>	<b>0.7</b>

Assumed a ratio of 500/1000 based on the corresponding Btu values with respect to natural gas combustion emission factors.

		Annual Average (lb/yr)														
	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene	SO <sub>x</sub>
Site 1	2246.4	604.8	121.0	129.6	0.46	11.98	0.29	0.007	0.005	0.074	0.05	12.63	0.63	0.47	0.16	402
Site 2	7862.4	2116.8	423.4	453.6	1.61	41.91	1.03	0.024	0.018	0.260	0.16	44.21	2.21	1.65	0.57	1407



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Table H.2.RPA.Un.2040-23. 2040 Reduced Project Alternative BP Berth Summary.

Operation	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Tanker Cruising and Manuevering	59,228	4,837	2,009	1,048	1,038	926	2,957
Tanker Hoteling	39,776	3,148	1,145	798	766	613	2,607
Offloading Emissions	3,676	919	52	608	426	285	5,177
Transiting Operations	505	126	7	84	58	39	711
Tug Assistance	6,817	1,703	314	---	299	275	5
Tanks	---	---	3,297	---	---	---	---
Vapor Destruction Units	10,560	2,843	569	---	609	---	1,890
Valves, Flanges, Pumps	---	---	1,188	---	---	---	---
<b>TOTAL</b>	<b>120,562</b>	<b>13,577</b>	<b>8,580</b>	<b>2,538</b>	<b>3,197</b>	<b>2,138</b>	<b>13,347</b>

Operation	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Tanker Cruising and Manuevering	162	13	6	3	3	3	8
Tanker Hoteling	109	9	3	2	2	2	7
Offloading Emissions	10	3	0	2	1	1	14
Transiting Operations	1	0.3	0.02	0.2	0.2	0.11	2
Tug Assistance	19	5	0.9	---	0.8	0.8	0.0
Tanks	---	---	9.0	---	---	---	---
Vapor Destruction Units	29	8	2	---	2	---	5
Valves, Flanges, Pumps	---	---	3	---	---	---	---
<b>TOTAL</b>	<b>330</b>	<b>37</b>	<b>24</b>	<b>7</b>	<b>9</b>	<b>6</b>	<b>37</b>

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Table H.2.RPA.Un.2040-24. 2040 Reduced Project Alternative Main Engines Average Daily Unmitigated Emissions (Tesoro).

Ship	Direction	Mode	Distance (nautical miles)	Ship speed (knots)	Activity (hours)	Maximum Speed (knots)	Load Factor	MCR (kW)	Energy (kW-hr)	Fuel Type	Shipcalls (vessels/ yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)	
AFRAMAX	South In	Cruising - CW to VSR	23	12	1.92	16.1	0.414	12,477	9,902	Dist at 0.2	78	36,151	2,977	1,276	617	617	567	1,654	
		Cruising - VSR to PZ	11	12	0.92	16.1	0.414	12,477	4,736	Dist at 0.2	78	17,290	1,424	610	295	295	271	791	
		Cruising - PZ to Pilot	4.7	7	0.67	16.1	0.082	12,477	689	Dist at 0.2	78	2,514	207	89	43	43	39	115	
	South Out	Maneuvering - Pilot to Berth			3	1.00	16.1	0.006	12,477	81	Dist at 0.2	78	295	24	10	5	5	5	13
		Maneuvering - Berth to Pilot			5	1.00	16.1	0.030	12,477	374	Dist at 0.2	78	1,364	112	48	23	23	21	62
		Cruising - Pilot to PZ	3.5	7	0.50	16.1	0.082	12,477	513	Dist at 0.2	78	1,872	154	66	32	32	29	86	
		Cruising - PZ to VSR	12.5	12	1.04	16.1	0.414	12,477	5,382	Dist at 0.2	78	19,647	1,618	693	335	335	308	899	
		Cruising - VSR to CW	24.5	12	2.04	16.1	0.414	12,477	10,548	Dist at 0.2	78	38,509	3,171	1,359	657	657	604	1,762	
<b>TOTAL</b>												<b>117,641</b>	<b>9,688</b>	<b>4,152</b>	<b>2,007</b>	<b>2,007</b>	<b>1,846</b>	<b>5,382</b>	

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Table H.2.RPA.Un.2040-25. 2040 Reduced Project Alternative Auxiliary Generator Average Daily Unmitigated Emissions (Tesoro).

Ship	Direction	Mode	Activity (hours)	MCR (kW)	Load Factor	Energy (kW-hr)	Fuel Type	Shipcalls (vessels/yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
AFRAMAX	South In	Cruising	3.50	3,600	0.278	3,508	Dist at 0.2	78	10,471	829	301	210	202	161	686
		Maneuvering	2.00	3,600	0.278	2,002	Dist at 0.2	78	5,975	473	172	120	115	92	392
	South Out	Maneuvering	1.5	3,600	0.278	1,501	Dist at 0.2	78	4,481	355	129	90	86	69	294
		Cruising	3.50	3,600	0.278	3,503	Dist at 0.2	78	10,456	827	301	210	201	161	685
<b>TOTAL</b>									<b>31,383</b>	<b>2,484</b>	<b>903</b>	<b>630</b>	<b>605</b>	<b>484</b>	<b>2,057</b>

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Table H.2.RPA.Un.2040-26. 2040 Reduced Project Alternative Boiler Warm-Up Average Daily Unmitigated Emissions (Tesoro).

Shipcalls (vessels/yr)	Vessel Size	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
78.0	Aframax	Dist at 0.2	0.20	102.17	30%	3	50,000	1,270	318	18	210	147	98	1,789
<b>TOTAL</b>								<b>1,270</b>	<b>318</b>	<b>18</b>	<b>210</b>	<b>147</b>	<b>98</b>	<b>1,789</b>

Table H.2.RPA.Un.2040-27. 2040 Reduced Project Alternative Berth Operations Average Daily Unmitigated Emissions (Tesoro).

**Auxiliary Generator Pre-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
78.0	Aframax	400,000	Dist at 0.2	0.20	3,600	27.8%	2.5	7,469	591	215	150	144	115	490
TOTAL								7,469	591	215	150	144	115	490

**Boiler Pre-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
78.0	Aframax	400,000	Dist at 0.2	0.20	102.17	30.0%	2.5	50,000	1,059	265	15	175	123	82	1,491
TOTAL									1,059	265	15	175	123	82	1,491

**Auxiliary Generator Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
78.0	Aframax	400,000	Dist at 0.2	0.20	3,600	55.6%	15.0	89,626	7,093	2,579	1,799	1,727	1,382	5,875
TOTAL								89,626	7,093	2,579	1,799	1,727	1,382	5,875

**Boiler Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Inerting Fuel Consumption Savings (lb/1000 bbl offloaded)	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
78.0	Aframax	400,000	Dist at 0.2	0.20	102.17	28.06	15.0	8,190	2,047	115	1,355	949	634	11,535
TOTAL								8,190	2,047	115	1,355	949	634	11,535

**Auxiliary Generator Post-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
78.0	Aframax	400,000	Dist at 0.2	0.20	3,600	27.8%	1.0	2,988	236	86	60	58	46	196
TOTAL								2,988	236	86	60	58	46	196

**Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR**

**Table H.2.RPA.Un.2040-28.**

**2040 Reduced Project Alternative Summary of Average Daily Unmitigated Vessel Emissions (Tesoro).**

<b>Mode</b>	<b>Equipment</b>	<b>NO<sub>x</sub> Emissions (lb/yr)</b>	<b>CO Emissions (lb/yr)</b>	<b>ROG Emissions (lb/yr)</b>	<b>PM Emissions (lb/yr)</b>	<b>PM<sub>10</sub> Emissions (lb/yr)</b>	<b>PM<sub>2.5</sub> Emissions (lb/yr)</b>	<b>SO<sub>2</sub> Emissions (lb/yr)</b>
Cruising	Main Engines	115,982	9,551	4,093	1,979	1,979	1,820	5,306
Cruising	Aux Generator	20,927	1,656	602	420	403	323	1,372
Maneuvering	Main Engines	1,659	137	59	28	28	26	76
Maneuvering	Aux Generator	10,456	827	301	210	201	161	685
Boiler Warm-up	Boiler	1,270	318	18	210	147	98	1,789
Berth Operations	Boiler	9,248	2,312	130	1,531	1,071	716	13,026
Berth Operations	Aux Generator	100,082	7,920	2,880	2,009	1,928	1,543	6,560
Propulsion	TOTAL	149,025	12,172	5,055	2,637	2,612	2,330	7,439
Non-Propulsion	TOTAL	110,600	10,550	3,028	3,750	3,147	2,358	21,375
<b>Total Emissions</b>		<b>259,625</b>	<b>22,721</b>	<b>8,083</b>	<b>6,386</b>	<b>5,759</b>	<b>4,688</b>	<b>28,814</b>

<b>Mode</b>	<b>Equipment</b>	<b>NO<sub>x</sub> Emissions (lb/day)</b>	<b>CO Emissions (lb/day)</b>	<b>ROG Emissions (lb/day)</b>	<b>PM Emissions (lb/day)</b>	<b>PM<sub>10</sub> Emissions (lb/day)</b>	<b>PM<sub>2.5</sub> Emissions (lb/day)</b>	<b>SO<sub>2</sub> Emissions (lb/day)</b>
Cruising	Main Engines	317.8	26.2	11.2	5.4	5.4	5.0	14.5
Cruising	Aux Generator	57.3	4.5	1.6	1.2	1.1	0.9	3.8
Maneuvering	Main Engines	4.5	0.4	0.2	0.1	0.1	0.1	0.2
Maneuvering	Aux Generator	28.6	2.3	0.8	0.6	0.6	0.4	1.9
Boiler Warm-up	Boiler	3.5	0.9	0.0	0.6	0.4	0.3	4.9
Berth Operations	Boiler	25.3	6.3	0.4	4.2	2.9	2.0	35.7
Berth Operations	Aux Generator	274.2	21.7	7.9	5.5	5.3	4.2	18.0
Propulsion	TOTAL	408.3	33.3	13.8	7.2	7.2	6.4	20.4
Non-Propulsion	TOTAL	303.0	28.9	8.3	10.3	8.6	6.5	58.6
<b>Total Emissions</b>		<b>711</b>	<b>62</b>	<b>22</b>	<b>17</b>	<b>16</b>	<b>13</b>	<b>79</b>



Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Un.2040-29. 2040 Reduced Project Alternative Tug Main Engines Average Daily Unmitigated Emissions (Tesoro).

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Shipcalls (vessels/yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
AFRAMAX	Maneuvering - Pilot to Berth	1.00	2	4,800	0.50	MGO	78.0	7,700	1,928	361	340	313	6
	Maneuvering - Berth to Pilc	1.00	2	4,800	0.50	MGO	78.0	7,700	1,928	361	340	313	6
<b>TOTAL</b>								<b>15,401</b>	<b>3,855</b>	<b>722</b>	<b>680</b>	<b>626</b>	<b>12</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Un.2040-30. 2040 Reduced Project Alternative Tug Auxiliary Generator Engines Average Daily Unmitigated Emissions (Tesoro).

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Shipcalls (vessels/yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
AFRAMAX	Maneuvering - Pilot to Berth	1.00	2	300	1.00	MGO	78.0	876	215	35	36	33	1
	Maneuvering - Berth to Pilot	1.00	2	300	1.00	MGO	78.0	876	215	35	36	33	1
<b>TOTAL</b>								<b>1,752</b>	<b>430</b>	<b>70</b>	<b>72</b>	<b>66</b>	<b>1</b>

Table H.2.RPA.Un.2040-31. 2040 Reduced Project Alternative Summary of Tug Average Daily Unmitigated Emissions (Tesoro).

Mode	Equipment	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Tug Assist	Main Engines	15,401	3,855	722	680	626	12
Tug Assist	Aux Generator	1,752	430	70	72	66	1
<b>TOTAL</b>		<b>17,153</b>	<b>4,286</b>	<b>791</b>	<b>753</b>	<b>692</b>	<b>13</b>

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Tug Assist	Main Engines	42	10.6	2.0	1.9	1.7	0.0
Tug Assist	Aux Generator	5	1.2	0.2	0.2	0.2	0.0
<b>TOTAL</b>		<b>47</b>	<b>11.7</b>	<b>2.2</b>	<b>2.1</b>	<b>1.9</b>	<b>0.0</b>

Table H.2.RPA.Un.2040-32. 2040 Reduced Project Alternative VDU Crude Average Daily Unmitigated Emissions (Tesoro).

	Annual Vessel Calls	crude vapors from tanks(scf/call)	annual gas usage (mmscf/yr)	mw crude vapors	destruction efficiency
Aframax	78	224,000	17.5	50	98%
<b>TOTAL</b>	<b>78</b>		<b>17.5</b>		

<b>Assumed Distribution based on tank storage volume:</b>	
Site 1	12.5%
Site 2	87.5%

Annual Average (lb/yr)

	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene
EF (lb/MMSCF)	130	35	7	7.5	0.38%	9.90%	0.017	0.0004	0.0003	0.0043	0.0027	0.731	0.0366	0.0272	0.0095
Panamax	1135.7	305.8	61.2	65.5	0.0	0.9	0.1	0.0	0.0	0.0	0.0	6.4	0.3	0.2	0.1
<b>TOTAL</b>	<b>1135.7</b>	<b>305.8</b>	<b>61.2</b>	<b>65.5</b>	<b>0.0</b>	<b>0.9</b>	<b>0.1</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>6.4</b>	<b>0.3</b>	<b>0.2</b>	<b>0.1</b>

Assumed a ratio of 500/1000 based on the corresponding Btu values with respect to natural gas combustion emission factors.

Annual Average (lb/yr)

	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene	SO <sub>x</sub>
Site 1	142	38.2	7.64	8.2	0.004	0.11	0.019	0.0004	0.0003	0.0047	0.0029	0.80	0.040	0.030	0.010	25
Site 2	994	268	53.5	57.3	0.03	0.76	0.130	0.0031	0.0023	0.033	0.021	5.6	0.28	0.21	0.073	178

Table H.2.RPA.Un.2040-33. 2040 Reduced Project Alternative VDU Legs Average Daily Unmitigated Emissions (Tesoro).

	tanks	crude vapors from tanks on legs(scf/yr)	annual gas usage (mmscf/yr)	mw crude vapors	destruction efficiency
Site 1	4	8640000	34.6	50	98%
Site 2	14	8640000	121.0	50	98%
<b>TOTAL</b>	<b>18</b>		<b>155.5</b>		

<b>48</b>	<b>hr/event</b>
<b>6</b>	<b>events/yr</b>
<b>500</b>	<b>ft3/min</b>

		Annual Average (lb/yr)													
	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene
EF (lb/MMSCF)	130	35	7	7.5	0.38%	9.90%	0.017	0.0004	0.0003	0.0043	0.0027	0.731	0.0366	0.0272	0.0095
<b>TOTAL</b>	<b>10108.8</b>	<b>2721.6</b>	<b>544.3</b>	<b>583.2</b>	<b>2.1</b>	<b>53.9</b>	<b>1.3</b>	<b>0.0</b>	<b>0.0</b>	<b>0.3</b>	<b>0.2</b>	<b>56.8</b>	<b>2.8</b>	<b>2.1</b>	<b>0.7</b>

Assumed a ratio of 500/1000 based on the corresponding Btu values with respect to natural gas combustion emission factors.

		Annual Average (lb/yr)														
	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene	SO <sub>x</sub>
Site 1	2246.4	604.8	121.0	129.6	0.46	11.98	0.29	0.007	0.005	0.074	0.05	12.63	0.63	0.47	0.16	402
Site 2	7862.4	2116.8	423.4	453.6	1.61	41.91	1.03	0.024	0.018	0.260	0.16	44.21	2.21	1.65	0.57	1407



**Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR**

**Table H.2.RPA.Un.2040-35. 2040 Reduced Project Alternative Tesoro Berth Summary.**

<b>Operation</b>	<b>NO<sub>x</sub> Emissions (lb/yr)</b>	<b>CO Emissions (lb/yr)</b>	<b>ROG Emissions (lb/yr)</b>	<b>PM Emissions (lb/yr)</b>	<b>PM<sub>10</sub> Emissions (lb/yr)</b>	<b>PM<sub>2.5</sub> Emissions (lb/yr)</b>	<b>SO<sub>2</sub> Emissions (lb/yr)</b>
Tanker Cruising and Maneuvering	149,025	12,172	5,055	2,637	2,612	2,330	7,439
Tanker Hoteling	100,082	7,920	2,880	2,009	1,928	1,543	6,560
Offloading Emissions	9,248	2,312	130	1,531	1,071	716	13,026
Transiting Operations	1,270	318	18	210	147	98	1,789
Tug Assistance	17,153	4,286	791	---	753	692	13
Tanks	---	---	3,297	---	---	---	---
Vapor Destruction Units	11,244	3,027	605	---	649	---	2,012
Valves, Flanges, Pumps	---	---	1,188	---	---	---	---
<b>TOTAL</b>	<b>288,023</b>	<b>30,035</b>	<b>13,965</b>	<b>6,386</b>	<b>7,160</b>	<b>5,380</b>	<b>30,840</b>

<b>Operation</b>	<b>NO<sub>x</sub> Emissions (lb/day)</b>	<b>CO Emissions (lb/day)</b>	<b>ROG Emissions (lb/day)</b>	<b>PM Emissions (lb/day)</b>	<b>PM<sub>10</sub> Emissions (lb/day)</b>	<b>PM<sub>2.5</sub> Emissions (lb/day)</b>	<b>SO<sub>2</sub> Emissions (lb/day)</b>
Tanker Cruising and Maneuvering	408	33	14	7	7	6	20
Tanker Hoteling	274	22	8	6	5	4	18
Offloading Emissions	25	6	0	4	3	2	36
Transiting Operations	3	0.9	0.05	0.6	0.4	0.27	5
Tug Assistance	47	12	2.2	---	2.1	1.9	0.0
Tanks	---	---	9.0	---	---	---	---
Vapor Destruction Units	31	8	2	---	2	---	6
Valves, Flanges, Pumps	---	---	3	---	---	---	---
<b>TOTAL</b>	<b>789</b>	<b>82</b>	<b>38</b>	<b>17</b>	<b>20</b>	<b>15</b>	<b>84</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Un.2040-36. 2040 Reduced Project Alternative Main Engines Average Daily Unmitigated Emissions (Exxon Mobil)

Ship	Direction	Mode	Distance (nautical miles)	Ship speed (knots)	Activity (hours)	Maximum Speed (knots)	Load Factor	MCR (kW)	Energy (kW-hr)	Fuel Type	Shipcalls (vessels/ yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)		
PANAMAX	South In	Cruising - CW to VSR	23	12	1.92	15.8	0.438	10,300	8,649	Dist at 0.2	131	53,031	4,367	1,872	905	905	832	2,426		
		Cruising - VSR to PZ	11	12	0.92	15.8	0.438	10,300	4,136	Dist at 0.2	131	25,363	2,089	895	433	433	398	1,160		
		Cruising - PZ to Pilot	4.7	7	0.67	15.8	0.087	10,300	601	Dist at 0.2	131	3,688	304	130	63	63	58	169		
	South Out	Maneuvering - Pilot to Berth			3	1.00	15.8	0.007	10,300	71	Dist at 0.2	131	432	36	15	7	7	7	20	
		Maneuvering - Berth to Pilot			5	1.00	15.8	0.032	10,300	326	Dist at 0.2	131	2,001	165	71	34	34	31	92	
		Cruising - Pilot to PZ			3.5	7	0.50	15.8	0.087	10,300	448	Dist at 0.2	131	2,746	226	97	47	47	43	126
		Cruising - PZ to VSR			12.5	12	1.04	15.8	0.438	10,300	4,700	Dist at 0.2	131	28,821	2,374	1,017	492	492	452	1,319
		Cruising - VSR to CW			24.5	12	2.04	15.8	0.438	10,300	9,213	Dist at 0.2	131	56,490	4,652	1,994	964	964	887	2,584
		<b>TOTAL</b>											<b>172,572</b>	<b>14,212</b>	<b>6,091</b>	<b>2,944</b>	<b>2,944</b>	<b>2,708</b>	<b>7,895</b>	



Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Un.2040-37. 2040 Reduced Project Alternative Auxiliary Generator Average Daily Unmitigated Emissions (Exxon Mobil).

Ship	Direction	Mode	Activity (hours)	MCR (kW)	Load Factor	Energy (kW-hr)	Fuel Type	Shipcalls (vessels/yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
PANAMAX	South In	Cruising	3.50	3,600	0.278	3,508	Dist at 0.2	131	17,585	1,392	506	353	339	271	1,153
		Maneuvering	2.00	3,600	0.278	2,002	Dist at 0.2	131	10,035	794	289	201	193	155	658
	South Out	Maneuvering	1.5	3,600	0.278	1,501	Dist at 0.2	131	7,526	596	217	151	145	116	493
		Cruising	3.58	3,600	0.278	3,586	Dist at 0.2	131	17,979	1,423	517	361	346	277	1,179
<b>TOTAL</b>									<b>53,126</b>	<b>4,204</b>	<b>1,529</b>	<b>1,066</b>	<b>1,024</b>	<b>819</b>	<b>3,482</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Un.2040-38. 2040 Reduced Project Alternative Boiler Warm-Up Average Daily Unmitigated Emissions (Exxon Mobil).

Shipcalls (vessels/yr)	Vessel Size	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
131.0	Panamax	Dist at 0.2	0.20	59.91	30%	3	35,000	876	219	12	145	101	68	1,233
<b>TOTAL</b>								<b>876</b>	<b>219</b>	<b>12</b>	<b>145</b>	<b>101</b>	<b>68</b>	<b>1,233</b>

Table H.2.RPA.Un.2040-39. 2040 Reduced Project Alternative Berth Operations Average Daily Unmitigated Emissions (Exxon Mobil).

Auxiliary Generator Pre-Pumpin

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
131.0	Panamax	300,000	Dist at 0.2	0.20	3,600	27.8%	2.5	12,544	993	361	252	242	193	822

AMP Reduction 70%

TOTAL 3,763 298 108 76 73 58 247

Boiler Pre-Pumpin

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
131.0	Panamax	300,000	Dist at 0.2	0.20	59.91	30.0%	2.5	35,000	730	182	10	121	85	57	1,028

TOTAL 730 182 10 121 85 57 1,028

Auxiliary Generator Pumpin

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
131.0	Panamax	300,000	Dist at 0.2	0.20	3,600	55.6%	11.0	110,385	8,736	3,177	2,216	2,127	1,702	7,235

AMP Reduction 70%

TOTAL 33,116 2,621 953 665 638 510 2,171

Boiler Pumpin

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Inerting Fuel Consumption Savings (lb/1000 bbl offloaded)	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
131.0	Panamax	300,000	Dist at 0.2	0.20	59.91	28.06	11.0	4,433	1,108	62	734	514	343	6,244

TOTAL 4,433 1,108 62 734 514 343 6,244

Auxiliary Generator Post-Pumpin

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
131.0	Panamax	300,000	Dist at 0.2	0.20	3,600	27.8%	1.0	5,018	397	144	101	97	77	329

AMP Reduction 70%

TOTAL 1,505 119 43 30 29 23 99

**Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR**

**Table H.2.RPA.Un.2040-40.**

**2040 Reduced Project Alternative Summary of Average Daily Unmitigated Vessel Emissions (Exxon Mobil).**

<b>Mode</b>	<b>Equipment</b>	<b>NO<sub>x</sub> Emissions (lb/yr)</b>	<b>CO Emissions (lb/yr)</b>	<b>ROG Emissions (lb/yr)</b>	<b>PM Emissions (lb/yr)</b>	<b>PM<sub>10</sub> Emissions (lb/yr)</b>	<b>PM<sub>2.5</sub> Emissions (lb/yr)</b>	<b>SO<sub>2</sub> Emissions (lb/yr)</b>
Cruising	Main Engines	170,138	14,011	6,005	2,902	2,902	2,670	7,784
Cruising	Aux Generator	35,565	2,814	1,023	714	685	548	2,331
Maneuvering	Main Engines	2,434	200	86	42	42	38	111
Maneuvering	Aux Generator	17,561	1,390	505	352	338	271	1,151
Boiler Warm-up	Boiler	876	219	12	145	101	68	1,233
Berth Operations	Boiler	5,163	1,291	73	854	598	400	7,272
Berth Operations	Aux Generator	38,384	3,038	1,105	770	740	592	2,516
Propulsion	TOTAL	225,698	18,416	7,620	4,010	3,968	3,527	11,378
Non-Propulsion	TOTAL	44,423	4,547	1,190	1,770	1,439	1,059	11,021
<b>Total Emissions</b>		<b>270,121</b>	<b>22,963</b>	<b>8,809</b>	<b>5,780</b>	<b>5,407</b>	<b>4,587</b>	<b>22,399</b>

<b>Mode</b>	<b>Equipment</b>	<b>NO<sub>x</sub> Emissions (lb/day)</b>	<b>CO Emissions (lb/day)</b>	<b>ROG Emissions (lb/day)</b>	<b>PM Emissions (lb/day)</b>	<b>PM<sub>10</sub> Emissions (lb/day)</b>	<b>PM<sub>2.5</sub> Emissions (lb/day)</b>	<b>SO<sub>2</sub> Emissions (lb/day)</b>
Cruising	Main Engines	466.1	38.4	16.5	8.0	8.0	7.3	21.3
Cruising	Aux Generator	97.4	7.7	2.8	2.0	1.9	1.5	6.4
Maneuvering	Main Engines	6.7	0.5	0.2	0.1	0.1	0.1	0.3
Maneuvering	Aux Generator	48.1	3.8	1.4	1.0	0.9	0.7	3.2
Boiler Warm-up	Boiler	2.4	0.6	0.0	0.4	0.3	0.2	3.4
Berth Operations	Boiler	14.1	3.5	0.2	2.3	1.6	1.1	19.9
Berth Operations	Aux Generator	105.2	8.3	3.0	2.1	2.0	1.6	6.9
Propulsion	TOTAL	618.4	50.5	20.9	11.0	10.9	9.7	31.2
Non-Propulsion	TOTAL	121.7	12.5	3.3	4.8	3.9	2.9	30.2
<b>Total Emissions</b>		<b>740</b>	<b>63</b>	<b>24</b>	<b>16</b>	<b>15</b>	<b>13</b>	<b>61</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Un.2040-41. 2040 Reduced Project Alternative Tug Main Engines Average Daily Unmitigated Emissions (Exxon Mobil).

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Shipcalls (vessels/yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
PANAMAX	Maneuvering - Pilot to Berth	1.00	2	4,800	0.50	MGO	131.0	12,933	3,237	606	571	526	10
	Maneuvering - Berth to Pilc	1.00	2	4,800	0.50	MGO	131.0	12,933	3,237	606	571	526	10
<b>TOTAL</b>								<b>25,865</b>	<b>6,475</b>	<b>1,212</b>	<b>1,143</b>	<b>1,051</b>	<b>21</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Un.2040-42. 2040 Reduced Project Alternative Tug Auxiliary Generator Engines Average Daily Unmitigated Emissions (Exxon Mobil).

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Shipcalls (vessels/yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
PANAMAX	Maneuvering - Pilot to Berth	1.00	2	300	1.00	MGO	131.0	1,472	361	58	61	56	1
	Maneuvering - Berth to Pilc	1.00	2	300	1.00	MGO	131.0	1,472	361	58	61	56	1
<b>TOTAL</b>								<b>2,943</b>	<b>723</b>	<b>117</b>	<b>121</b>	<b>111</b>	<b>2</b>

Table H.2.RPA.Un.2040-43. 2040 Reduced Project Alternative Summary of Tug Average Daily Unmitigated Emissions (Exxon Mobil).

Mode	Equipment	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Tug Assist	Main Engines	25,865	6,475	1,212	1,143	1,051	21
Tug Assist	Aux Generator	2,943	723	117	121	111	2
<b>TOTAL</b>		<b>28,808</b>	<b>7,198</b>	<b>1,329</b>	<b>1,264</b>	<b>1,163</b>	<b>23</b>

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Tug Assist	Main Engines	71	17.7	3.3	3.1	2.9	0.1
Tug Assist	Aux Generator	8	2.0	0.3	0.3	0.3	0.0
<b>TOTAL</b>		<b>79</b>	<b>19.7</b>	<b>3.6</b>	<b>3.5</b>	<b>3.2</b>	<b>0.1</b>

Table H.2.RPA.Un.2040-44. 2040 Reduced Project Alternative VDU Crude Average Daily Unmitigated Emissions (Exxon Mobil).

	Annual Vessel Calls	crude vapors from tanks(scf/call)	annual gas usage (mmscf/yr)	mw crude vapors	destruction efficiency
Panamax	131	116,667	15.3	50	98%
<b>TOTAL</b>	<b>131</b>		<b>15.3</b>		

<b>Assumed Distribution based on tank storage volume:</b>	
Site 1	12.5%
Site 2	87.5%

Annual Average (lb/yr)

	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene
EF (lb/MMSCF)	130	35	7	7.5	0.38%	9.90%	0.017	0.0004	0.0003	0.0043	0.0027	0.731	0.0366	0.0272	0.0095
Panamax	993.4	267.5	53.5	57.3	0.0	0.8	0.1	0.0	0.0	0.0	0.0	5.6	0.3	0.2	0.1
<b>TOTAL</b>	<b>993.4</b>	<b>267.5</b>	<b>53.5</b>	<b>57.3</b>	<b>0.0</b>	<b>0.8</b>	<b>0.1</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>5.6</b>	<b>0.3</b>	<b>0.2</b>	<b>0.1</b>

Assumed a ratio of 500/1000 based on the corresponding Btu values with respect to natural gas combustion emission factors.

Annual Average (lb/yr)

	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene	SO <sub>x</sub>
Site 1	124	33.4	6.69	7.2	0.004	0.09	0.016	0.0004	0.0003	0.0041	0.0026	0.70	0.035	0.026	0.009	22
Site 2	869	234	46.8	50.1	0.03	0.66	0.114	0.0027	0.0020	0.029	0.018	4.9	0.24	0.18	0.064	156



Table H.2.RPA.Un.2040-45. 2040 Reduced Project Alternative VDU Legs Average Daily Unmitigated Emissions (Exxon Mobil).

	tanks	crude vapors from tanks on legs(scf/yr)	annual gas usage (mmscf/yr)	mw crude vapors	destruction efficiency
Site 1	4	8640000	34.6	50	98%
Site 2	14	8640000	121.0	50	98%
<b>TOTAL</b>	<b>18</b>		<b>155.5</b>		

<b>48</b>	<b>hr/event</b>
<b>6</b>	<b>events/yr</b>
<b>500</b>	<b>ft3/min</b>

		Annual Average (lb/yr)													
	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene
EF (lb/MMSCF)	130	35	7	7.5	0.38%	9.90%	0.017	0.0004	0.0003	0.0043	0.0027	0.731	0.0366	0.0272	0.0095
<b>TOTAL</b>	<b>10108.8</b>	<b>2721.6</b>	<b>544.3</b>	<b>583.2</b>	<b>2.1</b>	<b>53.9</b>	<b>1.3</b>	<b>0.0</b>	<b>0.0</b>	<b>0.3</b>	<b>0.2</b>	<b>56.8</b>	<b>2.8</b>	<b>2.1</b>	<b>0.7</b>

Assumed a ratio of 500/1000 based on the corresponding Btu values with respect to natural gas combustion emission factors.

		Annual Average (lb/yr)														
	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene	SO <sub>x</sub>
Site 1	2246.4	604.8	121.0	129.6	0.46	11.98	0.29	0.007	0.005	0.074	0.05	12.63	0.63	0.47	0.16	402
Site 2	7862.4	2116.8	423.4	453.6	1.61	41.91	1.03	0.024	0.018	0.260	0.16	44.21	2.21	1.65	0.57	1407



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**Table H.2.RPA.Un.2040-47. 2040 Reduced Project Alternative Exxon Mobil Berth Summary.**

<b>Operation</b>	<b>NO<sub>x</sub> Emissions (lb/yr)</b>	<b>CO Emissions (lb/yr)</b>	<b>ROG Emissions (lb/yr)</b>	<b>PM Emissions (lb/yr)</b>	<b>PM<sub>10</sub> Emissions (lb/yr)</b>	<b>PM<sub>2.5</sub> Emissions (lb/yr)</b>	<b>SO<sub>2</sub> Emissions (lb/yr)</b>
Tanker Cruising and Manuevering	225,698	18,416	7,620	4,010	3,968	3,527	11,378
Tanker Hoteling	38,384	3,038	1,105	770	740	592	2,516
Offloading Emissions	5,163	1,291	73	854	598	400	7,272
Transiting Operations	876	219	12	145	101	68	1,233
Tug Assistance	28,808	7,198	1,329	---	1,264	1,163	23
Tanks	---	---	3,297	---	---	---	---
Vapor Destruction Units	11,102	2,989	598	---	641	---	1,987
Valves, Flanges, Pumps	---	---	1,188	---	---	---	---
<b>TOTAL</b>	<b>310,031</b>	<b>33,150</b>	<b>15,220</b>	<b>5,780</b>	<b>7,311</b>	<b>5,750</b>	<b>24,408</b>

<b>Operation</b>	<b>NO<sub>x</sub> Emissions (lb/day)</b>	<b>CO Emissions (lb/day)</b>	<b>ROG Emissions (lb/day)</b>	<b>PM Emissions (lb/day)</b>	<b>PM<sub>10</sub> Emissions (lb/day)</b>	<b>PM<sub>2.5</sub> Emissions (lb/day)</b>	<b>SO<sub>2</sub> Emissions (lb/day)</b>
Tanker Cruising and Manuevering	618	50	21	11	11	10	31
Tanker Hoteling	105	8	3	2	2	2	7
Offloading Emissions	14	4	0	2	2	1	20
Transiting Operations	2	1	0.03	0.4	0.3	0.2	3
Tug Assistance	79	20	3.6	---	3.5	3.2	0.1
Tanks	---	---	9.0	---	---	---	---
Vapor Destruction Units	30	8	2	---	2	---	5
Valves, Flanges, Pumps	---	---	3	---	---	---	---
<b>TOTAL</b>	<b>849</b>	<b>91</b>	<b>42</b>	<b>16</b>	<b>20</b>	<b>16</b>	<b>67</b>

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Table H.2.RPA.Un.2040-48. 2040 Reduced Project Alternative Overall Berth Summary (BP, Tesoro and Exxon Mobil).

Operation	BP (lb/yr)	Tesoro (lb/yr)	Exxon (lb/yr)	Total (lb/yr)
<b>Tanker Cruising and Maneuvering</b>				
NO <sub>x</sub>	59,228	149,025	225,698	433,950
CO	4,837	12,172	18,416	35,425
ROG	2,009	5,055	7,620	14,684
PM	1,048	2,637	4,010	7,695
PM <sub>10</sub>	1,038	2,612	3,968	7,617
PM <sub>2.5</sub>	926	2,330	3,527	6,783
SO <sub>2</sub>	2,957	7,439	11,378	21,774
<b>Tanker Hoteling</b>				
NO <sub>x</sub>	39,776	100,082	38,384	178,242
CO	3,148	7,920	3,038	14,105
ROG	1,145	2,880	1,105	5,129
PM	798	2,009	770	3,578
PM <sub>10</sub>	766	1,928	740	3,435
PM <sub>2.5</sub>	613	1,543	592	2,748
SO <sub>2</sub>	2,607	6,560	2,516	11,683
<b>Offloading Emissions</b>				
NO <sub>x</sub>	3,676	9,248	5,163	18,087
CO	919	2,312	1,291	4,522
ROG	52	130	73	255
PM	608	1,531	854	2,993
PM <sub>10</sub>	426	1,071	598	2,095
PM <sub>2.5</sub>	285	716	400	1,401
SO <sub>2</sub>	5,177	13,026	7,272	25,475
<b>Transiting Operations</b>				
NO <sub>x</sub>	505	1,270	876	2,651
CO	126	318	219	663
ROG	7	18	12	37
PM	84	210	145	439
PM <sub>10</sub>	58	147	101	307
PM <sub>2.5</sub>	39	98	68	205
SO <sub>2</sub>	711	1,789	1,233	3,733
<b>Tug Assistance</b>				
NO <sub>x</sub>	6,817	17,153	28,808	52,779
CO	1,703	4,286	7,198	13,187
ROG	314	791	1,329	2,434
PM	---	---	---	---
PM <sub>10</sub>	299	753	1,264	2,315
PM <sub>2.5</sub>	275	692	1,163	2,130
SO <sub>2</sub>	5	13	23	41

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<b>Tanks</b>				
NO <sub>x</sub>	---	---	---	---
CO	---	---	---	---
ROG	3,297	3,297	3,297	9,890
PM	---	---	---	---
PM <sub>10</sub>	---	---	---	---
PM <sub>2.5</sub>	---	---	---	---
SO <sub>2</sub>	---	---	---	---
<b>Vapor Destruction Units</b>				
NO <sub>x</sub>	10,560	11,244	11,102	32,907
CO	2,843	3,027	2,989	8,860
ROG	569	605	598	1,772
PM	---	---	---	---
PM <sub>10</sub>	609	649	641	1,898
PM <sub>2.5</sub>	---	---	---	---
SO <sub>2</sub>	1,890	2,012	1,987	5,889
<b>Valves, Flanges, Pumps</b>				
NO <sub>x</sub>	---	---	---	---
CO	---	---	---	---
ROG	1,188	1,188	1,188	3,564
PM	---	---	---	---
PM <sub>10</sub>	---	---	---	---
PM <sub>2.5</sub>	---	---	---	---
SO <sub>2</sub>	---	---	---	---

Operation	BP	Tesoro	Exxon	Total (lb/yr)
<b>Tanker Cruising</b>				
NO <sub>x</sub>	24,740	62,249	96,182	183,172
CO	2,011	5,059	7,806	14,876
ROG	819	2,061	3,163	6,043
PM	447	1,125	1,748	3,320
PM <sub>10</sub>	440	1,108	1,719	3,268
PM <sub>2.5</sub>	386	971	1,500	2,857
SO <sub>2</sub>	1,297	3,262	5,105	9,663
<b>Tanker Manuevering</b>				
NO <sub>x</sub>	4,815	12,115	19,995	36,926
CO	383	964	1,590	2,937
ROG	143	359	591	1,094
PM	95	238	394	727
PM <sub>10</sub>	91	230	380	701
PM <sub>2.5</sub>	74	187	309	571
SO <sub>2</sub>	303	761	1,262	2,326
<b>Check</b>				
NO <sub>x</sub>	29,672	74,660	109,521	213,853
CO	2,444	6,148	9,019	17,611
ROG	1,047	2,635	3,865	7,548
PM	506	1,274	1,868	3,648
PM <sub>10</sub>	506	1,274	1,868	3,648
PM <sub>2.5</sub>	466	1,172	1,719	3,356
SO <sub>2</sub>	1,358	3,416	5,011	9,784

Table H.2.RPA.Un.Bar.2040-1. 2040 Reduced Project Alternative Main Engines Average Daily Unmitigated Emissions from Barge Fuel Deliveries for OGV.

Ship	Direction	Mode	Distance (nautical miles)	Ship speed (knots)	Activity (hours)	Maximum Speed (knots)	Load Factor	MCR (kW)	Energy (kW-hr)	Fuel Type	Shipcalls (vessels/ yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Barge	North In	Volpak to Berth 408	5	3	1.67	3	0.50	4,800	4,000.00	MGO	8.0	1,163	97	44	63	63	63	71
Barge	North Out	Volpak to Berth 408	5	3	1.67	3.0	0.50	4,800	4,000.00	MGO	8.0	1,163	97	44	63	63	63	71
TOTAL												2,326	194	88	127	127	127	143

Table H.2.RPA.Un.Bar.2040-2. 2040 Reduced Project Alternative Tug Main Engines Average Daily Unmitigated Emissions from Barge Fuel Deliveries for OGV.

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Shipcalls (vessels/yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Barge	Maneuvering - Pilot to Berth	1.00	1	4,800	0.50	MGO	8.0	698	58	26	38	35	43
	Maneuvering - Berth to Pilot	1.00	1	4,800	0.50	MGO	8.0	698	58	26	38	35	43
TOTAL								1,396	116	53	76	70	86

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Table H.2.RPA.Un.Bar.2040-3. 2040 Reduced Project Alternative Tug Auxiliary Generator Engines Average Daily Unmitigated Emissions from Barge Fuel Deliveries for OGV.

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Shipcalls (vessels/yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Barge	Maneuvering - Pilot to Berth	1.00	1	300	1.00	MGO	8.0	66	11	2	3	2	5
	Maneuvering - Berth to Pilot	1.00	1	300	1.00	MGO	8.0	66	11	2	3	2	5
<b>TOTAL</b>								<b>132</b>	<b>22</b>	<b>4</b>	<b>5</b>	<b>5</b>	<b>11</b>



Table H.2.RPA.Un.Bar.2040-4. 2040 Reduced Project Alternative Summary of Tug Average Daily Unmitigated Emissions from Barge Fuel Deliveries for OGV.

Mode	Equipment	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Tug Assist	Main Engines	1,396	116	53	76	70	86
Tug Assist	Aux Generator	132	22	4	5	5	11
<b>TOTAL</b>		<b>1,528</b>	<b>139</b>	<b>56</b>	<b>81</b>	<b>75</b>	<b>96</b>

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Tug Assist	Main Engines	4	0.3	0.1	0.2	0.2	0.2
Tug Assist	Aux Generator	0.36	0.06	0.01	0.01	0.01	0.03
<b>TOTAL</b>		<b>4</b>	<b>0.4</b>	<b>0.2</b>	<b>0.2</b>	<b>0.2</b>	<b>0.3</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Un.Bar.2040-5. 2040 Reduced Project Alternative Summary of Average Daily Unmitigated Vessel Emissions from Barge Fuel Deliveries for OGV.

Operation	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Barge	2,326	194	88	127	127	143
Tug Assistance	1,528	139	56	81	75	96
<b>TOTAL</b>	<b>3,854</b>	<b>333</b>	<b>145</b>	<b>208</b>	<b>202</b>	<b>239</b>

Operation	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Barge	6.37	0.53	0.24	0.35	0.35	0.39
Tug Assistance	4.19	0.38	0.15	0.22	0.21	0.26
<b>TOTAL</b>	<b>10.56</b>	<b>0.91</b>	<b>0.40</b>	<b>0.57</b>	<b>0.55</b>	<b>0.65</b>

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Table H.2.RPA.Un.Max.2040-1. 2040 Reduced Project Alternative Main Engines Maximum Daily Unmitigated Emissions.

Ship	Direction	Mode	Distance (nautical miles)	Ship speed (knots)	Activity (hours)	Maximum Speed (knots)	Load Factor	MCR (kW)	Energy (kW-hr)	Fuel Type	Maximum Daily Shipcalls (vessels/day)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)	
VLCC	North In	Cruising - CW to VSR	22	15.54	1.42	16.9	0.777	25,400	27,957	HFO	1.0	1,393	108	46	120	120	110	808	
		Cruising - VSR to PZ	21	12	1.75	16.9	0.358	25,400	15,913	HFO	1.0	793	61	26	68	68	63	460	
		Cruising - PZ to Pilot	4.7	7	0.67	16.9	0.071	25,400	1,212	HFO	1.0	86	13	9	9	9	8	35	
	North Out	Maneuvering - Pilot to Berth			3	1.00	16.9	0.006	25,400	142	HFO	1.0	114	20	50	17	17	15	4
		Maneuvering - Berth to Pilot			5	1.00	16.9	0.026	25,400	658	HFO	1.0	98	20	23	13	13	12	19
		Cruising - Pilot to PZ	3.8	7	0.54	16.9	0.071	25,400	980	HFO	1.0	69	11	8	7	7	7	28	
		Cruising - PZ to VSR	21	12	1.75	16.9	0.358	25,400	15,913	HFO	1.0	793	61	26	68	68	63	460	
		Cruising - VSR to CW	22	15.54	1.42	16.9	0.777	25,400	27,957	HFO	1.0	1,393	108	46	120	120	110	808	
		<b>TOTAL</b>											<b>4,740</b>	<b>401</b>	<b>235</b>	<b>422</b>	<b>422</b>	<b>389</b>	<b>2,623</b>
AFRAMAX	South In	Cruising - CW to VSR	23	14.7	1.56	16.1	0.761	12,477	14,859	HFO	1.0	741	57	25	64	64	59	430	
		Cruising - VSR to PZ	11	12	0.92	16.1	0.414	12,477	4,736	HFO	1.0	236	18	8	20	20	19	137	
		Cruising - PZ to Pilot	4.7	7	0.67	16.1	0.082	12,477	689	HFO	1.0	45	6	4	5	5	4	20	
	South Out	Maneuvering - Pilot to Berth			3	1.00	16.1	0.006	12,477	81	HFO	1.0	61	10	23	9	9	8	2
		Maneuvering - Berth to Pilot			5	1.00	16.1	0.030	12,477	374	HFO	1.0	54	10	11	7	7	6	11
		Cruising - Pilot to PZ	3.5	7	0.50	16.1	0.082	12,477	513	HFO	1.0	34	5	3	3	3	3	15	
		Cruising - PZ to VSR	12.5	12	1.04	16.1	0.414	12,477	5,382	HFO	1.0	268	21	9	23	23	21	156	
		Cruising - VSR to CW	24.5	14.7	1.67	16.1	0.761	12,477	15,828	HFO	1.0	789	61	26	68	68	63	458	
		<b>TOTAL</b>											<b>2,228</b>	<b>188</b>	<b>108</b>	<b>199</b>	<b>199</b>	<b>183</b>	<b>1,228</b>
PANAMAX	South In	Cruising - CW to VSR	23	14.7	1.56	15.8	0.805	10,300	12,979	HFO	1.0	647	50	21	56	56	51	375	
		Cruising - VSR to PZ	11	12	0.92	15.8	0.438	10,300	4,136	HFO	1.0	206	16	7	18	18	16	120	
		Cruising - PZ to Pilot	4.7	7	0.67	15.8	0.087	10,300	601	HFO	1.0	30	2	1	3	3	2	17	
	South Out	Maneuvering - Pilot to Berth			3	1.00	15.8	0.007	10,300	71	HFO	1.0	4	0.3	0.1	0.3	0.3	0.3	2
		Maneuvering - Berth to Pilot			5	1.00	15.8	0.032	10,300	326	HFO	1.0	16	1	1	1	1	1	9
		Cruising - Pilot to PZ	3.5	7	0.50	15.8	0.087	10,300	448	HFO	1.0	22	2	1	2	2	2	13	
		Cruising - PZ to VSR	12.5	12	1.04	15.8	0.438	10,300	4,700	HFO	1.0	234	18	8	20	20	19	136	
		Cruising - VSR to CW	24.5	14.7	1.67	15.8	0.805	10,300	13,825	HFO	1.0	689	53	23	59	59	55	400	
		<b>TOTAL</b>											<b>1,848</b>	<b>143</b>	<b>61</b>	<b>159</b>	<b>159</b>	<b>147</b>	<b>1,072</b>
SUEZMAX	North In	Cruising - CW to VSR	22	15.54	1.42	17	0.764	16,000	17,302	HFO	1.0	862	67	29	74	74	68	500	
		Cruising - VSR to PZ	21	12	1.75	17	0.352	16,000	9,848	HFO	1.0	491	38	16	42	42	39	285	
		Cruising - PZ to Pilot	4.7	7	0.67	17	0.070	16,000	750	HFO	1.0	37	3	1	3	3	3	22	
	North Out	Maneuvering - Pilot to Berth			3	1.00	17	0.005	16,000	88	HFO	1.0	4	0.3	0.1	0	0.4	0.3	3
		Maneuvering - Berth to Pilot			5	1.00	17	0.025	16,000	407	HFO	1.0	20	2	1	2	2	2	12
		Cruising - Pilot to PZ	3.8	7	0.54	17	0.070	16,000	606	HFO	1.0	30	2	1	3	3	2	18	
		Cruising - PZ to VSR	21	12	1.75	17	0.352	16,000	9,848	HFO	1.0	491	38	16	42	42	39	285	
		Cruising - VSR to CW	22	15.54	1.42	17	0.764	16,000	17,302	HFO	1.0	862	67	29	74	74	68	500	
		<b>TOTAL</b>											<b>2,798</b>	<b>216</b>	<b>93</b>	<b>241</b>	<b>241</b>	<b>222</b>	<b>1,623</b>
<b>MAXIMUM</b>												<b>4,740</b>	<b>401</b>	<b>235</b>	<b>422</b>	<b>422</b>	<b>389</b>	<b>2,623</b>	

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Table H.2.RPA.Un.Max.2040-2. 2040 Reduced Project Alternative Auxiliary Generator Maximum Daily Unmitigated Emissions.

Ship	Direction	Mode	Activity (hours)	MCR (kW)	Load Factor	Energy (kW-hr)	Fuel Type	Maximum Daily Shipcalls (vessels/day)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
VLCC	North In	Cruising	3.84	3,600	0.278	3,840	HFO	1.0	155	12	4	16	15	12	130
		Maneuvering	2.00	3,600	0.278	2,002	HFO	1.0	81	6	2	8	8	6	68
	North Out	Maneuvering	1.50	3,600	0.278	1,501	HFO	1.0	61	5	2	6	6	5	51
		Cruising	3.71	3,600	0.278	3,712	HFO	1.0	150	11	4	15	15	12	126
<b>TOTAL</b>								<b>447</b>	<b>33</b>	<b>12</b>	<b>46</b>	<b>44</b>	<b>35</b>	<b>374</b>	
AFRAMAX	South In	Cruising	3.15	3,600	0.278	3,155	HFO	1.0	128	10	3	13	13	10	107
		Maneuvering	2.00	3,600	0.278	2,002	HFO	1.0	81	6	2	8	8	6	68
	South Out	Maneuvering	1.50	3,600	0.278	1,501	HFO	1.0	61	5	2	6	6	5	51
		Cruising	3.21	3,600	0.278	3,211	HFO	1.0	130	10	4	13	13	10	109
<b>TOTAL</b>								<b>399</b>	<b>30</b>	<b>11</b>	<b>41</b>	<b>39</b>	<b>31</b>	<b>334</b>	
PANAMAX	South In	Cruising	3.15	3,600	0.278	3,155	HFO	1.0	128	10	3	13	13	10	107
		Maneuvering	2.00	3,600	0.278	2,002	HFO	1.0	81	6	2	8	8	6	68
	South Out	Maneuvering	1.5	3,600	0.278	1,501	HFO	1.0	61	5	2	6	6	5	51
		Cruising	3.21	3,600	0.278	3,211	HFO	1.0	130	10	4	13	13	10	109
<b>TOTAL</b>								<b>399</b>	<b>30</b>	<b>11</b>	<b>41</b>	<b>39</b>	<b>31</b>	<b>334</b>	
SUEZMAX	North In	Cruising	3.84	3,600	0.278	3,840	HFO	1.0	155	12	4	16	15	12	130
		Maneuvering	2.00	3,600	0.278	2,002	HFO	1.0	81	6	2	8	8	6	68
	North Out	Maneuvering	1.5	3,600	0.278	1,501	HFO	1.0	61	5	2	6	6	5	51
		Cruising	3.71	3,600	0.278	3,712	HFO	1.0	150	11	4	15	15	12	126
<b>TOTAL</b>								<b>447</b>	<b>33</b>	<b>12</b>	<b>46</b>	<b>44</b>	<b>35</b>	<b>374</b>	
<b>MAXIMUM</b>								<b>447</b>	<b>33</b>	<b>12</b>	<b>46</b>	<b>44</b>	<b>35</b>	<b>374</b>	

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Table H.2.RPA.Un.Max.2040-3. 2040 Reduced Project Alternative Summary of Maximum Daily Unmitigated Vessel Emissions.

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Cruising	Main Engines	4,527	362	162	393	393	362	2,600
Cruising	Aux Generator	306	23	8	31	30	24	256
Maneuvering	Main Engines	212	39	73	29	29	27	23
Maneuvering	Aux Generator	142	11	4	14	14	11	119
<b>Maneuvering</b>	<b>TOTAL</b>	<b>354</b>	<b>50</b>	<b>77</b>	<b>44</b>	<b>43</b>	<b>38</b>	<b>142</b>
<b>Propulsion</b>	<b>TOTAL</b>	<b>5,187</b>	<b>435</b>	<b>248</b>	<b>468</b>	<b>466</b>	<b>424</b>	<b>2,997</b>

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Table H.2.RPA.Un.Max.2040-4. 2040 Reduced Project Alternative Boiler Warm-Up Maximum Daily Unmitigated Emissions.

Shipcalls (vessels/day)	Vessel Size	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	HFO	2.70	107.96	30%	3	50,000	42	4	1	9	8	5	327
1.0	VLCC	HFO	2.70	84.93	30%	3	90,000	51	5	1	32	28	18	463
1.0	Panamax	HFO	2.70	63.30	30%	3	35,000	17	2	0.4	4	3	2	134
1.0	Suezmax	HFO	2.70	87.54	30%	3	70,000	48	4	1	10	9	6	371

**MAXIMUM      51                      5                      1                      32                      28                      18                      463**

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Table H.2.RPA.Un.Max.2040-5. 2040 Reduced Project Alternative Summary of Boiler Warm-Up Maximum Unmitigated Emissions.

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Boiler Warm-up	Boiler	51	5	1	32	28	18	463

Table H.2.RPA.Un.Max.2040-6. 2040 Reduced Project Alternative Berth Operations Maximum Daily Unmitigated Emissions.

Auxiliary Generator Pre-Pumpin

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	700,000	HFO	2.70	3,600	27.8%	2.5	101	8	3	10	10	8	85
1.0	VLCC	2,000,000	HFO	2.70	3,600	27.8%	2.5	101	8	3	10	10	8	85
1.0	Panamax	350,000	HFO	2.70	3,600	27.8%	2.5	101	8	3	10	10	8	85
1.0	Suezmax	1,000,000	HFO	2.70	3,600	27.8%	2.5	101	8	3	10	10	8	85
MAXIMUM								101	8	3	10	10	8	85

Boiler Pre-Pumpin

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	700,000	HFO	2.70	107.96	30.0%	2.5	50,000	35	3	1	7	6	4	273
1.0	VLCC	2,000,000	HFO	2.70	84.93	30.0%	2.5	90,000	43	5	1	27	23	15	386
1.0	Panamax	350,000	HFO	2.70	63.30	30.0%	2.5	35,000	14	1	0	3	3	2	112
1.0	Suezmax	1,000,000	HFO	2.70	87.54	30.0%	2.5	70,000	40	4	1	8	7	5	310
MAXIMUM									43	5	1	27	23	15	386

Auxiliary Generator Pumpin

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	700,000	MDO	0.52	3,600	55.6%	15.0	1,149	91	33	25	24	19	196
1.0	VLCC	2,000,000	MDO	0.52	3,600	55.6%	23.2	1,777	141	51	38	37	29	303
1.0	Panamax	350,000	MDO	0.52	3,600	55.6%	11.0	843	67	24	18	17	14	144
1.0	Suezmax	1,000,000	MDO	0.52	3,600	55.6%	15.3	1,172	93	34	25	24	19	200
MAXIMUM								1,777	141	51	38	37	29	303

Boiler Pumpin

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Inerting Fuel Consumption Savings (lb/1000 bbl offloaded)	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	700,000	MDO	0.52	102.17	28.06	15.0	184	46	3	30	21	14	673
1.0	VLCC	2,000,000	MDO	0.52	80.38	28.06	23.2	444	93	20	61	43	29	1,357
1.0	Panamax	350,000	MDO	0.52	59.91	28.06	11.0	39	10	1	7	5	3	145
1.0	Suezmax	1,000,000	MDO	0.52	82.85	28.06	15.3	194	49	3	32	22	15	711
MAXIMUM								444	93	20	61	43	29	1,357

Auxiliary Generator Post-Pumpin

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	700,000	HFO	2.70	3,600	27.8%	1.0	41	3	1	4	4	3	34
1.0	VLCC	2,000,000	HFO	2.70	3,600	27.8%	1.0	41	3	1	4	4	3	34
1.0	Panamax	350,000	HFO	2.70	3,600	27.8%	1.0	41	3	1	4	4	3	34
1.0	Suezmax	1,000,000	HFO	2.70	3,600	27.8%	1.0	41	3	1	4	4	3	34
MAXIMUM								41	3	1	4	4	3	34



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Table H.2.RPA.Un.Max.2040-7. 2040 Reduced Project Alternative Summary of Berth Operations Maximum Daily Unmitigated Emissions.

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Berth Operations	Boiler	486	97	21	88	66	44	1,743
Berth Operations	Aux Generator	1,919	151	55	53	51	41	422

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Table H.2.RPA.Un.Max.2040-8. 2040 Reduced Project Alternative Tug Main Engines Maximum Daily Unmitigated Emissions.

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Shipcalls (vessels/day)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
VLCC	Maneuvering - Pilot to Berth	1.00	4	4,800	0.50	MGO	1.0	197	49	9	9	8	0
	Maneuvering - Berth to Pilot	1.00	2	4,800	0.50	MGO	1.0	99	25	5	4	4	0
							<b>TOTAL</b>	<b>296</b>	<b>74</b>	<b>14</b>	<b>13</b>	<b>12</b>	<b>0</b>
AFRAMAX	Maneuvering - Pilot to Berth	1.00	2	4,800	0.50	MGO	1.0	99	25	5	4	4	0
	Maneuvering - Berth to Pilot	1.00	2	4,800	0.50	MGO	1.0	99	25	5	4	4	0
							<b>TOTAL</b>	<b>197</b>	<b>49</b>	<b>9</b>	<b>9</b>	<b>8</b>	<b>0</b>
PANAMAX	Maneuvering - Pilot to Berth	1.00	2	4,800	0.50	MGO	1.0	99	25	5	4	4	0
	Maneuvering - Berth to Pilot	1.00	2	4,800	0.50	MGO	1.0	99	25	5	4	4	0
							<b>TOTAL</b>	<b>197</b>	<b>49</b>	<b>9</b>	<b>9</b>	<b>8</b>	<b>0</b>
SUEZMAX	Maneuvering - Pilot to Berth	1.00	3	4,800	0.50	MGO	1.0	148	37	7	7	6	0
	Maneuvering - Berth to Pilot	1.00	2	4,800	0.50	MGO	1.0	99	25	5	4	4	0
							<b>TOTAL</b>	<b>247</b>	<b>62</b>	<b>12</b>	<b>11</b>	<b>10</b>	<b>0</b>
							<b>MAXIMUM</b>	<b>296</b>	<b>74</b>	<b>14</b>	<b>13</b>	<b>12</b>	<b>0</b>

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Table H.2.RPA.Un.Max.2040-9. 2040 Reduced Project Alternative Tug Auxiliary Generator Engines Maximum Daily Unmitigated Emissions.

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Shipcalls (vessels/day)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
VLCC	Maneuvering - Pilot to Berth	1.00	4	300	1.00	MGO	1.0	22	6	1	1	1	0
	Maneuvering - Berth to Pilot	1.00	2	300	1.00	MGO	1.0	11	3	0	0	0	0
							<b>TOTAL</b>	<b>34</b>	<b>8</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>0</b>
AFRAMAX	Maneuvering - Pilot to Berth	1.00	2	300	1.00	MGO	1.0	11	3	0	0	0	0
	Maneuvering - Berth to Pilot	1.00	2	300	1.00	MGO	1.0	11	3	0	0	0	0
							<b>TOTAL</b>	<b>22</b>	<b>6</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>0</b>
PANAMAX	Maneuvering - Pilot to Berth	1.00	2	300	1.00	MGO	1.0	11	3	0	0	0	0
	Maneuvering - Berth to Pilot	1.00	2	300	1.00	MGO	1.0	11	3	0	0	0	0
							<b>TOTAL</b>	<b>22</b>	<b>6</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>0</b>
SUEZMAX	Maneuvering - Pilot to Berth	1.00	3	300	1.00	MGO	1.0	17	4	1	1	1	0
	Maneuvering - Berth to Pilot	1.00	2	300	1.00	MGO	1.0	11	3	0	0	0	0
							<b>TOTAL</b>	<b>28</b>	<b>7</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>0</b>
							<b>MAXIMUM</b>	<b>34</b>	<b>8</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>0</b>

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Table H.2.RPA.Un.Max.2040-10. 2040 Reduced Project Alternative Summary of Tug Maximum Daily Unmitigated Emissions.

Mode	Equipment	Maximum Daily NO <sub>x</sub> Emissions (lb/day)	Maximum Daily CO Emissions (lb/day)	Maximum Daily ROG Emissions (lb/day)	Maximum Daily PM <sub>10</sub> Emissions (lb/day)	Maximum Daily PM <sub>2.5</sub> Emissions (lb/day)	Maximum Daily SO <sub>2</sub> Emissions (lb/day)
Tug Assist	Main Engines	296	74	14	13	12	0
Tug Assist	Aux Generator	34	8	1	1	1	0
<b>TOTAL</b>		<b>330</b>	<b>82</b>	<b>15</b>	<b>14</b>	<b>13</b>	<b>0</b>

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Table H.2.RPA.Un.Max.2040-11. 2040 Reduced Project Alternative VDU Crude Maximum Daily Unmitigated Emissions.

	Maximum Daily Vessel Calls	crude vapors from tanks(scf/call)	daily gas usage (mmscf/day)	mw crude vapors	destruction efficiency
Aframax	1	224000	0.2	50	98%
VLCC	1	596,313	0.6	50	98%
Panamax	1	116,667	0.1	50	98%
Suezmax	1	333,333	0.3	50	98%
<b>TOTAL</b>	<b>4</b>		<b>1.3</b>		

<b>Assumed Distribution based on tank storage volume:</b>	
<b>Site 1</b>	<b>12.5%</b>
<b>Site 2</b>	<b>87.5%</b>

Maximum Daily Emissions (lb/day)

	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene
EF (lb/MMSCF)	130	35	7	7.5	0.38%	9.90%	0.017	0.0004	0.0003	0.0043	0.0027	0.731	0.0366	0.0272	0.0095
Aframax	14.6	3.9	0.8	0.8	0.00	0.08	0.0	0.000	0.000	0.000	0.000	0.1	0.0	0.0	0.0
VLCC	38.8	10.4	2.1	2.2	0.01	0.21	0.0	0.000	0.000	0.001	0.001	0.2	0.0	0.0	0.0
Panamax	7.6	2.0	0.4	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Suezmax	21.7	5.8	1.2	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0
<b>MAXIMUM</b>	<b>38.8</b>	<b>10.4</b>	<b>2.1</b>	<b>2.2</b>	<b>0.0</b>	<b>0.2</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.2</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>

Assumed a ratio of 500/1000 based on the corresponding Btu values with respect to natural gas combustion emission factors.

Maximum Daily Emissions (lb/day)

	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene	SO <sub>x</sub>
Site 1	5	1.3	0.26	0.3	0.001	0.03	0.001	0.0000	0.0000	0.0002	0.0001	0.03	0.001	0.001	0.000	2
Site 2	34	9	1.8	2.0	0.01	0.18	0.004	0.0001	0.0001	0.001	0.001	0.2	0.01	0.01	0.002	13

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Table H.2.RPA.Un.Max.2040-12. 2040 Reduced Project Alternative VDU Legs Maximum Daily Unmitigated Emissions.

	tanks	crude vapors from tanks on legs(scfd/day)	daily gas usage (mmscf/day)	mw crude vapors	destruction efficiency
Site 1	4	23671.23	0.09	50	98%
Site 2	14	23671.23	0.3	50	98%
<b>TOTAL</b>	<b>18</b>		<b>0.4</b>		

<b>48</b>	<b>hr/event</b>
<b>6</b>	<b>events/yr</b>
<b>500</b>	<b>ft3/min</b>

Maximum Daily Emissions (lb/day)															
	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene
EF (lb/MMSCF)	130	35	7	7.5	0.38%	9.90%	0.017	0.0004	0.0003	0.0043	0.0027	0.731	0.0366	0.0272	0.0095
<b>TOTAL</b>	<b>27.7</b>	<b>7.5</b>	<b>1.5</b>	<b>1.6</b>	<b>0.0</b>	<b>0.1</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.2</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>

Assumed a ratio of 500/1000 based on the corresponding Btu values with respect to natural gas combustion emission factors.

Maximum Daily Emissions (lb/day)																
	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene	SO <sub>x</sub>
Site 1	6.2	1.7	0.3	0.4	0.00	0.03	0.00	0.000	0.000	0.000	0.00	0.03	0.00	0.00	0.00	1
Site 2	21.5	5.8	1.2	1.2	0.00	0.11	0.00	0.000	0.000	0.001	0.00	0.12	0.01	0.00	0.00	4



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Table H.2.RPA.Un.Max.2040-14. 2040 Reduced Project Alternative Main Engines Maximum Daily Unmitigated Emissions (BP).

Ship	Direction	Mode	Distance (nautical miles)	Ship speed (knots)	Activity (hours)	Maximum Speed (knots)	Load Factor	MCR (kW)	Energy (kW-hr)	Fuel Type	Maximum Daily Shipcalls (vessels/day)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)	
AFRAMAX	South In	Cruising - CW to VSR	23	12	1.92	16.1	0.414	12,477	9,902	Dist at 0.2	1.0	463	38	16	8	8	7	21	
		Cruising - VSR to PZ	11	12	0.92	16.1	0.414	12,477	4,736	Dist at 0.2	1.0	222	18	8	4	4	3	10	
		Cruising - PZ to Pilot	4.7	7	0.67	16.1	0.082	12,477	689	Dist at 0.2	1.0	32	3	1	1	1	1	1	
	South Out	Maneuvering - Pilot to Berth		3	1.00	16.1	0.006	12,477	81	Dist at 0.2	1.0	4	0.3	0.1	0.1	0.1	0.1	0	
		Maneuvering - Berth to Pilot		5	1.00	16.1	0.030	12,477	374	Dist at 0.2	1.0	17	1	1	0	0	0	1	
		Cruising - Pilot to PZ		3.5	7	0.50	16.1	0.082	12,477	513	Dist at 0.2	1.0	24	2	1	0	0	0	1
		Cruising - PZ to VSR		12.5	12	1.04	16.1	0.414	12,477	5,382	Dist at 0.2	1.0	252	21	9	4	4	4	12
		Cruising - VSR to CW		24.5	12	2.04	16.1	0.414	12,477	10,548	Dist at 0.2	1.0	494	41	17	8	8	8	23
		<b>TOTAL</b>											<b>1,508</b>	<b>124</b>	<b>53</b>	<b>26</b>	<b>26</b>	<b>24</b>	<b>69</b>



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Table H.2.RPA.Un.Max.2040-15. 2040 Reduced Project Alternative Auxiliary Generator Maximum Daily Unmitigated Emissions (BP).

Ship	Direction	Mode	Activity (hours)	MCR (kW)	Load Factor	Energy (kW-hr)	Fuel Type	Maximum Daily Shipcalls (vessels/day)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
AFRAMAX	South In	Cruising	3.50	3,600	0.278	3,503	Dist at 0.2	1.0	134	11	4	3	3	2	9
		Maneuvering	2.00	3,600	0.278	2,002	Dist at 0.2	1.0	77	6	2	2	2	1	5
	South Out	Maneuvering	1.5	3,600	0.278	1,501	Dist at 0.2	1.0	57	5	2	1	1	1	4
		Cruising	3.50	3,600	0.278	3,503	Dist at 0.2	1.0	134	11	4	3	3	2	9
<b>TOTAL</b>									<b>402</b>	<b>32</b>	<b>12</b>	<b>9</b>	<b>8</b>	<b>7</b>	<b>26</b>

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Table H.2.RPA.Un.Max.2040-16. 2040 Reduced Project Alternative Summary of Maximum Daily Unmitigated Vessel Emissions (BP).

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Cruising	Main Engines	1,487	122	52	25	25	23	68
Cruising	Aux Generator	268	21	8	6	6	4	18
Maneuvering	Main Engines	21	2	1	0	0	0	1
Maneuvering	Aux Generator	134	11	4	3	3	2	9
<b>Cruising and Maneuvering</b>	<b>TOTAL</b>	<b>1,910</b>	<b>156</b>	<b>65</b>	<b>34</b>	<b>34</b>	<b>30</b>	<b>95</b>

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Table H.2.RPA.Un.Max.2040-17. 2040 Reduced Project Alternative Boiler Warm-Up Maximum Daily Unmitigated Emissions (BP).

Shipcalls (vessels/day)	Vessel Size	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	Dist at 0.2	0.20	102.17	30%	3	50,000	16	4	0.2	3	2	1	23
<b>MAXIMUM</b>								<b>16</b>	<b>4</b>	<b>0</b>	<b>3</b>	<b>2</b>	<b>1</b>	<b>23</b>

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Table H.2.RPA.Un.Max.2040-18. 2040 Reduced Project Alternative Summary of Boiler Warm-Up Maximum Unmitigated Emissions (BP).

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Boiler Warm-up	Boiler	16	4	0	3	2	1	23

Table H.2.RPA.Un.Max.2040-19. 2040 Reduced Project Alternative Berth Operations Maximum Daily Unmitigated Emissions (BP).

Auxiliary Generator Pre-Pumpin

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bb/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	400,000	Dist at 0.2	0.20	3,600	27.8%	2.5	96	8	3	2	2	2	6
MAXIMUM								96	8	3	2	2	2	6

Boiler Pre-Pumping

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bb/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	400,000	Dist at 0.2	0.20	102.17	30.0%	2.5	50,000	14	3	0	2	2	1	19
MAXIMUM									14	3	0	2	2	1	19

Auxiliary Generator Pumpin

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bb/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	400,000	Dist at 0.2	0.20	3,600	55.6%	15.0	1,149	91	33	25	24	19	75
MAXIMUM								1,149	91	33	25	24	19	75

Boiler Pumping

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bb/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Inerting Fuel Consumption Savings (lb/1000 bbl offloaded)	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	400,000	Dist at 0.2	0.20	102.17	28.06	15.0	105	26	1	17	12	8	148
MAXIMUM								105	26	1	17	12	8	148

Auxiliary Generator Post-Pumpin

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bb/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	400,000	Dist at 0.2	0.20	3,600	27.8%	1.0	38	3	1	1	1	1	3
MAXIMUM								38	3	1	1	1	1	3

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Table H.2.RPA.Un.Max.2040-20. 2040 Reduced Project Alternative Summary of Berth Operations Maximum Daily Unmitigated Emissions (BP).

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Berth Operations	Boiler	119	30	2	20	14	9	167
Berth Operations	Aux Generator	1,283	102	37	28	27	21	84

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Table H.2.RPA.Un.Max.2040-21. 2040 Reduced Project Alternative Tug Main Engines Maximum Daily Unmitigated Emissions (BP).

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Shipcalls (vessels/day)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
AFRAMAX	Maneuvering - Pilot to Berth	1.00	2	4,800	0.50	MGO	1.0	99	25	5	4	4	0
	Maneuvering - Berth to Pilot	1.00	2	4,800	0.50	MGO	1.0	99	25	5	4	4	0
<b>TOTAL</b>								<b>197</b>	<b>49</b>	<b>9</b>	<b>9</b>	<b>8</b>	<b>0</b>
<b>MAXIMUM</b>								<b>197</b>	<b>49</b>	<b>9</b>	<b>9</b>	<b>8</b>	<b>0</b>

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Table H.2.RPA.Un.Max.2040-22. 2040 Reduced Project Alternative Tug Auxiliary Generator Engines Maximum Daily Unmitigated Emissions (BP).

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Shipcalls (vessels/day)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
AFRAMAX	Maneuvering - Pilot to Berth	1.00	2	300	1.00	MGO	1.0	11	3	0	0	0	0
	Maneuvering - Berth to Pilc	1.00	2	300	1.00	MGO	1.0	11	3	0	0	0	0
<b>TOTAL</b>								<b>22</b>	<b>6</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>0</b>
<b>MAXIMUM</b>								<b>22</b>	<b>6</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>0</b>



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Table H.2.RPA.Un.Max.2040-23. 2040 Reduced Project Alternative Summary of Tug Maximum Daily Unmitigated Emissions (BP).

<b>Mode</b>	<b>Equipment</b>	<b>Maximum Daily NO<sub>x</sub> Emissions (lb/day)</b>	<b>Maximum Daily CO Emissions (lb/day)</b>	<b>Maximum Daily ROG Emissions (lb/day)</b>	<b>Maximum Daily PM<sub>10</sub> Emissions (lb/day)</b>	<b>Maximum Daily PM<sub>2.5</sub> Emissions (lb/day)</b>	<b>Maximum Daily SO<sub>2</sub> Emissions (lb/day)</b>
Tug Assist	Main Engines	197	49	9	9	8	0
Tug Assist	Aux Generator	22	6	1	1	1	0
<b>TOTAL</b>		<b>220</b>	<b>55</b>	<b>10</b>	<b>10</b>	<b>9</b>	<b>0</b>

Table H.2.RPA.Un.Max.2040-24. 2040 Reduced Project Alternative VDU Crude Maximum Daily Unmitigated Emissions (BP).

	Maximum Daily Vessel Calls	crude vapors from tanks(scf/call)	daily gas usage (mmscf/day)	mw crude vapors	destruction efficiency
Aframax	1	224,000	0.2	50	98%
<b>TOTAL</b>	<b>1</b>		<b>0.2</b>		

<b>Assumed Distribution based on tank storage volume:</b>	
<b>Site 1</b>	<b>12.5%</b>
<b>Site 2</b>	<b>87.5%</b>

Maximum Daily Emissions (lb/day)

	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene
EF (lb/MMSCF)	130	35	7	7.5	0.38%	9.90%	0.017	0.0004	0.0003	0.0043	0.0027	0.731	0.0366	0.0272	0.0095
Panamax	14.6	3.9	0.8	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0
<b>MAXIMUM</b>	<b>14.6</b>	<b>3.9</b>	<b>0.8</b>	<b>0.8</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.1</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>

Assumed a ratio of 500/1000 based on the corresponding Btu values with respect to natural gas combustion emission factors.

Maximum Daily Emissions (lb/day)

	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene	SO <sub>x</sub>
Site 1	2	0.5	0.10	0.1	0.000	0.00	0.000	0.0000	0.0000	0.0001	0.0000	0.01	0.001	0.000	0.000	0
Site 2	13	3	0.7	0.7	0.00	0.01	0.002	0.0000	0.0000	0.000	0.000	0.1	0.00	0.00	0.001	2

Table H.2.RPA.Un.Max.2040-25. 2040 Reduced Project Alternative VDU Legs Maximum Daily Unmitigated Emissions (BP).

	tanks	crude vapors from tanks on legs(scfd/day)	daily gas usage (mmscf/day)	mw crude vapors	destruction efficiency
Site 1	4	23671.23	0.09	50	98%
Site 2	14	23671.23	0.3	50	98%
<b>TOTAL</b>	<b>18</b>		<b>0.4</b>		

<b>48</b>	<b>hr/event</b>
<b>6</b>	<b>events/yr</b>
<b>500</b>	<b>ft3/min</b>

Maximum Daily Emissions (lb/day)															
	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene
EF (lb/MMSCF)	130	35	7	7.5	0.38%	9.90%	0.017	0.0004	0.0003	0.0043	0.0027	0.731	0.0366	0.0272	0.0095
<b>TOTAL</b>	<b>27.7</b>	<b>7.5</b>	<b>1.5</b>	<b>1.6</b>	<b>0.0</b>	<b>0.1</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.2</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>

Assumed a ratio of 500/1000 based on the corresponding Btu values with respect to natural gas combustion emission factors.

Maximum Daily Emissions (lb/day)																
	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene	SO <sub>x</sub>
Site 1	6.2	1.7	0.3	0.4	0.00	0.03	0.00	0.000	0.000	0.000	0.00	0.03	0.00	0.00	0.00	1
Site 2	21.5	5.8	1.2	1.2	0.00	0.11	0.00	0.000	0.000	0.001	0.00	0.12	0.01	0.00	0.00	4



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Table H.2.RPA.Un.Max.2040-27. 2040 Reduced Project Alternative BP Berth Summary.

Scenario	Operation	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Vessel Arrival/Departure	Cruising and maneuvering	1,910	156	65	34	34	30	95
	Boiler Warm-Up	16	4	0	3	2	1	23
	Tug Assistance	220	55	10	---	10	9	0
	Tanks	---	---	86	---	---	---	---
	Vapor Destruction Units	42.3	11.4	2.3	---	2.4	---	7.6
	Valves, Flanges, Pumps	---	---	3.25	---	---	---	---
	<b>TOTAL</b>	<b>2,189</b>	<b>226</b>	<b>167</b>	<b>37</b>	<b>48</b>	<b>40</b>	<b>126</b>
Vessel Offloading	Tanker Hoteling	1,283	102	37	28	27	21	84
	Offloading	119	30	2	20	14	9	167
	Tanks	---	---	86	---	---	---	---
	Vapor Destruction Units	42.3	11.4	2.3	---	2.4	---	7.6
	Valves, Flanges, Pumps	---	---	3.25	---	---	---	---
	<b>TOTAL</b>	<b>1,444</b>	<b>143</b>	<b>130</b>	<b>47</b>	<b>43</b>	<b>30</b>	<b>259</b>
No Vessel/Empty Berth	Vapor Destruction Units	42.3	11.4	2.3	---	2.4	---	7.6
	Tanks	---	---	86	---	---	---	---
	Valves, Flanges, Pumps	---	---	3.25	---	---	---	---
	<b>TOTAL</b>	<b>42</b>	<b>11</b>	<b>91</b>	<b>0</b>	<b>2</b>	<b>0</b>	<b>8</b>

Table H.2.RPA.Un.Max.2040-28. 2040 Reduced Project Alternative Main Engines Maximum Daily Unmitigated Emissions (Tesoro).

Ship	Direction	Mode	Distance (nautical miles)	Ship speed (knots)	Activity (hours)	Maximum Speed (knots)	Load Factor	MCR (kW)	Energy (kW-hr)	Fuel Type	Maximum Daily Shipcalls (vessels/day)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)	
AFRAMAX	South In	Cruising - CW to VSR	23	12	1.92	16.1	0.414	12,477	9,902	Dist at 0.2	1.0	463	38	16	8	8	7	21	
		Cruising - VSR to PZ	11	12	0.92	16.1	0.414	12,477	4,736	Dist at 0.2	1.0	222	18	8	4	4	3	10	
		Cruising - PZ to Pilot	4.7	7	0.67	16.1	0.082	12,477	689	Dist at 0.2	1.0	32	3	1	1	1	1	1	
	South Out	Maneuvering - Pilot to Berth			3	1.00	16.1	0.006	12,477	81	Dist at 0.2	1.0	4	0.3	0.1	0.1	0.1	0.1	0
		Maneuvering - Berth to Pilot			5	1.00	16.1	0.030	12,477	374	Dist at 0.2	1.0	17	1	1	0	0	0	1
		Cruising - Pilot to PZ			3.5	7	0.50	16.1	0.082	12,477	513	Dist at 0.2	1.0	24	2	1	0	0	1
		Cruising - PZ to VSR			12.5	12	1.04	16.1	0.414	12,477	5,382	Dist at 0.2	1.0	252	21	9	4	4	12
		Cruising - VSR to CW			24.5	12	2.04	16.1	0.414	12,477	10,548	Dist at 0.2	1.0	494	41	17	8	8	23
		<b>TOTAL</b>											<b>1,508</b>	<b>124</b>	<b>53</b>	<b>26</b>	<b>26</b>	<b>24</b>	<b>69</b>

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Table H.2.RPA.Un.Max.2040-29. 2040 Reduced Project Alternative Auxiliary Generator Maximum Daily Unmitigated Emissions (Tesoro).

Ship	Direction	Mode	Activity (hours)	MCR (kW)	Load Factor	Energy (kW-hr)	Fuel Type	Maximum Daily Shipcalls (vessels/day)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
AFRAMAX	South In	Cruising	3.50	3,600	0.278	3,503	Dist at 0.2	1.0	134	11	4	3	3	2	9
		Maneuvering	2.00	3,600	0.278	2,002	Dist at 0.2	1.0	77	6	2	2	2	1	5
	South Out	Maneuvering	1.5	3,600	0.278	1,501	Dist at 0.2	1.0	57	5	2	1	1	1	4
		Cruising	3.50	3,600	0.278	3,503	Dist at 0.2	1.0	134	11	4	3	3	2	9
<b>TOTAL</b>									<b>402</b>	<b>32</b>	<b>12</b>	<b>9</b>	<b>8</b>	<b>7</b>	<b>26</b>

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Table H.2.RPA.Un.Max.2040-30. 2040 Reduced Project Alternative Summary of Maximum Daily Unmitigated Vessel Emissions (Tesoro).

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Cruising	Main Engines	1,487	122	52	25	25	23	68
Cruising	Aux Generator	268	21	8	6	6	4	18
Maneuvering	Main Engines	21	2	1	0	0	0	1
Maneuvering	Aux Generator	134	11	4	3	3	2	9
<b>Cruising and Maneuvering</b>	<b>TOTAL</b>	<b>1,910</b>	<b>156</b>	<b>65</b>	<b>34</b>	<b>34</b>	<b>30</b>	<b>95</b>



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Table H.2.RPA.Un.Max.2040-31. 2040 Reduced Project Alternative Boiler Warm-Up Maximum Daily Unmitigated Emissions (Tesoro).

Shipcalls (vessels/day)	Vessel Size	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	Dist at 0.2	0.20	102.17	30%	3	50,000	16	4	0.2	3	2	1	23
MAXIMUM								16	4	0	3	2	1	23

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Table H.2.RPA.Un.Max.2040-32. 2040 Reduced Project Alternative Summary of Boiler Warm-Up Maximum Unmitigated Emissions (Tesoro).

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Boiler Warm-up	Boiler	16	4	0	3	2	1	23

Table H.2.RPA.Un.Max.2040-33. 2040 Reduced Project Alternative Berth Operations Maximum Daily Unmitigated Emissions (Tesoro).

Auxiliary Generator Pre-Pumpin

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	400,000	Dist at 0.2	0.20	3,600	27.8%	2.5	96	8	3	2	2	2	6
MAXIMUM								96	8	3	2	2	2	6

Boiler Pre-Pumping

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	400,000	Dist at 0.2	0.20	102.17	30.0%	2.5	50,000	14	3	0	2	2	1	19
MAXIMUM									14	3	0	2	2	1	19

Auxiliary Generator Pumpin

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	400,000	Dist at 0.2	0.20	3,600	55.6%	15.0	1,149	91	33	25	24	19	75
MAXIMUM								1,149	91	33	25	24	19	75

Boiler Pumping

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Inerting Fuel Consumption Savings (lb/1000 bbl offloaded)	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	400,000	Dist at 0.2	0.20	102.17	28.06	15.0	105	26	1	17	12	8	148
MAXIMUM								105	26	1	17	12	8	148

Auxiliary Generator Post-Pumpin

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	400,000	Dist at 0.2	0.20	3,600	27.8%	1.0	38	3	1	1	1	1	3
MAXIMUM								38	3	1	1	1	1	3

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Table H.2.RPA.Un.Max.2040-34. 2040 Reduced Project Alternative Summary of Berth Operations Maximum Daily Unmitigated Emissions (Tesoro).

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Berth Operations	Boiler	119	30	2	20	14	9	167
Berth Operations	Aux Generator	1,283	102	37	28	27	21	84

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Table H.2.RPA.Un.Max.2040-35. 2040 Reduced Project Alternative Tug Main Engines Maximum Daily Unmitigated Emissions (Tesoro).

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Shipcalls (vessels/day)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
AFRAMAX	Maneuvering - Pilot to Berth	1.00	2	4,800	0.50	MGO	1.0	99	25	5	4	4	0
	Maneuvering - Berth to Pilot	1.00	2	4,800	0.50	MGO	1.0	99	25	5	4	4	0
<b>TOTAL</b>								<b>197</b>	<b>49</b>	<b>9</b>	<b>9</b>	<b>8</b>	<b>0</b>
<b>MAXIMUM</b>								<b>197</b>	<b>49</b>	<b>9</b>	<b>9</b>	<b>8</b>	<b>0</b>

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Table H.2.RPA.Un.Max.2040-36. 2040 Reduced Project Alternative Tug Auxiliary Generator Engines Maximum Daily Unmitigated Emissions (Tesoro).

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Shipcalls (vessels/day)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
AFRAMAX	Maneuvering - Pilot to Berth	1.00	2	300	1.00	MGO	1.0	11	3	0	0	0	0
	Maneuvering - Berth to Pilot	1.00	2	300	1.00	MGO	1.0	11	3	0	0	0	0
<b>TOTAL</b>								<b>22</b>	<b>6</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>0</b>
<b>MAXIMUM</b>								<b>22</b>	<b>6</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>0</b>

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Table H.2.RPA.Un.Max.2040-37. 2040 Reduced Project Alternative Summary of Tug Maximum Daily Unmitigated Emissions (Tesoro).

<b>Mode</b>	<b>Equipment</b>	<b>Maximum Daily NO<sub>x</sub> Emissions (lb/day)</b>	<b>Maximum Daily CO Emissions (lb/day)</b>	<b>Maximum Daily ROG Emissions (lb/day)</b>	<b>Maximum Daily PM<sub>10</sub> Emissions (lb/day)</b>	<b>Maximum Daily PM<sub>2.5</sub> Emissions (lb/day)</b>	<b>Maximum Daily SO<sub>2</sub> Emissions (lb/day)</b>
Tug Assist	Main Engines	197	49	9	9	8	0
Tug Assist	Aux Generator	22	6	1	1	1	0
<b>TOTAL</b>		<b>220</b>	<b>55</b>	<b>10</b>	<b>10</b>	<b>9</b>	<b>0</b>

Table H.2.RPA.Un.Max.2040-38. 2040 Reduced Project Alternative VDU Crude Maximum Daily Unmitigated Emissions (Tesoro).

	Maximum Daily Vessel Calls	crude vapors from tanks(scf/call)	daily gas usage (mmscf/day)	mw crude vapors	destruction efficiency
Aframax	1	224,000	0.2	50	98%
<b>TOTAL</b>	<b>1</b>		<b>0.2</b>		

<b>Assumed Distribution based on tank storage volume:</b>	
<b>Site 1</b>	<b>12.5%</b>
<b>Site 2</b>	<b>87.5%</b>

Maximum Daily Emissions (lb/day)

	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene
EF (lb/MMSCF)	130	35	7	7.5	0.38%	9.90%	0.017	0.0004	0.0003	0.0043	0.0027	0.731	0.0366	0.0272	0.0095
Panamax	14.6	3.9	0.8	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0
<b>MAXIMUM</b>	<b>14.6</b>	<b>3.9</b>	<b>0.8</b>	<b>0.8</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.1</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>

Assumed a ratio of 500/1000 based on the corresponding Btu values with respect to natural gas combustion emission factors.

Maximum Daily Emissions (lb/day)

	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene	SO <sub>x</sub>
Site 1	2	0.5	0.10	0.1	0.000	0.00	0.000	0.0000	0.0000	0.0001	0.0000	0.01	0.001	0.000	0.000	0
Site 2	13	3	0.7	0.7	0.00	0.01	0.002	0.0000	0.0000	0.000	0.000	0.1	0.00	0.00	0.001	2



Table H.2.RPA.Un.Max.2040-39. 2040 Reduced Project Alternative VDU Legs Maximum Daily Unmitigated Emissions (Tesoro).

	tanks	crude vapors from tanks on legs(scfd/day)	daily gas usage (mmscf/day)	mw crude vapors	destruction efficiency
Site 1	4	23671.23	0.09	50	98%
Site 2	14	23671.23	0.3	50	98%
<b>TOTAL</b>	<b>18</b>		<b>0.4</b>		

<b>48</b>	<b>hr/event</b>
<b>6</b>	<b>events/yr</b>
<b>500</b>	<b>ft3/min</b>

Maximum Daily Emissions (lb/day)															
	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene
EF (lb/MMSCF)	130	35	7	7.5	0.38%	9.90%	0.017	0.0004	0.0003	0.0043	0.0027	0.731	0.0366	0.0272	0.0095
<b>TOTAL</b>	<b>27.7</b>	<b>7.5</b>	<b>1.5</b>	<b>1.6</b>	<b>0.0</b>	<b>0.1</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.2</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>

Assumed a ratio of 500/1000 based on the corresponding Btu values with respect to natural gas combustion emission factors.

Maximum Daily Emissions (lb/day)																
	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene	SO <sub>x</sub>
Site 1	6.2	1.7	0.3	0.4	0.00	0.03	0.00	0.000	0.000	0.000	0.00	0.03	0.00	0.00	0.00	1
Site 2	21.5	5.8	1.2	1.2	0.00	0.11	0.00	0.000	0.000	0.001	0.00	0.12	0.01	0.00	0.00	4



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Table H.2.RPA.Un.Max.2040-41. 2040 Reduced Project Alternative Tesoro Berth Summary.

Scenario	Operation	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Vessel Arrival/Departure	Cruising and maneuvering	1,910	156	65	34	34	30	95
	Boiler Warm-Up	16	4	0	3	2	1	23
	Tug Assistance	220	55	10	---	10	9	0
	Tanks	---	---	86	---	---	---	---
	Vapor Destruction Units	42.3	11.4	2.3	---	2.4	---	7.6
	Valves, Flanges, Pumps	---	---	3.25	---	---	---	---
	<b>TOTAL</b>	<b>2,189</b>	<b>226</b>	<b>167</b>	<b>37</b>	<b>48</b>	<b>40</b>	<b>126</b>
Vessel Offloading	Tanker Hoteling	1,283	102	37	28	27	21	84
	Offloading	119	30	2	20	14	9	167
	Tanks	---	---	86	---	---	---	---
	Vapor Destruction Units	42.3	11.4	2.3	---	2.4	---	7.6
	Valves, Flanges, Pumps	---	---	3.25	---	---	---	---
	<b>TOTAL</b>	<b>1,444</b>	<b>143</b>	<b>130</b>	<b>47</b>	<b>43</b>	<b>30</b>	<b>259</b>
No Vessel/Empty Berth	Vapor Destruction Units	42.3	11.4	2.3	---	2.4	---	7.6
	Tanks	---	---	86	---	---	---	---
	Valves, Flanges, Pumps	---	---	3.25	---	---	---	---
	<b>TOTAL</b>	<b>42</b>	<b>11</b>	<b>91</b>	<b>0</b>	<b>2</b>	<b>0</b>	<b>8</b>

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Table H.2.RPA.Un.Max.2040-42. 2040 Reduced Project Alternative Main Engines Maximum Daily Unmitigated Emissions (Exxon Mobil).

Ship	Direction	Mode	Distance (nautical miles)	Ship speed (knots)	Activity (hours)	Maximum Speed (knots)	Load Factor	MCR (kW)	Energy (kW-hr)	Fuel Type	Maximum Daily Shipcalls (vessels/day)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)	
PANAMAX	South In	Cruising - CW to VSR	23	12	1.92	15.8	0.438	10,300	8,649	Dist at 0.2	1.0	405	33	14	7	7	6	19	
		Cruising - VSR to PZ	11	12	0.92	15.8	0.438	10,300	4,136	Dist at 0.2	1.0	194	16	7	3	3	3	9	
		Cruising - PZ to Pilot	4.7	7	0.67	15.8	0.087	10,300	601	Dist at 0.2	1.0	28	2	1	0	0	0	1	
	South Out	Maneuvering - Pilot to Berth		3	1.00	15.8	0.007	10,300	71	Dist at 0.2	1.0	3	0.3	0.1	0.1	0.1	0.1	0	
		Maneuvering - Berth to Pilot		5	1.00	15.8	0.032	10,300	326	Dist at 0.2	1.0	15	1	1	0	0	0	1	
		Cruising - Pilot to PZ	3.5	7	0.50	15.8	0.087	10,300	448	Dist at 0.2	1.0	21	2	1	0	0	0	1	
		Cruising - PZ to VSR	12.5	12	1.04	15.8	0.438	10,300	4,700	Dist at 0.2	1.0	220	18	8	4	4	3	10	
		Cruising - VSR to CW	24.5	12	2.04	15.8	0.438	10,300	9,213	Dist at 0.2	1.0	431	36	15	7	7	7	20	
		<b>TOTAL</b>											<b>1,317</b>	<b>108</b>	<b>46</b>	<b>22</b>	<b>22</b>	<b>21</b>	<b>60</b>

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Table H.2.RPA.Un.Max.2040-43. 2040 Reduced Project Alternative Auxiliary Generator Maximum Daily Unmitigated Emissions (Exxon Mobil).

Ship	Direction	Mode	Activity (hours)	MCR (kW)	Load Factor	Energy (kW-hr)	Fuel Type	Maximum Daily Shipcalls (vessels/day)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
PANAMAX	South In	Cruising	3.15	3,600	0.278	3,155	Dist at 0.2	1.0	121	10	3	3	3	2	8
		Maneuvering	2.00	3,600	0.278	2,002	Dist at 0.2	1.0	77	6	2	2	2	1	5
	South Out	Maneuvering	1.5	3,600	0.278	1,501	Dist at 0.2	1.0	57	5	2	1	1	1	4
		Cruising	3.21	3,600	0.278	3,211	Dist at 0.2	1.0	123	10	4	3	3	2	8
<b>TOTAL</b>									<b>378</b>	<b>30</b>	<b>11</b>	<b>8</b>	<b>8</b>	<b>6</b>	<b>25</b>

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Table H.2.RPA.Un.Max.2040-44. 2040 Reduced Project Alternative Summary of Maximum Daily Unmitigated Vessel Emissions (Exxon Mobil).

<b>Mode</b>	<b>Equipment</b>	<b>NO<sub>x</sub> Emissions (lb/day)</b>	<b>CO Emissions (lb/day)</b>	<b>ROG Emissions (lb/day)</b>	<b>PM Emissions (lb/day)</b>	<b>PM<sub>10</sub> Emissions (lb/day)</b>	<b>PM<sub>2.5</sub> Emissions (lb/day)</b>	<b>SO<sub>2</sub> Emissions (lb/day)</b>
Cruising	Main Engines	1,299	107	46	22	22	20	59
Cruising	Aux Generator	244	19	7	5	5	4	16
Maneuvering	Main Engines	19	2	1	0	0	0	1
Maneuvering	Aux Generator	134	11	4	3	3	2	9
<b>Cruising and Maneuvering</b>	<b>TOTAL</b>	<b>1,695</b>	<b>138</b>	<b>57</b>	<b>31</b>	<b>30</b>	<b>27</b>	<b>85</b>

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Table H.2.RPA.Un.Max.2040-45. 2040 Reduced Project Alternative Boiler Warm-Up Maximum Daily Unmitigated Emissions (Exxon Mobil).

Shipcalls (vessels/day)	Vessel Size	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Panamax	Dist at 0.2	0.20	59.91	30%	3	35,000	7	2	0.1	1	1	1	9
<b>MAXIMUM</b>								<b>7</b>	<b>2</b>	<b>0</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>9</b>

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Table H.2.RPA.Un.Max.2040-46. 2040 Reduced Project Alternative Summary of Boiler Warm-Up Maximum Unmitigated Emissions (Exxon Mobil).

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Boiler Warm-up	Boiler	7	2	0	1	1	1	9



Table H.2.RPA.Un.Max.2040-47. 2040 Reduced Project Alternative Berth Operations Maximum Daily Unmitigated Emissions (Exxon Mobil).

**Auxiliary Generator Pre-Pumpin**

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bb/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Panamax	300,000	Dist at 0.2	0.20	3,600	27.8%	2.5	96	8	3	2	2	2	6

AMP Reduction 70% MAXIMUM 29 2 1 1 1 0.5 2

**Boiler Pre-Pumping**

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bb/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Panamax	300,000	Dist at 0.2	0.20	59.91	30.0%	2.5	35,000	6	1	0	1	1	0	8

MAXIMUM 6 1 0 1 1 0 8

**Auxiliary Generator Pumpin**

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bb/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Panamax	300,000	Dist at 0.2	0.20	3,600	55.6%	11.0	843	67	24	18	17	14	55

AMP Reduction 70% MAXIMUM 253 20 7 5 5 4 17

**Boiler Pumping**

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bb/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Inerting Fuel Consumption Savings (lb/1000 bbl offloaded)	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Panamax	300,000	Dist at 0.2	0.20	59.91	28.06	11.0	34	8	0	6	4	3	48

MAXIMUM 34 8 0 6 4 3 48

**Auxiliary Generator Post-Pumpin**

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bb/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Panamax	300,000	Dist at 0.2	0.20	3,600	27.8%	1.0	38	3	1	1	1	1	3

AMP Reduction 70% MAXIMUM 11 1 0 0 0 0 1

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Table H.2.RPA.Un.Max.2040-48. 2040 Reduced Project Alternative Summary of Berth Operations Maximum Daily Unmitigated Emissions (Exxon Mobil).

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Berth Operations	Boiler	39	10	1	7	5	3	56
Berth Operations	Aux Generator	293	23	8	6	6	5	19

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Table H.2.RPA.Un.Max.2040-49. 2040 Reduced Project Alternative Tug Main Engines Maximum Daily Unmitigated Emissions (Exxon Mobil).

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Shipcalls (vessels/day)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
PANAMAX	Maneuvering - Pilot to Berth	1.00	2	4,800	0.50	MGO	1.0	99	25	5	4	4	0
	Maneuvering - Berth to Pilot	1.00	2	4,800	0.50	MGO	1.0	99	25	5	4	4	0
<b>TOTAL</b>								<b>197</b>	<b>49</b>	<b>9</b>	<b>9</b>	<b>8</b>	<b>0</b>
<b>MAXIMUM</b>								<b>197</b>	<b>49</b>	<b>9</b>	<b>9</b>	<b>8</b>	<b>0</b>

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Table H.2.RPA.Un.Max.2040-50. 2040 Reduced Project Alternative Tug Auxiliary Generator Engines Maximum Daily Unmitigated Emissions (Exxon Mobil).

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Shipcalls (vessels/day)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
PANAMAX	Maneuvering - Pilot to Berth	1.00	2	300	1.00	MGO	1.0	11	3	0	0	0	0
	Maneuvering - Berth to Pilot	1.00	2	300	1.00	MGO	1.0	11	3	0	0	0	0
<b>TOTAL</b>								<b>22</b>	<b>6</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>0</b>
<b>MAXIMUM</b>								<b>22</b>	<b>6</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>0</b>

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Table H.2.RPA.Un.Max.2040-51. 2040 Reduced Project Alternative Summary of Tug Maximum Daily Unmitigated Emissions (Exxon Mobil).

<b>Mode</b>	<b>Equipment</b>	<b>Maximum Daily NO<sub>x</sub> Emissions (lb/day)</b>	<b>Maximum Daily CO Emissions (lb/day)</b>	<b>Maximum Daily ROG Emissions (lb/day)</b>	<b>Maximum Daily PM<sub>10</sub> Emissions (lb/day)</b>	<b>Maximum Daily PM<sub>2.5</sub> Emissions (lb/day)</b>	<b>Maximum Daily SO<sub>2</sub> Emissions (lb/day)</b>
Tug Assist	Main Engines	197	49	9	9	8	0
Tug Assist	Aux Generator	22	6	1	1	1	0
<b>TOTAL</b>		<b>220</b>	<b>55</b>	<b>10</b>	<b>10</b>	<b>9</b>	<b>0</b>

Table H.2.RPA.Un.Max.2040-52. 2040 Reduced Project Alternative VDU Crude Maximum Daily Unmitigated Emissions (Exxon Mobil).

	Maximum Daily Vessel Calls	crude vapors from tanks(scf/call)	daily gas usage (mmscf/day)	mw crude vapors	destruction efficiency
Panamax	1	116,667	0.1	50	98%
<b>TOTAL</b>	<b>1</b>		<b>0.1</b>		

<b>Assumed Distribution based on tank storage volume:</b>	
<b>Site 1</b>	<b>12.5%</b>
<b>Site 2</b>	<b>87.5%</b>

Maximum Daily Emissions (lb/day)

	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene
EF (lb/MMSCF)	130	35	7	7.5	0.38%	9.90%	0.017	0.0004	0.0003	0.0043	0.0027	0.731	0.0366	0.0272	0.0095
Panamax	7.6	2.0	0.4	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>MAXIMUM</b>	<b>7.6</b>	<b>2.0</b>	<b>0.4</b>	<b>0.4</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>

Assumed a ratio of 500/1000 based on the corresponding Btu values with respect to natural gas combustion emission factors.

Maximum Daily Emissions (lb/day)

	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene	SO <sub>x</sub>
Site 1	1	0.3	0.05	0.1	0.000	0.00	0.000	0.0000	0.0000	0.0000	0.0000	0.01	0.000	0.000	0.000	0
Site 2	7	2	0.4	0.4	0.00	0.01	0.001	0.0000	0.0000	0.000	0.000	0.0	0.00	0.00	0.000	1

Table H.2.RPA.Un.Max.2040-53. 2040 Reduced Project Alternative VDU Legs Maximum Daily Unmitigated Emissions (Exxon Mobil).

	tanks	crude vapors from tanks on legs(scfd/day)	daily gas usage (mmscf/day)	mw crude vapors	destruction efficiency
Site 1	4	23671.23	0.09	50	98%
Site 2	14	23671.23	0.3	50	98%
<b>TOTAL</b>	<b>18</b>		<b>0.4</b>		

<b>48</b>	<b>hr/event</b>
<b>6</b>	<b>events/yr</b>
<b>500</b>	<b>ft3/min</b>

Maximum Daily Emissions (lb/day)															
	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene
EF (lb/MMSCF)	130	35	7	7.5	0.38%	9.90%	0.017	0.0004	0.0003	0.0043	0.0027	0.731	0.0366	0.0272	0.0095
<b>TOTAL</b>	<b>27.7</b>	<b>7.5</b>	<b>1.5</b>	<b>1.6</b>	<b>0.0</b>	<b>0.1</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.2</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>

Assumed a ratio of 500/1000 based on the corresponding Btu values with respect to natural gas combustion emission factors.

Maximum Daily Emissions (lb/day)																
	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	benzene	hexane	formaldehyde	PAH	naphthalene	acetaldehyde	acrolein	propylene	toluene	xylene	ethylbenzene	SO <sub>x</sub>
Site 1	6.2	1.7	0.3	0.4	0.00	0.03	0.00	0.000	0.000	0.000	0.00	0.03	0.00	0.00	0.00	1
Site 2	21.5	5.8	1.2	1.2	0.00	0.11	0.00	0.000	0.000	0.001	0.00	0.12	0.01	0.00	0.00	4





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Table H.2.RPA.Un.Max.2040-55. 2040 Reduced Project Alternative Exxon Mobil Berth Summary.

Scenario	Operation	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Vessel Arrival/Departure	Cruising and maneuvering	1,695	138	57	31	30	27	85
	Boiler Warm-Up	7	2	0	1	1	1	9
	Tug Assistance	220	55	10	---	10	9	0
	Tanks	---	---	86	---	---	---	---
	Vapor Destruction Units	35.3	9.5	1.9	---	2.0	---	6.3
	Valves, Flanges, Pumps	---	---	3.25	---	---	---	---
	<b>TOTAL</b>	<b>1,957</b>	<b>204</b>	<b>159</b>	<b>32</b>	<b>43</b>	<b>36</b>	<b>101</b>
Vessel Offloading	Tanker Hoteling	293	23	8	6	6	5	19
	Offloading	39	10	1	7	5	3	56
	Tanks	---	---	86	---	---	---	---
	Vapor Destruction Units	35.3	9.5	1.9	---	2.0	---	6.3
	Valves, Flanges, Pumps	---	---	3.25	---	---	---	---
	<b>TOTAL</b>	<b>368</b>	<b>43</b>	<b>100</b>	<b>13</b>	<b>13</b>	<b>8</b>	<b>81</b>
No Vessel/Empty Berth	Vapor Destruction Units	35.3	9.5	1.9	---	2.0	---	6.3
	Tanks	---	---	86	---	---	---	---
	Valves, Flanges, Pumps	---	---	3.25	---	---	---	---
	<b>TOTAL</b>	<b>35</b>	<b>9</b>	<b>91</b>	<b>0</b>	<b>2</b>	<b>0</b>	<b>6</b>

Table H.2.RPA.Un.Max.Bar.2040-1. 2040 Reduced Project Alternative Main Engines Maximum Daily Unmitigated Emissions from Barge Fuel Deliveries for OGV.

Ship	Direction	Mode	Distance (nautical miles)	Ship speed (knots)	Activity (hours)	Maximum Speed (knots)	Load Factor	MCR (kW)	Energy (kW-hr)	Fuel Type	Shipcalls (vessels/ yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Barge	North In	Volpak to Berth 408	5	3	1.67	3	1.00	4,800	8,000.00	MGO	1.0	291	24	11	16	16	16	18
Barge	North Out	Volpak to Berth 408	5	3	1.67	3.0	1.00	4,800	8,000.00	MGO	1.0	291	24	11	16	16	16	18
TOTAL												581	48	22	32	32	32	36

Table H.2.RPA.Un.Max.Bar.2040-2. 2040 Reduced Project Alternative Tug Main Engines Maximum Daily Unmitigated Emissions from Barge Fuel Deliveries for OGV.

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Shipcalls (vessels/day)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Barge	Maneuvering - Pilot to Berth	1.00	1	4,800	0.50	MGO	1.0	87	7	3	5	4	5
	Maneuvering - Berth to Pilot	1.00	1	4,800	0.50	MGO	1.0	87	7	3	5	4	5
<b>TOTAL</b>								<b>174</b>	<b>15</b>	<b>7</b>	<b>10</b>	<b>9</b>	<b>11</b>
<b>MAXIMUM</b>								<b>174</b>	<b>15</b>	<b>7</b>	<b>10</b>	<b>9</b>	<b>11</b>

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Table H.2.RPA.Un.Max.Bar.2040-3. 2040 Reduced Project Alternative Tug Auxiliary Generator Engines Maximum Daily Unmitigated Emissions from Barge Fuel Deliveries for OG

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Shipcalls (vessels/day)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Barge	Maneuvering - Pilot to Berth	1.00	1	300	1.00	MGO	1.0	8	1	0	0	0	1
	Maneuvering - Berth to Pilot	1.00	1	300	1.00	MGO	1.0	8	1	0	0	0	1
<b>TOTAL</b>								<b>17</b>	<b>3</b>	<b>0</b>	<b>1</b>	<b>1</b>	<b>1</b>

**MAXIMUM      17            3            0            1            1            1**

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Table H.2.RPA.Un.Max.Bar.2040-4. 2040 Reduced Project Alternative Summary of Tug Maximum Daily Unmitigated Emissions from Barge Fuel Deliveries for OGV.

Mode	Equipment	Maximum Daily NO <sub>x</sub> Emissions (lb/day)	Maximum Daily CO Emissions (lb/day)	Maximum Daily ROG Emissions (lb/day)	Maximum Daily PM <sub>10</sub> Emissions (lb/day)	Maximum Daily PM <sub>2.5</sub> Emissions (lb/day)	Maximum Daily SO <sub>2</sub> Emissions (lb/day)
Tug Assist	Main Engines	174	15	7	10	9	11
Tug Assist	Aux Generator	17	3	0	1	1	1
<b>TOTAL</b>		<b>191</b>	<b>17</b>	<b>7</b>	<b>10</b>	<b>9</b>	<b>12</b>

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Table H.2.RPA.Un.Max.Bar.2040-5. 2040 Reduced Project Alternative Summary of Maximum Daily Unmitigated Vessel Emissions from Barge Fuel Deliveries for OGV.

Operation	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Barge	581	48	22	32	32	36
Tug Assistance	191	17	7	10	9	12
<b>TOTAL</b>	<b>772</b>	<b>66</b>	<b>29</b>	<b>42</b>	<b>41</b>	<b>48</b>

Operation	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Barge	1.59	0.13	0.06	0.09	0.09	0.10
Tug Assistance	0.52	0.05	0.02	0.03	0.03	0.03
<b>TOTAL</b>	<b>2.12</b>	<b>0.18</b>	<b>0.08</b>	<b>0.11</b>	<b>0.11</b>	<b>0.13</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Mit.2010-1. 2010 Reduced Project Alternative Main Engines Average Daily Mitigated Emissions.

Ship	Direction	Mode	Distance (nautical miles)	Ship speed (knots)	Activity (hours)	Maximum Speed (knots)	Load Factor	MCR (kW)	Energy (kW-hr)	Fuel Type	Annual Shipcalls (vessels/yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
VLCC	North In	Cruising - CW to VSR	22	12	1.83	16.9	0.358	25,400	16,671	MDO	26.0	20,288	1,671	716	465	465	428	2,413
		Cruising - VSR to PZ	21	12	1.75	16.9	0.358	25,400	15,913	MDO	26.0	19,366	1,595	683	444	444	409	2,304
		Cruising - PZ to Pilot	4.7	7	0.67	16.9	0.071	25,400	1,212	MDO	26.0	2,088	342	246	58	58	54	175
		Maneuvering - Pilot to Berth		3	1.00	16.9	0.006	25,400	142	MDO	26.0	2,786	509	1,303	108	108	99	21
<b>TOTAL</b>											<b>44,528</b>	<b>4,117</b>	<b>2,949</b>	<b>1,076</b>	<b>1,076</b>	<b>990</b>	<b>4,913</b>	
	North Out	Maneuvering - Berth to Pilot	3.8	5	1.00	16.9	0.026	25,400	658	Dist at 0.2	26.0	2,402	509	606	61	61	56	37
		Cruising - Pilot to PZ		7	0.54	16.9	0.071	25,400	980	Dist at 0.2	26.0	1,688	276	199	35	35	32	55
		Cruising - PZ to VSR	21	12	1.75	16.9	0.358	25,400	15,913	Dist at 0.2	26.0	19,366	1,595	683	330	330	304	886
		Cruising - VSR to CW	22	12	1.83	16.9	0.358	25,400	16,671	Dist at 0.2	26.0	20,288	1,671	716	346	346	318	928
<b>TOTAL</b>											<b>43,744</b>	<b>4,051</b>	<b>2,204</b>	<b>773</b>	<b>773</b>	<b>711</b>	<b>1,905</b>	
AFRAMAX	South In	Cruising - CW to VSR	23	12	1.92	16.1	0.414	12,477	9,902	MDO	32.0	14,831	1,221	523	340	340	313	1,764
		Cruising - VSR to PZ	11	12	0.92	16.1	0.414	12,477	4,736	MDO	32.0	7,093	584	250	163	163	150	844
		Cruising - PZ to Pilot	4.7	7	0.67	16.1	0.082	12,477	689	MDO	32.0	1,362	207	138	37	37	34	123
		Maneuvering - Pilot to Berth		3	1.00	16.1	0.006	12,477	81	MDO	32.0	1,827	308	733	71	71	65	14
<b>TOTAL</b>											<b>25,113</b>	<b>2,320</b>	<b>1,645</b>	<b>611</b>	<b>611</b>	<b>562</b>	<b>2,745</b>	
	South Out	Maneuvering - Berth to Pilot	3.5	5	1.00	16.1	0.030	12,477	374	Dist at 0.2	32.0	1,632	308	341	41	41	38	26
		Cruising - Pilot to PZ		7	0.50	16.1	0.082	12,477	513	Dist at 0.2	32.0	1,014	154	103	20	20	19	35
		Cruising - PZ to VSR	12.5	12	1.04	16.1	0.414	12,477	5,382	Dist at 0.2	32.0	8,060	664	284	138	138	127	369
		Cruising - VSR to CW	24.5	12	2.04	16.1	0.414	12,477	10,548	Dist at 0.2	32.0	15,798	1,301	558	270	270	248	723
<b>TOTAL</b>											<b>26,505</b>	<b>2,427</b>	<b>1,286</b>	<b>469</b>	<b>469</b>	<b>431</b>	<b>1,152</b>	
PANAMAX	South In	Cruising - CW to VSR	23	12	1.92	15.8	0.438	10,300	8,649	MDO	26	10,525	867	371	241	241	222	1,252
		Cruising - VSR to PZ	11	12	0.92	15.8	0.438	10,300	4,136	MDO	26	5,034	415	178	115	115	106	599
		Cruising - PZ to Pilot	4.7	7	0.67	15.8	0.087	10,300	601	MDO	26	732	60	26	17	17	15	87
		Maneuvering - Pilot to Berth		3	1.00	15.8	0.007	10,300	71	MDO	26	86	7	3	2	2	2	10
<b>TOTAL</b>											<b>16,377</b>	<b>1,349</b>	<b>578</b>	<b>376</b>	<b>376</b>	<b>346</b>	<b>1,948</b>	
	South Out	Maneuvering - Berth to Pilot	3.5	5	1.00	15.8	0.032	10,300	326	Dist at 0.2	26	397	33	14	7	7	6	18
		Cruising - Pilot to PZ		7	0.50	15.8	0.087	10,300	448	Dist at 0.2	26	545	45	19	9	9	9	25
		Cruising - PZ to VSR	12.5	12	1.04	15.8	0.438	10,300	4,700	Dist at 0.2	26	5,720	471	202	98	98	90	262
		Cruising - VSR to CW	24.5	12	2.04	15.8	0.438	10,300	9,213	Dist at 0.2	26	11,212	923	396	191	191	176	513
<b>TOTAL</b>											<b>17,874</b>	<b>1,472</b>	<b>631</b>	<b>305</b>	<b>305</b>	<b>281</b>	<b>818</b>	
SUEZMAX	North In	Cruising - CW to VSR	22	12	1.83	17	0.352	16,000	10,317	MDO	45	21,731	1,790	767	499	499	459	2,585
		Cruising - VSR to PZ	21	12	1.75	17	0.352	16,000	9,848	MDO	45	20,743	1,708	732	476	476	438	2,467
		Cruising - PZ to Pilot	4.7	7	0.67	17	0.070	16,000	750	MDO	45	1,580	130	56	36	36	33	188
		Maneuvering - Pilot to Berth		3	1.00	17	0.005	16,000	88	MDO	45	185	15	7	4	4	4	22
	<b>TOTAL</b>											<b>44,239</b>	<b>3,643</b>	<b>1,561</b>	<b>1,015</b>	<b>1,015</b>	<b>934</b>	<b>5,262</b>
	North Out	Maneuvering - Berth to Pilot		5	1.00	17	0.025	16,000	407	Dist at 0.2	45	857	71	30	15	15	13	39
		Cruising - Pilot to PZ	3.8	7	0.54	17	0.070	16,000	606	Dist at 0.2	45	1,277	105	45	22	22	20	58
		Cruising - PZ to VSR	21	12	1.75	17	0.352	16,000	9,848	Dist at 0.2	45	20,743	1,708	732	354	354	326	949
Cruising - VSR to CW		22	12	1.83	17	0.352	16,000	10,317	Dist at 0.2	45	21,731	1,790	767	371	371	341	994	
<b>TOTAL</b>											<b>44,608</b>	<b>3,674</b>	<b>1,574</b>	<b>761</b>	<b>761</b>	<b>700</b>	<b>2,041</b>	
<b>GRAND TOTAL</b>												<b>262,988</b>	<b>23,053</b>	<b>12,428</b>	<b>5,384</b>	<b>5,384</b>	<b>4,954</b>	<b>20,785</b>

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Table H.2.RPA.Mit.2010-2. 2010 Reduced Project Alternative Auxiliary Generator Average Daily Mitigated Emissions

Ship	Direction	Mode	Activity (hours)	MCR (kW)	Load Factor	Energy (kW-hr)	Fuel Type	Annual Shipcalls (vessels/yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
VLCC	North In	Cruising	4.25	3,600	0.278	4,258	MDO	26.0	4,237	335	122	91	88	70	722
		Maneuvering	2.00	3,600	0.278	2,002	MDO	26.0	1,992	158	57	43	41	33	339
	North Out	Maneuvering	1.50	3,600	0.278	1,501	Dist at 0.2	26.0	1,494	118	43	32	31	25	98
		Cruising	4.13	3,600	0.278	4,129	Dist at 0.2	26.0	4,109	325	118	89	85	68	269
		<b>TOTAL</b>							<b>6,229</b>	<b>493</b>	<b>179</b>	<b>134</b>	<b>129</b>	<b>103</b>	<b>1,062</b>
AFRAMAX	South In	Cruising	3.50	3,600	0.278	3,508	MDO	32.0	4,296	340	124	93	89	71	732
		Maneuvering	2.00	3,600	0.278	2,002	MDO	32.0	2,451	194	71	53	51	41	418
	South Out	Maneuvering	1.50	3,600	0.278	1,501	Dist at 0.2	32.0	1,838	145	53	40	38	30	121
		Cruising	3.58	3,600	0.278	3,586	Dist at 0.2	32.0	4,392	348	126	95	91	73	288
		<b>TOTAL</b>							<b>6,230</b>	<b>493</b>	<b>179</b>	<b>134</b>	<b>129</b>	<b>103</b>	<b>408</b>
PANAMAX	South In	Cruising	3.50	3,600	0.278	3,508	MDO	26	3,490	276	100	75	72	58	595
		Maneuvering	2.00	3,600	0.278	2,002	MDO	26	1,992	158	57	43	41	33	339
	South Out	Maneuvering	1.5	3,600	0.278	1,501	Dist at 0.2	26	1,494	118	43	32	31	25	98
		Cruising	3.58	3,600	0.278	3,586	Dist at 0.2	26	3,568	282	103	77	74	59	234
SUEZMAX	North In	Cruising	4.25	3,600	0.278	4,258	MDO	45	7,333	580	211	158	152	122	1,250
		Maneuvering	2.00	3,600	0.278	2,002	MDO	45	3,447	273	99	74	71	57	587
	North Out	Maneuvering	1.5	3,600	0.278	1,501	Dist at 0.2	45	2,585	205	74	56	54	43	169
		Cruising	4.13	3,600	0.278	4,129	Dist at 0.2	45	7,112	563	205	153	147	118	466
		<b>TOTAL</b>							<b>9,697</b>	<b>767</b>	<b>279</b>	<b>209</b>	<b>201</b>	<b>161</b>	<b>636</b>
<b>GRAND TOTAL</b>									<b>55,831</b>	<b>4,418</b>	<b>1,607</b>	<b>1,205</b>	<b>1,157</b>	<b>925</b>	<b>6,726</b>



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Table H.2.RPA.Mit.2010-3. 2010 Reduced Project Alternative Summary of Average Daily Mitigated Vessel Emissions.

Mode	Equipment	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Cruising	Main Engines	252,815	21,292	9,391	5,076	5,076	4,670	20,598
Cruising	Aux Generator	38,537	3,050	1,109	832	798	639	4,556
Maneuvering	Main Engines	10,173	1,760	3,037	309	309	284	187
Maneuvering	Aux Generator	17,293	1,369	498	373	358	287	2,170
<b>Cruising and Maneuvering</b>	<b>TOTAL</b>	<b>318,819</b>	<b>27,471</b>	<b>14,035</b>	<b>6,589</b>	<b>6,541</b>	<b>5,879</b>	<b>27,511</b>

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Cruising	Main Engines	693	58	26	14	14	13	56
Cruising	Aux Generator	106	8	3	2	2	2	12
Maneuvering	Main Engines	28	5	8	1	1	1	1
Maneuvering	Aux Generator	47	4	1	1	1	1	6
<b>Cruising and Maneuvering</b>	<b>TOTAL</b>	<b>873</b>	<b>75</b>	<b>38</b>	<b>18</b>	<b>18</b>	<b>16</b>	<b>75</b>

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Table H.2.RPA.Mit.2010-4. 2010 Reduced Project Alternative Boiler Warm-Up Average Daily Mitigated Emissions.

Shipcalls (vessels/yr)	Vessel Size	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
32.0	Aframax	MDO	0.52	102.17	30%	3	50,000	521	130	7	86	60	40	1,908
26.0	VLCC	MDO	0.52	80.38	30%	3	90,000	718	150	32	99	69	46	2,196
26.0	Panamax	MDO	0.52	59.91	30%	3	35,000	174	43	2	29	20	13	636
45.0	Suezmax	MDO	0.52	82.85	30%	3	70,000	832	208	12	138	96	64	3,047
<b>TOTAL</b>								<b>2,245</b>	<b>532</b>	<b>53</b>	<b>352</b>	<b>246</b>	<b>165</b>	<b>7,787</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Mit.2010-5. 2010 Reduced Project Alternative Summary of Boiler Warm-Up Average Daily Mitigated Emissions.

Mode	Equipment	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Boiler Warm-up	Boiler	2,245	532	53	352	246	165	7,787

Table H.2.RPA.Mit.2010-6. 2010 Reduced Project Alternative Berth Operations Average Daily Mitigated Emissions.

**Auxiliary Generator Pre-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
32.0	Aframax	700,000	MDO	0.52	3,600	27.8%	2.5	3,064	242	88	66	63	51	522
26.0	VLCC	2,000,000	MDO	0.52	3,600	27.8%	2.5	2,490	197	72	54	52	41	424
26.0	Panamax	350,000	MDO	0.52	3,600	27.8%	2.5	2,490	197	72	54	52	41	424
45.0	Suezmax	1,000,000	MDO	0.52	3,600	27.8%	2.5	4,309	341	124	93	89	71	734
<b>TOTAL</b>								<b>12,352</b>	<b>978</b>	<b>355</b>	<b>267</b>	<b>256</b>	<b>205</b>	<b>2,105</b>

**Boiler Pre-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
32.0	Aframax	700,000	MDO	0.52	102.17	30.0%	2.5	50,000	434	109	6	72	50	34	1,590
26.0	VLCC	2,000,000	MDO	0.52	80.38	30.0%	2.5	90,000	598	125	26	83	58	39	1,830
26.0	Panamax	350,000	MDO	0.52	59.91	30.0%	2.5	35,000	145	36	2	24	17	11	530
45.0	Suezmax	1,000,000	MDO	0.52	82.85	30.0%	2.5	70,000	693	173	10	115	80	54	2,539
<b>TOTAL</b>									<b>1,871</b>	<b>443</b>	<b>44</b>	<b>293</b>	<b>205</b>	<b>137</b>	<b>6,489</b>

**Auxiliary Generator Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
32.0	Aframax	700,000	Dist at 0.2%S	0.20	3,600	55.6%	15.0	36,769	2,910	1,058	794	762	609	2,410
26.0	VLCC	2,000,000	Dist at 0.2%S	0.20	3,600	55.6%	23.2	46,207	3,657	1,330	997	957	766	3,029
26.0	Panamax	350,000	Dist at 0.2%S	0.20	3,600	55.6%	11.0	21,908	1,734	630	473	454	363	1,436
45.0	Suezmax	1,000,000	Dist at 0.2%S	0.20	3,600	55.6%	15.3	52,741	4,174	1,518	1,138	1,093	874	3,457
<b>TOTAL</b>								<b>157,626</b>	<b>12,474</b>	<b>4,536</b>	<b>3,402</b>	<b>3,266</b>	<b>2,613</b>	<b>10,332</b>

**Boiler Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Inerting Fuel Consumption Savings (lb/1000 bbl offloaded)	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
32.0	Aframax	700,000	Dist at 0.2%S	0.20	102.17	28.06	15.0	5,880	1,470	83	973	681	455	8,282
26.0	VLCC	2,000,000	Dist at 0.2%S	0.20	80.38	28.06	23.2	11,536	2,409	509	1,595	1,116	746	13,572
26.0	Panamax	350,000	Dist at 0.2%S	0.20	59.91	28.06	11.0	1,027	257	14	170	119	80	1,446
45.0	Suezmax	1,000,000	Dist at 0.2%S	0.20	82.85	28.06	15.3	8,733	2,183	123	1,445	1,012	676	12,300
<b>TOTAL</b>								<b>27,175</b>	<b>6,319</b>	<b>729</b>	<b>4,183</b>	<b>2,928</b>	<b>1,958</b>	<b>35,599</b>

**Auxiliary Generator Post-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
32.0	Aframax	700,000	Dist at 0.2%S	0.20	3,600	27.8%	1.0	1,226	97	35	26	25	20	80
26.0	VLCC	2,000,000	Dist at 0.2%S	0.20	3,600	27.8%	1.0	996	79	29	21	21	17	65
26.0	Panamax	350,000	Dist at 0.2%S	0.20	3,600	27.8%	1.0	996	79	29	21	21	17	65
45.0	Suezmax	1,000,000	Dist at 0.2%S	0.20	3,600	27.8%	1.0	1,724	136	50	37	36	29	113
<b>TOTAL</b>								<b>4,941</b>	<b>391</b>	<b>142</b>	<b>107</b>	<b>102</b>	<b>82</b>	<b>324</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Mit.2010-7. 2010 Reduced Project Alternative Summary of Berth Operations Average Daily Mitigated Emissions.

No AMP

Mode	Equipment	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Berth Operations	Boiler	29,046	6,762	774	4,476	3,133	2,095	42,088
Berth Operations	Aux Generator	174,919	13,843	5,034	3,775	3,624	2,899	12,761

Mitigated Emissions with AMP - 2010

AMP Reduction 0%

Mode	Equipment	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Berth Operations	Boiler	29,046	6,762	774	4,476	3,133	2,095	42,088
Berth Operations	Aux Generator	174,919	13,843	5,034	3,775	3,624	2,899	12,761

Table H.2.RPA.Mit.Max.2010-1. 2010 Reduced Project Alternative Main Engines Maximum Daily Mitigated Emissions.

Ship	Direction	Mode	Distance (nautical miles)	Ship speed (knots)	Activity (hours)	Maximum Speed (knots)	Load Factor	MCR (kW)	Energy (kW-hr)	Fuel Type	Maximum Daily Shipcalls (vessels/day)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
VLCC	North In	Cruising - CW to VSR	22	12	1.83	16.9	0.358	25,400	16,671	MDO	1.0	780	64	28	18	18	16	93
		Cruising - VSR to PZ	21	12	1.75	16.9	0.358	25,400	15,913	MDO	1.0	745	61	26	17	17	16	89
		Cruising - PZ to Pilot	4.7	7	0.67	16.9	0.071	25,400	1,212	MDO	1.0	80	13	9	2	2	2	7
	North Out	Maneuvering - Pilot to Berth	3	1.00	16.9	0.006	25,400	142	MDO	1.0	107	20	50	4	4	4	4	1
		Maneuvering - Berth to Pilot	5	1.00	16.9	0.026	25,400	658	Dist at 0.2	1.0	92	20	23	2	2	2	2	1
		Cruising - Pilot to PZ	3.8	7	0.54	16.9	0.071	25,400	980	Dist at 0.2	1.0	65	11	8	1	1	1	2
		Cruising - PZ to VSR	21	12	1.75	16.9	0.358	25,400	15,913	Dist at 0.2	1.0	745	61	26	13	13	12	34
		Cruising - VSR to CW	22	12	1.83	16.9	0.358	25,400	16,671	Dist at 0.2	1.0	780	64	28	13	13	12	36
		<b>TOTAL</b>										<b>3,395</b>	<b>314</b>	<b>198</b>	<b>71</b>	<b>71</b>	<b>65</b>	<b>262</b>
AFRAMAX	South In	Cruising - CW to VSR	23	12	1.92	16.1	0.414	12,477	9,902	MDO	1.0	463	38	16	11	11	10	55
		Cruising - VSR to PZ	11	12	0.92	16.1	0.414	12,477	4,736	MDO	1.0	222	18	8	5	5	5	26
		Cruising - PZ to Pilot	4.7	7	0.67	16.1	0.082	12,477	689	MDO	1.0	43	6	4	1	1	1	4
	South Out	Maneuvering - Pilot to Berth	3	1.00	16.1	0.006	12,477	81	MDO	1.0	57	10	23	2	2	2	0	
		Maneuvering - Berth to Pilot	5	1.00	16.1	0.030	12,477	374	Dist at 0.2	1.0	51	10	11	1	1	1	1	
		Cruising - Pilot to PZ	3.5	7	0.50	16.1	0.082	12,477	513	Dist at 0.2	1.0	32	5	3	1	1	1	
		Cruising - PZ to VSR	12.5	12	1.04	16.1	0.414	12,477	5,382	Dist at 0.2	1.0	252	21	9	4	4	4	12
		Cruising - VSR to CW	24.5	12	2.04	16.1	0.414	12,477	10,548	Dist at 0.2	1.0	494	41	17	8	8	8	23
		<b>TOTAL</b>										<b>1,613</b>	<b>148</b>	<b>92</b>	<b>34</b>	<b>34</b>	<b>31</b>	<b>122</b>
PANAMAX	South In	Cruising - CW to VSR	23	12	1.92	15.8	0.438	10,300	8,649	MDO	1.0	405	33	14	9	9	9	48
		Cruising - VSR to PZ	11	12	0.92	15.8	0.438	10,300	4,136	MDO	1.0	194	16	7	4	4	4	23
		Cruising - PZ to Pilot	4.7	7	0.67	15.8	0.087	10,300	601	MDO	1.0	28	2	1	1	1	1	3
	South Out	Maneuvering - Pilot to Berth	3	1.00	15.8	0.007	10,300	71	MDO	1.0	3	0	0	0	0	0	0	
		Maneuvering - Berth to Pilot	5	1.00	15.8	0.032	10,300	326	Dist at 0.2	1.0	15	1	1	0	0	0	1	
		Cruising - Pilot to PZ	3.5	7	0.50	15.8	0.087	10,300	448	Dist at 0.2	1.0	21	2	1	0	0	0	1
		Cruising - PZ to VSR	12.5	12	1.04	15.8	0.438	10,300	4,700	Dist at 0.2	1.0	220	18	8	4	4	3	10
		Cruising - VSR to CW	24.5	12	2.04	15.8	0.438	10,300	9,213	Dist at 0.2	1.0	431	36	15	7	7	7	20
		<b>TOTAL</b>										<b>1,317</b>	<b>108</b>	<b>46</b>	<b>26</b>	<b>26</b>	<b>24</b>	<b>106</b>
SUEZMAX	North In	Cruising - CW to VSR	22	12	1.83	17	0.352	16,000	10,317	MDO	1.0	483	40	17	11	11	10	57
		Cruising - VSR to PZ	21	12	1.75	17	0.352	16,000	9,848	MDO	1.0	461	38	16	11	11	10	55
		Cruising - PZ to Pilot	4.7	7	0.67	17	0.070	16,000	750	MDO	1.0	35	3	1	1	1	1	4
	North Out	Maneuvering - Pilot to Berth	3	1.00	17	0.005	16,000	88	MDO	1.0	4	0	0	0	0	0	0	
		Maneuvering - Berth to Pilot	5	1.00	17	0.025	16,000	407	Dist at 0.2	1.0	19	2	1	0	0	0	1	
		Cruising - Pilot to PZ	3.8	7	0.54	17	0.070	16,000	606	Dist at 0.2	1.0	28	2	1	0	0	0	1
		Cruising - PZ to VSR	21	12	1.75	17	0.352	16,000	9,848	Dist at 0.2	1.0	461	38	16	8	8	7	21
		Cruising - VSR to CW	22	12	1.83	17	0.352	16,000	10,317	Dist at 0.2	1.0	483	40	17	8	8	8	22
		<b>TOTAL</b>										<b>1,974</b>	<b>163</b>	<b>70</b>	<b>39</b>	<b>39</b>	<b>36</b>	<b>162</b>
<b>MAXIMUM</b>												<b>3,395</b>	<b>314</b>	<b>198</b>	<b>71</b>	<b>71</b>	<b>65</b>	<b>262</b>

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Table H.2.RPA.Mit.Max.2010-2. 2010 Reduced Project Alternative Auxiliary Generator Maximum Daily Mitigated Emissions

Ship	Direction	Mode	Activity (hours)	MCR (kW)	Load Factor	Energy (kW-hr)	Fuel Type	Maximum Daily Shipcalls (vessels/day)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
VLCC	North In	Cruising	4.25	3,600	0.278	4,258	MDO	1.0	163	13	5	4	3	3	28
		Maneuvering	2.00	3,600	0.278	2,002	MDO	1.0	77	6	2	2	2	1	13
	North Out	Maneuvering	1.50	3,600	0.278	1,501	Dist at 0.2	1.0	57	5	2	1	1	1	4
		Cruising	4.13	3,600	0.278	4,129	Dist at 0.2	1.0	158	13	5	3	3	3	10
<b>TOTAL</b>								<b>455</b>	<b>36</b>	<b>13</b>	<b>10</b>	<b>9</b>	<b>8</b>	<b>55</b>	
AFRAMAX	South In	Cruising	3.50	3,600	0.278	3,508	MDO	1.0	134	11	4	3	3	2	23
		Maneuvering	2.00	3,600	0.278	2,002	MDO	1.0	77	6	2	2	2	1	13
	South Out	Maneuvering	1.50	3,600	0.278	1,501	Dist at 0.2	1.0	57	5	2	1	1	1	4
		Cruising	3.58	3,600	0.278	3,586	Dist at 0.2	1.0	137	11	4	3	3	2	9
<b>TOTAL</b>								<b>406</b>	<b>32</b>	<b>12</b>	<b>9</b>	<b>8</b>	<b>7</b>	<b>49</b>	
PANAMAX	South In	Cruising	3.15	3,600	0.278	3,155	MDO	1.0	121	10	3	3	3	2	21
		Maneuvering	2.00	3,600	0.278	2,002	MDO	1.0	77	6	2	2	2	1	13
	South Out	Maneuvering	1.5	3,600	0.278	1,501	Dist at 0.2	1.0	57	5	2	1	1	1	4
		Cruising	3.21	3,600	0.278	3,211	Dist at 0.2	1.0	123	10	4	3	3	2	8
<b>TOTAL</b>								<b>378</b>	<b>30</b>	<b>11</b>	<b>8</b>	<b>8</b>	<b>6</b>	<b>45</b>	
SUEZMAX	North In	Cruising	3.84	3,600	0.278	3,840	MDO	1.0	147	12	4	3	3	2	25
		Maneuvering	2.00	3,600	0.278	2,002	MDO	1.0	77	6	2	2	2	1	13
	North Out	Maneuvering	1.5	3,600	0.278	1,501	Dist at 0.2	1.0	57	5	2	1	1	1	4
		Cruising	3.71	3,600	0.278	3,712	Dist at 0.2	1.0	142	11	4	3	3	2	9
<b>TOTAL</b>								<b>423</b>	<b>33</b>	<b>12</b>	<b>9</b>	<b>9</b>	<b>7</b>	<b>51</b>	
<b>MAXIMUM</b>								<b>455</b>	<b>36</b>	<b>13</b>	<b>10</b>	<b>9</b>	<b>8</b>	<b>55</b>	

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Mit.Max.2010-3. 2010 Reduced Project Alternative Summary of Maximum Daily Mitigated Vessel Emissions.

<b>Mode</b>	<b>Equipment</b>	<b>NO<sub>x</sub> Emissions (lb/day)</b>	<b>CO Emissions (lb/day)</b>	<b>ROG Emissions (lb/day)</b>	<b>PM Emissions (lb/day)</b>	<b>PM<sub>10</sub> Emissions (lb/day)</b>	<b>PM<sub>2.5</sub> Emissions (lb/day)</b>	<b>SO<sub>2</sub> Emissions (lb/day)</b>
Cruising	Main Engines	3,196	275	125	65	65	59	260
Cruising	Aux Generator	321	25	9	7	7	5	38
Maneuvering	Main Engines	200	39	73	7	7	6	2
Maneuvering	Aux Generator	134	11	4	3	3	2	17
<b>Cruising and Maneuvering</b>	<b>TOTAL</b>	<b>3,850</b>	<b>350</b>	<b>211</b>	<b>81</b>	<b>81</b>	<b>73</b>	<b>317</b>



Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Mit.Max.2010-4. 2010 Reduced Project Alternative Boiler Warm-Up Maximum Daily Mitigated Emissions.

Shipcalls (vessels/day)	Vessel Size	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	MDO	0.52	102.17	30%	3	50,000	16	4	0	3	2	1	60
1.0	VLCC	MDO	0.52	80.38	30%	3	90,000	28	6	1	4	3	2	84
1.0	Panamax	MDO	0.52	59.91	30%	3	35,000	7	2	0	1	1	1	24
1.0	Suezmax	MDO	0.52	82.85	30%	3	70,000	18	5	0	3	2	1	68
<b>MAXIMUM</b>								<b>28</b>	<b>6</b>	<b>1</b>	<b>4</b>	<b>3</b>	<b>2</b>	<b>84</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Mit.Max.2010-5. 2010 Reduced Project Alternative Summary of Boiler Warm-Up Maximum Mitigated Emissions.

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Boiler Warm-up	Boiler	28	6	1	4	3	2	84

Table H.2.RPA.Mit.Max.2010-6. 2010 Reduced Project Alternative Berth Operations Maximum Daily Mitigated Emissions.

**Auxiliary Generator Pre-Pumpin**

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	700,000	MDO	0.52	3,600	27.8%	2.5	96	8	3	2	2	2	16
1.0	VLCC	2,000,000	MDO	0.52	3,600	27.8%	2.5	96	8	3	2	2	2	16
1.0	Panamax	350,000	MDO	0.52	3,600	27.8%	2.5	96	8	3	2	2	2	16
1.0	Suezmax	1,000,000	MDO	0.52	3,600	27.8%	2.5	96	8	3	2	2	2	16
<b>MAXIMUM</b>								<b>96</b>	<b>8</b>	<b>3</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>16</b>

**Boiler Pre-Pumpin**

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	700,000	MDO	0.52	102.17	30.0%	2.5	50,000	14	3	0	2	2	1	50
1.0	VLCC	2,000,000	MDO	0.52	80.38	30.0%	2.5	90,000	23	5	1	3	2	1	70
1.0	Panamax	350,000	MDO	0.52	59.91	30.0%	2.5	35,000	6	1	0	1	1	0	20
1.0	Suezmax	1,000,000	MDO	0.52	82.85	30.0%	2.5	70,000	15	4	0	3	2	1	56
<b>MAXIMUM</b>									<b>23</b>	<b>5</b>	<b>1</b>	<b>3</b>	<b>2</b>	<b>1</b>	<b>70</b>

**Auxiliary Generator Pumpin**

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	700,000	Dist at 0.2%S	0.20	3,600	55.6%	15.0	1,149	91	33	25	24	19	75
1.0	VLCC	2,000,000	Dist at 0.2%S	0.20	3,600	55.6%	23.2	1,777	141	51	38	37	29	116
1.0	Panamax	350,000	Dist at 0.2%S	0.20	3,600	55.6%	11.0	843	67	24	18	17	14	55
1.0	Suezmax	1,000,000	Dist at 0.2%S	0.20	3,600	55.6%	15.3	1,172	93	34	25	24	19	77
<b>MAXIMUM</b>								<b>1,777</b>	<b>141</b>	<b>51</b>	<b>38</b>	<b>37</b>	<b>29</b>	<b>116</b>

**Boiler Pumpin**

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Inerting Fuel Consumption Savings (lb/1000 bbl offloaded)	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	700,000	Dist at 0.2%S	0.20	102.17	28.06	15.0	184	46	3	30	21	14	259
1.0	VLCC	2,000,000	Dist at 0.2%S	0.20	80.38	28.06	23.2	444	93	20	61	43	29	522
1.0	Panamax	350,000	Dist at 0.2%S	0.20	59.91	28.06	11.0	39	10	1	7	5	3	56
1.0	Suezmax	1,000,000	Dist at 0.2%S	0.20	82.85	28.06	15.3	194	49	3	32	22	15	273
<b>MAXIMUM</b>								<b>444</b>	<b>93</b>	<b>20</b>	<b>61</b>	<b>43</b>	<b>29</b>	<b>522</b>

**Auxiliary Generator Post-Pumpin**

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	700,000	Dist at 0.2%S	0.20	3,600	27.8%	1.0	38	3	1	1	1	1	3
1.0	VLCC	2,000,000	Dist at 0.2%S	0.20	3,600	27.8%	1.0	38	3	1	1	1	1	3
1.0	Panamax	350,000	Dist at 0.2%S	0.20	3,600	27.8%	1.0	38	3	1	1	1	1	3
1.0	Suezmax	1,000,000	Dist at 0.2%S	0.20	3,600	27.8%	1.0	38	3	1	1	1	1	3
<b>MAXIMUM</b>								<b>38</b>	<b>3</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>3</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Mit.Max.2010-7. 2010 Reduced Project Alternative Summary of Berth Operations Maximum Daily Mitigated Emissions.

No AMP

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Berth Operations	Boiler	467	97	21	65	45	30	592
Berth Operations	Aux Generator	1,911	151	55	41	40	32	135

Mitigated Emissions with AMP - 2010

AMP Reduction 0%

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Berth Operations	Boiler	467	97	21	65	45	30	592
Berth Operations	Aux Generator	1,911	151	55	41	40	32	135

Table H.2.RPA.Mit.2015-1. 2015 Reduced Project Alternative Main Engines Average Daily Mitigated Emissions.

Ship	Direction	Mode	Distance (nautical miles)	Ship speed (knots)	Activity (hours)	Maximum Speed (knots)	Load Factor	MCR (KW)	Energy (KW-hr)	Fuel Type	Annual Shipcalls (vessels/yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
VLCC	North In	Cruising - CW to VSR	22	12	1.83	16.9	0.358	25,400	16,671	MDO	23.0	17,947	1,478	633	412	412	379	2,135
		Cruising - VSR to PZ	21	12	1.75	16.9	0.358	25,400	15,913	MDO	23.0	17,131	1,411	605	393	393	362	2,038
		Cruising - PZ to Pilot	4.7	7	0.67	16.9	0.071	25,400	1,212	MDO	23.0	1,847	302	217	52	52	48	155
		Maneuvering - Pilot to Berth	3	3	1.00	16.9	0.006	25,400	142	MDO	23.0	2,464	451	1,153	96	96	88	18
VLCC	North In	Cruising - CW to VSR	22	12	1.83	16.9	0.358	25,400	16,671	Dist at 0.2	23.0	17,947	1,478	633	306	306	282	821
		Cruising - VSR to PZ	21	12	1.75	16.9	0.358	25,400	15,913	Dist at 0.2	23.0	17,131	1,411	605	292	292	269	784
		Cruising - PZ to Pilot	4.7	7	0.67	16.9	0.071	25,400	1,212	Dist at 0.2	23.0	1,847	302	217	38	38	35	60
		Maneuvering - Pilot to Berth	3	3	1.00	16.9	0.006	25,400	142	Dist at 0.2	23.0	2,464	451	1,153	71	71	65	7
<b>TOTAL</b>											<b>78,780</b>	<b>7,284</b>	<b>5,217</b>	<b>1,660</b>	<b>1,660</b>	<b>1,527</b>	<b>6,018</b>	
	North Out	Maneuvering - Berth to Pilot		5	1.00	16.9	0.026	25,400	658	Dist at 0.2	46.0	4,250	901	1,072	108	108	99	65
		Cruising - Pilot to PZ	3.8	7	0.54	16.9	0.071	25,400	980	Dist at 0.2	46.0	2,987	489	352	62	62	57	97
		Cruising - PZ to VSR	21	12	1.75	16.9	0.358	25,400	15,913	Dist at 0.2	46.0	34,262	2,822	1,209	584	584	538	1,568
		Cruising - VSR to CW	22	12	1.83	16.9	0.358	25,400	16,671	Dist at 0.2	46.0	35,894	2,956	1,267	612	612	563	1,642
<b>TOTAL</b>											<b>77,393</b>	<b>7,168</b>	<b>3,900</b>	<b>1,367</b>	<b>1,367</b>	<b>1,257</b>	<b>3,371</b>	
AFRAMAX	South In	Cruising - CW to VSR	23	12	1.92	16.1	0.414	12,477	9,902	MDO	12.0	5,562	458	196	128	128	117	662
		Cruising - VSR to PZ	11	12	0.92	16.1	0.414	12,477	4,736	MDO	12.0	2,660	219	94	61	61	56	316
		Cruising - PZ to Pilot	4.7	7	0.67	16.1	0.082	12,477	689	MDO	12.0	511	78	52	14	14	13	46
		Maneuvering - Pilot to Berth	3	3	1.00	16.1	0.006	12,477	81	MDO	12.0	685	115	275	27	27	24	5
AFRAMAX	South In	Cruising - CW to VSR	23	12	1.92	16.1	0.414	12,477	9,902	Dist at 0.2	12.0	5,562	458	196	95	95	87	254
		Cruising - VSR to PZ	11	12	0.92	16.1	0.414	12,477	4,736	Dist at 0.2	12.0	2,660	219	94	45	45	42	122
		Cruising - PZ to Pilot	4.7	7	0.67	16.1	0.082	12,477	689	Dist at 0.2	12.0	511	78	52	10	10	9	18
		Maneuvering - Pilot to Berth	3	3	1.00	16.1	0.006	12,477	81	Dist at 0.2	12.0	685	115	275	20	20	18	2
<b>TOTAL</b>											<b>18,835</b>	<b>1,740</b>	<b>1,234</b>	<b>399</b>	<b>399</b>	<b>367</b>	<b>1,425</b>	
	South Out	Maneuvering - Berth to Pilot		5	1.00	16.1	0.030	12,477	374	Dist at 0.2	24.0	1,224	231	256	31	31	28	19
		Cruising - Pilot to PZ	3.5	7	0.50	16.1	0.082	12,477	513	Dist at 0.2	24.0	761	115	77	15	15	14	26
		Cruising - PZ to VSR	12.5	12	1.04	16.1	0.414	12,477	5,382	Dist at 0.2	24.0	6,045	498	213	103	103	95	277
		Cruising - VSR to CW	24.5	12	2.04	16.1	0.414	12,477	10,548	Dist at 0.2	24.0	11,849	976	418	202	202	186	542
<b>TOTAL</b>											<b>19,879</b>	<b>1,820</b>	<b>964</b>	<b>352</b>	<b>352</b>	<b>323</b>	<b>864</b>	
PANAMAX	South In	Cruising - CW to VSR	23	12	1.92	15.8	0.438	10,300	8,649	MDO	5	2,024	167	71	46	46	43	241
		Cruising - VSR to PZ	11	12	0.92	15.8	0.438	10,300	4,136	MDO	5	968	80	34	22	20	115	
		Cruising - PZ to Pilot	4.7	7	0.67	15.8	0.087	10,300	601	MDO	5	141	12	5	3	3	17	
		Maneuvering - Pilot to Berth	3	3	1.00	15.8	0.007	10,300	71	MDO	5	17	1	1	0	0	0	2
PANAMAX	South In	Cruising - CW to VSR	23	12	1.92	15.8	0.438	10,300	8,649	Dist at 0.2	5	2,024	167	71	35	35	32	93
		Cruising - VSR to PZ	11	12	0.92	15.8	0.438	10,300	4,136	Dist at 0.2	5	968	80	34	17	15	44	
		Cruising - PZ to Pilot	4.7	7	0.67	15.8	0.087	10,300	601	Dist at 0.2	5	141	12	5	2	2	2	6
		Maneuvering - Pilot to Berth	3	3	1.00	15.8	0.007	10,300	71	Dist at 0.2	5	17	1	1	0	0	0	1
<b>TOTAL</b>											<b>6,299</b>	<b>519</b>	<b>222</b>	<b>126</b>	<b>126</b>	<b>116</b>	<b>519</b>	
	South Out	Maneuvering - Berth to Pilot		5	1.00	15.8	0.032	10,300	326	Dist at 0.2	10	153	13	5	3	3	2	7
		Cruising - Pilot to PZ	3.5	7	0.50	15.8	0.087	10,300	448	Dist at 0.2	10	210	17	7	4	4	3	10
		Cruising - PZ to VSR	12.5	12	1.04	15.8	0.438	10,300	4,700	Dist at 0.2	10	2,200	181	78	38	38	35	101
		Cruising - VSR to CW	24.5	12	2.04	15.8	0.438	10,300	9,213	Dist at 0.2	10	4,312	355	152	74	74	68	197
<b>TOTAL</b>											<b>6,875</b>	<b>566</b>	<b>243</b>	<b>117</b>	<b>117</b>	<b>108</b>	<b>315</b>	
SUEZMAX	North In	Cruising - CW to VSR	22	12	1.83	17	0.352	16,000	10,317	MDO	26	12,556	1,034	443	288	288	265	1,494
		Cruising - VSR to PZ	21	12	1.75	17	0.352	16,000	9,848	MDO	26	11,985	987	423	275	275	253	1,426
		Cruising - PZ to Pilot	4.7	7	0.67	17	0.070	16,000	750	MDO	26	913	75	32	21	21	19	109
		Maneuvering - Pilot to Berth	3	3	1.00	17	0.005	16,000	88	MDO	26	107	9	4	2	2	2	13
SUEZMAX	North In	Cruising - CW to VSR	22	12	1.83	17	0.352	16,000	10,317	Dist at 0.2	26	12,556	1,034	443	214	214	197	574
		Cruising - VSR to PZ	21	12	1.75	17	0.352	16,000	9,848	Dist at 0.2	26	11,985	987	423	204	204	188	548
		Cruising - PZ to Pilot	4.7	7	0.67	17	0.070	16,000	750	Dist at 0.2	26	913	75	32	16	16	14	42
		Maneuvering - Pilot to Berth	3	3	1.00	17	0.005	16,000	88	Dist at 0.2	26	107	9	4	2	2	2	5
<b>TOTAL</b>											<b>51,120</b>	<b>4,210</b>	<b>1,804</b>	<b>1,022</b>	<b>1,022</b>	<b>941</b>	<b>4,210</b>	
	North Out	Maneuvering - Berth to Pilot		5	1.00	17	0.025	16,000	407	Dist at 0.2	52	991	82	35	17	17	16	45
		Cruising - Pilot to PZ	3.8	7	0.54	17	0.070	16,000	606	Dist at 0.2	52	1,476	122	52	25	25	23	68
		Cruising - PZ to VSR	21	12	1.75	17	0.352	16,000	9,848	Dist at 0.2	52	23,970	1,974	846	409	409	376	1,097
		Cruising - VSR to CW	22	12	1.83	17	0.352	16,000	10,317	Dist at 0.2	52	25,111	2,068	886	428	428	394	1,149
<b>TOTAL</b>											<b>51,547</b>	<b>4,245</b>	<b>1,819</b>	<b>879</b>	<b>879</b>	<b>809</b>	<b>2,358</b>	
<b>GRAND TOTAL</b>												<b>310,728</b>	<b>27,552</b>	<b>15,403</b>	<b>5,922</b>	<b>5,922</b>	<b>5,449</b>	<b>19,080</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Mit.2015-2. 2015 Reduced Project Alternative Auxiliary Generator Average Daily Mitigated Emissions

Ship	Direction	Mode	Activity (hours)	MCR (kW)	Load Factor	Energy (kW-hr)	Fuel Type	Annual Shipcalls (vessels/yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
VLCC	North In	Cruising	4.25	3,600	0.278	4,258	MDO	23.0	3,748	297	108	81	78	62	639
		Maneuvering	2.00	3,600	0.278	2,002	MDO	23.0	1,762	139	51	38	37	29	300
	North In	Cruising	4.25	3,600	0.278	4,258	Dist at 0.2	23.0	3,748	297	108	81	78	62	246
		Maneuvering	2.00	3,600	0.278	2,002	Dist at 0.2	23.0	1,762	139	51	38	37	29	115
	<b>TOTAL</b>								<b>11,020</b>	<b>872</b>	<b>317</b>	<b>238</b>	<b>228</b>	<b>183</b>	<b>1,300</b>
	North Out	Maneuvering	1.50	3,600	0.278	1,501	Dist at 0.2	46.0	2,643	209	76	57	55	44	173
Cruising		4.13	3,600	0.278	4,129	Dist at 0.2	46.0	7,270	575	209	157	151	121	477	
<b>TOTAL</b>								<b>9,913</b>	<b>784</b>	<b>285</b>	<b>214</b>	<b>205</b>	<b>164</b>	<b>650</b>	
AFRAMAX	South In	Cruising	3.50	3,600	0.278	3,508	MDO	12.0	1,611	127	46	35	33	27	275
		Maneuvering	2.00	3,600	0.278	2,002	MDO	12.0	919	73	26	20	19	15	157
AFRAMAX	South In	Cruising	3.50	3,600	0.278	3,508	Dist at 0.2	12.0	1,611	127	46	35	33	27	106
		Maneuvering	2.00	3,600	0.278	2,002	Dist at 0.2	12.0	919	73	26	20	19	15	60
<b>TOTAL</b>								<b>5,060</b>	<b>400</b>	<b>146</b>	<b>109</b>	<b>105</b>	<b>84</b>	<b>597</b>	
South Out	Maneuvering	1.50	3,600	0.278	1,501	Dist at 0.2	24.0	1,379	109	40	30	29	23	90	
	Cruising	3.58	3,600	0.278	3,586	Dist at 0.2	24.0	3,294	261	95	71	68	55	216	
<b>TOTAL</b>								<b>4,673</b>	<b>370</b>	<b>134</b>	<b>101</b>	<b>97</b>	<b>77</b>	<b>306</b>	
PANAMAX	South In	Cruising	3.50	3,600	0.278	3,508	MDO	5	671	53	19	14	14	11	114
		Maneuvering	2.00	3,600	0.278	2,002	MDO	5	383	30	11	8	8	6	65
PANAMAX	South In	Cruising	3.50	3,600	0.278	3,508	Dist at 0.2	5	671	53	19	14	14	11	44
		Maneuvering	2.00	3,600	0.278	2,002	Dist at 0.2	5	383	30	11	8	8	6	25
<b>TOTAL</b>								<b>2,108</b>	<b>167</b>	<b>61</b>	<b>46</b>	<b>44</b>	<b>35</b>	<b>249</b>	
South Out	Maneuvering	1.5	3,600	0.278	1,501	Dist at 0.2	10	575	45	17	12	12	10	38	
	Cruising	3.58	3,600	0.278	3,586	Dist at 0.2	10	1,372	109	39	30	28	23	90	
<b>TOTAL</b>								<b>1,947</b>	<b>154</b>	<b>56</b>	<b>42</b>	<b>40</b>	<b>32</b>	<b>128</b>	
SUEZMAX	North In	Cruising	4.25	3,600	0.278	4,258	MDO	26	4,237	335	122	91	88	70	722
		Maneuvering	2.00	3,600	0.278	2,002	MDO	26	1,992	158	57	43	41	33	339
SUEZMAX	North In	Cruising	4.25	3,600	0.278	4,258	Dist at 0.2	26	4,237	335	122	91	88	70	278
		Maneuvering	2.00	3,600	0.278	2,002	Dist at 0.2	26	1,992	158	57	43	41	33	131
<b>TOTAL</b>								<b>12,457</b>	<b>986</b>	<b>358</b>	<b>269</b>	<b>258</b>	<b>206</b>	<b>1,470</b>	
North Out	Maneuvering	1.5	3,600	0.278	1,501	Dist at 0.2	52	2,988	236	86	64	62	50	196	
	Cruising	4.13	3,600	0.278	4,129	Dist at 0.2	52	8,218	650	236	177	170	136	539	
<b>TOTAL</b>								<b>11,206</b>	<b>887</b>	<b>322</b>	<b>242</b>	<b>232</b>	<b>186</b>	<b>734</b>	
<b>GRAND TOTAL</b>									<b>58,384</b>	<b>4,620</b>	<b>1,680</b>	<b>1,260</b>	<b>1,210</b>	<b>968</b>	<b>5,434</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Mit.2015-3. 2015 Reduced Project Alternative Summary of Average Daily Mitigated Vessel Emissions.

Mode	Equipment	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Cruising	Main Engines	297,564	25,173	11,171	5,546	5,546	5,103	18,890
Cruising	Aux Generator	40,689	3,220	1,171	878	843	674	3,744
Maneuvering	Main Engines	13,164	2,379	4,233	376	376	346	189
Maneuvering	Aux Generator	17,695	1,400	509	382	367	293	1,690
<b>Cruising and Maneuvering</b>	<b>TOTAL</b>	<b>369,112</b>	<b>32,172</b>	<b>17,083</b>	<b>7,182</b>	<b>7,132</b>	<b>6,416</b>	<b>24,514</b>

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Cruising	Main Engines	815	69	31	15	15	14	52
Cruising	Aux Generator	111	9	3	2	2	2	10
Maneuvering	Main Engines	36	7	12	1	1	1	1
Maneuvering	Aux Generator	48	4	1	1	1	1	5
<b>Cruising and Maneuvering</b>	<b>TOTAL</b>	<b>1,011</b>	<b>88</b>	<b>47</b>	<b>20</b>	<b>20</b>	<b>18</b>	<b>67</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Mit.2015-4. 2015 Reduced Project Alternative Boiler Warm-Up Average Daily Mitigated Emissions.

Shipcalls (vessels/yr)	Vessel Size	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
12.0	Aframax	MDO	0.52	102.17	30%	3	50,000	195	49	3	32	23	15	716
12.0	Aframax	Dist at 0.2	0.20	102.17	30%	3	50,000	195	49	3	32	23	15	275
23.0	VLCC	MDO	0.52	80.38	30%	3	90,000	635	133	28	88	61	41	1,942
23.0	VLCC	Dist at 0.2	0.20	80.38	30%	3	90,000	635	133	28	88	61	41	747
5	Panamax	MDO	0.52	59.91	30%	3	35,000	28	7	0	5	3	2	102
5	Panamax	Dist at 0.2	0.20	59.91	30%	3	35,000	28	7	0	5	3	2	39
26	Suezmax	MDO	0.52	82.85	30%	3	70,000	401	100	6	66	46	31	1,467
26	Suezmax	Dist at 0.2	0.20	82.85	30%	3	70,000	401	100	6	66	46	31	564
<b>TOTAL</b>								<b>2,518</b>	<b>577</b>	<b>74</b>	<b>382</b>	<b>267</b>	<b>179</b>	<b>5,852</b>



Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Mit.2015-5. 2015 Reduced Project Alternative Summary of Boiler Warm-Up Average Daily Mitigated Emissions.

Mode	Equipment	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Boiler Warm-up	Boiler	2,518	577	74	382	267	179	5,852

Table H.2.RPA.Mit.2015-6. 2015 Reduced Project Alternative Berth Operations Average Daily Mitigated Emissions.

**Auxiliary Generator Pre-Pumpin**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
12.0	Aframax	700,000	MDO	0.52	3,600	27.8%	2.5	1,149	91	33	25	24	19	196
12.0	Aframax	700,000	Dist at 0.2%S	0.20	3,600	27.8%	2.5	1,149	91	33	25	24	19	75
23.0	VLCC	2,000,000	MDO	0.52	3,600	27.8%	2.5	2,202	174	63	48	46	37	375
23.0	VLCC	2,000,000	Dist at 0.2%S	0.20	3,600	27.8%	2.5	2,202	174	63	48	46	37	144
5.0	Panamax	350,000	MDO	0.52	3,600	27.8%	2.5	479	38	14	10	10	8	82
5.0	Panamax	350,000	Dist at 0.2%S	0.20	3,600	27.8%	2.5	479	38	14	10	10	8	31
26.0	Suezmax	1,000,000	MDO	0.52	3,600	27.8%	2.5	2,490	197	72	54	52	41	424
26.0	Suezmax	1,000,000	Dist at 0.2%S	0.20	3,600	27.8%	2.5	2,490	197	72	54	52	41	163
<b>TOTAL</b>								<b>12,640</b>	<b>1,000</b>	<b>364</b>	<b>273</b>	<b>262</b>	<b>210</b>	<b>1,491</b>

**Boiler Pre-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
12.0	Aframax	700,000	MDO	0.52	102.17	30.0%	2.5	50,000	163	41	2	27	19	13	596
12.0	Aframax	700,000	Dist at 0.2%S	0.20	102.17	30.0%	2.5	50,000	163	41	2	27	19	13	229
23.0	VLCC	2,000,000	MDO	0.52	80.38	30.0%	2.5	90,000	529	110	23	73	51	34	1,619
23.0	VLCC	2,000,000	Dist at 0.2%S	0.20	80.38	30.0%	2.5	90,000	529	110	23	73	51	34	623
5.0	Panamax	350,000	MDO	0.52	59.91	30.0%	2.5	35,000	28	7	0	5	3	2	102
5.0	Panamax	350,000	Dist at 0.2%S	0.20	59.91	30.0%	2.5	35,000	28	7	0	5	3	2	39
26.0	Suezmax	1,000,000	MDO	0.52	82.85	30.0%	2.5	70,000	401	100	6	66	46	31	1,467
26.0	Suezmax	1,000,000	Dist at 0.2%S	0.20	82.85	30.0%	2.5	70,000	401	100	6	66	46	31	564
<b>TOTAL</b>									<b>2,241</b>	<b>517</b>	<b>63</b>	<b>342</b>	<b>239</b>	<b>160</b>	<b>5,239</b>

**Auxiliary Generator Pumpin**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
24.0	Aframax	700,000	Dist at 0.2%S	0.20	3,600	55.6%	15.0	27,577	2,182	794	595	571	457	1,808
46.0	VLCC	2,000,000	Dist at 0.2%S	0.20	3,600	55.6%	23.2	81,751	6,469	2,353	1,764	1,694	1,355	5,359
10.0	Panamax	350,000	Dist at 0.2%S	0.20	3,600	55.6%	11.0	8,426	667	242	182	175	140	552
52.0	Suezmax	1,000,000	Dist at 0.2%S	0.20	3,600	55.6%	15.3	60,945	4,823	1,754	1,315	1,263	1,010	3,995
<b>TOTAL</b>								<b>178,700</b>	<b>14,142</b>	<b>5,142</b>	<b>3,857</b>	<b>3,703</b>	<b>2,962</b>	<b>11,713</b>

**Boiler Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Inerting Fuel Consumption Savings (lb/1000 bbl offloaded)	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
24.0	Aframax	700,000	Dist at 0.2%S	0.20	102.17	28.06	15.0	4,410	1,102	62	730	511	342	6,211
46.0	VLCC	2,000,000	Dist at 0.2%S	0.20	80.38	28.06	23.2	20,410	4,262	900	2,821	1,975	1,321	24,011
10.0	Panamax	350,000	Dist at 0.2%S	0.20	59.91	28.06	11.0	395	99	6	65	46	31	556
52.0	Suezmax	1,000,000	Dist at 0.2%S	0.20	82.85	28.06	15.3	10,091	2,523	142	1,670	1,169	782	14,213
<b>TOTAL</b>								<b>35,306</b>	<b>7,986</b>	<b>1,110</b>	<b>5,287</b>	<b>3,701</b>	<b>2,475</b>	<b>44,992</b>

**Auxiliary Generator Post-Pumpin**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
24.0	Aframax	700,000	Dist at 0.2%S	0.20	3,600	27.8%	1.0	919	73	26	20	19	15	60
46.0	VLCC	2,000,000	Dist at 0.2%S	0.20	3,600	27.8%	1.0	1,762	139	51	38	37	29	115
10.0	Panamax	350,000	Dist at 0.2%S	0.20	3,600	27.8%	1.0	383	30	11	8	8	6	25
52.0	Suezmax	1,000,000	Dist at 0.2%S	0.20	3,600	27.8%	1.0	1,992	158	57	43	41	33	131
<b>TOTAL</b>								<b>5,056</b>	<b>400</b>	<b>145</b>	<b>109</b>	<b>105</b>	<b>84</b>	<b>331</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Mit.2015-7. 2015 Reduced Project Alternative Summary of Berth Operations Average Daily Mitigated Emissions.

No AMP

Mode	Equipment	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Berth Operations	Boiler	37,547	8,503	1,174	5,629	3,940	2,635	50,231
Berth Operations	Aux Generator	196,395	15,542	5,652	4,239	4,069	3,255	13,536

Mitigated Emissions with AMP - Year 2015

AMP Reduction 15%

Berth Operations	Boiler	37,547	8,503	1,174	5,629	3,940	2,635	50,231
Berth Operations	Aux Generator	166,936	13,211	4,804	3,603	3,459	2,767	11,506

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Mit.Max.2015-1. 2015 Reduced Project Alternative Main Engines Maximum Daily Mitigated Emissions.

Ship	Direction	Mode	Distance (nautical miles)	Ship speed (knots)	Activity (hours)	Maximum Speed (knots)	Load Factor	MCR (kW)	Energy (kW-hr)	Fuel Type	Maximum Daily Shipcalls (vessels/day)	NO <sub>x</sub> Emission s (lb/day)	CO Emission s (lb/day)	ROG Emission s (lb/day)	PM Emission s (lb/day)	PM <sub>10</sub> Emission s (lb/day)	PM <sub>2.5</sub> Emission s (lb/day)	SO <sub>2</sub> Emission s (lb/day)
VLCC	North In	Cruising - CW to VSR	22	12	1.83	16.9	0.358	25,400	16,671	MDO	0.5	390	32	14	9	9	8	46
		Cruising - VSR to PZ	21	12	1.75	16.9	0.358	25,400	15,913	MDO	0.5	372	31	13	9	9	8	44
		Cruising - PZ to Pilot	4.7	7	0.67	16.9	0.071	25,400	1,212	MDO	0.5	40	7	5	1	1	1	3
	North In	Maneuvering - Pilot to Berth		3	1.00	16.9	0.006	25,400	142	MDO	0.5	54	10	25	2	2	2	0
		Cruising - CW to VSR	22	12	1.83	16.9	0.358	25,400	16,671	Dist at 0.2	0.5	390	32	14	7	7	6	18
		Cruising - VSR to PZ	21	12	1.75	16.9	0.358	25,400	15,913	Dist at 0.2	0.5	372	31	13	6	6	6	17
		Cruising - PZ to Pilot	4.7	7	0.67	16.9	0.071	25,400	1,212	Dist at 0.2	0.5	40	7	5	1	1	1	1
		Maneuvering - Pilot to Berth		3	1.00	16.9	0.006	25,400	142	Dist at 0.2	0.5	54	10	25	2	2	1	0
		Maneuvering - Berth to Pilot		5	1.00	16.9	0.026	25,400	658	Dist at 0.2	1.0	92	20	23	2	2	2	1
	North Out	Cruising - Pilot to PZ	3.8	7	0.54	16.9	0.071	25,400	980	Dist at 0.2	1.0	65	11	8	1	1	1	2
		Cruising - PZ to VSR	21	12	1.75	16.9	0.358	25,400	15,913	Dist at 0.2	1.0	745	61	26	13	13	12	34
		Cruising - VSR to CW	22	12	1.83	16.9	0.358	25,400	16,671	Dist at 0.2	1.0	780	64	28	13	13	12	36
<b>TOTAL</b>											<b>3,395</b>	<b>314</b>	<b>198</b>	<b>66</b>	<b>66</b>	<b>61</b>	<b>204</b>	
AFRAMAX	South In	Cruising - CW to VSR	23	12	1.92	16.1	0.414	12,477	9,902	MDO	0.5	232	19	8	5	5	5	28
		Cruising - VSR to PZ	11	12	0.92	16.1	0.414	12,477	4,736	MDO	0.5	111	9	4	3	3	2	13
		Cruising - PZ to Pilot	4.7	7	0.67	16.1	0.082	12,477	689	MDO	0.5	21	3	2	1	1	1	2
AFRAMAX	South In	Maneuvering - Pilot to Berth		3	1.00	16.1	0.006	12,477	81	MDO	0.5	29	5	11	1	1	1	0
		Cruising - CW to VSR	23	12	1.92	16.1	0.414	12,477	9,902	Dist at 0.2	0.5	232	19	8	4	4	4	11
		Cruising - VSR to PZ	11	12	0.92	16.1	0.414	12,477	4,736	Dist at 0.2	0.5	111	9	4	2	2	2	5
	South Out	Cruising - PZ to Pilot	4.7	7	0.67	16.1	0.082	12,477	689	Dist at 0.2	0.5	21	3	2	0	0	0	1
		Maneuvering - Pilot to Berth		3	1.00	16.1	0.006	12,477	81	Dist at 0.2	0.5	29	5	11	1	1	1	0
		Maneuvering - Berth to Pilot		5	1.00	16.1	0.030	12,477	374	Dist at 0.2	1.0	51	10	11	1	1	1	1
AFRAMAX	South Out	Cruising - Pilot to PZ	3.5	7	0.50	16.1	0.082	12,477	513	Dist at 0.2	1.0	32	5	3	1	1	1	1
		Cruising - PZ to VSR	12.5	12	1.04	16.1	0.414	12,477	5,382	Dist at 0.2	1.0	252	21	9	4	4	4	12
	Cruising - VSR to CW	24.5	12	2.04	16.1	0.414	12,477	10,548	Dist at 0.2	1.0	494	41	17	8	8	8	23	
	<b>TOTAL</b>										<b>1,613</b>	<b>148</b>	<b>92</b>	<b>31</b>	<b>31</b>	<b>29</b>	<b>95</b>	
PANAMAX	South In	Cruising - CW to VSR	23	12	1.92	15.8	0.438	10,300	8,649	MDO	0.5	202	17	7	5	5	4	24
		Cruising - VSR to PZ	11	12	0.92	15.8	0.438	10,300	4,136	MDO	0.5	97	8	3	2	2	2	12
		Cruising - PZ to Pilot	4.7	7	0.67	15.8	0.087	10,300	601	MDO	0.5	14	1	0	0	0	0	2
PANAMAX	South In	Maneuvering - Pilot to Berth		3	1.00	15.8	0.007	10,300	71	MDO	0.5	2	0	0	0	0	0	0
		Cruising - CW to VSR	23	12	1.92	15.8	0.438	10,300	8,649	Dist at 0.2	0.5	202	17	7	3	3	3	9
		Cruising - VSR to PZ	11	12	0.92	15.8	0.438	10,300	4,136	Dist at 0.2	0.5	97	8	3	2	2	2	4
	South Out	Cruising - PZ to Pilot	4.7	7	0.67	15.8	0.087	10,300	601	Dist at 0.2	0.5	14	1	0	0	0	0	1
		Maneuvering - Pilot to Berth		3	1.00	15.8	0.007	10,300	71	Dist at 0.2	0.5	2	0	0	0	0	0	0
		Maneuvering - Berth to Pilot		5	1.00	15.8	0.032	10,300	326	Dist at 0.2	1.0	15	1	1	0	0	0	1
PANAMAX	South Out	Cruising - Pilot to PZ	3.5	7	0.50	15.8	0.087	10,300	448	Dist at 0.2	1.0	21	2	1	0	0	0	1
		Cruising - PZ to VSR	12.5	12	1.04	15.8	0.438	10,300	4,700	Dist at 0.2	1.0	220	18	8	4	4	3	10
	Cruising - VSR to CW	24.5	12	2.04	15.8	0.438	10,300	9,213	Dist at 0.2	1.0	431	36	15	7	7	7	20	
	<b>TOTAL</b>										<b>1317</b>	<b>108</b>	<b>46</b>	<b>24</b>	<b>24</b>	<b>22</b>	<b>83</b>	
SUEZMAX	North In	Cruising - CW to VSR	22	12	1.83	17	0.352	16,000	10,317	MDO	0.5	241	20	9	6	6	5	29
		Cruising - VSR to PZ	21	12	1.75	17	0.352	16,000	9,848	MDO	0.5	230	19	8	5	5	5	27
		Cruising - PZ to Pilot	4.7	7	0.67	17	0.070	16,000	750	MDO	0.5	18	1	0	0	0	0	2
SUEZMAX	North In	Maneuvering - Pilot to Berth		3	1.00	17	0.005	16,000	88	MDO	0.5	2	0	0	0	0	0	0
		Cruising - CW to VSR	22	12	1.83	17	0.352	16,000	10,317	Dist at 0.2	0.5	241	20	9	4	4	4	11
		Cruising - VSR to PZ	21	12	1.75	17	0.352	16,000	9,848	Dist at 0.2	0.5	230	19	8	4	4	4	11
	North Out	Cruising - PZ to Pilot	4.7	7	0.67	17	0.070	16,000	750	Dist at 0.2	0.5	18	1	0	0	0	0	1
		Maneuvering - Pilot to Berth		3	1.00	17	0.005	16,000	88	Dist at 0.2	0.5	2	0	0	0	0	0	0
		Maneuvering - Berth to Pilot		5	1.00	17	0.025	16,000	407	Dist at 0.2	1.0	19	2	1	0	0	0	1
SUEZMAX	North Out	Cruising - Pilot to PZ	3.8	7	0.54	17	0.070	16,000	606	Dist at 0.2	1.0	28	2	1	0	0	0	1
		Cruising - PZ to VSR	21	12	1.75	17	0.352	16,000	9,848	Dist at 0.2	1.0	461	38	16	8	8	7	21
	Cruising - VSR to CW	22	12	1.83	17	0.352	16,000	10,317	Dist at 0.2	1.0	483	40	17	8	8	8	22	
	<b>TOTAL</b>										<b>1974</b>	<b>163</b>	<b>70</b>	<b>37</b>	<b>37</b>	<b>34</b>	<b>126</b>	
<b>MAXIMUM</b>												<b>3,395</b>	<b>314</b>	<b>198</b>	<b>66</b>	<b>66</b>	<b>61</b>	<b>204</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Mit.Max.2015-2. 2015 Reduced Project Alternative Auxiliary Generator Maximum Daily Mitigated Emissions

Ship	Direction	Mode	Activity (hours)	MCR (kW)	Load Factor	Energy (kW-hr)	Fuel Type	Maximum Daily Shipcalls (vessels/day)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
VLCC	North In	Cruising	4.25	3,600	0.278	4,258	MDO	0.5	81	6	2	2	2	1	14
		Maneuvering	2.00	3,600	0.278	2,002	MDO	0.5	38	3	1	1	1	1	7
VLCC	North In	Cruising	4.25	3,600	0.278	4,258	Dist at 0.2	0.5	81	6	2	2	2	1	5
		Maneuvering	2.00	3,600	0.278	2,002	Dist at 0.2	0.5	38	3	1	1	1	1	3
	North Out	Maneuvering	1.50	3,600	0.278	1,501	Dist at 0.2	1.0	57	5	2	1	1	1	4
		Cruising	4.13	3,600	0.278	4,129	Dist at 0.2	1.0	158	13	5	3	3	3	10
<b>TOTAL</b>								<b>455</b>	<b>36</b>	<b>13</b>	<b>10</b>	<b>9</b>	<b>8</b>	<b>42</b>	
AFRAMAX	South In	Cruising	3.50	3,600	0.278	3,508	MDO	0.5	67	5	2	1	1	1	11
AFRAMAX	South In	Maneuvering	2.00	3,600	0.278	2,002	MDO	0.5	38	3	1	1	1	1	7
		Cruising	3.50	3,600	0.278	3,508	Dist at 0.2	0.5	67	5	2	1	1	1	4
	South Out	Maneuvering	2.00	3,600	0.278	2,002	Dist at 0.2	0.5	38	3	1	1	1	1	3
		Maneuvering	1.50	3,600	0.278	1,501	Dist at 0.2	1.0	57	5	2	1	1	1	4
		Cruising	3.58	3,600	0.278	3,586	Dist at 0.2	1.0	137	11	4	3	3	2	9
<b>TOTAL</b>								<b>406</b>	<b>32</b>	<b>12</b>	<b>9</b>	<b>8</b>	<b>7</b>	<b>38</b>	
PANAMAX	South In	Cruising	3.15	3,600	0.278	3,155	MDO	0.5	60	5	2	1	1	1	10
PANAMAX	South In	Maneuvering	2.00	3,600	0.278	2,002	MDO	0.5	38	3	1	1	1	1	7
		Cruising	3.15	3,600	0.278	3,155	Dist at 0.2	0.5	60	5	2	1	1	1	4
	South Out	Maneuvering	2.00	3,600	0.278	2,002	Dist at 0.2	0.5	38	3	1	1	1	1	3
		Maneuvering	1.5	3,600	0.278	1,501	Dist at 0.2	1.0	57	5	2	1	1	1	4
		Cruising	3.21	3,600	0.278	3,211	Dist at 0.2	1.0	123	10	4	3	3	2	8
<b>TOTAL</b>								<b>378</b>	<b>30</b>	<b>11</b>	<b>8</b>	<b>8</b>	<b>6</b>	<b>35</b>	
SUEZMAX	North In	Cruising	3.84	3,600	0.278	3,840	MDO	0.5	73	6	2	2	2	1	13
SUEZMAX	North In	Maneuvering	2.00	3,600	0.278	2,002	MDO	0.5	38	3	1	1	1	1	7
		Cruising	3.84	3,600	0.278	3,840	Dist at 0.2	0.5	73	6	2	2	2	1	5
	North Out	Maneuvering	2.00	3,600	0.278	2,002	Dist at 0.2	0.5	38	3	1	1	1	1	3
		Maneuvering	1.5	3,600	0.278	1,501	Dist at 0.2	1.0	57	5	2	1	1	1	4
		Cruising	3.71	3,600	0.278	3,712	Dist at 0.2	1.0	142	11	4	3	3	2	9
<b>TOTAL</b>								<b>423</b>	<b>33</b>	<b>12</b>	<b>9</b>	<b>9</b>	<b>7</b>	<b>39</b>	
<b>MAXIMUM</b>								<b>455</b>	<b>36</b>	<b>13</b>	<b>10</b>	<b>9</b>	<b>8</b>	<b>42</b>	

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Mit.Max.2015-3. 2015 Reduced Project Alternative Summary of Maximum Daily Mitigated Vessel Emissions.

<b>Mode</b>	<b>Equipment</b>	<b>NO<sub>x</sub> Emissions (lb/day)</b>	<b>CO Emissions (lb/day)</b>	<b>ROG Emissions (lb/day)</b>	<b>PM Emissions (lb/day)</b>	<b>PM<sub>10</sub> Emissions (lb/day)</b>	<b>PM<sub>2.5</sub> Emissions (lb/day)</b>	<b>SO<sub>2</sub> Emissions (lb/day)</b>
Cruising	Main Engines	3,196	275	125	60	60	55	202
Cruising	Aux Generator	321	25	9	7	7	5	30
Maneuvering	Main Engines	200	39	73	6	6	5	2
Maneuvering	Aux Generator	134	11	4	3	3	2	13
<b>Cruising and Maneuvering</b>	<b>TOTAL</b>	<b>3,850</b>	<b>350</b>	<b>211</b>	<b>76</b>	<b>75</b>	<b>68</b>	<b>246</b>

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Table H.2.RPA.Mit.Max.2015-4. 2015 Reduced Project Alternative Boiler Warm-Up Maximum Daily Mitigated Emissions.

Shipcalls (vessels/ day)	Vessel Size	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
0.5	Aframax	MDO	0.52	102.17	30%	3	50,000	8	2	0	1	1	1	30
0.5	Aframax	Dist at 0.2	0.20	102.17	30%	3	50,000	8	2	0	1	1	1	11
0.5	VLCC	MDO	0.52	80.38	30%	3	90,000	14	3	1	2	1	1	42
0.5	VLCC	Dist at 0.2	0.20	80.38	30%	3	90,000	14	3	1	2	1	1	16
0.5	Panamax	MDO	0.52	59.91	30%	3	35,000	3	1	0	1	0	0	12
0.5	Panamax	Dist at 0.2	0.20	59.91	30%	3	35,000	3	1	0	1	0	0	5
0.5	Suezmax	MDO	0.52	82.85	30%	3	70,000	9	2	0	2	1	1	34
0.5	Suezmax	Dist at 0.2	0.20	82.85	30%	3	70,000	9	2	0	2	1	1	13
<b>MAXIMUM</b>								<b>14</b>	<b>3</b>	<b>1</b>	<b>2</b>	<b>1</b>	<b>1</b>	<b>42</b>

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Table H.2.RPA.Mit.Max.2015-5. 2015 Reduced Project Alternative Summary of Boiler Warm-Up Maximum Mitigated Emissions.

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Boiler Warm-up	Boiler	14	3	1	2	1	1	42





Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Mit.Max.2015-7. 2015 Reduced Project Alternative Summary of Berth Operations Maximum Daily Mitigated Emissions.

No AMP

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Berth Operations	Boiler	453	95	20	63	44	29	551
Berth Operations	Aux Generator	1,863	147	54	40	39	31	127

Mitigated Emissions with AMP - Year 2015

AMP Reduction 15%

Berth Operations	Boiler	453	95	20	63	44	29	551
Berth Operations	Aux Generator	1583.86	125.34	45.58	34.18	32.82	26.25	108.09

Table H.2.RPA.Mit.2025-1. 2025 Reduced Project Alternative Main Engines Average Daily Mitigated Emissions.

Ship	Direction	Mode	Distance (nautical miles)	Ship speed (knots)	Activity (hours)	Maximum Speed (knots)	Load Factor	MCR (kW)	Energy (kW-hr)	Fuel Type	Annual Shipcalls (vessels/yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
VLCC	North In	Cruising - CW to VSR	22	12	1.83	16.9	0.358	25,400	16,671	MDO	4.6	3,589	296	127	82	82	76	427
		Cruising - VSR to PZ	21	12	1.75	16.9	0.358	25,400	15,913	MDO	4.6	3,426	282	121	79	79	72	408
		Cruising - PZ to Pilot	4.7	7	0.67	16.9	0.071	25,400	1,212	MDO	4.6	369	60	43	10	10	10	31
		Maneuvering - Pilot to Berth	3	3	1.00	16.9	0.006	25,400	142	MDO	4.6	493	90	231	19	19	18	4
VLCC	North In	Cruising - CW to VSR	22	12	1.83	16.9	0.358	25,400	16,671	Dist at 0.2	41.4	32,304	2,660	1,140	551	551	507	1,478
		Cruising - VSR to PZ	21	12	1.75	16.9	0.358	25,400	15,913	Dist at 0.2	41.4	30,836	2,539	1,088	526	526	484	1,411
		Cruising - PZ to Pilot	4.7	7	0.67	16.9	0.071	25,400	1,212	Dist at 0.2	41.4	3,325	544	391	69	69	64	107
		Maneuvering - Pilot to Berth	3	3	1.00	16.9	0.006	25,400	142	Dist at 0.2	41.4	4,436	811	2,076	128	128	118	13
<b>TOTAL</b>											<b>78,780</b>	<b>7,284</b>	<b>5,217</b>	<b>1,465</b>	<b>1,465</b>	<b>1,347</b>	<b>3,878</b>	
	North Out	Maneuvering - Berth to Pilot		5	1.00	16.9	0.026	25,400	658	Dist at 0.2	46.0	4,250	901	1,072	108	108	99	65
		Cruising - Pilot to PZ	3.8	7	0.54	16.9	0.071	25,400	980	Dist at 0.2	46.0	2,987	489	352	62	62	57	97
		Cruising - PZ to VSR	21	12	1.75	16.9	0.358	25,400	15,913	Dist at 0.2	46.0	34,262	2,822	1,209	584	584	538	1,568
		Cruising - VSR to CW	22	12	1.83	16.9	0.358	25,400	16,671	Dist at 0.2	46.0	35,894	2,956	1,267	612	612	563	1,642
<b>TOTAL</b>											<b>77,393</b>	<b>7,168</b>	<b>3,900</b>	<b>1,367</b>	<b>1,367</b>	<b>1,257</b>	<b>3,371</b>	
AFRAMAX	South In	Cruising - CW to VSR	23	12	1.92	16.1	0.414	12,477	9,902	MDO	2.4	1,112	92	39	26	26	23	132
		Cruising - VSR to PZ	11	12	0.92	16.1	0.414	12,477	4,736	MDO	2.4	532	44	19	12	12	11	63
		Cruising - PZ to Pilot	4.7	7	0.67	16.1	0.082	12,477	689	MDO	2.4	102	16	10	3	3	3	9
		Maneuvering - Pilot to Berth	3	3	1.00	16.1	0.006	12,477	81	MDO	2.4	137	23	55	5	5	5	1
AFRAMAX	South In	Cruising - CW to VSR	23	12	1.92	16.1	0.414	12,477	9,902	Dist at 0.2	21.6	10,011	824	353	171	171	157	458
		Cruising - VSR to PZ	11	12	0.92	16.1	0.414	12,477	4,736	Dist at 0.2	21.6	4,788	394	169	82	82	75	219
		Cruising - PZ to Pilot	4.7	7	0.67	16.1	0.082	12,477	689	Dist at 0.2	21.6	919	140	93	19	19	17	32
		Maneuvering - Pilot to Berth	3	3	1.00	16.1	0.006	12,477	81	Dist at 0.2	21.6	1,233	208	495	35	35	33	4
<b>TOTAL</b>											<b>18,835</b>	<b>1,740</b>	<b>1,234</b>	<b>352</b>	<b>352</b>	<b>324</b>	<b>919</b>	
	South Out	Maneuvering - Berth to Pilot		5	1.00	16.1	0.030	12,477	374	Dist at 0.2	24.0	1,224	231	256	31	31	28	19
		Cruising - Pilot to PZ	3.5	7	0.50	16.1	0.082	12,477	513	Dist at 0.2	24.0	761	115	77	15	15	14	26
		Cruising - PZ to VSR	12.5	12	1.04	16.1	0.414	12,477	5,382	Dist at 0.2	24.0	6,045	498	213	103	103	95	277
		Cruising - VSR to CW	24.5	12	2.04	16.1	0.414	12,477	10,548	Dist at 0.2	24.0	11,849	976	418	202	202	186	542
<b>TOTAL</b>											<b>19,879</b>	<b>1,820</b>	<b>964</b>	<b>352</b>	<b>352</b>	<b>323</b>	<b>864</b>	
PANAMAX	South In	Cruising - CW to VSR	23	12	1.92	15.8	0.438	10,300	8,649	MDO	1	405	33	14	9	9	9	48
		Cruising - VSR to PZ	11	12	0.92	15.8	0.438	10,300	4,136	MDO	1	194	16	7	4	4	4	23
		Cruising - PZ to Pilot	4.7	7	0.67	15.8	0.087	10,300	601	MDO	1	28	2	1	1	1	1	3
		Maneuvering - Pilot to Berth	3	3	1.00	15.8	0.007	10,300	71	MDO	1	3	0	0	0	0	0	0
PANAMAX	South In	Cruising - CW to VSR	23	12	1.92	15.8	0.438	10,300	8,649	Dist at 0.2	9	3,643	300	129	62	62	57	167
		Cruising - VSR to PZ	11	12	0.92	15.8	0.438	10,300	4,136	Dist at 0.2	9	1,742	143	61	30	30	27	80
		Cruising - PZ to Pilot	4.7	7	0.67	15.8	0.087	10,300	601	Dist at 0.2	9	253	21	9	4	4	4	12
		Maneuvering - Pilot to Berth	3	3	1.00	15.8	0.007	10,300	71	Dist at 0.2	9	30	2	1	1	1	0	1
<b>TOTAL</b>											<b>6,299</b>	<b>519</b>	<b>222</b>	<b>111</b>	<b>111</b>	<b>102</b>	<b>334</b>	
	South Out	Maneuvering - Berth to Pilot		5	1.00	15.8	0.032	10,300	326	Dist at 0.2	10	153	13	5	3	3	2	7
		Cruising - Pilot to PZ	3.5	7	0.50	15.8	0.087	10,300	448	Dist at 0.2	10	210	17	7	4	4	3	10
		Cruising - PZ to VSR	12.5	12	1.04	15.8	0.438	10,300	4,700	Dist at 0.2	10	2,200	181	78	38	38	35	101
		Cruising - VSR to CW	24.5	12	2.04	15.8	0.438	10,300	9,213	Dist at 0.2	10	4,312	355	152	74	74	68	197
<b>TOTAL</b>											<b>6,875</b>	<b>566</b>	<b>243</b>	<b>117</b>	<b>117</b>	<b>108</b>	<b>315</b>	
SUEZMAX	North In	Cruising - CW to VSR	22	12	1.83	17	0.352	16,000	10,317	MDO	5.2	2,511	207	89	58	58	53	299
		Cruising - VSR to PZ	21	12	1.75	17	0.352	16,000	9,848	MDO	5.2	2,397	197	85	55	55	51	285
		Cruising - PZ to Pilot	4.7	7	0.67	17	0.070	16,000	750	MDO	5.2	183	15	6	4	4	4	22
		Maneuvering - Pilot to Berth	3	3	1.00	17	0.005	16,000	88	MDO	5.2	21	2	1	0	0	0	3
SUEZMAX	North In	Cruising - CW to VSR	22	12	1.83	17	0.352	16,000	10,317	Dist at 0.2	46.8	22,600	1,861	798	386	386	355	1,034
		Cruising - VSR to PZ	21	12	1.75	17	0.352	16,000	9,848	Dist at 0.2	46.8	21,573	1,777	761	368	368	339	987
		Cruising - PZ to Pilot	4.7	7	0.67	17	0.070	16,000	750	Dist at 0.2	46.8	1,643	135	58	28	28	26	75
		Maneuvering - Pilot to Berth	3	3	1.00	17	0.005	16,000	88	Dist at 0.2	46.8	193	16	7	3	3	3	9
<b>TOTAL</b>											<b>51,120</b>	<b>4,210</b>	<b>1,804</b>	<b>902</b>	<b>902</b>	<b>830</b>	<b>2,713</b>	
	North Out	Maneuvering - Berth to Pilot		5	1.00	17	0.025	16,000	407	Dist at 0.2	52	991	82	35	17	17	16	45
		Cruising - Pilot to PZ	3.8	7	0.54	17	0.070	16,000	606	Dist at 0.2	52	1,476	122	52	25	25	23	68
		Cruising - PZ to VSR	21	12	1.75	17	0.352	16,000	9,848	Dist at 0.2	52	23,970	1,974	846	409	409	376	1,097
		Cruising - VSR to CW	22	12	1.83	17	0.352	16,000	10,317	Dist at 0.2	52	25,111	2,068	886	428	428	394	1,149
<b>TOTAL</b>											<b>51,547</b>	<b>4,245</b>	<b>1,819</b>	<b>879</b>	<b>879</b>	<b>809</b>	<b>2,358</b>	
<b>GRAND TOTAL</b>												<b>310,728</b>	<b>27,552</b>	<b>15,403</b>	<b>5,545</b>	<b>5,545</b>	<b>5,101</b>	<b>14,752</b>

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Table H.2.RPA.Mit.2025-2. 2025 Reduced Project Alternative Auxiliary Generator Average Daily Mitigated Emissions

Ship	Direction	Mode	Activity (hours)	MCR (kW)	Load Factor	Energy (kW-hr)	Fuel Type	Annual Shipcalls (vessels/yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
VLCC	North In	Cruising	4.25	3,600	0.278	4,258	MDO	4.6	750	59	22	16	16	12	128
		Maneuvering	2.00	3,600	0.278	2,002	MDO	4.6	352	28	10	8	7	6	60
VLCC	North In	Cruising	4.25	3,600	0.278	4,258	Dist at 0.2	41.4	6,747	534	194	146	140	112	442
		Maneuvering	2.00	3,600	0.278	2,002	Dist at 0.2	41.4	3,171	251	91	68	66	53	208
								<b>TOTAL</b>	<b>11,020</b>	<b>872</b>	<b>317</b>	<b>238</b>	<b>228</b>	<b>183</b>	<b>838</b>
	North Out	Maneuvering	1.50	3,600	0.278	1,501	Dist at 0.2	46.0	2,643	209	76	57	55	44	173
		Cruising	4.13	3,600	0.278	4,129	Dist at 0.2	46.0	7,270	575	209	157	151	121	477
								<b>TOTAL</b>	<b>9,913</b>	<b>784</b>	<b>285</b>	<b>214</b>	<b>205</b>	<b>164</b>	<b>650</b>
AFRAMAX	South In	Cruising	3.50	3,600	0.278	3,508	MDO	2.4	322	25	9	7	7	5	55
AFRAMAX	South In	Maneuvering	2.00	3,600	0.278	2,002	MDO	2.4	184	15	5	4	4	3	31
		Cruising	3.50	3,600	0.278	3,508	Dist at 0.2	21.6	2,900	229	83	63	60	48	190
	South Out	Maneuvering	2.00	3,600	0.278	2,002	Dist at 0.2	21.6	1,655	131	48	36	34	27	108
		Cruising	1.50	3,600	0.278	1,501	Dist at 0.2	24.0	1,379	109	40	30	29	23	90
								<b>TOTAL</b>	<b>5,060</b>	<b>400</b>	<b>146</b>	<b>109</b>	<b>105</b>	<b>84</b>	<b>385</b>
								<b>TOTAL</b>	<b>4,673</b>	<b>370</b>	<b>134</b>	<b>101</b>	<b>97</b>	<b>77</b>	<b>306</b>
PANAMAX	South In	Cruising	3.50	3,600	0.278	3,508	MDO	1	134	11	4	3	3	2	23
PANAMAX	South In	Maneuvering	2.00	3,600	0.278	2,002	MDO	1	77	6	2	2	2	1	13
		Cruising	3.50	3,600	0.278	3,508	Dist at 0.2	9	1,208	96	35	26	25	20	79
	South Out	Maneuvering	2.00	3,600	0.278	2,002	Dist at 0.2	9	689	55	20	15	14	11	45
		Cruising	1.5	3,600	0.278	1,501	Dist at 0.2	10	575	45	17	12	12	10	38
								<b>TOTAL</b>	<b>2,108</b>	<b>167</b>	<b>61</b>	<b>46</b>	<b>44</b>	<b>35</b>	<b>160</b>
								<b>TOTAL</b>	<b>1,947</b>	<b>154</b>	<b>56</b>	<b>42</b>	<b>40</b>	<b>32</b>	<b>128</b>
SUEZMAX	North In	Cruising	4.25	3,600	0.278	4,258	MDO	5.2	847	67	24	18	18	14	144
SUEZMAX	North In	Maneuvering	2.00	3,600	0.278	2,002	MDO	5.2	398	32	11	9	8	7	68
		Cruising	4.25	3,600	0.278	4,258	Dist at 0.2	46.8	7,627	604	219	165	158	126	500
	North Out	Maneuvering	2.00	3,600	0.278	2,002	Dist at 0.2	46.8	3,585	284	103	77	74	59	235
		Cruising	1.5	3,600	0.278	1,501	Dist at 0.2	52	2,988	236	86	64	62	50	196
								<b>TOTAL</b>	<b>12,457</b>	<b>986</b>	<b>358</b>	<b>269</b>	<b>258</b>	<b>206</b>	<b>947</b>
								<b>TOTAL</b>	<b>8,218</b>	<b>650</b>	<b>236</b>	<b>177</b>	<b>170</b>	<b>136</b>	<b>539</b>
<b>TOTAL</b>									<b>11,206</b>	<b>887</b>	<b>322</b>	<b>242</b>	<b>232</b>	<b>186</b>	<b>734</b>
<b>GRAND TOTAL</b>									<b>58,384</b>	<b>4,620</b>	<b>1,680</b>	<b>1,260</b>	<b>1,210</b>	<b>968</b>	<b>4,148</b>

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Table H.2.RPA.Mit.2025-3. 2025 Reduced Project Alternative Summary of Average Daily Mitigated Vessel Emissions.

Mode	Equipment	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Cruising	Main Engines	297,564	25,173	11,171	5,194	5,194	4,779	14,582
Cruising	Aux Generator	40,689	3,220	1,171	878	843	674	2,882
Maneuvering	Main Engines	13,164	2,379	4,233	351	351	322	170
Maneuvering	Aux Generator	17,695	1,400	509	382	367	293	1,266
<b>Cruising and Maneuvering</b>	<b>TOTAL</b>	<b>369,112</b>	<b>32,172</b>	<b>17,083</b>	<b>6,805</b>	<b>6,755</b>	<b>6,069</b>	<b>18,900</b>

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Cruising	Main Engines	815	69	31	14	14	13	40
Cruising	Aux Generator	111	9	3	2	2	2	8
Maneuvering	Main Engines	36	7	12	1	1	1	0
Maneuvering	Aux Generator	48	4	1	1	1	1	3
<b>Cruising and Maneuvering</b>	<b>TOTAL</b>	<b>1,011</b>	<b>88</b>	<b>47</b>	<b>19</b>	<b>19</b>	<b>17</b>	<b>52</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Mit.2025-4. 2025 Reduced Project Alternative Boiler Warm-Up Average Daily Mitigated Emissions.

Shipcalls (vessels/ day)	Vessel Size	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
2.4	Aframax	MDO	0.52	102.17	30%	3	50,000	39	10	1	6	5	3	143
21.6	Aframax	Dist at 0.2	0.20	102.17	30%	3	50,000	352	88	5	58	41	27	495
4.6	VLCC	MDO	0.52	80.38	30%	3	90,000	127	27	6	18	12	8	388
41.4	VLCC	Dist at 0.2	0.20	80.38	30%	3	90,000	1,143	239	50	158	111	74	1,345
1	Panamax	MDO	0.52	59.91	30%	3	35,000	7	2	0	1	1	1	24
9	Panamax	Dist at 0.2	0.20	59.91	30%	3	35,000	60	15	1	10	7	5	85
5.2	Suezmax	MDO	0.52	82.85	30%	3	70,000	96	24	1	16	11	7	352
46.8	Suezmax	Dist at 0.2	0.20	82.85	30%	3	70,000	865	216	12	143	100	67	1,219
<b>TOTAL</b>								<b>2,689</b>	<b>620</b>	<b>76</b>	<b>410</b>	<b>287</b>	<b>192</b>	<b>4,052</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Mit.2025-5. 2025 Reduced Project Alternative Summary of Boiler Warm-Up Average Daily Mitigated Emissions.

Mode	Equipment	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Boiler Warm-up	Boiler	2,689	620	76	410	287	192	4,052

Table H.2.RPA.Mit.2025-6. 2025 Reduced Project Alternative Berth Operations Average Daily Mitigated Emissions.

**Auxiliary Generator Pre-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
2.4	Aframax	700,000	MDO	0.52	3,600	27.8%	2.5	230	18	7	5	5	4	39
21.6	Aframax	700,000	Dist at 0.2%S	0.20	3,600	27.8%	2.5	2,068	164	60	45	43	34	136
4.6	VLCC	2,000,000	MDO	0.52	3,600	27.8%	2.5	440	35	13	10	9	7	75
41.4	VLCC	2,000,000	Dist at 0.2%S	0.20	3,600	27.8%	2.5	3,964	314	114	86	82	66	260
1.0	Panamax	350,000	MDO	0.52	3,600	27.8%	2.5	96	8	3	2	2	2	16
9.0	Panamax	350,000	Dist at 0.2%S	0.20	3,600	27.8%	2.5	862	68	25	19	18	14	56
5.2	Suezmax	1,000,000	MDO	0.52	3,600	27.8%	2.5	498	39	14	11	10	8	85
46.8	Suezmax	1,000,000	Dist at 0.2%S	0.20	3,600	27.8%	2.5	4,481	355	129	97	93	74	294
<b>TOTAL</b>								<b>12,640</b>	<b>1,000</b>	<b>364</b>	<b>273</b>	<b>262</b>	<b>210</b>	<b>961</b>

**Boiler Pre-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
2.4	Aframax	700,000	MDO	0.52	102.17	30.0%	2.5	50,000	33	8	0	5	4	3	119
21.6	Aframax	700,000	Dist at 0.2%S	0.20	102.17	30.0%	2.5	50,000	293	73	4	49	34	23	413
4.6	VLCC	2,000,000	MDO	0.52	80.38	30.0%	2.5	90,000	106	22	5	15	10	7	324
41.4	VLCC	2,000,000	Dist at 0.2%S	0.20	80.38	30.0%	2.5	90,000	952	199	42	132	92	62	1,121
1.0	Panamax	350,000	MDO	0.52	59.91	30.0%	2.5	35,000	6	1	0	1	1	0	20
9.0	Panamax	350,000	Dist at 0.2%S	0.20	59.91	30.0%	2.5	35,000	50	13	1	8	6	4	71
5.2	Suezmax	1,000,000	MDO	0.52	82.85	30.0%	2.5	70,000	80	20	1	13	9	6	293
46.8	Suezmax	1,000,000	Dist at 0.2%S	0.20	82.85	30.0%	2.5	70,000	721	180	10	119	84	56	1,016
<b>TOTAL</b>									<b>2,241</b>	<b>517</b>	<b>63</b>	<b>342</b>	<b>239</b>	<b>160</b>	<b>3,376</b>

**Auxiliary Generator Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
24.0	Aframax	700,000	Dist at 0.2%S	0.20	3,600	55.6%	15.0	27,577	2,182	794	595	571	457	1,808
46.0	VLCC	2,000,000	Dist at 0.2%S	0.20	3,600	55.6%	23.2	81,751	6,469	2,353	1,764	1,694	1,355	5,359
10.0	Panamax	350,000	Dist at 0.2%S	0.20	3,600	55.6%	11.0	8,426	667	242	182	175	140	552
52.0	Suezmax	1,000,000	Dist at 0.2%S	0.20	3,600	55.6%	15.3	60,945	4,823	1,754	1,315	1,263	1,010	3,995
<b>TOTAL</b>								<b>178,700</b>	<b>14,142</b>	<b>5,142</b>	<b>3,857</b>	<b>3,703</b>	<b>2,962</b>	<b>11,713</b>

**Boiler Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Inerting Fuel Consumption Savings (lb/1000 bbl offloaded)	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
24.0	Aframax	700,000	Dist at 0.2%S	0.20	102.17	28.06	15.0	4,410	1,102	62	730	511	342	6,211
46.0	VLCC	2,000,000	Dist at 0.2%S	0.20	80.38	28.06	23.2	20,410	4,262	900	2,821	1,975	1,321	24,011
10.0	Panamax	350,000	Dist at 0.2%S	0.20	59.91	28.06	11.0	395	99	6	65	46	31	556
52.0	Suezmax	1,000,000	Dist at 0.2%S	0.20	82.85	28.06	15.3	10,091	2,523	142	1,670	1,169	782	14,213
<b>TOTAL</b>								<b>35,306</b>	<b>7,986</b>	<b>1,110</b>	<b>5,287</b>	<b>3,701</b>	<b>2,475</b>	<b>44,992</b>

**Auxiliary Generator Post-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
24.0	Aframax	700,000	Dist at 0.2%S	0.20	3,600	27.8%	1.0	919	73	26	20	19	15	60
46.0	VLCC	2,000,000	Dist at 0.2%S	0.20	3,600	27.8%	1.0	1,762	139	51	38	37	29	115
10.0	Panamax	350,000	Dist at 0.2%S	0.20	3,600	27.8%	1.0	383	30	11	8	8	6	25
52.0	Suezmax	1,000,000	Dist at 0.2%S	0.20	3,600	27.8%	1.0	1,992	158	57	43	41	33	131
<b>TOTAL</b>								<b>5,056</b>	<b>400</b>	<b>145</b>	<b>109</b>	<b>105</b>	<b>84</b>	<b>331</b>



Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Mit.2025-7. 2025 Reduced Project Alternative Summary of Berth Operations Average Daily Mitigated Emissions.

No AMP

Mode	Equipment	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Berth Operations	Boiler	37,547	8,503	1,174	5,629	3,940	2,635	48,368
Berth Operations	Aux Generator	196,395	15,542	5,652	4,239	4,069	3,255	13,006

Mitigated Emissions with AMP - Year 2025

AMP Reduction 40%

Berth Operations	Boiler	37,547	8,503	1,174	5,629	3,940	2,635	48,368
Berth Operations	Aux Generator	117,837	9,325	3,391	2,543	2,442	1,953	7,803

Table H.2.RPA.Mit.Max.2025-1. 2025 Reduced Project Alternative Main Engines Maximum Daily Mitigated Emissions.

Ship	Direction	Mode	Distance (nautical miles)	Ship speed (knots)	Activity (hours)	Maximum Speed (knots)	Load Factor	MCR (KW)	Energy (kW-hr)	Fuel Type	Maximum Daily Shipcalls (vessels/day)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
VLCC	North In	Cruising - CW to VSR	22	12	1.83	16.9	0.358	25,400	16,671	MDO	0.1	78	6	3	2	2	2	9
		Cruising - VSR to PZ	21	12	1.75	16.9	0.358	25,400	15,913	MDO	0.1	74	6	3	2	2	2	9
		Cruising - PZ to Pilot	4.7	7	0.67	16.9	0.071	25,400	1,212	MDO	0.1	8	1	1	0	0	0	1
	North In	Maneuvering - Pilot to Berth	3	1.00	16.9	0.006	25,400	142	MDO	0.1	11	2	5	0	0	0	0	0
		Cruising - CW to VSR	22	12	1.83	16.9	0.358	25,400	16,671	Dist at 0.2	0.9	702	58	25	12	12	11	32
		Cruising - VSR to PZ	21	12	1.75	16.9	0.358	25,400	15,913	Dist at 0.2	0.9	670	55	24	11	11	11	31
		Cruising - PZ to Pilot	4.7	7	0.67	16.9	0.071	25,400	1,212	Dist at 0.2	0.9	72	12	9	2	2	1	2
		Maneuvering - Pilot to Berth	3	1.00	16.9	0.006	25,400	142	Dist at 0.2	0.9	96	18	45	3	3	3	0	0
		Maneuvering - Berth to Pilot	5	1.00	16.9	0.026	25,400	658	Dist at 0.2	1.0	92	20	23	2	2	2	1	1
		Cruising - Pilot to PZ	3.8	7	0.54	16.9	0.071	25,400	980	Dist at 0.2	1.0	65	11	8	1	1	1	2
		Cruising - PZ to VSR	21	12	1.75	16.9	0.358	25,400	15,913	Dist at 0.2	1.0	745	61	26	13	13	12	34
		Cruising - VSR to CW	22	12	1.83	16.9	0.358	25,400	16,671	Dist at 0.2	1.0	780	64	28	13	13	12	36
<b>TOTAL</b>											<b>3,395</b>	<b>314</b>	<b>198</b>	<b>62</b>	<b>62</b>	<b>57</b>	<b>158</b>	
AFRAMAX	South In	Cruising - CW to VSR	23	12	1.92	16.1	0.414	12,477	9,902	MDO	0.1	46	4	2	1	1	1	6
		Cruising - VSR to PZ	11	12	0.92	16.1	0.414	12,477	4,736	MDO	0.1	22	2	1	1	1	0	3
		Cruising - PZ to Pilot	4.7	7	0.67	16.1	0.082	12,477	689	MDO	0.1	4	1	0	0	0	0	0
		Maneuvering - Pilot to Berth	3	1.00	16.1	0.006	12,477	81	MDO	0.1	6	1	2	0	0	0	0	
AFRAMAX	South In	Cruising - CW to VSR	23	12	1.92	16.1	0.414	12,477	9,902	Dist at 0.2	0.9	417	34	15	7	7	7	19
		Cruising - VSR to PZ	11	12	0.92	16.1	0.414	12,477	4,736	Dist at 0.2	0.9	199	16	7	3	3	3	9
		Cruising - PZ to Pilot	4.7	7	0.67	16.1	0.082	12,477	689	Dist at 0.2	0.9	38	6	4	1	1	1	1
		Maneuvering - Pilot to Berth	3	1.00	16.1	0.006	12,477	81	Dist at 0.2	0.9	51	9	21	1	1	1	0	
AFRAMAX	South Out	Maneuvering - Berth to Pilot	5	1.00	16.1	0.030	12,477	374	Dist at 0.2	1.0	51	10	11	1	1	1	1	1
		Cruising - Pilot to PZ	3.5	7	0.50	16.1	0.082	12,477	513	Dist at 0.2	1.0	32	5	3	1	1	1	1
		Cruising - PZ to VSR	12.5	12	1.04	16.1	0.414	12,477	5,382	Dist at 0.2	1.0	252	21	9	4	4	4	12
		Cruising - VSR to CW	24.5	12	2.04	16.1	0.414	12,477	10,548	Dist at 0.2	1.0	494	41	17	8	8	8	23
<b>TOTAL</b>											<b>1,613</b>	<b>148</b>	<b>92</b>	<b>29</b>	<b>29</b>	<b>27</b>	<b>74</b>	
PANAMAX	South In	Cruising - CW to VSR	23	12	1.92	15.8	0.438	10,300	8,649	MDO	0.1	40	3	1	1	1	1	5
		Cruising - VSR to PZ	11	12	0.92	15.8	0.438	10,300	4,136	MDO	0.1	19	2	1	0	0	0	2
		Cruising - PZ to Pilot	4.7	7	0.67	15.8	0.087	10,300	601	MDO	0.1	3	0	0	0	0	0	0
		Maneuvering - Pilot to Berth	3	1.00	15.8	0.007	10,300	71	MDO	0.1	0	0	0	0	0	0	0	
PANAMAX	South In	Cruising - CW to VSR	23	12	1.92	15.8	0.438	10,300	8,649	Dist at 0.2	0.9	364	30	13	6	6	6	17
		Cruising - VSR to PZ	11	12	0.92	15.8	0.438	10,300	4,136	Dist at 0.2	0.9	174	14	6	3	3	3	8
		Cruising - PZ to Pilot	4.7	7	0.67	15.8	0.087	10,300	601	Dist at 0.2	0.9	25	2	1	0	0	0	1
		Maneuvering - Pilot to Berth	3	1.00	15.8	0.007	10,300	71	Dist at 0.2	0.9	3	0	0	0	0	0	0	
PANAMAX	South Out	Maneuvering - Berth to Pilot	5	1.00	15.8	0.032	10,300	326	Dist at 0.2	1.0	15	1	1	0	0	0	0	1
		Cruising - Pilot to PZ	3.5	7	0.50	15.8	0.087	10,300	448	Dist at 0.2	1.0	21	2	1	0	0	0	1
		Cruising - PZ to VSR	12.5	12	1.04	15.8	0.438	10,300	4,700	Dist at 0.2	1.0	220	18	8	4	4	3	10
		Cruising - VSR to CW	24.5	12	2.04	15.8	0.438	10,300	9,213	Dist at 0.2	1.0	431	36	15	7	7	7	20
<b>TOTAL</b>											<b>1317</b>	<b>108</b>	<b>46</b>	<b>23</b>	<b>23</b>	<b>21</b>	<b>65</b>	
SUEZMAX	North In	Cruising - CW to VSR	22	12	1.83	17	0.352	16,000	10,317	MDO	0.1	48	4	2	1	1	1	6
		Cruising - VSR to PZ	21	12	1.75	17	0.352	16,000	9,848	MDO	0.1	46	4	2	1	1	1	5
		Cruising - PZ to Pilot	4.7	7	0.67	17	0.070	16,000	750	MDO	0.1	4	0	0	0	0	0	0
		Maneuvering - Pilot to Berth	3	1.00	17	0.005	16,000	88	MDO	0.1	0	0	0	0	0	0	0	
SUEZMAX	North In	Cruising - CW to VSR	22	12	1.83	17	0.352	16,000	10,317	Dist at 0.2	0.9	435	36	15	7	7	7	20
		Cruising - VSR to PZ	21	12	1.75	17	0.352	16,000	9,848	Dist at 0.2	0.9	415	34	15	7	7	7	19
		Cruising - PZ to Pilot	4.7	7	0.67	17	0.070	16,000	750	Dist at 0.2	0.9	32	3	1	1	1	0	1
		Maneuvering - Pilot to Berth	3	1.00	17	0.005	16,000	88	Dist at 0.2	0.9	4	0	0	0	0	0	0	
SUEZMAX	North Out	Maneuvering - Berth to Pilot	5	1.00	17	0.025	16,000	407	Dist at 0.2	1.0	19	2	1	0	0	0	0	1
		Cruising - Pilot to PZ	3.8	7	0.54	17	0.070	16,000	606	Dist at 0.2	1.0	28	2	1	0	0	0	1
		Cruising - PZ to VSR	21	12	1.75	17	0.352	16,000	9,848	Dist at 0.2	1.0	461	38	16	8	8	7	21
		Cruising - VSR to CW	22	12	1.83	17	0.352	16,000	10,317	Dist at 0.2	1.0	483	40	17	8	8	8	22
<b>TOTAL</b>											<b>1974</b>	<b>163</b>	<b>70</b>	<b>34</b>	<b>34</b>	<b>32</b>	<b>98</b>	
<b>MAXIMUM</b>											<b>3,395</b>	<b>314</b>	<b>198</b>	<b>62</b>	<b>62</b>	<b>57</b>	<b>158</b>	

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Mit.Max.2025-2. 2025 Reduced Project Alternative Auxiliary Generator Maximum Daily Mitigated Emissions

Ship	Direction	Mode	Activity (hours)	MCR (kW)	Load Factor	Energy (kW-hr)	Fuel Type	Maximum Daily Shipcalls (vessels/day)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
VLCC	North In	Cruising	4.25	3,600	0.278	4,258	MDO	0.1	16	1	0	0	0	0	3
		Maneuvering	2.00	3,600	0.278	2,002	MDO	0.1	8	1	0	0	0	0	1
VLCC	North In	Cruising	4.25	3,600	0.278	4,258	Dist at 0.2	0.9	147	12	4	3	3	2	10
		Maneuvering	2.00	3,600	0.278	2,002	Dist at 0.2	0.9	69	5	2	1	1	1	5
	North Out	Maneuvering	1.50	3,600	0.278	1,501	Dist at 0.2	1.0	57	5	2	1	1	1	4
		Cruising	4.13	3,600	0.278	4,129	Dist at 0.2	1.0	158	13	5	3	3	3	10
<b>TOTAL</b>								<b>455</b>	<b>36</b>	<b>13</b>	<b>10</b>	<b>9</b>	<b>8</b>	<b>32</b>	
AFRAMAX	South In	Cruising	3.50	3,600	0.278	3,508	MDO	0.1	13	1	0	0	0	0	2
AFRAMAX	South In	Maneuvering	2.00	3,600	0.278	2,002	MDO	0.1	8	1	0	0	0	0	1
		Cruising	3.50	3,600	0.278	3,508	Dist at 0.2	0.9	121	10	3	3	3	2	8
	South Out	Maneuvering	2.00	3,600	0.278	2,002	Dist at 0.2	0.9	69	5	2	1	1	1	5
		Maneuvering	1.50	3,600	0.278	1,501	Dist at 0.2	1.0	57	5	2	1	1	1	4
		Cruising	3.58	3,600	0.278	3,586	Dist at 0.2	1.0	137	11	4	3	3	2	9
<b>TOTAL</b>								<b>406</b>	<b>32</b>	<b>12</b>	<b>9</b>	<b>8</b>	<b>7</b>	<b>29</b>	
PANAMAX	South In	Cruising	3.15	3,600	0.278	3,155	MDO	0.1	12	1	0	0	0	0	2
PANAMAX	South In	Maneuvering	2.00	3,600	0.278	2,002	MDO	0.1	8	1	0	0	0	0	1
		Cruising	3.15	3,600	0.278	3,155	Dist at 0.2	0.9	109	9	3	2	2	2	7
	South Out	Maneuvering	2.00	3,600	0.278	2,002	Dist at 0.2	0.9	69	5	2	1	1	1	5
		Maneuvering	1.5	3,600	0.278	1,501	Dist at 0.2	1.0	57	5	2	1	1	1	4
		Cruising	3.21	3,600	0.278	3,211	Dist at 0.2	1.0	123	10	4	3	3	2	8
<b>TOTAL</b>								<b>378</b>	<b>30</b>	<b>11</b>	<b>8</b>	<b>8</b>	<b>6</b>	<b>27</b>	
SUEZMAX	North In	Cruising	3.84	3,600	0.278	3,840	MDO	0.1	15	1	0	0	0	0	3
SUEZMAX	North In	Maneuvering	2.00	3,600	0.278	2,002	MDO	0.1	8	1	0	0	0	0	1
		Cruising	3.84	3,600	0.278	3,840	Dist at 0.2	0.9	132	10	4	3	3	2	9
	North Out	Maneuvering	2.00	3,600	0.278	2,002	Dist at 0.2	0.9	69	5	2	1	1	1	5
		Maneuvering	1.5	3,600	0.278	1,501	Dist at 0.2	1.0	57	5	2	1	1	1	4
		Cruising	3.71	3,600	0.278	3,712	Dist at 0.2	1.0	142	11	4	3	3	2	9
<b>TOTAL</b>								<b>423</b>	<b>33</b>	<b>12</b>	<b>9</b>	<b>9</b>	<b>7</b>	<b>30</b>	
<b>MAXIMUM</b>								<b>455</b>	<b>36</b>	<b>13</b>	<b>10</b>	<b>9</b>	<b>8</b>	<b>32</b>	

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Mit.Max.2025-3. 2025 Reduced Project Alternative Summary of Maximum Daily Mitigated Vessel Emissions.

<b>Mode</b>	<b>Equipment</b>	<b>NO<sub>x</sub> Emissions (lb/day)</b>	<b>CO Emissions (lb/day)</b>	<b>ROG Emissions (lb/day)</b>	<b>PM Emissions (lb/day)</b>	<b>PM<sub>10</sub> Emissions (lb/day)</b>	<b>PM<sub>2.5</sub> Emissions (lb/day)</b>	<b>SO<sub>2</sub> Emissions (lb/day)</b>
Cruising	Main Engines	3,196	275	125	56	56	52	156
Cruising	Aux Generator	321	25	9	7	7	5	23
Maneuvering	Main Engines	200	39	73	6	6	5	2
Maneuvering	Aux Generator	134	11	4	3	3	2	10
<b>Cruising and Maneuvering</b>	<b>TOTAL</b>	<b>3,850</b>	<b>350</b>	<b>211</b>	<b>71</b>	<b>71</b>	<b>64</b>	<b>190</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Mit.Max.2025-4. 2025 Reduced Project Alternative Boiler Warm-Up Maximum Daily Mitigated Emissions.

Shipcalls (vessels/ day)	Vessel Size	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
0.1	Aframax	MDO	0.52	102.17	30%	3	50,000	2	0	0	0	0	0	6
0.9	Aframax	Dist at 0.2	0.20	102.17	30%	3	50,000	15	4	0	2	2	1	21
							<b>TOTAL</b>	16	4	0	3	2	1	27
0.1	VLCC	MDO	0.52	80.38	30%	3	90,000	3	1	0	0	0	0	8
0.9	VLCC	Dist at 0.2	0.20	80.38	30%	3	90,000	25	5	1	3	2	2	29
							<b>TOTAL</b>	28	6	1	4	3	2	38
0.1	Panamax	MDO	0.52	59.91	30%	3	35,000	1	0	0	0	0	0	2
0.9	Panamax	Dist at 0.2	0.20	59.91	30%	3	35,000	6	2	0	1	1	0	8
							<b>TOTAL</b>	7	2	0	1	1	1	11
0.1	Suezmax	MDO	0.52	82.85	30%	3	70,000	2	0	0	0	0	0	7
0.9	Suezmax	Dist at 0.2	0.20	82.85	30%	3	70,000	17	4	0	3	2	1	23
							<b>TOTAL</b>	18	5	0	3	2	1	30
							<b>MAXIMUM</b>	28	6	1	4	3	2	38

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Mit.Max.2025-5. 2025 Reduced Project Alternative Summary of Boiler Warm-Up Maximum Mitigated Emissions.

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Boiler Warm-up	Boiler	28	6	1	4	3	2	38

Table H.2.RPA.Mit.Max.2025-6. 2025 Reduced Project Alternative Berth Operations Maximum Daily Mitigated Emissions.

**Auxiliary Generator Pre-Pumpin**

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
0.1	Aframax	700,000	MDO	0.52	3,600	27.8%	2.5	10	1	0	0	0	0	2
0.9	Aframax	700,000	Dist at 0.2%S	0.20	3,600	27.8%	2.5	86	7	2	2	2	1	6
							<b>TOTAL</b>	<b>96</b>	<b>8</b>	<b>3</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>7</b>
0.1	VLCC	2,000,000	MDO	0.52	3,600	27.8%	2.5	10	1	0	0	0	0	2
0.9	VLCC	2,000,000	Dist at 0.2%S	0.20	3,600	27.8%	2.5	86	7	2	2	2	1	6
							<b>TOTAL</b>	<b>96</b>	<b>8</b>	<b>3</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>7</b>
0.1	Panamax	350,000	MDO	0.52	3,600	27.8%	2.5	10	1	0	0	0	0	2
0.9	Panamax	350,000	Dist at 0.2%S	0.20	3,600	27.8%	2.5	86	7	2	2	2	1	6
							<b>TOTAL</b>	<b>96</b>	<b>8</b>	<b>3</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>7</b>
0.1	Suezmax	1,000,000	MDO	0.52	3,600	27.8%	2.5	10	1	0	0	0	0	2
0.9	Suezmax	1,000,000	Dist at 0.2%S	0.20	3,600	27.8%	2.5	86	7	2	2	2	1	6
							<b>TOTAL</b>	<b>96</b>	<b>8</b>	<b>3</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>7</b>
<b>MAXIMUM</b>								<b>96</b>	<b>8</b>	<b>3</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>7</b>

**Boiler Pre-Pumping**

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
0.1	Aframax	700,000	MDO	0.52	102.17	30.0%	2.5	50,000	1	0	0	0	0	0	5
0.9	Aframax	700,000	Dist at 0.2%S	0.20	102.17	30.0%	2.5	50,000	12	3	0	2	1	1	17
							<b>TOTAL</b>	<b>14</b>	<b>3</b>	<b>0</b>	<b>2</b>	<b>2</b>	<b>1</b>	<b>1</b>	<b>22</b>
0.1	VLCC	2,000,000	MDO	0.52	80.38	30.0%	2.5	90,000	2	0	0	0	0	0	7
0.9	VLCC	2,000,000	Dist at 0.2%S	0.20	80.38	30.0%	2.5	90,000	21	4	1	3	2	1	24
							<b>TOTAL</b>	<b>23</b>	<b>5</b>	<b>1</b>	<b>3</b>	<b>2</b>	<b>1</b>	<b>1</b>	<b>31</b>
0.1	Panamax	350,000	MDO	0.52	59.91	30.0%	2.5	35,000	1	0	0	0	0	0	2
0.9	Panamax	350,000	Dist at 0.2%S	0.20	59.91	30.0%	2.5	35,000	5	1	0	1	1	0	7
							<b>TOTAL</b>	<b>6</b>	<b>1</b>	<b>0</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>0</b>	<b>9</b>
0.1	Suezmax	1,000,000	MDO	0.52	82.85	30.0%	2.5	70,000	2	0	0	0	0	0	6
0.9	Suezmax	1,000,000	Dist at 0.2%S	0.20	82.85	30.0%	2.5	70,000	14	3	0	2	2	1	20
							<b>TOTAL</b>	<b>15</b>	<b>4</b>	<b>0</b>	<b>3</b>	<b>2</b>	<b>1</b>	<b>1</b>	<b>25</b>
<b>MAXIMUM</b>									<b>23</b>	<b>5</b>	<b>1</b>	<b>3</b>	<b>2</b>	<b>1</b>	<b>31</b>

**Auxiliary Generator Pumpin**

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	700,000	Dist at 0.2%S	0.20	3,600	55.6%	15.0	1,149	91	33	25	24	19	75
1.0	VLCC	2,000,000	Dist at 0.2%S	0.20	3,600	55.6%	23.2	1,777	141	51	38	37	29	116
1.0	Panamax	350,000	Dist at 0.2%S	0.20	3,600	55.6%	11.0	843	67	24	18	17	14	55
1.0	Suezmax	1,000,000	Dist at 0.2%S	0.20	3,600	55.6%	15.3	1,172	93	34	25	24	19	77
<b>MAXIMUM</b>								<b>1,777</b>	<b>141</b>	<b>51</b>	<b>38</b>	<b>37</b>	<b>29</b>	<b>116</b>

**Boiler Pumping**

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Inerting Fuel Consumption Savings (lb/1000 bbl offloaded)	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	700,000	Dist at 0.2%S	0.20	102.17	28.06	15.0	184	46	3	30	21	14	259
1.0	VLCC	2,000,000	Dist at 0.2%S	0.20	80.38	28.06	23.2	444	93	20	61	43	29	522
1.0	Panamax	350,000	Dist at 0.2%S	0.20	59.91	28.06	11.0	39	10	1	7	5	3	56
1.0	Suezmax	1,000,000	Dist at 0.2%S	0.20	82.85	28.06	15.3	194	49	3	32	22	15	273
<b>MAXIMUM</b>								<b>444</b>	<b>93</b>	<b>20</b>	<b>61</b>	<b>43</b>	<b>29</b>	<b>522</b>

**Auxiliary Generator Post-Pumpin**

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	700,000	Dist at 0.2%S	0.20	3,600	27.8%	1.0	38	3	1	1	1	1	3
1.0	VLCC	2,000,000	Dist at 0.2%S	0.20	3,600	27.8%	1.0	38	3	1	1	1	1	3
1.0	Panamax	350,000	Dist at 0.2%S	0.20	3,600	27.8%	1.0	38	3	1	1	1	1	3
1.0	Suezmax	1,000,000	Dist at 0.2%S	0.20	3,600	27.8%	1.0	38	3	1	1	1	1	3
<b>MAXIMUM</b>								<b>38</b>	<b>3</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>3</b>

**Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR**

**Table H.2.RPA.Mit.Max.2025-7. 2025 Reduced Project Alternative Summary of Berth Operations Maximum Daily Mitigated Emissions.**

**No AMP**

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Berth Operations	Boiler	467	97	21	65	45	30	553
Berth Operations	Aux Generator	1,911	151	55	41	40	32	126

**Mitigated Emissions with AMP - Year 2025**

AMP Reduction            40%

Berth Operations	Boiler	467	97	21	65	45	30	553
Berth Operations	Aux Generator	1146.75	90.75	33.00	24.75	23.76	19.01	75.77



Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Mit.2040-1. 2040 Reduced Project Alternative Main Engines Average Daily Mitigated Emissions.

Ship	Direction	Mode	Distance (nautical miles)	Ship speed (knots)	Activity (hours)	Maximum Speed (knots)	Load Factor	MCR (kW)	Energy (kW-hr)	Fuel Type	Annual Shipcalls (vessels/yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
VLCC	North In	Cruising - CW to VSR	22	12	1.83	16.9	0.358	25,400	16,671	MDO	4.6	3,589	296	127	82	82	76	427
		Cruising - VSR to PZ	21	12	1.75	16.9	0.358	25,400	15,913	MDO	4.6	3,426	282	121	79	79	72	408
		Cruising - PZ to Pilot	4.7	7	0.67	16.9	0.071	25,400	1,212	MDO	4.6	369	60	43	10	10	10	31
		Maneuvering - Pilot to Berth	3	3	1.00	16.9	0.006	25,400	142	MDO	4.6	493	90	231	19	19	18	4
VLCC	North In	Cruising - CW to VSR	22	12	1.83	16.9	0.358	25,400	16,671	Dist at 0.2	41.4	32,304	2,660	1,140	551	551	507	1,478
		Cruising - VSR to PZ	21	12	1.75	16.9	0.358	25,400	15,913	Dist at 0.2	41.4	30,836	2,539	1,088	526	526	484	1,411
		Cruising - PZ to Pilot	4.7	7	0.67	16.9	0.071	25,400	1,212	Dist at 0.2	41.4	3,325	544	391	69	69	64	107
		Maneuvering - Pilot to Berth	3	3	1.00	16.9	0.006	25,400	142	Dist at 0.2	41.4	4,436	811	2,076	128	128	118	13
<b>TOTAL</b>											<b>78,780</b>	<b>7,284</b>	<b>5,217</b>	<b>1,465</b>	<b>1,465</b>	<b>1,347</b>	<b>3,878</b>	
	North Out	Maneuvering - Berth to Pilot		5	1.00	16.9	0.026	25,400	658	Dist at 0.2	46.0	4,250	901	1,072	108	108	99	65
		Cruising - Pilot to PZ	3.8	7	0.54	16.9	0.071	25,400	980	Dist at 0.2	46.0	2,987	489	352	62	62	57	97
		Cruising - PZ to VSR	21	12	1.75	16.9	0.358	25,400	15,913	Dist at 0.2	46.0	34,262	2,822	1,209	584	584	538	1,568
		Cruising - VSR to CW	22	12	1.83	16.9	0.358	25,400	16,671	Dist at 0.2	46.0	35,894	2,956	1,267	612	612	563	1,642
<b>TOTAL</b>											<b>77,393</b>	<b>7,168</b>	<b>3,900</b>	<b>1,367</b>	<b>1,367</b>	<b>1,257</b>	<b>3,371</b>	
AFRAMAX	South In	Cruising - CW to VSR	23	12	1.92	16.1	0.414	12,477	9,902	MDO	2.4	1,112	92	39	26	26	23	132
		Cruising - VSR to PZ	11	12	0.92	16.1	0.414	12,477	4,736	MDO	2.4	532	44	19	12	12	11	63
		Cruising - PZ to Pilot	4.7	7	0.67	16.1	0.082	12,477	689	MDO	2.4	102	16	10	3	3	3	9
		Maneuvering - Pilot to Berth	3	3	1.00	16.1	0.006	12,477	81	MDO	2.4	137	23	55	5	5	5	1
AFRAMAX	South In	Cruising - CW to VSR	23	12	1.92	16.1	0.414	12,477	9,902	Dist at 0.2	21.6	10,011	824	353	171	171	157	458
		Cruising - VSR to PZ	11	12	0.92	16.1	0.414	12,477	4,736	Dist at 0.2	21.6	4,788	394	169	82	82	75	219
		Cruising - PZ to Pilot	4.7	7	0.67	16.1	0.082	12,477	689	Dist at 0.2	21.6	919	140	93	19	19	17	32
		Maneuvering - Pilot to Berth	3	3	1.00	16.1	0.006	12,477	81	Dist at 0.2	21.6	1,233	208	495	35	35	33	4
<b>TOTAL</b>											<b>18,835</b>	<b>1,740</b>	<b>1,234</b>	<b>352</b>	<b>352</b>	<b>324</b>	<b>919</b>	
	South Out	Maneuvering - Berth to Pilot		5	1.00	16.1	0.030	12,477	374	Dist at 0.2	24.0	1,224	231	256	31	31	28	19
		Cruising - Pilot to PZ	3.5	7	0.50	16.1	0.082	12,477	513	Dist at 0.2	24.0	761	115	77	15	15	14	26
		Cruising - PZ to VSR	12.5	12	1.04	16.1	0.414	12,477	5,382	Dist at 0.2	24.0	6,045	498	213	103	103	95	277
		Cruising - VSR to CW	24.5	12	2.04	16.1	0.414	12,477	10,548	Dist at 0.2	24.0	11,849	976	418	202	202	186	542
<b>TOTAL</b>											<b>19,879</b>	<b>1,820</b>	<b>964</b>	<b>352</b>	<b>352</b>	<b>323</b>	<b>864</b>	
PANAMAX	South In	Cruising - CW to VSR	23	12	1.92	15.8	0.438	10,300	8,649	MDO	1	405	33	14	9	9	9	48
		Cruising - VSR to PZ	11	12	0.92	15.8	0.438	10,300	4,136	MDO	1	194	16	7	4	4	4	23
		Cruising - PZ to Pilot	4.7	7	0.67	15.8	0.087	10,300	601	MDO	1	28	2	1	1	1	1	3
		Maneuvering - Pilot to Berth	3	3	1.00	15.8	0.007	10,300	71	MDO	1	3	0	0	0	0	0	0
PANAMAX	South In	Cruising - CW to VSR	23	12	1.92	15.8	0.438	10,300	8,649	Dist at 0.2	9	3,643	300	129	62	62	57	167
		Cruising - VSR to PZ	11	12	0.92	15.8	0.438	10,300	4,136	Dist at 0.2	9	1,742	143	61	30	30	27	80
		Cruising - PZ to Pilot	4.7	7	0.67	15.8	0.087	10,300	601	Dist at 0.2	9	253	21	9	4	4	4	12
		Maneuvering - Pilot to Berth	3	3	1.00	15.8	0.007	10,300	71	Dist at 0.2	9	30	2	1	1	1	0	1
<b>TOTAL</b>											<b>6,299</b>	<b>519</b>	<b>222</b>	<b>111</b>	<b>111</b>	<b>102</b>	<b>334</b>	
	South Out	Maneuvering - Berth to Pilot		5	1.00	15.8	0.032	10,300	326	Dist at 0.2	10	153	13	5	3	3	2	7
		Cruising - Pilot to PZ	3.5	7	0.50	15.8	0.087	10,300	448	Dist at 0.2	10	210	17	7	4	4	3	10
		Cruising - PZ to VSR	12.5	12	1.04	15.8	0.438	10,300	4,700	Dist at 0.2	10	2,200	181	78	38	38	35	101
		Cruising - VSR to CW	24.5	12	2.04	15.8	0.438	10,300	9,213	Dist at 0.2	10	4,312	355	152	74	74	68	197
<b>TOTAL</b>											<b>6,875</b>	<b>566</b>	<b>243</b>	<b>117</b>	<b>117</b>	<b>108</b>	<b>315</b>	
SUEZMAX	North In	Cruising - CW to VSR	22	12	1.83	17	0.352	16,000	10,317	MDO	5.2	2,511	207	89	58	58	53	299
		Cruising - VSR to PZ	21	12	1.75	17	0.352	16,000	9,848	MDO	5.2	2,397	197	85	55	55	51	285
		Cruising - PZ to Pilot	4.7	7	0.67	17	0.070	16,000	750	MDO	5.2	183	15	6	4	4	4	22
		Maneuvering - Pilot to Berth	3	3	1.00	17	0.005	16,000	88	MDO	5.2	21	2	1	0	0	0	3
SUEZMAX	North In	Cruising - CW to VSR	22	12	1.83	17	0.352	16,000	10,317	Dist at 0.2	46.8	22,600	1,861	798	386	386	355	1,034
		Cruising - VSR to PZ	21	12	1.75	17	0.352	16,000	9,848	Dist at 0.2	46.8	21,573	1,777	761	368	368	339	987
		Cruising - PZ to Pilot	4.7	7	0.67	17	0.070	16,000	750	Dist at 0.2	46.8	1,643	135	58	28	28	26	75
		Maneuvering - Pilot to Berth	3	3	1.00	17	0.005	16,000	88	Dist at 0.2	46.8	193	16	7	3	3	3	9
<b>TOTAL</b>											<b>51,120</b>	<b>4,210</b>	<b>1,804</b>	<b>902</b>	<b>902</b>	<b>830</b>	<b>2,713</b>	
	North Out	Maneuvering - Berth to Pilot		5	1.00	17	0.025	16,000	407	Dist at 0.2	52	991	82	35	17	17	16	45
		Cruising - Pilot to PZ	3.8	7	0.54	17	0.070	16,000	606	Dist at 0.2	52	1,476	122	52	25	25	23	68
		Cruising - PZ to VSR	21	12	1.75	17	0.352	16,000	9,848	Dist at 0.2	52	23,970	1,974	846	409	409	376	1,097
		Cruising - VSR to CW	22	12	1.83	17	0.352	16,000	10,317	Dist at 0.2	52	25,111	2,068	886	428	428	394	1,149
<b>TOTAL</b>											<b>51,547</b>	<b>4,245</b>	<b>1,819</b>	<b>879</b>	<b>879</b>	<b>809</b>	<b>2,358</b>	
<b>GRAND TOTAL</b>												<b>310,728</b>	<b>27,552</b>	<b>15,403</b>	<b>5,545</b>	<b>5,545</b>	<b>5,101</b>	<b>14,752</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Mit.2040-2. 2040 Reduced Project Alternative Auxiliary Generator Average Daily Mitigated Emissions

Ship	Direction	Mode	Activity (hours)	MCR (kW)	Load Factor	Energy (kW-hr)	Fuel Type	Annual Shipcalls (vessels/yr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
VLCC	North In	Cruising	4.25	3,600	0.278	4,258	MDO	4.6	750	59	22	16	16	12	128
		Maneuvering	2.00	3,600	0.278	2,002	MDO	4.6	352	28	10	8	7	6	60
	North In	Cruising	4.25	3,600	0.278	4,258	Dist at 0.2	41.4	6,747	534	194	146	140	112	442
		Maneuvering	2.00	3,600	0.278	2,002	Dist at 0.2	41.4	3,171	251	91	68	66	53	208
	North Out	Maneuvering	1.50	3,600	0.278	1,501	Dist at 0.2	46.0	2,643	209	76	57	55	44	173
		Cruising	4.13	3,600	0.278	4,129	Dist at 0.2	46.0	7,270	575	209	157	151	121	477
<b>TOTAL</b>								<b>9,913</b>	<b>784</b>	<b>285</b>	<b>214</b>	<b>205</b>	<b>164</b>	<b>650</b>	
AFRAMAX	South In	Cruising	3.50	3,600	0.278	3,508	MDO	2.4	322	25	9	7	7	5	55
		Maneuvering	2.00	3,600	0.278	2,002	MDO	2.4	184	15	5	4	4	3	31
AFRAMAX	South In	Cruising	3.50	3,600	0.278	3,508	Dist at 0.2	21.6	2,900	229	83	63	60	48	190
		Maneuvering	2.00	3,600	0.278	2,002	Dist at 0.2	21.6	1,655	131	48	36	34	27	108
AFRAMAX	South Out	Maneuvering	1.50	3,600	0.278	1,501	Dist at 0.2	24.0	1,379	109	40	30	29	23	90
		Cruising	3.58	3,600	0.278	3,586	Dist at 0.2	24.0	3,294	261	95	71	68	55	216
<b>TOTAL</b>								<b>4,673</b>	<b>370</b>	<b>134</b>	<b>101</b>	<b>97</b>	<b>77</b>	<b>306</b>	
PANAMAX	South In	Cruising	3.50	3,600	0.278	3,508	MDO	1	134	11	4	3	3	2	23
		Maneuvering	2.00	3,600	0.278	2,002	MDO	1	77	6	2	2	2	1	13
PANAMAX	South In	Cruising	3.50	3,600	0.278	3,508	Dist at 0.2	9	1,208	96	35	26	25	20	79
		Maneuvering	2.00	3,600	0.278	2,002	Dist at 0.2	9	689	55	20	15	14	11	45
PANAMAX	South Out	Maneuvering	1.5	3,600	0.278	1,501	Dist at 0.2	10	575	45	17	12	12	10	38
		Cruising	3.58	3,600	0.278	3,586	Dist at 0.2	10	1,372	109	39	30	28	23	90
<b>TOTAL</b>								<b>1,947</b>	<b>154</b>	<b>56</b>	<b>42</b>	<b>40</b>	<b>32</b>	<b>128</b>	
SUEZMAX	North In	Cruising	4.25	3,600	0.278	4,258	MDO	5.2	847	67	24	18	18	14	144
		Maneuvering	2.00	3,600	0.278	2,002	MDO	5.2	398	32	11	9	8	7	68
SUEZMAX	North In	Cruising	4.25	3,600	0.278	4,258	Dist at 0.2	46.8	7,627	604	219	165	158	126	500
		Maneuvering	2.00	3,600	0.278	2,002	Dist at 0.2	46.8	3,585	284	103	77	74	59	235
SUEZMAX	North Out	Maneuvering	1.5	3,600	0.278	1,501	Dist at 0.2	52	2,988	236	86	64	62	50	196
		Cruising	4.13	3,600	0.278	4,129	Dist at 0.2	52	8,218	650	236	177	170	136	539
<b>TOTAL</b>								<b>11,206</b>	<b>887</b>	<b>322</b>	<b>242</b>	<b>232</b>	<b>186</b>	<b>734</b>	
<b>GRAND TOTAL</b>									<b>58,384</b>	<b>4,620</b>	<b>1,680</b>	<b>1,260</b>	<b>1,210</b>	<b>968</b>	<b>4,148</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Mit.2040-3. 2040 Reduced Project Alternative Summary of Average Daily Mitigated Vessel Emissions.

Mode	Equipment	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Cruising	Main Engines	297,564	25,173	11,171	5,194	5,194	4,779	14,582
Cruising	Aux Generator	40,689	3,220	1,171	878	843	674	2,882
Maneuvering	Main Engines	13,164	2,379	4,233	351	351	322	170
Maneuvering	Aux Generator	17,695	1,400	509	382	367	293	1,266
<b>Cruising and Maneuvering</b>	<b>TOTAL</b>	<b>369,112</b>	<b>32,172</b>	<b>17,083</b>	<b>6,805</b>	<b>6,755</b>	<b>6,069</b>	<b>18,900</b>

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Cruising	Main Engines	815	69	31	14	14	13	40
Cruising	Aux Generator	111	9	3	2	2	2	8
Maneuvering	Main Engines	36	7	12	1	1	1	0
Maneuvering	Aux Generator	48	4	1	1	1	1	3
<b>Cruising and Maneuvering</b>	<b>TOTAL</b>	<b>1,011</b>	<b>88</b>	<b>47</b>	<b>19</b>	<b>19</b>	<b>17</b>	<b>52</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Mit.2040-4. 2040 Reduced Project Alternative Boiler Warm-Up Average Daily Mitigated Emissions.

Shipcalls (vessels/ day)	Vessel Size	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
2.4	Aframax	MDO	0.52	102.17	30%	3	50,000	39	10	1	6	5	3	143
21.6	Aframax	Dist at 0.2	0.20	102.17	30%	3	50,000	352	88	5	58	41	27	495
4.6	VLCC	MDO	0.52	80.38	30%	3	90,000	127	27	6	18	12	8	388
41.4	VLCC	Dist at 0.2	0.20	80.38	30%	3	90,000	1,143	239	50	158	111	74	1,345
1	Panamax	MDO	0.52	59.91	30%	3	35,000	7	2	0	1	1	1	24
9	Panamax	Dist at 0.2	0.20	59.91	30%	3	35,000	60	15	1	10	7	5	85
5.2	Suezmax	MDO	0.52	82.85	30%	3	70,000	96	24	1	16	11	7	352
46.8	Suezmax	Dist at 0.2	0.20	82.85	30%	3	70,000	865	216	12	143	100	67	1,219
<b>TOTAL</b>								<b>2,689</b>	<b>620</b>	<b>76</b>	<b>410</b>	<b>287</b>	<b>192</b>	<b>4,052</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Mit.2040-5. 2040 Reduced Project Alternative Summary of Boiler Warm-Up Average Daily Mitigated Emissions.

Mode	Equipment	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Boiler Warm-up	Boiler	2,689	620	76	410	287	192	4,052

Table H.2.RPA.Mit.2040-6. 2040 Reduced Project Alternative Berth Operations Average Daily Mitigated Emissions.

**Auxiliary Generator Pre-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
2.4	Aframax	700,000	MDO	0.52	3,600	27.8%	2.5	230	18	7	5	5	4	39
21.6	Aframax	700,000	Dist at 0.2%S	0.20	3,600	27.8%	2.5	2,068	164	60	45	43	34	136
4.6	VLCC	2,000,000	MDO	0.52	3,600	27.8%	2.5	440	35	13	10	9	7	75
41.4	VLCC	2,000,000	Dist at 0.2%S	0.20	3,600	27.8%	2.5	3,964	314	114	86	82	66	260
1.0	Panamax	350,000	MDO	0.52	3,600	27.8%	2.5	96	8	3	2	2	2	16
9.0	Panamax	350,000	Dist at 0.2%S	0.20	3,600	27.8%	2.5	862	68	25	19	18	14	56
5.2	Suezmax	1,000,000	MDO	0.52	3,600	27.8%	2.5	498	39	14	11	10	8	85
46.8	Suezmax	1,000,000	Dist at 0.2%S	0.20	3,600	27.8%	2.5	4,481	355	129	97	93	74	294
<b>TOTAL</b>								<b>12,640</b>	<b>1,000</b>	<b>364</b>	<b>273</b>	<b>262</b>	<b>210</b>	<b>961</b>

**Boiler Pre-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
2.4	Aframax	700,000	MDO	0.52	102.17	30.0%	2.5	50,000	33	8	0	5	4	3	119
21.6	Aframax	700,000	Dist at 0.2%S	0.20	102.17	30.0%	2.5	50,000	293	73	4	49	34	23	413
4.6	VLCC	2,000,000	MDO	0.52	80.38	30.0%	2.5	90,000	106	22	5	15	10	7	324
41.4	VLCC	2,000,000	Dist at 0.2%S	0.20	80.38	30.0%	2.5	90,000	952	199	42	132	92	62	1,121
1.0	Panamax	350,000	MDO	0.52	59.91	30.0%	2.5	35,000	6	1	0	1	1	0	20
9.0	Panamax	350,000	Dist at 0.2%S	0.20	59.91	30.0%	2.5	35,000	50	13	1	8	6	4	71
5.2	Suezmax	1,000,000	MDO	0.52	82.85	30.0%	2.5	70,000	80	20	1	13	9	6	293
46.8	Suezmax	1,000,000	Dist at 0.2%S	0.20	82.85	30.0%	2.5	70,000	721	180	10	119	84	56	1,016
<b>TOTAL</b>									<b>2,241</b>	<b>517</b>	<b>63</b>	<b>342</b>	<b>239</b>	<b>160</b>	<b>3,376</b>

**Auxiliary Generator Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
24.0	Aframax	700,000	Dist at 0.2%S	0.20	3,600	55.6%	15.0	27,577	2,182	794	595	571	457	1,808
46.0	VLCC	2,000,000	Dist at 0.2%S	0.20	3,600	55.6%	23.2	81,751	6,469	2,353	1,764	1,694	1,355	5,359
10.0	Panamax	350,000	Dist at 0.2%S	0.20	3,600	55.6%	11.0	8,426	667	242	182	175	140	552
52.0	Suezmax	1,000,000	Dist at 0.2%S	0.20	3,600	55.6%	15.3	60,945	4,823	1,754	1,315	1,263	1,010	3,995
<b>TOTAL</b>								<b>178,700</b>	<b>14,142</b>	<b>5,142</b>	<b>3,857</b>	<b>3,703</b>	<b>2,962</b>	<b>11,713</b>

**Boiler Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Inerting Fuel Consumption Savings (lb/1000 bbl offloaded)	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
24.0	Aframax	700,000	Dist at 0.2%S	0.20	102.17	28.06	15.0	4,410	1,102	62	730	511	342	6,211
46.0	VLCC	2,000,000	Dist at 0.2%S	0.20	80.38	28.06	23.2	20,410	4,262	900	2,821	1,975	1,321	24,011
10.0	Panamax	350,000	Dist at 0.2%S	0.20	59.91	28.06	11.0	395	99	6	65	46	31	556
52.0	Suezmax	1,000,000	Dist at 0.2%S	0.20	82.85	28.06	15.3	10,091	2,523	142	1,670	1,169	782	14,213
<b>TOTAL</b>								<b>35,306</b>	<b>7,986</b>	<b>1,110</b>	<b>5,287</b>	<b>3,701</b>	<b>2,475</b>	<b>44,992</b>

**Auxiliary Generator Post-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
24.0	Aframax	700,000	Dist at 0.2%S	0.20	3,600	27.8%	1.0	919	73	26	20	19	15	60
46.0	VLCC	2,000,000	Dist at 0.2%S	0.20	3,600	27.8%	1.0	1,762	139	51	38	37	29	115
10.0	Panamax	350,000	Dist at 0.2%S	0.20	3,600	27.8%	1.0	383	30	11	8	8	6	25
52.0	Suezmax	1,000,000	Dist at 0.2%S	0.20	3,600	27.8%	1.0	1,992	158	57	43	41	33	131
<b>TOTAL</b>								<b>5,056</b>	<b>400</b>	<b>145</b>	<b>109</b>	<b>105</b>	<b>84</b>	<b>331</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Mit.2040-7. 2040 Reduced Project Alternative Summary of Berth Operations Average Daily Mitigated Emissions.

No AMP

Mode	Equipment	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Berth Operations	Boiler	37,547	8,503	1,174	5,629	3,940	2,635	48,368
Berth Operations	Aux Generator	196,395	15,542	5,652	4,239	4,069	3,255	13,006

Mitigated Emissions with AMP - Year 2040

AMP Reduction 70%

Berth Operations	Boiler	37,547	8,503	1,174	5,629	3,940	2,635	48,368
Berth Operations	Aux Generator	58,918	4,663	1,695	1,272	1,221	977	3,902

Table H.2.RPA.Mit.Max.2040-1. 2040 Reduced Project Alternative Main Engines Maximum Daily Mitigated Emissions.

Ship	Direction	Mode	Distance (nautical miles)	Ship speed (knots)	Activity (hours)	Maximum Speed (knots)	Load Factor	MCR (KW)	Energy (kW-hr)	Fuel Type	Maximum Daily Shipcalls (vessels/day)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
VLCC	North In	Cruising - CW to VSR	22	12	1.83	16.9	0.358	25,400	16,671	MDO	0.1	78	6	3	2	2	2	9
		Cruising - VSR to PZ	21	12	1.75	16.9	0.358	25,400	15,913	MDO	0.1	74	6	3	2	2	2	9
		Cruising - PZ to Pilot	4.7	7	0.67	16.9	0.071	25,400	1,212	MDO	0.1	8	1	1	0	0	0	1
	North In	Maneuvering - Pilot to Berth	3	1.00	16.9	0.006	25,400	142	MDO	0.1	11	2	5	0	0	0	0	0
		Cruising - CW to VSR	22	12	1.83	16.9	0.358	25,400	16,671	Dist at 0.2	0.9	702	58	25	12	12	11	32
		Cruising - VSR to PZ	21	12	1.75	16.9	0.358	25,400	15,913	Dist at 0.2	0.9	670	55	24	11	11	11	31
		Cruising - PZ to Pilot	4.7	7	0.67	16.9	0.071	25,400	1,212	Dist at 0.2	0.9	72	12	9	2	2	1	2
		Maneuvering - Pilot to Berth	3	1.00	16.9	0.006	25,400	142	Dist at 0.2	0.9	96	18	45	3	3	3	0	
		Maneuvering - Berth to Pilot	5	1.00	16.9	0.026	25,400	658	Dist at 0.2	1.0	92	20	23	2	2	2	1	
		Cruising - Pilot to PZ	3.8	7	0.54	16.9	0.071	25,400	980	Dist at 0.2	1.0	65	11	8	1	1	1	2
		Cruising - PZ to VSR	21	12	1.75	16.9	0.358	25,400	15,913	Dist at 0.2	1.0	745	61	26	13	13	12	34
		Cruising - VSR to CW	22	12	1.83	16.9	0.358	25,400	16,671	Dist at 0.2	1.0	780	64	28	13	13	12	36
<b>TOTAL</b>											<b>3,395</b>	<b>314</b>	<b>198</b>	<b>62</b>	<b>62</b>	<b>57</b>	<b>158</b>	
AFRAMAX	South In	Cruising - CW to VSR	23	12	1.92	16.1	0.414	12,477	9,902	MDO	0.1	46	4	2	1	1	1	6
		Cruising - VSR to PZ	11	12	0.92	16.1	0.414	12,477	4,736	MDO	0.1	22	2	1	1	1	0	3
		Cruising - PZ to Pilot	4.7	7	0.67	16.1	0.082	12,477	689	MDO	0.1	4	1	0	0	0	0	0
	South In	Maneuvering - Pilot to Berth	3	1.00	16.1	0.006	12,477	81	MDO	0.1	6	1	2	0	0	0	0	0
		Cruising - CW to VSR	23	12	1.92	16.1	0.414	12,477	9,902	Dist at 0.2	0.9	417	34	15	7	7	7	19
		Cruising - VSR to PZ	11	12	0.92	16.1	0.414	12,477	4,736	Dist at 0.2	0.9	199	16	7	3	3	3	9
South Out	Cruising - PZ to Pilot	4.7	7	0.67	16.1	0.082	12,477	689	Dist at 0.2	0.9	38	6	4	1	1	1	1	
	Maneuvering - Pilot to Berth	3	1.00	16.1	0.006	12,477	81	Dist at 0.2	0.9	51	9	21	1	1	1	0		
	Maneuvering - Berth to Pilot	5	1.00	16.1	0.030	12,477	374	Dist at 0.2	1.0	51	10	11	1	1	1	1		
	Cruising - Pilot to PZ	3.5	7	0.50	16.1	0.082	12,477	513	Dist at 0.2	1.0	32	5	3	1	1	1	1	
	Cruising - PZ to VSR	12.5	12	1.04	16.1	0.414	12,477	5,382	Dist at 0.2	1.0	252	21	9	4	4	4	12	
	Cruising - VSR to CW	24.5	12	2.04	16.1	0.414	12,477	10,548	Dist at 0.2	1.0	494	41	17	8	8	8	23	
<b>TOTAL</b>											<b>1,613</b>	<b>148</b>	<b>92</b>	<b>29</b>	<b>29</b>	<b>27</b>	<b>74</b>	
PANAMAX	South In	Cruising - CW to VSR	23	12	1.92	15.8	0.438	10,300	8,649	MDO	0.1	40	3	1	1	1	1	5
		Cruising - VSR to PZ	11	12	0.92	15.8	0.438	10,300	4,136	MDO	0.1	19	2	1	0	0	0	2
		Cruising - PZ to Pilot	4.7	7	0.67	15.8	0.087	10,300	601	MDO	0.1	3	0	0	0	0	0	0
	South In	Maneuvering - Pilot to Berth	3	1.00	15.8	0.007	10,300	71	MDO	0.1	0	0	0	0	0	0	0	0
		Cruising - CW to VSR	23	12	1.92	15.8	0.438	10,300	8,649	Dist at 0.2	0.9	364	30	13	6	6	6	17
		Cruising - VSR to PZ	11	12	0.92	15.8	0.438	10,300	4,136	Dist at 0.2	0.9	174	14	6	3	3	3	8
		Cruising - PZ to Pilot	4.7	7	0.67	15.8	0.087	10,300	601	Dist at 0.2	0.9	25	2	1	0	0	0	1
		Maneuvering - Pilot to Berth	3	1.00	15.8	0.007	10,300	71	Dist at 0.2	0.9	3	0	0	0	0	0	0	
		Maneuvering - Berth to Pilot	5	1.00	15.8	0.032	10,300	326	Dist at 0.2	1.0	15	1	1	0	0	0	1	
		Cruising - Pilot to PZ	3.5	7	0.50	15.8	0.087	10,300	448	Dist at 0.2	1.0	21	2	1	0	0	0	1
		Cruising - PZ to VSR	12.5	12	1.04	15.8	0.438	10,300	4,700	Dist at 0.2	1.0	220	18	8	4	4	3	10
		Cruising - VSR to CW	24.5	12	2.04	15.8	0.438	10,300	9,213	Dist at 0.2	1.0	431	36	15	7	7	7	20
<b>TOTAL</b>											<b>1317</b>	<b>108</b>	<b>46</b>	<b>23</b>	<b>23</b>	<b>21</b>	<b>65</b>	
SUEZMAX	North In	Cruising - CW to VSR	22	12	1.83	17	0.352	16,000	10,317	MDO	0.1	48	4	2	1	1	1	6
		Cruising - VSR to PZ	21	12	1.75	17	0.352	16,000	9,848	MDO	0.1	46	4	2	1	1	1	5
		Cruising - PZ to Pilot	4.7	7	0.67	17	0.070	16,000	750	MDO	0.1	4	0	0	0	0	0	0
	North In	Maneuvering - Pilot to Berth	3	1.00	17	0.005	16,000	88	MDO	0.1	0	0	0	0	0	0	0	0
		Cruising - CW to VSR	22	12	1.83	17	0.352	16,000	10,317	Dist at 0.2	0.9	435	36	15	7	7	7	20
		Cruising - VSR to PZ	21	12	1.75	17	0.352	16,000	9,848	Dist at 0.2	0.9	415	34	15	7	7	7	19
North Out	Cruising - PZ to Pilot	4.7	7	0.67	17	0.070	16,000	750	Dist at 0.2	0.9	32	3	1	1	1	0	1	
	Maneuvering - Pilot to Berth	3	1.00	17	0.005	16,000	88	Dist at 0.2	0.9	4	0	0	0	0	0	0		
	Maneuvering - Berth to Pilot	5	1.00	17	0.025	16,000	407	Dist at 0.2	1.0	19	2	1	0	0	0	1		
	Cruising - Pilot to PZ	3.8	7	0.54	17	0.070	16,000	606	Dist at 0.2	1.0	28	2	1	0	0	0	1	
	Cruising - PZ to VSR	21	12	1.75	17	0.352	16,000	9,848	Dist at 0.2	1.0	461	38	16	8	8	7	21	
	Cruising - VSR to CW	22	12	1.83	17	0.352	16,000	10,317	Dist at 0.2	1.0	483	40	17	8	8	8	22	
<b>TOTAL</b>											<b>1974</b>	<b>163</b>	<b>70</b>	<b>34</b>	<b>34</b>	<b>32</b>	<b>98</b>	
<b>MAXIMUM</b>											<b>3,395</b>	<b>314</b>	<b>198</b>	<b>62</b>	<b>62</b>	<b>57</b>	<b>158</b>	



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Table H.2.RPA.Mit.Max.2040-2. 2040 Reduced Project Alternative Auxiliary Generator Maximum Daily Mitigated Emissions

Ship	Direction	Mode	Activity (hours)	MCR (kW)	Load Factor	Energy (kW-hr)	Fuel Type	Maximum Daily Shipcalls (vessels/day)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
VLCC	North In	Cruising	4.25	3,600	0.278	4,258	MDO	0.1	16	1	0	0	0	0	3
		Maneuvering	2.00	3,600	0.278	2,002	MDO	0.1	8	1	0	0	0	0	1
VLCC	North In	Cruising	4.25	3,600	0.278	4,258	Dist at 0.2	0.9	147	12	4	3	3	2	10
		Maneuvering	2.00	3,600	0.278	2,002	Dist at 0.2	0.9	69	5	2	1	1	1	5
	North Out	Maneuvering	1.50	3,600	0.278	1,501	Dist at 0.2	1.0	57	5	2	1	1	1	4
		Cruising	4.13	3,600	0.278	4,129	Dist at 0.2	1.0	158	13	5	3	3	3	10
<b>TOTAL</b>								<b>455</b>	<b>36</b>	<b>13</b>	<b>10</b>	<b>9</b>	<b>8</b>	<b>32</b>	
AFRAMAX	South In	Cruising	3.50	3,600	0.278	3,508	MDO	0.1	13	1	0	0	0	0	2
AFRAMAX	South In	Maneuvering	2.00	3,600	0.278	2,002	MDO	0.1	8	1	0	0	0	0	1
		Cruising	3.50	3,600	0.278	3,508	Dist at 0.2	0.9	121	10	3	3	3	2	8
	South Out	Maneuvering	2.00	3,600	0.278	2,002	Dist at 0.2	0.9	69	5	2	1	1	1	5
		Maneuvering	1.50	3,600	0.278	1,501	Dist at 0.2	1.0	57	5	2	1	1	1	4
		Cruising	3.58	3,600	0.278	3,586	Dist at 0.2	1.0	137	11	4	3	3	2	9
<b>TOTAL</b>								<b>406</b>	<b>32</b>	<b>12</b>	<b>9</b>	<b>8</b>	<b>7</b>	<b>29</b>	
PANAMAX	South In	Cruising	3.15	3,600	0.278	3,155	MDO	0.1	12	1	0	0	0	0	2
PANAMAX	South In	Maneuvering	2.00	3,600	0.278	2,002	MDO	0.1	8	1	0	0	0	0	1
		Cruising	3.15	3,600	0.278	3,155	Dist at 0.2	0.9	109	9	3	2	2	2	7
	South Out	Maneuvering	2.00	3,600	0.278	2,002	Dist at 0.2	0.9	69	5	2	1	1	1	5
		Maneuvering	1.5	3,600	0.278	1,501	Dist at 0.2	1.0	57	5	2	1	1	1	4
		Cruising	3.21	3,600	0.278	3,211	Dist at 0.2	1.0	123	10	4	3	3	2	8
<b>TOTAL</b>								<b>378</b>	<b>30</b>	<b>11</b>	<b>8</b>	<b>8</b>	<b>6</b>	<b>27</b>	
SUEZMAX	North In	Cruising	3.84	3,600	0.278	3,840	MDO	0.1	15	1	0	0	0	0	3
SUEZMAX	North In	Maneuvering	2.00	3,600	0.278	2,002	MDO	0.1	8	1	0	0	0	0	1
		Cruising	3.84	3,600	0.278	3,840	Dist at 0.2	0.9	132	10	4	3	3	2	9
	North Out	Maneuvering	2.00	3,600	0.278	2,002	Dist at 0.2	0.9	69	5	2	1	1	1	5
		Maneuvering	1.5	3,600	0.278	1,501	Dist at 0.2	1.0	57	5	2	1	1	1	4
		Cruising	3.71	3,600	0.278	3,712	Dist at 0.2	1.0	142	11	4	3	3	2	9
<b>TOTAL</b>								<b>423</b>	<b>33</b>	<b>12</b>	<b>9</b>	<b>9</b>	<b>7</b>	<b>30</b>	
<b>MAXIMUM</b>								<b>455</b>	<b>36</b>	<b>13</b>	<b>10</b>	<b>9</b>	<b>8</b>	<b>32</b>	

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Mit.Max.2040-3. 2040 Reduced Project Alternative Summary of Maximum Daily Mitigated Vessel Emissions.

<b>Mode</b>	<b>Equipment</b>	<b>NO<sub>x</sub> Emissions (lb/day)</b>	<b>CO Emissions (lb/day)</b>	<b>ROG Emissions (lb/day)</b>	<b>PM Emissions (lb/day)</b>	<b>PM<sub>10</sub> Emissions (lb/day)</b>	<b>PM<sub>2.5</sub> Emissions (lb/day)</b>	<b>SO<sub>2</sub> Emissions (lb/day)</b>
Cruising	Main Engines	3,196	275	125	56	56	52	156
Cruising	Aux Generator	321	25	9	7	7	5	23
Maneuvering	Main Engines	200	39	73	6	6	5	2
Maneuvering	Aux Generator	134	11	4	3	3	2	10
<b>Cruising and Maneuvering</b>	<b>TOTAL</b>	<b>3,850</b>	<b>350</b>	<b>211</b>	<b>71</b>	<b>71</b>	<b>64</b>	<b>190</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Mit.Max.2040-4. 2040 Reduced Project Alternative Boiler Warm-Up Maximum Daily Mitigated Emissions.

Shipcalls (vessels/ day)	Vessel Size	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
0.1	Aframax	MDO	0.52	102.17	30%	3	50,000	2	0	0	0	0	0	6
0.9	Aframax	Dist at 0.2	0.20	102.17	30%	3	50,000	15	4	0	2	2	1	21
							<b>TOTAL</b>	16	4	0	3	2	1	27
0.1	VLCC	MDO	0.52	80.38	30%	3	90,000	3	1	0	0	0	0	8
0.9	VLCC	Dist at 0.2	0.20	80.38	30%	3	90,000	25	5	1	3	2	2	29
							<b>TOTAL</b>	28	6	1	4	3	2	38
0.1	Panamax	MDO	0.52	59.91	30%	3	35,000	1	0	0	0	0	0	2
0.9	Panamax	Dist at 0.2	0.20	59.91	30%	3	35,000	6	2	0	1	1	0	8
							<b>TOTAL</b>	7	2	0	1	1	1	11
0.1	Suezmax	MDO	0.52	82.85	30%	3	70,000	2	0	0	0	0	0	7
0.9	Suezmax	Dist at 0.2	0.20	82.85	30%	3	70,000	17	4	0	3	2	1	23
							<b>TOTAL</b>	18	5	0	3	2	1	30
							<b>MAXIMUM</b>	28	6	1	4	3	2	38

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Mit.Max.2040-5. 2040 Reduced Project Alternative Summary of Boiler Warm-Up Maximum Mitigated Emissions.

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Boiler Warm-up	Boiler	28	6	1	4	3	2	38

Table H.2.RPA.Mit.Max.2040-6. 2040 Reduced Project Alternative Berth Operations Maximum Daily Mitigated Emissions.

**Auxiliary Generator Pre-Pumping**

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
0.1	Aframax	700,000	MDO	0.52	3,600	27.8%	2.5	10	1	0	0	0	0	2
0.9	Aframax	700,000	Dist at 0.2%S	0.20	3,600	27.8%	2.5	86	7	2	2	2	1	6
								<b>TOTAL</b>	<b>96</b>	<b>8</b>	<b>3</b>	<b>2</b>	<b>2</b>	<b>7</b>
0.1	VLCC	2,000,000	MDO	0.52	3,600	27.8%	2.5	10	1	0	0	0	0	2
0.9	VLCC	2,000,000	Dist at 0.2%S	0.20	3,600	27.8%	2.5	86	7	2	2	2	1	6
								<b>TOTAL</b>	<b>96</b>	<b>8</b>	<b>3</b>	<b>2</b>	<b>2</b>	<b>7</b>
0.1	Panamax	350,000	MDO	0.52	3,600	27.8%	2.5	10	1	0	0	0	0	2
0.9	Panamax	350,000	Dist at 0.2%S	0.20	3,600	27.8%	2.5	86	7	2	2	2	1	6
								<b>TOTAL</b>	<b>96</b>	<b>8</b>	<b>3</b>	<b>2</b>	<b>2</b>	<b>7</b>
0.1	Suezmax	1,000,000	MDO	0.52	3,600	27.8%	2.5	10	1	0	0	0	0	2
0.9	Suezmax	1,000,000	Dist at 0.2%S	0.20	3,600	27.8%	2.5	86	7	2	2	2	1	6
								<b>TOTAL</b>	<b>96</b>	<b>8</b>	<b>3</b>	<b>2</b>	<b>2</b>	<b>7</b>
<b>MAXIMUM</b>								<b>96</b>	<b>8</b>	<b>3</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>7</b>

**Boiler Pre-Pumping**

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
0.1	Aframax	700,000	MDO	0.52	102.17	30.0%	2.5	50,000	1	0	0	0	0	0	5
0.9	Aframax	700,000	Dist at 0.2%S	0.20	102.17	30.0%	2.5	50,000	12	3	0	2	1	1	17
								<b>TOTAL</b>	<b>14</b>	<b>3</b>	<b>0</b>	<b>2</b>	<b>2</b>	<b>1</b>	<b>22</b>
0.1	VLCC	2,000,000	MDO	0.52	80.38	30.0%	2.5	90,000	2	0	0	0	0	0	7
0.9	VLCC	2,000,000	Dist at 0.2%S	0.20	80.38	30.0%	2.5	90,000	21	4	1	3	2	1	24
								<b>TOTAL</b>	<b>23</b>	<b>5</b>	<b>1</b>	<b>3</b>	<b>2</b>	<b>1</b>	<b>31</b>
0.1	Panamax	350,000	MDO	0.52	59.91	30.0%	2.5	35,000	1	0	0	0	0	0	2
0.9	Panamax	350,000	Dist at 0.2%S	0.20	59.91	30.0%	2.5	35,000	5	1	0	1	1	0	7
								<b>TOTAL</b>	<b>6</b>	<b>1</b>	<b>0</b>	<b>1</b>	<b>1</b>	<b>0</b>	<b>9</b>
0.1	Suezmax	1,000,000	MDO	0.52	82.85	30.0%	2.5	70,000	2	0	0	0	0	0	6
0.9	Suezmax	1,000,000	Dist at 0.2%S	0.20	82.85	30.0%	2.5	70,000	14	3	0	2	2	1	20
								<b>TOTAL</b>	<b>15</b>	<b>4</b>	<b>0</b>	<b>3</b>	<b>2</b>	<b>1</b>	<b>25</b>
<b>MAXIMUM</b>								<b>23</b>	<b>5</b>	<b>1</b>	<b>3</b>	<b>2</b>	<b>1</b>	<b>31</b>	

**Auxiliary Generator Pumping**

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	700,000	Dist at 0.2%S	0.20	3,600	55.6%	15.0	1,149	91	33	25	24	19	75
1.0	VLCC	2,000,000	Dist at 0.2%S	0.20	3,600	55.6%	23.2	1,777	141	51	38	37	29	116
1.0	Panamax	350,000	Dist at 0.2%S	0.20	3,600	55.6%	11.0	843	67	24	18	17	14	55
1.0	Suezmax	1,000,000	Dist at 0.2%S	0.20	3,600	55.6%	15.3	1,172	93	34	25	24	19	77
<b>MAXIMUM</b>								<b>1,777</b>	<b>141</b>	<b>51</b>	<b>38</b>	<b>37</b>	<b>29</b>	<b>116</b>

**Boiler Pumping**

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Inerting Fuel Consumption Savings (lb/1000 bbl offloaded)	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	700,000	Dist at 0.2%S	0.20	102.17	28.06	15.0	184	46	3	30	21	14	259
1.0	VLCC	2,000,000	Dist at 0.2%S	0.20	80.38	28.06	23.2	444	93	20	61	43	29	522
1.0	Panamax	350,000	Dist at 0.2%S	0.20	59.91	28.06	11.0	39	10	1	7	5	3	56
1.0	Suezmax	1,000,000	Dist at 0.2%S	0.20	82.85	28.06	15.3	194	49	3	32	22	15	273
<b>MAXIMUM</b>								<b>444</b>	<b>93</b>	<b>20</b>	<b>61</b>	<b>43</b>	<b>29</b>	<b>522</b>

**Auxiliary Generator Post-Pumping**

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	700,000	Dist at 0.2%S	0.20	3,600	27.8%	1.0	38	3	1	1	1	1	3
1.0	VLCC	2,000,000	Dist at 0.2%S	0.20	3,600	27.8%	1.0	38	3	1	1	1	1	3
1.0	Panamax	350,000	Dist at 0.2%S	0.20	3,600	27.8%	1.0	38	3	1	1	1	1	3
1.0	Suezmax	1,000,000	Dist at 0.2%S	0.20	3,600	27.8%	1.0	38	3	1	1	1	1	3
<b>MAXIMUM</b>								<b>38</b>	<b>3</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>3</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Mit.Max.2040-7. 2040 Reduced Project Alternative Summary of Berth Operations Maximum Daily Mitigated Emissions.

No AMP

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Berth Operations	Boiler	467	97	21	65	45	30	553
Berth Operations	Aux Generator	1,911	151	55	41	40	32	126

Mitigated Emissions with AMP - Year 2040

AMP Reduction 70%

Berth Operations	Boiler	467	97	21	65	45	30	553
Berth Operations	Aux Generator	573.37	45.37	16.50	12.37	11.88	9.50	37.88

**APPENDIX H.2 - SECTION 2.2**  
**AMP ELECTRICITY CONSUMPTION**

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Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Mit.AMP.2010-1. 2010 Proposed Project Berth Operations Average Daily Mitigated Emissions by AMP Electricity Consumption.

Auxiliary Generator Pre-Pumping

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NOx Emission Factor (lb/MW-hr)	CO Emission Factor (lb/MW-hr)	ROG Emission Factor (lb/MW-hr)	PM Emission Factor (lb/MW-hr)	PM10 Emission Factor (lb/MW-hr)	PM2.5 Emission Factor (lb/MW-hr)	SOx Emission Factor (lb/MW-hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
32.0	Aframax	700,000	MDO	0.52	3,600	27.8%	2.5	1.15	0.20	0.01	0.04	0.04	0.04	0.12	119	21	1.03	4.13	4.13	4.13	12.39
26.0	VLCC	2,000,000	MDO	0.52	3,600	27.8%	2.5	1.15	0.20	0.01	0.04	0.04	0.04	0.12	97	17	0.84	3.36	3.36	3.36	10.07
26.0	Panamax	350,000	MDO	0.52	3,600	27.8%	2.5	1.15	0.20	0.01	0.04	0.04	0.04	0.12	97	17	0.84	3.36	3.36	3.36	10.07
45.0	Suezmax	1,000,000	MDO	0.52	3,600	27.8%	2.5	1.15	0.20	0.01	0.04	0.04	0.04	0.12	167	29	1.45	5.81	5.81	5.81	17.43
<b>TOTAL</b>															<b>479</b>	<b>83</b>	<b>4</b>	<b>17</b>	<b>17</b>	<b>17</b>	<b>50</b>

Auxiliary Generator Pumping

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NOx Emission Factor (lb/MW-hr)	CO Emission Factor (lb/MW-hr)	ROG Emission Factor (lb/MW-hr)	PM Emission Factor (lb/MW-hr)	PM10 Emission Factor (lb/MW-hr)	PM2.5 Emission Factor (lb/MW-hr)	SOx Emission Factor (lb/MW-hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
32.0	Aframax	700,000	Dist at 0.2%	0.20	3,600	55.6%	15.0	1.15	0.20	0.01	0.04	0.04	0.04	0.12	1,425	248	12.39	49.58	49.58	49.58	148.73
26.0	VLCC	2,000,000	Dist at 0.2%	0.20	3,600	55.6%	23.2	1.15	0.20	0.01	0.04	0.04	0.04	0.12	1,791	312	15.58	62.30	62.30	62.30	186.90
26.0	Panamax	350,000	Dist at 0.2%	0.20	3,600	55.6%	11.0	1.15	0.20	0.01	0.04	0.04	0.04	0.12	849	148	7.38	29.54	29.54	29.54	88.62
45.0	Suezmax	1,000,000	Dist at 0.2%	0.20	3,600	55.6%	15.3	1.15	0.20	0.01	0.04	0.04	0.04	0.12	2,044	356	17.78	71.11	71.11	71.11	213.33
<b>TOTAL</b>															<b>6,110</b>	<b>1,063</b>	<b>53</b>	<b>213</b>	<b>213</b>	<b>213</b>	<b>638</b>

Auxiliary Generator Post-Pumping

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NOx Emission Factor (lb/MW-hr)	CO Emission Factor (lb/MW-hr)	ROG Emission Factor (lb/MW-hr)	PM Emission Factor (lb/MW-hr)	PM10 Emission Factor (lb/MW-hr)	PM2.5 Emission Factor (lb/MW-hr)	SOx Emission Factor (lb/MW-hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
32.0	Aframax	700,000	Dist at 0.2%	0.20	3,600	27.8%	1.0	1.15	0.20	0.01	0.04	0.04	0.04	0.12	48	8	0.41	1.65	1.65	1.65	4.96
26.0	VLCC	2,000,000	Dist at 0.2%	0.20	3,600	27.8%	1.0	1.15	0.20	0.01	0.04	0.04	0.04	0.12	39	7	0.34	1.34	1.34	1.34	4.03
26.0	Panamax	350,000	Dist at 0.2%	0.20	3,600	27.8%	1.0	1.15	0.20	0.01	0.04	0.04	0.04	0.12	39	7	0.34	1.34	1.34	1.34	4.03
45.0	Suezmax	1,000,000	Dist at 0.2%	0.20	3,600	27.8%	1.0	1.15	0.20	0.01	0.04	0.04	0.04	0.12	67	12	0.58	2.32	2.32	2.32	6.97
<b>TOTAL</b>															<b>192</b>	<b>33</b>	<b>2</b>	<b>7</b>	<b>7</b>	<b>7</b>	<b>20</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Mit.AMP.2010-2. 2010 Proposed Project Summary of Berth Operations Average Daily Mitigated Emissions by AMP Electricity Consumption.

Mode	Equipment	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Berth Operations	Aux Generator	6,780	1,179	59	236	236	236	708

NO AMP 0%

Mode	Equipment	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Berth Operations	Aux Generator	6,780	1,179	59	236	236	236	708

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Mit.AMP.2010-3. 2010 Proposed Project Berth Operations Maximum Daily Mitigated Emissions by AMP Electricity Consumption.

Auxiliary Generator Pre-Pumpin

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded (bbl/call)	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NOx Emission Factors (lb/MW-hr)	CO Emission Factors (lb/MW-hr)	ROG Emission Factors (lb/MW-hr)	PM Emission Factors (lb/MW-hr)	PM10 Emission Factors (lb/MW-hr)	PM2.5 Emission Factors (lb/MW-hr)	SOx Emission Factors (lb/MW-hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)	
1.0	Aframax	700,000	MDO	0.52	3,600	27.8%	2.5	1.15	0.20	0.01	0.04	0.04	0.04	0.12	4	1	0.03	0.13	0.13	0.13	0.13	0.38
1.0	VLCC	2,000,000	MDO	0.52	3,600	27.8%	2.5	1.15	0.20	0.01	0.04	0.04	0.04	0.12	4	1	0.03	0.13	0.13	0.13	0.13	0.38
1.0	Panamax	350,000	MDO	0.52	3,600	27.8%	2.5	1.15	0.20	0.01	0.04	0.04	0.04	0.12	4	1	0.03	0.13	0.13	0.13	0.13	0.38
1.0	Suezmax	1,000,000	MDO	0.52	3,600	27.8%	2.5	1.15	0.20	0.01	0.04	0.04	0.04	0.12	4	1	0.03	0.13	0.13	0.13	0.13	0.38
<b>MAXIMUM</b>															<b>4</b>	<b>1</b>	<b>0.03</b>	<b>0.13</b>	<b>0.13</b>	<b>0.13</b>	<b>0.38</b>	

Auxiliary Generator Pumpin

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded (bbl/call)	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NOx Emission Factors (lb/MW-hr)	CO Emission Factors (lb/MW-hr)	ROG Emission Factors (lb/MW-hr)	PM Emission Factors (lb/MW-hr)	PM10 Emission Factors (lb/MW-hr)	PM2.5 Emission Factors (lb/MW-hr)	SOx Emission Factors (lb/MW-hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	700,000	Dist at 0.2%S	0.20	3,600	55.6%	15.0	1.15	0.20	0.01	0.04	0.04	0.04	0.12	43	8	0.38	1.50	1.50	1.50	4.50
1.0	VLCC	2,000,000	Dist at 0.2%S	0.20	3,600	55.6%	23.2	1.15	0.20	0.01	0.04	0.04	0.04	0.12	67	12	0.58	2.32	2.32	2.32	6.97
1.0	Panamax	350,000	Dist at 0.2%S	0.20	3,600	55.6%	11.0	1.15	0.20	0.01	0.04	0.04	0.04	0.12	32	6	0.28	1.10	1.10	1.10	3.30
1.0	Suezmax	1,000,000	Dist at 0.2%S	0.20	3,600	55.6%	15.3	1.15	0.20	0.01	0.04	0.04	0.04	0.12	44	8	0.38	1.53	1.53	1.53	4.59
<b>MAXIMUM</b>															<b>67</b>	<b>12</b>	<b>1</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>7</b>

Auxiliary Generator Post-Pumpin

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded (bbl/call)	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NOx Emission Factors (lb/MW-hr)	CO Emission Factors (lb/MW-hr)	ROG Emission Factors (lb/MW-hr)	PM Emission Factors (lb/MW-hr)	PM10 Emission Factors (lb/MW-hr)	PM2.5 Emission Factors (lb/MW-hr)	SOx Emission Factors (lb/MW-hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	700,000	Dist at 0.2%S	0.20	3,600	27.8%	1.0	1.15	0.20	0.01	0.04	0.04	0.04	0.12	1	0.25	0.01	0.05	0.05	0.05	0.15
1.0	VLCC	2,000,000	Dist at 0.2%S	0.20	3,600	27.8%	1.0	1.15	0.20	0.01	0.04	0.04	0.04	0.12	1	0.25	0.01	0.05	0.05	0.05	0.15
1.0	Panamax	350,000	Dist at 0.2%S	0.20	3,600	27.8%	1.0	1.15	0.20	0.01	0.04	0.04	0.04	0.12	1	0.25	0.01	0.05	0.05	0.05	0.15
1.0	Suezmax	1,000,000	Dist at 0.2%S	0.20	3,600	27.8%	1.0	1.15	0.20	0.01	0.04	0.04	0.04	0.12	1	0.25	0.01	0.05	0.05	0.05	0.15
<b>MAXIMUM</b>															<b>1</b>	<b>0.25</b>	<b>0.01</b>	<b>0.05</b>	<b>0.05</b>	<b>0.05</b>	<b>0.15</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Mit.AMP.2010-4. 2010 Proposed Project Summary of Berth Operations Maximum Daily Mitigated Emissions by AMP Electricity Consumption.

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Berth Operations	Aux Generator	72	12	1	2	2	2	7

No AMP 0%

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Berth Operations	Aux Generator	0	0	0	0	0	0	0

Table H.2.PP.Mit.AMP.2015-1. 2015 Proposed Project Berth Operations Average Daily Mitigated Emissions by AMP Electricity Consumption.

Auxiliary Generator Pre-Pumping

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NOx Emission Factor (lb/MW-hr)	CO Emission Factor (lb/MW-hr)	ROG Emission Factor (lb/MW-hr)	PM Emission Factor (lb/MW-hr)	PM10 Emission Factor (lb/MW-hr)	PM2.5 Emission Factor (lb/MW-hr)	SOx Emission Factor (lb/MW-hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
24.0	Aframax	700,000	Dist at 0.2%S	0.20	3,600	27.8%	2.5	1.15	0.20	0.01	0.04	0.04	0.04	0.12	89	15	0.77	3.10	3.10	3.10	9.30
51.0	VLCC	2,000,000	Dist at 0.2%S	0.20	3,600	27.8%	2.5	1.15	0.20	0.01	0.04	0.04	0.04	0.12	189	33	1.65	6.58	6.58	6.58	19.75
12.0	Panamax	350,000	Dist at 0.2%S	0.20	3,600	27.8%	2.5	1.15	0.20	0.01	0.04	0.04	0.04	0.12	45	8	0.39	1.55	1.55	1.55	4.65
60.0	Suezmax	1,000,000	Dist at 0.2%S	0.20	3,600	27.8%	2.5	1.15	0.20	0.01	0.04	0.04	0.04	0.12	223	39	1.94	7.75	7.75	7.75	23.24
<b>TOTAL</b>															<b>546</b>	<b>95</b>	<b>5</b>	<b>19</b>	<b>19</b>	<b>19</b>	<b>57</b>

Auxiliary Generator Pumping

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NOx Emission Factor (lb/MW-hr)	CO Emission Factor (lb/MW-hr)	ROG Emission Factor (lb/MW-hr)	PM Emission Factor (lb/MW-hr)	PM10 Emission Factor (lb/MW-hr)	PM2.5 Emission Factor (lb/MW-hr)	SOx Emission Factor (lb/MW-hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
24.0	Aframax	700,000	Dist at 0.2%S	0.20	3,600	55.6%	15.0	1.15	0.20	0.01	0.04	0.04	0.04	0.12	1,069	186	9.30	37.18	37.18	37.18	111.55
51.0	VLCC	2,000,000	Dist at 0.2%S	0.20	3,600	55.6%	23.2	1.15	0.20	0.01	0.04	0.04	0.04	0.12	3,513	611	30.55	122.20	122.20	122.20	366.61
12.0	Panamax	350,000	Dist at 0.2%S	0.20	3,600	55.6%	11.0	1.15	0.20	0.01	0.04	0.04	0.04	0.12	392	68	3.41	13.63	13.63	13.63	40.90
60.0	Suezmax	1,000,000	Dist at 0.2%S	0.20	3,600	55.6%	15.3	1.15	0.20	0.01	0.04	0.04	0.04	0.12	2,726	474	23.70	94.81	94.81	94.81	284.44
<b>TOTAL</b>															<b>7,700</b>	<b>1,339</b>	<b>67</b>	<b>268</b>	<b>268</b>	<b>268</b>	<b>803</b>

Auxiliary Generator Post-Pumping

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NOx Emission Factor (lb/MW-hr)	CO Emission Factor (lb/MW-hr)	ROG Emission Factor (lb/MW-hr)	PM Emission Factor (lb/MW-hr)	PM10 Emission Factor (lb/MW-hr)	PM2.5 Emission Factor (lb/MW-hr)	SOx Emission Factor (lb/MW-hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
24.0	Aframax	700,000	Dist at 0.2%S	0.20	3,600	27.8%	1.0	1.15	0.20	0.01	0.04	0.04	0.04	0.12	36	6	0.31	1.24	1.24	1.24	3.72
51.0	VLCC	2,000,000	Dist at 0.2%S	0.20	3,600	27.8%	1.0	1.15	0.20	0.01	0.04	0.04	0.04	0.12	76	13	0.66	2.63	2.63	2.63	7.90
12.0	Panamax	350,000	Dist at 0.2%S	0.20	3,600	27.8%	1.0	1.15	0.20	0.01	0.04	0.04	0.04	0.12	18	3	0.15	0.62	0.62	0.62	1.86
60.0	Suezmax	1,000,000	Dist at 0.2%S	0.20	3,600	27.8%	1.0	1.15	0.20	0.01	0.04	0.04	0.04	0.12	89	15	0.77	3.10	3.10	3.10	9.30
<b>TOTAL</b>															<b>218</b>	<b>38</b>	<b>2</b>	<b>8</b>	<b>8</b>	<b>8</b>	<b>23</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Mit.AMP.2015-2. 2015 Proposed Project Summary of Berth Operations Average Daily Mitigated Emissions by AMP Electricity Consumption.

No AMP

Mode	Equipment	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Berth Operations	Aux Generator	8,464	1,472	74	294	294	294	883

Mitigated Emissions with AMP - Year 2015

AMP Reduction 15%

Mode	Equipment	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Berth Operations	Aux Generator	7,194	1,251	63	250	250	250	751

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Berth Operations	Aux Generator	20	3	0	1	1	1	2

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Mit.AMP.2015-3. 2015 Proposed Project Berth Operations Maximum Daily Mitigated Emissions by AMP Electricity Consumption.

Auxiliary Generator Pre-Pumping

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NOx Emission Factors (lb/MW-hr)	CO Emission Factors (lb/MW-hr)	ROG Emission Factors (lb/MW-hr)	PM Emission Factors (lb/MW-hr)	PM10 Emission Factors (lb/MW-hr)	PM2.5 Emission Factors (lb/MW-hr)	SOx Emission Factors (lb/MW-hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)	
1.0	Aframax	700,000	Dist. at 0.20 %S	0.20	3,600	27.8%	2.5	1.15	0.20	0.01	0.04	0.04	0.04	0.12	4	1	0.03	0.13	0.13	0.13	0.13	0.38
1.0	VLCC	2,000,000	Dist. at 0.20 %S	0.20	3,600	27.8%	2.5	1.15	0.20	0.01	0.04	0.04	0.04	0.12	4	1	0.03	0.13	0.13	0.13	0.13	0.38
1.0	Panamax	350,000	Dist. at 0.20 %S	0.20	3,600	27.8%	2.5	1.15	0.20	0.01	0.04	0.04	0.04	0.12	4	1	0.03	0.13	0.13	0.13	0.13	0.38
1.0	Suezmax	1,000,000	Dist. at 0.20 %S	0.20	3,600	27.8%	2.5	1.15	0.20	0.01	0.04	0.04	0.04	0.12	4	1	0.03	0.13	0.13	0.13	0.13	0.38
<b>MAXIMUM</b>															<b>4</b>	<b>1</b>	<b>0.03</b>	<b>0.13</b>	<b>0.13</b>	<b>0.13</b>	<b>0.13</b>	<b>0.38</b>

Auxiliary Generator Pumping

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NOx Emission Factors (lb/MW-hr)	CO Emission Factors (lb/MW-hr)	ROG Emission Factors (lb/MW-hr)	PM Emission Factors (lb/MW-hr)	PM10 Emission Factors (lb/MW-hr)	PM2.5 Emission Factors (lb/MW-hr)	SOx Emission Factors (lb/MW-hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	700,000	Dist at 0.2%S	0.20	3,600	55.6%	15.0	1.15	0.20	0.01	0.04	0.04	0.04	0.12	43	8	0.38	1.50	1.50	1.50	4.50
1.0	VLCC	2,000,000	Dist at 0.2%S	0.20	3,600	55.6%	23.2	1.15	0.20	0.01	0.04	0.04	0.04	0.12	67	12	0.58	2.32	2.32	2.32	6.97
1.0	Panamax	350,000	Dist at 0.2%S	0.20	3,600	55.6%	11.0	1.15	0.20	0.01	0.04	0.04	0.04	0.12	32	6	0.28	1.10	1.10	1.10	3.30
1.0	Suezmax	1,000,000	Dist at 0.2%S	0.20	3,600	55.6%	15.3	1.15	0.20	0.01	0.04	0.04	0.04	0.12	44	8	0.38	1.53	1.53	1.53	4.59
<b>MAXIMUM</b>															<b>67</b>	<b>12</b>	<b>1</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>7</b>

Auxiliary Generator Post-Pumping

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NOx Emission Factors (lb/MW-hr)	CO Emission Factors (lb/MW-hr)	ROG Emission Factors (lb/MW-hr)	PM Emission Factors (lb/MW-hr)	PM10 Emission Factors (lb/MW-hr)	PM2.5 Emission Factors (lb/MW-hr)	SOx Emission Factors (lb/MW-hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	700,000	Dist at 0.2%S	0.20	3,600	27.8%	1.0	1.15	0.20	0.01	0.04	0.04	0.04	0.12	1	0.25	0.01	0.05	0.05	0.05	0.15
1.0	VLCC	2,000,000	Dist at 0.2%S	0.20	3,600	27.8%	1.0	1.15	0.20	0.01	0.04	0.04	0.04	0.12	1	0.25	0.01	0.05	0.05	0.05	0.15
1.0	Panamax	350,000	Dist at 0.2%S	0.20	3,600	27.8%	1.0	1.15	0.20	0.01	0.04	0.04	0.04	0.12	1	0.25	0.01	0.05	0.05	0.05	0.15
1.0	Suezmax	1,000,000	Dist at 0.2%S	0.20	3,600	27.8%	1.0	1.15	0.20	0.01	0.04	0.04	0.04	0.12	1	0.25	0.01	0.05	0.05	0.05	0.15
<b>MAXIMUM</b>															<b>1</b>	<b>0.25</b>	<b>0.01</b>	<b>0.05</b>	<b>0.05</b>	<b>0.05</b>	<b>0.15</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Mit.AMP.2015-4. 2015 Proposed Project Summary of Berth Operations Maximum Daily Mitigated Emissions by AMP Electricity Consumption.

No AMP

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Berth Operations	Aux Generator	71.79	12.48	0.62	2.50	2.50	2.50	7.49

Mitigated Emissions with AMP - Year 2015

AMP Reduction 15%

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Berth Operations	Aux Generator	61.02	10.61	0.53	2.12	2.12	2.12	6.37



Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Mit.AMP.2025-1. 2025 Proposed Project Berth Operations Average Daily Mitigated Emissions by AMP Electricity Consumption.

Auxiliary Generator Pre-Pumping

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NOx Emission Factor (lb/MW-hr)	CO Emission Factor (lb/MW-hr)	ROG Emission Factor (lb/MW-hr)	PM Emission Factor (lb/MW-hr)	PM10 Emission Factor (lb/MW-hr)	PM2.5 Emission Factor (lb/MW-hr)	SOx Emission Factor (lb/MW-hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
36.0	Aframax	700,000	Dist at 0.2%S	0.20	3,600	27.8%	2.5	1.15	0.20	0.01	0.04	0.04	0.04	0.12	134	23	1.16	4.65	4.65	4.65	13.94
69.0	VLCC	2,000,000	Dist at 0.2%S	0.20	3,600	27.8%	2.5	1.15	0.20	0.01	0.04	0.04	0.04	0.12	256	45	2.23	8.91	8.91	8.91	26.72
18.0	Panamax	350,000	Dist at 0.2%S	0.20	3,600	27.8%	2.5	1.15	0.20	0.01	0.04	0.04	0.04	0.12	67	12	0.58	2.32	2.32	2.32	6.97
78.0	Suezmax	1,000,000	Dist at 0.2%S	0.20	3,600	27.8%	2.5	1.15	0.20	0.01	0.04	0.04	0.04	0.12	290	50	2.52	10.07	10.07	10.07	30.21
<b>TOTAL</b>															<b>746</b>	<b>130</b>	<b>6</b>	<b>26</b>	<b>26</b>	<b>26</b>	<b>78</b>

Auxiliary Generator Pumping

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NOx Emission Factor (lb/MW-hr)	CO Emission Factor (lb/MW-hr)	ROG Emission Factor (lb/MW-hr)	PM Emission Factor (lb/MW-hr)	PM10 Emission Factor (lb/MW-hr)	PM2.5 Emission Factor (lb/MW-hr)	SOx Emission Factor (lb/MW-hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
36.0	Aframax	700,000	Dist at 0.2%S	0.20	3,600	55.6%	15.0	1.15	0.20	0.01	0.04	0.04	0.04	0.12	1,603	279	13.94	55.77	55.77	55.77	167.32
69.0	VLCC	2,000,000	Dist at 0.2%S	0.20	3,600	55.6%	23.2	1.15	0.20	0.01	0.04	0.04	0.04	0.12	4,753	827	41.33	165.33	165.33	165.33	496.00
18.0	Panamax	350,000	Dist at 0.2%S	0.20	3,600	55.6%	11.0	1.15	0.20	0.01	0.04	0.04	0.04	0.12	588	102	5.11	20.45	20.45	20.45	61.35
78.0	Suezmax	1,000,000	Dist at 0.2%S	0.20	3,600	55.6%	15.3	1.15	0.20	0.01	0.04	0.04	0.04	0.12	3,544	616	30.81	123.26	123.26	123.26	369.77
<b>TOTAL</b>															<b>10,488</b>	<b>1,824</b>	<b>91</b>	<b>365</b>	<b>365</b>	<b>365</b>	<b>1,094</b>

Auxiliary Generator Post-Pumping

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NOx Emission Factor (lb/MW-hr)	CO Emission Factor (lb/MW-hr)	ROG Emission Factor (lb/MW-hr)	PM Emission Factor (lb/MW-hr)	PM10 Emission Factor (lb/MW-hr)	PM2.5 Emission Factor (lb/MW-hr)	SOx Emission Factor (lb/MW-hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
36.0	Aframax	700,000	Dist at 0.2%S	0.20	3,600	27.8%	1.0	1.15	0.20	0.01	0.04	0.04	0.04	0.12	53	9	0.46	1.86	1.86	1.86	5.58
69.0	VLCC	2,000,000	Dist at 0.2%S	0.20	3,600	27.8%	1.0	1.15	0.20	0.01	0.04	0.04	0.04	0.12	102	18	0.89	3.56	3.56	3.56	10.69
18.0	Panamax	350,000	Dist at 0.2%S	0.20	3,600	27.8%	1.0	1.15	0.20	0.01	0.04	0.04	0.04	0.12	27	5	0.23	0.93	0.93	0.93	2.79
78.0	Suezmax	1,000,000	Dist at 0.2%S	0.20	3,600	27.8%	1.0	1.15	0.20	0.01	0.04	0.04	0.04	0.12	116	20	1.01	4.03	4.03	4.03	12.08
<b>TOTAL</b>															<b>298</b>	<b>52</b>	<b>3</b>	<b>10</b>	<b>10</b>	<b>10</b>	<b>31</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Mit.AMP.2025-2. 2025 Proposed Project Summary of Berth Operations Average Daily Mitigated Emissions by AMP Electricity Consumption.

No AMP

Mode	Equipment	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Berth Operations	Aux Generator	11,533	2,006	100	401	401	401	1,203

Mitigated Emissions with AMP - Year 2025

AMP Reduction 40%

Mode	Equipment	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Berth Operations	Aux Generator	6,920	1,203	60	241	241	241	722

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Berth Operations	Aux Generator	19	3	0	1	1	1	2

Table H.2.PP.Mit.AMP.2025-3. 2025 Proposed Project Berth Operations Maximum Daily Mitigated Emissions by AMP Electricity Consumption.

Auxiliary Generator Pre-Pumpin

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NOx Emission Factors (lb/MW-hr)	CO Emission Factors (lb/MW-hr)	ROG Emission Factors (lb/MW-hr)	PM Emission Factors (lb/MW-hr)	PM10 Emission Factors (lb/MW-hr)	PM2.5 Emission Factors (lb/MW-hr)	SOx Emission Factors (lb/MW-hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)	
1.0	Aframax	700,000	Dist. at 0.20 %S	0.20	3,600	27.8%	2.5	1.15	0.20	0.01	0.04	0.04	0.04	0.12	4	1	0.03	0.13	0.13	0.13	0.13	0.38
1.0	VLCC	2,000,000	Dist. at 0.20 %S	0.20	3,600	27.8%	2.5	1.15	0.20	0.01	0.04	0.04	0.04	0.12	4	1	0.03	0.13	0.13	0.13	0.13	0.38
1.0	Panamax	350,000	Dist. at 0.20 %S	0.20	3,600	27.8%	2.5	1.15	0.20	0.01	0.04	0.04	0.04	0.12	4	1	0.03	0.13	0.13	0.13	0.13	0.38
1.0	Suezmax	1,000,000	Dist. at 0.20 %S	0.20	3,600	27.8%	2.5	1.15	0.20	0.01	0.04	0.04	0.04	0.12	4	1	0.03	0.13	0.13	0.13	0.13	0.38
<b>MAXIMUM</b>															<b>4</b>	<b>1</b>	<b>0.03</b>	<b>0.13</b>	<b>0.13</b>	<b>0.13</b>	<b>0.13</b>	<b>0.38</b>

Auxiliary Generator Pumpin

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NOx Emission Factors (lb/MW-hr)	CO Emission Factors (lb/MW-hr)	ROG Emission Factors (lb/MW-hr)	PM Emission Factors (lb/MW-hr)	PM10 Emission Factors (lb/MW-hr)	PM2.5 Emission Factors (lb/MW-hr)	SOx Emission Factors (lb/MW-hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	700,000	Dist at 0.2%S	0.20	3,600	55.6%	15.0	1.15	0.20	0.01	0.04	0.04	0.04	0.12	43	8	0.38	1.50	1.50	1.50	4.50
1.0	VLCC	2,000,000	Dist at 0.2%S	0.20	3,600	55.6%	23.2	1.15	0.20	0.01	0.04	0.04	0.04	0.12	67	12	0.58	2.32	2.32	2.32	6.97
1.0	Panamax	350,000	Dist at 0.2%S	0.20	3,600	55.6%	11.0	1.15	0.20	0.01	0.04	0.04	0.04	0.12	32	6	0.28	1.10	1.10	1.10	3.30
1.0	Suezmax	1,000,000	Dist at 0.2%S	0.20	3,600	55.6%	15.3	1.15	0.20	0.01	0.04	0.04	0.04	0.12	44	8	0.38	1.53	1.53	1.53	4.59
<b>MAXIMUM</b>															<b>67</b>	<b>12</b>	<b>1</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>7</b>

Auxiliary Generator Post-Pumpin

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NOx Emission Factors (lb/MW-hr)	CO Emission Factors (lb/MW-hr)	ROG Emission Factors (lb/MW-hr)	PM Emission Factors (lb/MW-hr)	PM10 Emission Factors (lb/MW-hr)	PM2.5 Emission Factors (lb/MW-hr)	SOx Emission Factors (lb/MW-hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	700,000	Dist at 0.2%S	0.20	3,600	27.8%	1.0	1.15	0.20	0.01	0.04	0.04	0.04	0.12	1	0.25	0.01	0.05	0.05	0.05	0.15
1.0	VLCC	2,000,000	Dist at 0.2%S	0.20	3,600	27.8%	1.0	1.15	0.20	0.01	0.04	0.04	0.04	0.12	1	0.25	0.01	0.05	0.05	0.05	0.15
1.0	Panamax	350,000	Dist at 0.2%S	0.20	3,600	27.8%	1.0	1.15	0.20	0.01	0.04	0.04	0.04	0.12	1	0.25	0.01	0.05	0.05	0.05	0.15
1.0	Suezmax	1,000,000	Dist at 0.2%S	0.20	3,600	27.8%	1.0	1.15	0.20	0.01	0.04	0.04	0.04	0.12	1	0.25	0.01	0.05	0.05	0.05	0.15
<b>MAXIMUM</b>															<b>1</b>	<b>0.25</b>	<b>0.01</b>	<b>0.05</b>	<b>0.05</b>	<b>0.05</b>	<b>0.15</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Mit.AMP.2025-4. 2025 Proposed Project Summary of Berth Operations Maximum Daily Mitigated Emissions by AMP Electricity Consumption.

No AMP

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Berth Operations	Aux Generator	71.79	12.48	0.62	2.50	2.50	2.50	7.49

Mitigated Emissions with AMP - Year 2025

AMP Reduction 40%

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Berth Operations	Aux Generator	43.07	7.49	0.37	1.50	1.50	1.50	4.49

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Mit.AMP.2040-1. 2040 Proposed Project Berth Operations Average Daily Mitigated Emissions by AMP Electricity Consumption.

Auxiliary Generator Pre-Pumping

Shipcalls	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NOx Emission Factor (lb/MW-hr)	CO Emission Factor (lb/MW-hr)	ROG Emission Factor (lb/MW-hr)	PM Emission Factor (lb/MW-hr)	PM10 Emission Factor (lb/MW-hr)	PM2.5 Emission Factor (lb/MW-hr)	SOx Emission Factor (lb/MW-hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
36.0	Aframax	700,000	list at 0.2%	0.20	3,600	27.8%	2.5	1.15	0.20	0.01	0.04	0.04	0.04	0.12	134	23	1.16	4.65	4.65	4.65	13.94
69.0	VLCC	2,000,000	list at 0.2%	0.20	3,600	27.8%	2.5	1.15	0.20	0.01	0.04	0.04	0.04	0.12	256	45	2.23	8.91	8.91	8.91	26.72
18.0	Panamax	350,000	list at 0.2%	0.20	3,600	27.8%	2.5	1.15	0.20	0.01	0.04	0.04	0.04	0.12	67	12	0.58	2.32	2.32	2.32	6.97
78.0	Suezmax	1,000,000	list at 0.2%	0.20	3,600	27.8%	2.5	1.15	0.20	0.01	0.04	0.04	0.04	0.12	290	50	2.52	10.07	10.07	10.07	30.21
<b>TOTAL</b>															<b>746</b>	<b>130</b>	<b>6</b>	<b>26</b>	<b>26</b>	<b>26</b>	<b>78</b>

Auxiliary Generator Pumping

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NOx Emission Factor (lb/MW-hr)	CO Emission Factor (lb/MW-hr)	ROG Emission Factor (lb/MW-hr)	PM Emission Factor (lb/MW-hr)	PM10 Emission Factor (lb/MW-hr)	PM2.5 Emission Factor (lb/MW-hr)	SOx Emission Factor (lb/MW-hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
36.0	Aframax	700,000	list at 0.2%	0.20	3,600	55.6%	15.0	1.15	0.20	0.01	0.04	0.04	0.04	0.12	1,603	279	13.94	55.77	55.77	55.77	167.32
69.0	VLCC	2,000,000	list at 0.2%	0.20	3,600	55.6%	23.2	1.15	0.20	0.01	0.04	0.04	0.04	0.12	4,753	827	41.33	165.33	165.33	165.33	496.00
18.0	Panamax	350,000	list at 0.2%	0.20	3,600	55.6%	11.0	1.15	0.20	0.01	0.04	0.04	0.04	0.12	588	102	5.11	20.45	20.45	20.45	61.35
78.0	Suezmax	1,000,000	list at 0.2%	0.20	3,600	55.6%	15.3	1.15	0.20	0.01	0.04	0.04	0.04	0.12	3,544	616	30.81	123.26	123.26	123.26	369.77
<b>TOTAL</b>															<b>10,488</b>	<b>1,824</b>	<b>91</b>	<b>365</b>	<b>365</b>	<b>365</b>	<b>1,094</b>

Auxiliary Generator Post-Pumping

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NOx Emission Factor (lb/MW-hr)	CO Emission Factor (lb/MW-hr)	ROG Emission Factor (lb/MW-hr)	PM Emission Factor (lb/MW-hr)	PM10 Emission Factor (lb/MW-hr)	PM2.5 Emission Factor (lb/MW-hr)	SOx Emission Factor (lb/MW-hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
36.0	Aframax	700,000	list at 0.2%	0.20	3,600	27.8%	1.0	1.15	0.20	0.01	0.04	0.04	0.04	0.12	53	9	0.46	1.86	1.86	1.86	5.58
69.0	VLCC	2,000,000	list at 0.2%	0.20	3,600	27.8%	1.0	1.15	0.20	0.01	0.04	0.04	0.04	0.12	102	18	0.89	3.56	3.56	3.56	10.69
18.0	Panamax	350,000	list at 0.2%	0.20	3,600	27.8%	1.0	1.15	0.20	0.01	0.04	0.04	0.04	0.12	27	5	0.23	0.93	0.93	0.93	2.79
78.0	Suezmax	1,000,000	list at 0.2%	0.20	3,600	27.8%	1.0	1.15	0.20	0.01	0.04	0.04	0.04	0.12	116	20	1.01	4.03	4.03	4.03	12.08
<b>TOTAL</b>															<b>298</b>	<b>52</b>	<b>3</b>	<b>10</b>	<b>10</b>	<b>10</b>	<b>31</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Mit.AMP.2040-2. 2040 Proposed Project Summary of Berth Operations Average Daily Mitigated Emissions by AMP Electricity Consumption.

No AMP

Mode	Equipment	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Berth Operations	Aux Generator	11,533	2,006	100	401	401	401	1,203

Mitigated Emissions with AMP - Year 2040

AMP Reduction 70%

Mode	Equipment	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Berth Operations	Aux Generator	3,460	602	30	120	120	120	361

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Berth Operations	Aux Generator	9	2	0	0	0	0	1

Table H.2.PP.Mit.AMP.2040-3. 2040 Proposed Project Berth Operations Maximum Daily Mitigated Emissions by AMP Electricity Consumption.

Auxiliary Generator Pre-Pumpin

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NOx Emission Factors (lb/MW-hr)	CO Emission Factors (lb/MW-hr)	ROG Emission Factors (lb/MW-hr)	PM Emission Factors (lb/MW-hr)	PM10 Emission Factors (lb/MW-hr)	PM2.5 Emission Factors (lb/MW-hr)	SOx Emission Factors (lb/MW-hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)	
1.0	Aframax	700,000	Dist. at 0.20 %S	0.20	3,600	27.8%	2.5	1.15	0.20	0.01	0.04	0.04	0.04	0.12	4	1	0.03	0.13	0.13	0.13	0.13	0.38
1.0	VLCC	2,000,000	Dist. at 0.20 %S	0.20	3,600	27.8%	2.5	1.15	0.20	0.01	0.04	0.04	0.04	0.12	4	1	0.03	0.13	0.13	0.13	0.13	0.38
1.0	Panamax	350,000	Dist. at 0.20 %S	0.20	3,600	27.8%	2.5	1.15	0.20	0.01	0.04	0.04	0.04	0.12	4	1	0.03	0.13	0.13	0.13	0.13	0.38
1.0	Suezmax	1,000,000	Dist. at 0.20 %S	0.20	3,600	27.8%	2.5	1.15	0.20	0.01	0.04	0.04	0.04	0.12	4	1	0.03	0.13	0.13	0.13	0.13	0.38
<b>MAXIMUM</b>															<b>4</b>	<b>1</b>	<b>0.03</b>	<b>0.13</b>	<b>0.13</b>	<b>0.13</b>	<b>0.38</b>	

Auxiliary Generator Pumpin

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NOx Emission Factors (lb/MW-hr)	CO Emission Factors (lb/MW-hr)	ROG Emission Factors (lb/MW-hr)	PM Emission Factors (lb/MW-hr)	PM10 Emission Factors (lb/MW-hr)	PM2.5 Emission Factors (lb/MW-hr)	SOx Emission Factors (lb/MW-hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	700,000	Dist at 0.2%S	0.20	3,600	55.6%	15.0	1.15	0.20	0.01	0.04	0.04	0.04	0.12	43	8	0.38	1.50	1.50	1.50	4.50
1.0	VLCC	2,000,000	Dist at 0.2%S	0.20	3,600	55.6%	23.2	1.15	0.20	0.01	0.04	0.04	0.04	0.12	67	12	0.58	2.32	2.32	2.32	6.97
1.0	Panamax	350,000	Dist at 0.2%S	0.20	3,600	55.6%	11.0	1.15	0.20	0.01	0.04	0.04	0.04	0.12	32	6	0.28	1.10	1.10	1.10	3.30
1.0	Suezmax	1,000,000	Dist at 0.2%S	0.20	3,600	55.6%	15.3	1.15	0.20	0.01	0.04	0.04	0.04	0.12	44	8	0.38	1.53	1.53	1.53	4.59
<b>MAXIMUM</b>															<b>67</b>	<b>12</b>	<b>1</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>7</b>

Auxiliary Generator Post-Pumpin

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NOx Emission Factors (lb/MW-hr)	CO Emission Factors (lb/MW-hr)	ROG Emission Factors (lb/MW-hr)	PM Emission Factors (lb/MW-hr)	PM10 Emission Factors (lb/MW-hr)	PM2.5 Emission Factors (lb/MW-hr)	SOx Emission Factors (lb/MW-hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	700,000	Dist at 0.2%S	0.20	3,600	27.8%	1.0	1.15	0.20	0.01	0.04	0.04	0.04	0.12	1	0.25	0.01	0.05	0.05	0.05	0.15
1.0	VLCC	2,000,000	Dist at 0.2%S	0.20	3,600	27.8%	1.0	1.15	0.20	0.01	0.04	0.04	0.04	0.12	1	0.25	0.01	0.05	0.05	0.05	0.15
1.0	Panamax	350,000	Dist at 0.2%S	0.20	3,600	27.8%	1.0	1.15	0.20	0.01	0.04	0.04	0.04	0.12	1	0.25	0.01	0.05	0.05	0.05	0.15
1.0	Suezmax	1,000,000	Dist at 0.2%S	0.20	3,600	27.8%	1.0	1.15	0.20	0.01	0.04	0.04	0.04	0.12	1	0.25	0.01	0.05	0.05	0.05	0.15
<b>MAXIMUM</b>															<b>1</b>	<b>0.25</b>	<b>0.01</b>	<b>0.05</b>	<b>0.05</b>	<b>0.05</b>	<b>0.15</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Mit.AMP.2040-4. 2040 Proposed Project Summary of Berth Operations Maximum Daily Mitigated Emissions by AMP Electricity Consumption.

No AMP

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Berth Operations	Aux Generator	71.79	12.48	0.62	2.50	2.50	2.50	7.49

Mitigated Emissions with AMP - Year 2040

AMP Reduction 70%

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Berth Operations	Aux Generator	21.54	3.75	0.19	0.75	0.75	0.75	2.25



Table H.2.NFA/NPA.Un.AMP.2015-1. 2015 No Federal Action/No Project Alternative Berth Operations Average Daily Unmitigated Emissions by AMP Electricity Consumption (Exxon Mobil).

**Auxiliary Generator Pre-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NOx Emission Factor (lb/MW-hr)	CO Emission Factor (lb/MW-hr)	ROG Emission Factor (lb/MW-hr)	PM Emission Factor (lb/MW-hr)	PM10 Emission Factor (lb/MW-hr)	PM2.5 Emission Factor (lb/MW-hr)	SOx Emission Factor (lb/MW-hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
164.0	Panamax	300,000	Dist at 0.2	0.20	3,600	27.8%	2.5	1.15	0.20	0.01	0.04	0.04	0.04	0.12	590	103	5	21	21	21	62

AMP Reduction 15%

TOTAL 501 87 4 17 17 17 52

**Auxiliary Generator Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NOx Emission Factor (lb/MW-hr)	CO Emission Factor (lb/MW-hr)	ROG Emission Factor (lb/MW-hr)	PM Emission Factor (lb/MW-hr)	PM10 Emission Factor (lb/MW-hr)	PM2.5 Emission Factor (lb/MW-hr)	SOx Emission Factor (lb/MW-hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
164.0	Panamax	300,000	Dist at 0.2	0.20	3,600	55.6%	11.0	1.15	0.20	0.01	0.04	0.04	0.04	0.12	5,191	903	45	181	181	181	542

AMP Reduction 15%

TOTAL 4,412 767 38 153 153 153 460

**Auxiliary Generator Post-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NOx Emission Factor (lb/MW-hr)	CO Emission Factor (lb/MW-hr)	ROG Emission Factor (lb/MW-hr)	PM Emission Factor (lb/MW-hr)	PM10 Emission Factor (lb/MW-hr)	PM2.5 Emission Factor (lb/MW-hr)	SOx Emission Factor (lb/MW-hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
164.0	Panamax	300,000	Dist at 0.2	0.20	3,600	27.8%	1.0	1.15	0.20	0.01	0.04	0.04	0.04	0.12	236	41	2	8	8	8	25

AMP Reduction 15%

TOTAL 201 35 2 7 7 7 21

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.NFA/NPA.Un.AMP.2015-2. 2015 No Federal Action/No Project Alternative Berth Operations Maximum Daily Unmitigated Emissions by AMP Electricity Consumption (Exxon Mobil).

Auxiliary Generator Pre-Pumping

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NOx Emission Factor (lb/MW-hr)	CO Emission Factor (lb/MW-hr)	ROG Emission Factor (lb/MW-hr)	PM Emission Factor (lb/MW-hr)	PM10 Emission Factor (lb/MW-hr)	PM2.5 Emission Factor (lb/MW-hr)	SOx Emission Factor (lb/MW-hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Panamax	300,000	Dist at 0.2	0.20	3,600	27.8%	2.5	1.15	0.20	0.01	0.04	0.04	0.04	0.12	3.60	0.63	0.03	0.13	0.13	0.13	0.38

AMP Reduction 15%

MAXIMUM 3.06 0.53 0.03 0.11 0.11 0.11 0.32

Auxiliary Generator Pumping

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NOx Emission Factor (lb/MW-hr)	CO Emission Factor (lb/MW-hr)	ROG Emission Factor (lb/MW-hr)	PM Emission Factor (lb/MW-hr)	PM10 Emission Factor (lb/MW-hr)	PM2.5 Emission Factor (lb/MW-hr)	SOx Emission Factor (lb/MW-hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Panamax	300,000	Dist at 0.2	0.20	3,600	55.6%	11.0	1.15	0.20	0.01	0.04	0.04	0.04	0.12	31.65	5.50	0.28	1.10	1.10	1.10	3.30

AMP Reduction 15%

MAXIMUM 26.90 4.68 0.23 0.94 0.94 0.94 2.81

Auxiliary Generator Post-Pumping

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NOx Emission Factor (lb/MW-hr)	CO Emission Factor (lb/MW-hr)	ROG Emission Factor (lb/MW-hr)	PM Emission Factor (lb/MW-hr)	PM10 Emission Factor (lb/MW-hr)	PM2.5 Emission Factor (lb/MW-hr)	SOx Emission Factor (lb/MW-hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Panamax	300,000	Dist at 0.2	0.20	3,600	27.8%	1.0	1.15	0.20	0.01	0.04	0.04	0.04	0.12	1.44	0.25	0.01	0.05	0.05	0.05	0.15

AMP Reduction 15%

MAXIMUM 1.22 0.21 0.01 0.04 0.04 0.04 0.13

Table H.2.NFA/NPA.Un.AMP.2025-1. 2025 No Federal Action/No Project Alternative Berth Operations Average Daily Unmitigated Emissions by AMP Electricity Consumption (Exxon Mobil).

**Auxiliary Generator Pre-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NOx Emission Factor (lb/MW-hr)	CO Emission Factor (lb/MW-hr)	ROG Emission Factor (lb/MW-hr)	PM Emission Factor (lb/MW-hr)	PM10 Emission Factor (lb/MW-hr)	PM2.5 Emission Factor (lb/MW-hr)	SOx Emission Factor (lb/MW-hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
164.0	Panamax	300,000	Dist at 0.2	0.20	3,600	27.8%	2.5	1.15	0.20	0.01	0.04	0.04	0.04	0.12	590	103	5	21	21	21	62

AMP Reduction 70%

TOTAL 177 31 2 6 6 6 18

**Auxiliary Generator Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NOx Emission Factor (lb/MW-hr)	CO Emission Factor (lb/MW-hr)	ROG Emission Factor (lb/MW-hr)	PM Emission Factor (lb/MW-hr)	PM10 Emission Factor (lb/MW-hr)	PM2.5 Emission Factor (lb/MW-hr)	SOx Emission Factor (lb/MW-hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
164.0	Panamax	300,000	Dist at 0.2	0.20	3,600	55.6%	11.0	1.15	0.20	0.01	0.04	0.04	0.04	0.12	5,191	903	45	181	181	181	542

AMP Reduction 70%

TOTAL 1,557 271 14 54 54 54 162

**Auxiliary Generator Post-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NOx Emission Factor (lb/MW-hr)	CO Emission Factor (lb/MW-hr)	ROG Emission Factor (lb/MW-hr)	PM Emission Factor (lb/MW-hr)	PM10 Emission Factor (lb/MW-hr)	PM2.5 Emission Factor (lb/MW-hr)	SOx Emission Factor (lb/MW-hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
164.0	Panamax	300,000	Dist at 0.2	0.20	3,600	27.8%	1.0	1.15	0.20	0.01	0.04	0.04	0.04	0.12	236	41	2	8	8	8	25

AMP Reduction 70%

TOTAL 71 12 1 2 2 2 7

Table H.2.NFA/NPA.Un.AMP.2025-2. 2025 No Federal Action/No Project Alternative Berth Operations Maximum Daily Unmitigated Emissions by AMP Electricity Consumption (Exxon Mobil).

Auxiliary Generator Pre-Pumping

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NOx Emission Factor (lb/MW-hr)	CO Emission Factor (lb/MW-hr)	ROG Emission Factor (lb/MW-hr)	PM Emission Factor (lb/MW-hr)	PM10 Emission Factor (lb/MW-hr)	PM2.5 Emission Factor (lb/MW-hr)	SOx Emission Factor (lb/MW-hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Panamax	300,000	Dist at 0.2	0.20	3,600	27.8%	2.5	1.15	0.20	0.01	0.04	0.04	0.04	0.12	3.60	0.63	0.03	0.13	0.13	0.13	0.38

AMP Reduction 70%

MAXIMUM 1.08 0.19 0.01 0.04 0.04 0.04 0.11

Auxiliary Generator Pumping

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NOx Emission Factor (lb/MW-hr)	CO Emission Factor (lb/MW-hr)	ROG Emission Factor (lb/MW-hr)	PM Emission Factor (lb/MW-hr)	PM10 Emission Factor (lb/MW-hr)	PM2.5 Emission Factor (lb/MW-hr)	SOx Emission Factor (lb/MW-hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Panamax	300,000	Dist at 0.2	0.20	3,600	55.6%	11.0	1.15	0.20	0.01	0.04	0.04	0.04	0.12	31.65	5.50	0.28	1.10	1.10	1.10	3.30

AMP Reduction 70%

MAXIMUM 9.50 1.65 0.08 0.33 0.33 0.33 0.99

Auxiliary Generator Post-Pumping

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NOx Emission Factor (lb/MW-hr)	CO Emission Factor (lb/MW-hr)	ROG Emission Factor (lb/MW-hr)	PM Emission Factor (lb/MW-hr)	PM10 Emission Factor (lb/MW-hr)	PM2.5 Emission Factor (lb/MW-hr)	SOx Emission Factor (lb/MW-hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Panamax	300,000	Dist at 0.2	0.20	3,600	27.8%	1.0	1.15	0.20	0.01	0.04	0.04	0.04	0.12	1.44	0.25	0.01	0.05	0.05	0.05	0.15

AMP Reduction 70%

MAXIMUM 0.43 0.08 0.00 0.02 0.02 0.02 0.05

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.NFA/NPA.Un.AMP.2040-1. 2040 No Federal Action/No Project Alternative Berth Operations Average Daily Unmitigated Emissions by AMP Electricity Consumption (Exxon Mobil).

**Auxiliary Generator Pre-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NOx Emission Factor (lb/MW-hr)	CO Emission Factor (lb/MW-hr)	ROG Emission Factor (lb/MW-hr)	PM Emission Factor (lb/MW-hr)	PM10 Emission Factor (lb/MW-hr)	PM2.5 Emission Factor (lb/MW-hr)	SOx Emission Factor (lb/MW-hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
164.0	Panamax	300,000	Dist at 0.2	0.20	3,600	27.8%	2.5	1.15	0.20	0.01	0.04	0.04	0.04	0.12	590	103	5	21	21	21	62

AMP Reduction 70%

TOTAL 177 31 2 6 6 6 18

**Auxiliary Generator Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NOx Emission Factor (lb/MW-hr)	CO Emission Factor (lb/MW-hr)	ROG Emission Factor (lb/MW-hr)	PM Emission Factor (lb/MW-hr)	PM10 Emission Factor (lb/MW-hr)	PM2.5 Emission Factor (lb/MW-hr)	SOx Emission Factor (lb/MW-hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
164.0	Panamax	300,000	Dist at 0.2	0.20	3,600	55.6%	11.0	1.15	0.20	0.01	0.04	0.04	0.04	0.12	5,191	903	45	181	181	181	542

AMP Reduction 70%

TOTAL 1,557 271 14 54 54 54 162

**Auxiliary Generator Post-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NOx Emission Factor (lb/MW-hr)	CO Emission Factor (lb/MW-hr)	ROG Emission Factor (lb/MW-hr)	PM Emission Factor (lb/MW-hr)	PM10 Emission Factor (lb/MW-hr)	PM2.5 Emission Factor (lb/MW-hr)	SOx Emission Factor (lb/MW-hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
164.0	Panamax	300,000	Dist at 0.2	0.20	3,600	27.8%	1.0	1.15	0.20	0.01	0.04	0.04	0.04	0.12	236	41	2	8	8	8	25

AMP Reduction 70%

TOTAL 71 12 1 2 2 2 7

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.NFA/NPA.Un.AMP.2040-2. 2040 No Federal Action/No Project Alternative Berth Operations Maximum Daily Unmitigated Emissions by AMP Electricity Consumption (Exxon Mobil).

**Auxiliary Generator Pre-Pumping**

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NOx Emission Factor (lb/MW-hr)	CO Emission Factor (lb/MW-hr)	ROG Emission Factor (lb/MW-hr)	PM Emission Factor (lb/MW-hr)	PM10 Emission Factor (lb/MW-hr)	PM2.5 Emission Factor (lb/MW-hr)	SOx Emission Factor (lb/MW-hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)	
1.0	Panamax	300,000	Dist at 0.2	0.20	3,600	27.8%	2.5	1.15	0.20	0.01	0.04	0.04	0.04	0.12	3.60	0.63	0.03	0.13	0.13	0.13	0.13	0.38

AMP Reduction 70%

MAXIMUM 1.08 0.19 0.01 0.04 0.04 0.04 0.11

**Auxiliary Generator Pumping**

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NOx Emission Factor (lb/MW-hr)	CO Emission Factor (lb/MW-hr)	ROG Emission Factor (lb/MW-hr)	PM Emission Factor (lb/MW-hr)	PM10 Emission Factor (lb/MW-hr)	PM2.5 Emission Factor (lb/MW-hr)	SOx Emission Factor (lb/MW-hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)	
1.0	Panamax	300,000	Dist at 0.2	0.20	3,600	55.6%	11.0	1.15	0.20	0.01	0.04	0.04	0.04	0.12	31.65	5.50	0.28	1.10	1.10	1.10	1.10	3.30

AMP Reduction 70%

MAXIMUM 9.50 1.65 0.08 0.33 0.33 0.33 0.99

**Auxiliary Generator Post-Pumping**

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NOx Emission Factor (lb/MW-hr)	CO Emission Factor (lb/MW-hr)	ROG Emission Factor (lb/MW-hr)	PM Emission Factor (lb/MW-hr)	PM10 Emission Factor (lb/MW-hr)	PM2.5 Emission Factor (lb/MW-hr)	SOx Emission Factor (lb/MW-hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)	
1.0	Panamax	300,000	Dist at 0.2	0.20	3,600	27.8%	1.0	1.15	0.20	0.01	0.04	0.04	0.04	0.12	1.44	0.25	0.01	0.05	0.05	0.05	0.05	0.15

AMP Reduction 70%

MAXIMUM 0.43 0.08 0.00 0.02 0.02 0.02 0.05

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Mit.AMP.2010-1. 2010 Reduced Project Alternative Berth Operations Average Daily Mitigated Emissions by AMP Electricity Consumption.

Auxiliary Generator Pre-Pumping

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NOx Emission Factor (lb/MW-hr)	CO Emission Factor (lb/MW-hr)	ROG Emission Factor (lb/MW-hr)	PM Emission Factor (lb/MW-hr)	PM10 Emission Factor (lb/MW-hr)	PM2.5 Emission Factor (lb/MW-hr)	SOx Emission Factor (lb/MW-hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
32.0	Aframax	700,000	MDO	0.52	3,600	27.8%	2.5	1.15	0.20	0.01	0.04	0.04	0.04	0.12	119	21	1.03	4.13	4.13	4.13	12.39
26.0	VLCC	2,000,000	MDO	0.52	3,600	27.8%	2.5	1.15	0.20	0.01	0.04	0.04	0.04	0.12	97	17	0.84	3.36	3.36	3.36	10.07
26.0	Panamax	350,000	MDO	0.52	3,600	27.8%	2.5	1.15	0.20	0.01	0.04	0.04	0.04	0.12	97	17	0.84	3.36	3.36	3.36	10.07
45.0	Suezmax	1,000,000	MDO	0.52	3,600	27.8%	2.5	1.15	0.20	0.01	0.04	0.04	0.04	0.12	167	29	1.45	5.81	5.81	5.81	17.43
<b>TOTAL</b>															<b>479</b>	<b>83</b>	<b>4</b>	<b>17</b>	<b>17</b>	<b>17</b>	<b>50</b>

Auxiliary Generator Pumping

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NOx Emission Factor (lb/MW-hr)	CO Emission Factor (lb/MW-hr)	ROG Emission Factor (lb/MW-hr)	PM Emission Factor (lb/MW-hr)	PM10 Emission Factor (lb/MW-hr)	PM2.5 Emission Factor (lb/MW-hr)	SOx Emission Factor (lb/MW-hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
32.0	Aframax	700,000	list at 0.2%	0.20	3,600	55.6%	15.0	1.15	0.20	0.01	0.04	0.04	0.04	0.12	1,425	248	12.39	49.58	49.58	49.58	148.73
26.0	VLCC	2,000,000	list at 0.2%	0.20	3,600	55.6%	23.2	1.15	0.20	0.01	0.04	0.04	0.04	0.12	1,791	312	15.58	62.30	62.30	62.30	186.90
26.0	Panamax	350,000	list at 0.2%	0.20	3,600	55.6%	11.0	1.15	0.20	0.01	0.04	0.04	0.04	0.12	849	148	7.38	29.54	29.54	29.54	88.62
45.0	Suezmax	1,000,000	list at 0.2%	0.20	3,600	55.6%	15.3	1.15	0.20	0.01	0.04	0.04	0.04	0.12	2,044	356	17.78	71.11	71.11	71.11	213.33
<b>TOTAL</b>															<b>6,110</b>	<b>1,063</b>	<b>53</b>	<b>213</b>	<b>213</b>	<b>213</b>	<b>638</b>

Auxiliary Generator Post-Pumping

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NOx Emission Factor (lb/MW-hr)	CO Emission Factor (lb/MW-hr)	ROG Emission Factor (lb/MW-hr)	PM Emission Factor (lb/MW-hr)	PM10 Emission Factor (lb/MW-hr)	PM2.5 Emission Factor (lb/MW-hr)	SOx Emission Factor (lb/MW-hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
32.0	Aframax	700,000	list at 0.2%	0.20	3,600	27.8%	1.0	1.15	0.20	0.01	0.04	0.04	0.04	0.12	48	8	0.41	1.65	1.65	1.65	4.96
26.0	VLCC	2,000,000	list at 0.2%	0.20	3,600	27.8%	1.0	1.15	0.20	0.01	0.04	0.04	0.04	0.12	39	7	0.34	1.34	1.34	1.34	4.03
26.0	Panamax	350,000	list at 0.2%	0.20	3,600	27.8%	1.0	1.15	0.20	0.01	0.04	0.04	0.04	0.12	39	7	0.34	1.34	1.34	1.34	4.03
45.0	Suezmax	1,000,000	list at 0.2%	0.20	3,600	27.8%	1.0	1.15	0.20	0.01	0.04	0.04	0.04	0.12	67	12	0.58	2.32	2.32	2.32	6.97
<b>TOTAL</b>															<b>192</b>	<b>33</b>	<b>2</b>	<b>7</b>	<b>7</b>	<b>7</b>	<b>20</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Mit.AMP.2010-2. 2010 Reduced Project Alternative Summary of Berth Operations Average Daily Mitigated Emissions by AMP Electricity Consumption.

Mode	Equipment	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Berth Operations	Aux Generator	6,780	1,179	59	236	236	236	708

NO AMP 0%

Mode	Equipment	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Berth Operations	Aux Generator	6,780	1,179	59	236	236	236	708



Table H.2.RPA.Mit.AMP.2010-3. 2010 Reduced Project Alternative Berth Operations Maximum Daily Mitigated Emissions by AMP Electricity Consumption.

Auxiliary Generator Pre-Pumpin

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded (bbl/call)	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NOx Emission Factors (lb/MW-hr)	CO Emission Factors (lb/MW-hr)	ROG Emission Factors (lb/MW-hr)	PM Emission Factors (lb/MW-hr)	PM10 Emission Factors (lb/MW-hr)	PM2.5 Emission Factors (lb/MW-hr)	SOx Emission Factors (lb/MW-hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)	
1.0	Aframax	700,000	MDO	0.52	3,600	27.8%	2.5	1.15	0.20	0.01	0.04	0.04	0.04	0.12	4	1	0.03	0.13	0.13	0.13	0.13	0.38
1.0	VLCC	2,000,000	MDO	0.52	3,600	27.8%	2.5	1.15	0.20	0.01	0.04	0.04	0.04	0.12	4	1	0.03	0.13	0.13	0.13	0.13	0.38
1.0	Panamax	350,000	MDO	0.52	3,600	27.8%	2.5	1.15	0.20	0.01	0.04	0.04	0.04	0.12	4	1	0.03	0.13	0.13	0.13	0.13	0.38
1.0	Suezmax	1,000,000	MDO	0.52	3,600	27.8%	2.5	1.15	0.20	0.01	0.04	0.04	0.04	0.12	4	1	0.03	0.13	0.13	0.13	0.13	0.38
<b>MAXIMUM</b>															<b>4</b>	<b>1</b>	<b>0.03</b>	<b>0.13</b>	<b>0.13</b>	<b>0.13</b>	<b>0.13</b>	<b>0.38</b>

Auxiliary Generator Pumpin

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded (bbl/call)	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NOx Emission Factors (lb/MW-hr)	CO Emission Factors (lb/MW-hr)	ROG Emission Factors (lb/MW-hr)	PM Emission Factors (lb/MW-hr)	PM10 Emission Factors (lb/MW-hr)	PM2.5 Emission Factors (lb/MW-hr)	SOx Emission Factors (lb/MW-hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	700,000	Dist at 0.2%S	0.20	3,600	55.6%	15.0	1.15	0.20	0.01	0.04	0.04	0.04	0.12	43	8	0.38	1.50	1.50	1.50	4.50
1.0	VLCC	2,000,000	Dist at 0.2%S	0.20	3,600	55.6%	23.2	1.15	0.20	0.01	0.04	0.04	0.04	0.12	67	12	0.58	2.32	2.32	2.32	6.97
1.0	Panamax	350,000	Dist at 0.2%S	0.20	3,600	55.6%	11.0	1.15	0.20	0.01	0.04	0.04	0.04	0.12	32	6	0.28	1.10	1.10	1.10	3.30
1.0	Suezmax	1,000,000	Dist at 0.2%S	0.20	3,600	55.6%	15.3	1.15	0.20	0.01	0.04	0.04	0.04	0.12	44	8	0.38	1.53	1.53	1.53	4.59
<b>MAXIMUM</b>															<b>67</b>	<b>12</b>	<b>1</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>7</b>

Auxiliary Generator Post-Pumpin

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded (bbl/call)	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NOx Emission Factors (lb/MW-hr)	CO Emission Factors (lb/MW-hr)	ROG Emission Factors (lb/MW-hr)	PM Emission Factors (lb/MW-hr)	PM10 Emission Factors (lb/MW-hr)	PM2.5 Emission Factors (lb/MW-hr)	SOx Emission Factors (lb/MW-hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	700,000	Dist at 0.2%S	0.20	3,600	27.8%	1.0	1.15	0.20	0.01	0.04	0.04	0.04	0.12	1	0.25	0.01	0.05	0.05	0.05	0.15
1.0	VLCC	2,000,000	Dist at 0.2%S	0.20	3,600	27.8%	1.0	1.15	0.20	0.01	0.04	0.04	0.04	0.12	1	0.25	0.01	0.05	0.05	0.05	0.15
1.0	Panamax	350,000	Dist at 0.2%S	0.20	3,600	27.8%	1.0	1.15	0.20	0.01	0.04	0.04	0.04	0.12	1	0.25	0.01	0.05	0.05	0.05	0.15
1.0	Suezmax	1,000,000	Dist at 0.2%S	0.20	3,600	27.8%	1.0	1.15	0.20	0.01	0.04	0.04	0.04	0.12	1	0.25	0.01	0.05	0.05	0.05	0.15
<b>MAXIMUM</b>															<b>1</b>	<b>0.25</b>	<b>0.01</b>	<b>0.05</b>	<b>0.05</b>	<b>0.05</b>	<b>0.15</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Mit.AMP.2010-4. 2010 Reduced Project Alternative Summary of Berth Operations Maximum Daily Mitigated Emissions by AMP Electricity Consumption.

No AMP

		NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Mode	Equipment							
Berth Operations	Aux Generator	72	12	1	2	2	2	7

No AMP 0%

		NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Mode	Equipment							
Berth Operations	Aux Generator	72	12	1	2	2	2	7

Table H.2.RPA.Mit.AMP.2015-1. 2015 Reduced Project Alternative Berth Operations Average Daily Mitigated Emissions by AMP Electricity Consumption.

Auxiliary Generator Pre-Pumping

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NOx Emission Factor (lb/MW-hr)	CO Emission Factor (lb/MW-hr)	ROG Emission Factor (lb/MW-hr)	PM Emission Factor (lb/MW-hr)	PM10 Emission Factor (lb/MW-hr)	PM2.5 Emission Factor (lb/MW-hr)	SOx Emission Factor (lb/MW-hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
24.0	Aframax	700,000	Dist at 0.2%S	0.20	3,600	27.8%	2.5	1.15	0.20	0.01	0.04	0.04	0.04	0.12	89	15	0.77	3.10	3.10	3.10	9.30
46.0	VLCC	2,000,000	Dist at 0.2%S	0.20	3,600	27.8%	2.5	1.15	0.20	0.01	0.04	0.04	0.04	0.12	171	30	1.48	5.94	5.94	5.94	17.82
10.0	Panamax	350,000	Dist at 0.2%S	0.20	3,600	27.8%	2.5	1.15	0.20	0.01	0.04	0.04	0.04	0.12	37	6	0.32	1.29	1.29	1.29	3.87
52.0	Suezmax	1,000,000	Dist at 0.2%S	0.20	3,600	27.8%	2.5	1.15	0.20	0.01	0.04	0.04	0.04	0.12	193	34	1.68	6.71	6.71	6.71	20.14
<b>TOTAL</b>															<b>490</b>	<b>85</b>	<b>4</b>	<b>17</b>	<b>17</b>	<b>17</b>	<b>51</b>

Auxiliary Generator Pumping

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NOx Emission Factor (lb/MW-hr)	CO Emission Factor (lb/MW-hr)	ROG Emission Factor (lb/MW-hr)	PM Emission Factor (lb/MW-hr)	PM10 Emission Factor (lb/MW-hr)	PM2.5 Emission Factor (lb/MW-hr)	SOx Emission Factor (lb/MW-hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
24.0	Aframax	700,000	Dist at 0.2%S	0.20	3,600	55.6%	15.0	1.15	0.20	0.01	0.04	0.04	0.04	0.12	1,069	186	9.30	37.18	37.18	37.18	111.55
46.0	VLCC	2,000,000	Dist at 0.2%S	0.20	3,600	55.6%	23.2	1.15	0.20	0.01	0.04	0.04	0.04	0.12	3,169	551	27.56	110.22	110.22	110.22	330.67
10.0	Panamax	350,000	Dist at 0.2%S	0.20	3,600	55.6%	11.0	1.15	0.20	0.01	0.04	0.04	0.04	0.12	327	57	2.84	11.36	11.36	11.36	34.08
52.0	Suezmax	1,000,000	Dist at 0.2%S	0.20	3,600	55.6%	15.3	1.15	0.20	0.01	0.04	0.04	0.04	0.12	2,362	411	20.54	82.17	82.17	82.17	246.51
<b>TOTAL</b>															<b>6,927</b>	<b>1,205</b>	<b>60</b>	<b>241</b>	<b>241</b>	<b>241</b>	<b>723</b>

Auxiliary Generator Post-Pumping

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NOx Emission Factor (lb/MW-hr)	CO Emission Factor (lb/MW-hr)	ROG Emission Factor (lb/MW-hr)	PM Emission Factor (lb/MW-hr)	PM10 Emission Factor (lb/MW-hr)	PM2.5 Emission Factor (lb/MW-hr)	SOx Emission Factor (lb/MW-hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
24.0	Aframax	700,000	Dist at 0.2%S	0.20	3,600	27.8%	1.0	1.15	0.20	0.01	0.04	0.04	0.04	0.12	36	6	0.31	1.24	1.24	1.24	3.72
46.0	VLCC	2,000,000	Dist at 0.2%S	0.20	3,600	27.8%	1.0	1.15	0.20	0.01	0.04	0.04	0.04	0.12	68	12	0.59	2.38	2.38	2.38	7.13
10.0	Panamax	350,000	Dist at 0.2%S	0.20	3,600	27.8%	1.0	1.15	0.20	0.01	0.04	0.04	0.04	0.12	15	3	0.13	0.52	0.52	0.52	1.55
52.0	Suezmax	1,000,000	Dist at 0.2%S	0.20	3,600	27.8%	1.0	1.15	0.20	0.01	0.04	0.04	0.04	0.12	77	13	0.67	2.69	2.69	2.69	8.06
<b>TOTAL</b>															<b>196</b>	<b>34</b>	<b>2</b>	<b>7</b>	<b>7</b>	<b>7</b>	<b>20</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Mit.AMP.2015-2. 2015 Reduced Project Alternative Summary of Berth Operations Average Daily Mitigated Emissions by AMP Electricity Consumption.

No AMP

Mode	Equipment	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Berth Operations	Aux Generator	7,613	1,324	66	265	265	265	794

Mitigated Emissions with AMP - Year 2015

AMP Reduction 15%

Mode	Equipment	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Berth Operations	Aux Generator	6,471	1,125	56	225	225	225	675

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Berth Operations	Aux Generator	18	3	0	1	1	1	2

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Mit.AMP.2015-3. 2015 Reduced Project Alternative Berth Operations Maximum Daily Mitigated Emissions by AMP Electricity Consumption.

Auxiliary Generator Pre-Pumping

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NOx Emission Factors (lb/MW-hr)	CO Emission Factors (lb/MW-hr)	ROG Emission Factors (lb/MW-hr)	PM Emission Factors (lb/MW-hr)	PM10 Emission Factors (lb/MW-hr)	PM2.5 Emission Factors (lb/MW-hr)	SOx Emission Factors (lb/MW-hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)	
1.0	Aframax	700,000	Dist. at 0.20 %S	0.20	3,600	27.8%	2.5	1.15	0.20	0.01	0.04	0.04	0.04	0.12	4	1	0.03	0.13	0.13	0.13	0.13	0.38
1.0	VLCC	2,000,000	Dist. at 0.20 %S	0.20	3,600	27.8%	2.5	1.15	0.20	0.01	0.04	0.04	0.04	0.12	4	1	0.03	0.13	0.13	0.13	0.13	0.38
1.0	Panamax	350,000	Dist. at 0.20 %S	0.20	3,600	27.8%	2.5	1.15	0.20	0.01	0.04	0.04	0.04	0.12	4	1	0.03	0.13	0.13	0.13	0.13	0.38
1.0	Suezmax	1,000,000	Dist. at 0.20 %S	0.20	3,600	27.8%	2.5	1.15	0.20	0.01	0.04	0.04	0.04	0.12	4	1	0.03	0.13	0.13	0.13	0.13	0.38
<b>MAXIMUM</b>															<b>4</b>	<b>1</b>	<b>0.03</b>	<b>0.13</b>	<b>0.13</b>	<b>0.13</b>	<b>0.13</b>	<b>0.38</b>

Auxiliary Generator Pumping

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NOx Emission Factors (lb/MW-hr)	CO Emission Factors (lb/MW-hr)	ROG Emission Factors (lb/MW-hr)	PM Emission Factors (lb/MW-hr)	PM10 Emission Factors (lb/MW-hr)	PM2.5 Emission Factors (lb/MW-hr)	SOx Emission Factors (lb/MW-hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	700,000	Dist at 0.2%S	0.20	3,600	55.6%	15.0	1.15	0.20	0.01	0.04	0.04	0.04	0.12	43	8	0.38	1.50	1.50	1.50	4.50
1.0	VLCC	2,000,000	Dist at 0.2%S	0.20	3,600	55.6%	23.2	1.15	0.20	0.01	0.04	0.04	0.04	0.12	67	12	0.58	2.32	2.32	2.32	6.97
1.0	Panamax	350,000	Dist at 0.2%S	0.20	3,600	55.6%	11.0	1.15	0.20	0.01	0.04	0.04	0.04	0.12	32	6	0.28	1.10	1.10	1.10	3.30
1.0	Suezmax	1,000,000	Dist at 0.2%S	0.20	3,600	55.6%	15.3	1.15	0.20	0.01	0.04	0.04	0.04	0.12	44	8	0.38	1.53	1.53	1.53	4.59
<b>MAXIMUM</b>															<b>67</b>	<b>12</b>	<b>1</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>7</b>

Auxiliary Generator Post-Pumping

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NOx Emission Factors (lb/MW-hr)	CO Emission Factors (lb/MW-hr)	ROG Emission Factors (lb/MW-hr)	PM Emission Factors (lb/MW-hr)	PM10 Emission Factors (lb/MW-hr)	PM2.5 Emission Factors (lb/MW-hr)	SOx Emission Factors (lb/MW-hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	700,000	Dist at 0.2%S	0.20	3,600	27.8%	1.0	1.15	0.20	0.01	0.04	0.04	0.04	0.12	1	0.25	0.01	0.05	0.05	0.05	0.15
1.0	VLCC	2,000,000	Dist at 0.2%S	0.20	3,600	27.8%	1.0	1.15	0.20	0.01	0.04	0.04	0.04	0.12	1	0.25	0.01	0.05	0.05	0.05	0.15
1.0	Panamax	350,000	Dist at 0.2%S	0.20	3,600	27.8%	1.0	1.15	0.20	0.01	0.04	0.04	0.04	0.12	1	0.25	0.01	0.05	0.05	0.05	0.15
1.0	Suezmax	1,000,000	Dist at 0.2%S	0.20	3,600	27.8%	1.0	1.15	0.20	0.01	0.04	0.04	0.04	0.12	1	0.25	0.01	0.05	0.05	0.05	0.15
<b>MAXIMUM</b>															<b>1</b>	<b>0.25</b>	<b>0.01</b>	<b>0.05</b>	<b>0.05</b>	<b>0.05</b>	<b>0.15</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Mit.AMP.2015-4. 2015 Reduced Project Alternative Summary of Berth Operations Maximum Daily Mitigated Emissions by AMP Electricity Consumption.

No AMP

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Berth Operations	Aux Generator	71.79	12.48	0.62	2.50	2.50	2.50	7.49

Mitigated Emissions with AMP - Year 2015

AMP Reduction 15%

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Berth Operations	Aux Generator	61.02	10.61	0.53	2.12	2.12	2.12	6.37

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Mit.AMP.2025-1. 2025 Reduced Project Alternative Berth Operations Average Daily Mitigated Emissions by AMP Electricity Consumption.

Auxiliary Generator Pre-Pumping

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NOx Emission Factor (lb/MW-hr)	CO Emission Factor (lb/MW-hr)	ROG Emission Factor (lb/MW-hr)	PM Emission Factor (lb/MW-hr)	PM10 Emission Factor (lb/MW-hr)	PM2.5 Emission Factor (lb/MW-hr)	SOx Emission Factor (lb/MW-hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
24.0	Aframax	700,000	Dist at 0.2%S	0.20	3,600	27.8%	2.5	1.15	0.20	0.01	0.04	0.04	0.04	0.12	89	15	0.77	3.10	3.10	3.10	9.30
46.0	VLCC	2,000,000	Dist at 0.2%S	0.20	3,600	27.8%	2.5	1.15	0.20	0.01	0.04	0.04	0.04	0.12	171	30	1.48	5.94	5.94	5.94	17.82
10.0	Panamax	350,000	Dist at 0.2%S	0.20	3,600	27.8%	2.5	1.15	0.20	0.01	0.04	0.04	0.04	0.12	37	6	0.32	1.29	1.29	1.29	3.87
52.0	Suezmax	1,000,000	Dist at 0.2%S	0.20	3,600	27.8%	2.5	1.15	0.20	0.01	0.04	0.04	0.04	0.12	193	34	1.68	6.71	6.71	6.71	20.14
<b>TOTAL</b>															<b>490</b>	<b>85</b>	<b>4</b>	<b>17</b>	<b>17</b>	<b>17</b>	<b>51</b>

Auxiliary Generator Pumping

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NOx Emission Factor (lb/MW-hr)	CO Emission Factor (lb/MW-hr)	ROG Emission Factor (lb/MW-hr)	PM Emission Factor (lb/MW-hr)	PM10 Emission Factor (lb/MW-hr)	PM2.5 Emission Factor (lb/MW-hr)	SOx Emission Factor (lb/MW-hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
24.0	Aframax	700,000	Dist at 0.2%S	0.20	3,600	55.6%	15.0	1.15	0.20	0.01	0.04	0.04	0.04	0.12	1,069	186	9.30	37.18	37.18	37.18	111.55
46.0	VLCC	2,000,000	Dist at 0.2%S	0.20	3,600	55.6%	23.2	1.15	0.20	0.01	0.04	0.04	0.04	0.12	3,169	551	27.56	110.22	110.22	110.22	330.67
10.0	Panamax	350,000	Dist at 0.2%S	0.20	3,600	55.6%	11.0	1.15	0.20	0.01	0.04	0.04	0.04	0.12	327	57	2.84	11.36	11.36	11.36	34.08
52.0	Suezmax	1,000,000	Dist at 0.2%S	0.20	3,600	55.6%	15.3	1.15	0.20	0.01	0.04	0.04	0.04	0.12	2,362	411	20.54	82.17	82.17	82.17	246.51
<b>TOTAL</b>															<b>6,927</b>	<b>1,205</b>	<b>60</b>	<b>241</b>	<b>241</b>	<b>241</b>	<b>723</b>

Auxiliary Generator Post-Pumping

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NOx Emission Factor (lb/MW-hr)	CO Emission Factor (lb/MW-hr)	ROG Emission Factor (lb/MW-hr)	PM Emission Factor (lb/MW-hr)	PM10 Emission Factor (lb/MW-hr)	PM2.5 Emission Factor (lb/MW-hr)	SOx Emission Factor (lb/MW-hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
24.0	Aframax	700,000	Dist at 0.2%S	0.20	3,600	27.8%	1.0	1.15	0.20	0.01	0.04	0.04	0.04	0.12	36	6	0.31	1.24	1.24	1.24	3.72
46.0	VLCC	2,000,000	Dist at 0.2%S	0.20	3,600	27.8%	1.0	1.15	0.20	0.01	0.04	0.04	0.04	0.12	68	12	0.59	2.38	2.38	2.38	7.13
10.0	Panamax	350,000	Dist at 0.2%S	0.20	3,600	27.8%	1.0	1.15	0.20	0.01	0.04	0.04	0.04	0.12	15	3	0.13	0.52	0.52	0.52	1.55
52.0	Suezmax	1,000,000	Dist at 0.2%S	0.20	3,600	27.8%	1.0	1.15	0.20	0.01	0.04	0.04	0.04	0.12	77	13	0.67	2.69	2.69	2.69	8.06
<b>TOTAL</b>															<b>196</b>	<b>34</b>	<b>2</b>	<b>7</b>	<b>7</b>	<b>7</b>	<b>20</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Mit.AMP.2025-2. 2025 Reduced Project Alternative Summary of Berth Operations Average Daily Mitigated Emissions by AMP Electricity Consumption.

No AMP

Mode	Equipment	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Berth Operations	Aux Generator	7,613	1,324	66	265	265	265	794

Mitigated Emissions with AMP - Year 2025

AMP Reduction 40%

Mode	Equipment	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Berth Operations	Aux Generator	4,568	794	40	159	159	159	477

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Berth Operations	Aux Generator	13	2	0	0	0	0	1



Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Mit.AMP.2025-3. 2025 Reduced Project Alternative Berth Operations Maximum Daily Mitigated Emissions by AMP Electricity Consumption.

Auxiliary Generator Pre-Pumping

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NOx Emission Factors (lb/MW-hr)	CO Emission Factors (lb/MW-hr)	ROG Emission Factors (lb/MW-hr)	PM Emission Factors (lb/MW-hr)	PM10 Emission Factors (lb/MW-hr)	PM2.5 Emission Factors (lb/MW-hr)	SOx Emission Factors (lb/MW-hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)	
1.0	Aframax	700,000	Dist. at 0.20 %S	0.20	3,600	27.8%	2.5	1.15	0.20	0.01	0.04	0.04	0.04	0.12	4	1	0.03	0.13	0.13	0.13	0.13	0.38
1.0	VLCC	2,000,000	Dist. at 0.20 %S	0.20	3,600	27.8%	2.5	1.15	0.20	0.01	0.04	0.04	0.04	0.12	4	1	0.03	0.13	0.13	0.13	0.13	0.38
1.0	Panamax	350,000	Dist. at 0.20 %S	0.20	3,600	27.8%	2.5	1.15	0.20	0.01	0.04	0.04	0.04	0.12	4	1	0.03	0.13	0.13	0.13	0.13	0.38
1.0	Suezmax	1,000,000	Dist. at 0.20 %S	0.20	3,600	27.8%	2.5	1.15	0.20	0.01	0.04	0.04	0.04	0.12	4	1	0.03	0.13	0.13	0.13	0.13	0.38

MAXIMUM 4 1 0.03 0.13 0.13 0.13 0.38

Auxiliary Generator Pumping

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NOx Emission Factors (lb/MW-hr)	CO Emission Factors (lb/MW-hr)	ROG Emission Factors (lb/MW-hr)	PM Emission Factors (lb/MW-hr)	PM10 Emission Factors (lb/MW-hr)	PM2.5 Emission Factors (lb/MW-hr)	SOx Emission Factors (lb/MW-hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	700,000	Dist at 0.2%S	0.20	3,600	55.6%	15.0	1.15	0.20	0.01	0.04	0.04	0.04	0.12	43	8	0.38	1.50	1.50	1.50	4.50
1.0	VLCC	2,000,000	Dist at 0.2%S	0.20	3,600	55.6%	23.2	1.15	0.20	0.01	0.04	0.04	0.04	0.12	67	12	0.58	2.32	2.32	2.32	6.97
1.0	Panamax	350,000	Dist at 0.2%S	0.20	3,600	55.6%	11.0	1.15	0.20	0.01	0.04	0.04	0.04	0.12	32	6	0.28	1.10	1.10	1.10	3.30
1.0	Suezmax	1,000,000	Dist at 0.2%S	0.20	3,600	55.6%	15.3	1.15	0.20	0.01	0.04	0.04	0.04	0.12	44	8	0.38	1.53	1.53	1.53	4.59

MAXIMUM 67 12 1 2 2 2 7

Auxiliary Generator Post-Pumping

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NOx Emission Factors (lb/MW-hr)	CO Emission Factors (lb/MW-hr)	ROG Emission Factors (lb/MW-hr)	PM Emission Factors (lb/MW-hr)	PM10 Emission Factors (lb/MW-hr)	PM2.5 Emission Factors (lb/MW-hr)	SOx Emission Factors (lb/MW-hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	700,000	Dist at 0.2%S	0.20	3,600	27.8%	1.0	1.15	0.20	0.01	0.04	0.04	0.04	0.12	1	0.25	0.01	0.05	0.05	0.05	0.15
1.0	VLCC	2,000,000	Dist at 0.2%S	0.20	3,600	27.8%	1.0	1.15	0.20	0.01	0.04	0.04	0.04	0.12	1	0.25	0.01	0.05	0.05	0.05	0.15
1.0	Panamax	350,000	Dist at 0.2%S	0.20	3,600	27.8%	1.0	1.15	0.20	0.01	0.04	0.04	0.04	0.12	1	0.25	0.01	0.05	0.05	0.05	0.15
1.0	Suezmax	1,000,000	Dist at 0.2%S	0.20	3,600	27.8%	1.0	1.15	0.20	0.01	0.04	0.04	0.04	0.12	1	0.25	0.01	0.05	0.05	0.05	0.15

MAXIMUM 1 0.25 0.01 0.05 0.05 0.05 0.15

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Mit.AMP.2025-4. 2025 Reduced Project Alternative Summary of Berth Operations Maximum Daily Mitigated Emissions by AMP Electricity Consumption.

No AMP

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Berth Operations	Aux Generator	71.79	12.48	0.62	2.50	2.50	2.50	7.49

Mitigated Emissions with AMP - Year 2025

AMP Reduction 40%

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Berth Operations	Aux Generator	43.07	7.49	0.37	1.50	1.50	1.50	4.49

Table H.2.RPA.Mit.AMP.2025-5. 2025 Reduced Project Alternative Berth Operations Average Daily Mitigated Emissions by AMP Electricity Consumption (Exxon Mobil).

**Auxiliary Generator Pre-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NOx Emission Factor (lb/MW-hr)	CO Emission Factor (lb/MW-hr)	ROG Emission Factor (lb/MW-hr)	PM Emission Factor (lb/MW-hr)	PM10 Emission Factor (lb/MW-hr)	PM2.5 Emission Factor (lb/MW-hr)	SOx Emission Factor (lb/MW-hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
151.0	Panamax	300,000	Dist at 0.2	0.20	3,600	27.8%	2.5	1.15	0.20	0.01	0.04	0.04	0.04	0.12	543	94	5	19	19	19	57

AMP Reduction 70%

TOTAL 163 28 1 6 6 6 17

**Auxiliary Generator Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NOx Emission Factor (lb/MW-hr)	CO Emission Factor (lb/MW-hr)	ROG Emission Factor (lb/MW-hr)	PM Emission Factor (lb/MW-hr)	PM10 Emission Factor (lb/MW-hr)	PM2.5 Emission Factor (lb/MW-hr)	SOx Emission Factor (lb/MW-hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
151.0	Panamax	300,000	Dist at 0.2	0.20	3,600	55.6%	11.0	1.15	0.20	0.01	0.04	0.04	0.04	0.12	4,779	831	42	166	166	166	499

AMP Reduction 70%

TOTAL 1,434 249 12 50 50 50 150

**Auxiliary Generator Post-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NOx Emission Factor (lb/MW-hr)	CO Emission Factor (lb/MW-hr)	ROG Emission Factor (lb/MW-hr)	PM Emission Factor (lb/MW-hr)	PM10 Emission Factor (lb/MW-hr)	PM2.5 Emission Factor (lb/MW-hr)	SOx Emission Factor (lb/MW-hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
151.0	Panamax	300,000	Dist at 0.2	0.20	3,600	27.8%	1.0	1.15	0.20	0.01	0.04	0.04	0.04	0.12	217	38	2	8	8	8	23

AMP Reduction 70%

TOTAL 65 11 1 2 2 2 7

Grand Total 1,661.86 289.02 14.45 57.80 57.80 57.80 173.41

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Mit.AMP.2025-6. 2025 Reduced Project Alternative Berth Operations Maximum Daily Mitigated Emissions by AMP Electricity Consumption (Exxon Mobil).

**Auxiliary Generator Pre-Pumping**

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NOx Emission Factor (lb/MW-hr)	CO Emission Factor (lb/MW-hr)	ROG Emission Factor (lb/MW-hr)	PM Emission Factor (lb/MW-hr)	PM10 Emission Factor (lb/MW-hr)	PM2.5 Emission Factor (lb/MW-hr)	SOx Emission Factor (lb/MW-hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Panamax	300,000	Dist at 0.2	0.20	3,600	27.8%	2.5	1.15	0.20	0.01	0.04	0.04	0.04	0.12	3.60	0.63	0.03	0.13	0.13	0.13	0.38

AMP Reduction 70%

MAXIMUM 1.08 0.19 0.01 0.04 0.04 0.04 0.11

**Auxiliary Generator Pumping**

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NOx Emission Factor (lb/MW-hr)	CO Emission Factor (lb/MW-hr)	ROG Emission Factor (lb/MW-hr)	PM Emission Factor (lb/MW-hr)	PM10 Emission Factor (lb/MW-hr)	PM2.5 Emission Factor (lb/MW-hr)	SOx Emission Factor (lb/MW-hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Panamax	300,000	Dist at 0.2	0.20	3,600	55.6%	11.0	1.15	0.20	0.01	0.04	0.04	0.04	0.12	31.65	5.50	0.28	1.10	1.10	1.10	3.30

AMP Reduction 70%

MAXIMUM 9.50 1.65 0.08 0.33 0.33 0.33 0.99

**Auxiliary Generator Post-Pumping**

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NOx Emission Factor (lb/MW-hr)	CO Emission Factor (lb/MW-hr)	ROG Emission Factor (lb/MW-hr)	PM Emission Factor (lb/MW-hr)	PM10 Emission Factor (lb/MW-hr)	PM2.5 Emission Factor (lb/MW-hr)	SOx Emission Factor (lb/MW-hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Panamax	300,000	Dist at 0.2	0.20	3,600	27.8%	1.0	1.15	0.20	0.01	0.04	0.04	0.04	0.12	1.44	0.25	0.01	0.05	0.05	0.05	0.15

AMP Reduction 70%

MAXIMUM 0.43 0.08 0.00 0.02 0.02 0.02 0.05

Grand Total 11.01 1.91 0.10 0.38 0.38 0.38 1.15

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Mit.AMP.2040-1. 2040 Reduced Project Alternative Berth Operations Average Daily Mitigated Emissions by AMP Electricity Consumption

Auxiliary Generator Pre-Pumping

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NOx Emission Factor (lb/MW-hr)	CO Emission Factor (lb/MW-hr)	ROG Emission Factor (lb/MW-hr)	PM Emission Factor (lb/MW-hr)	PM10 Emission Factor (lb/MW-hr)	PM2.5 Emission Factor (lb/MW-hr)	SOx Emission Factor (lb/MW-hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
24.0	Aframax	700,000	Dist at 0.2%S	0.20	3,600	27.8%	2.5	1.15	0.20	0.01	0.04	0.04	0.04	0.12	89	15	0.77	3.10	3.10	3.10	9.30
46.0	VLCC	2,000,000	Dist at 0.2%S	0.20	3,600	27.8%	2.5	1.15	0.20	0.01	0.04	0.04	0.04	0.12	171	30	1.48	5.94	5.94	5.94	17.82
10.0	Panamax	350,000	Dist at 0.2%S	0.20	3,600	27.8%	2.5	1.15	0.20	0.01	0.04	0.04	0.04	0.12	37	6	0.32	1.29	1.29	1.29	3.87
52.0	Suezmax	1,000,000	Dist at 0.2%S	0.20	3,600	27.8%	2.5	1.15	0.20	0.01	0.04	0.04	0.04	0.12	193	34	1.68	6.71	6.71	6.71	20.14
<b>TOTAL</b>															<b>490</b>	<b>85</b>	<b>4</b>	<b>17</b>	<b>17</b>	<b>17</b>	<b>51</b>

Auxiliary Generator Pumping

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NOx Emission Factor (lb/MW-hr)	CO Emission Factor (lb/MW-hr)	ROG Emission Factor (lb/MW-hr)	PM Emission Factor (lb/MW-hr)	PM10 Emission Factor (lb/MW-hr)	PM2.5 Emission Factor (lb/MW-hr)	SOx Emission Factor (lb/MW-hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
24.0	Aframax	700,000	Dist at 0.2%S	0.20	3,600	55.6%	15.0	1.15	0.20	0.01	0.04	0.04	0.04	0.12	1,069	186	9.30	37.18	37.18	37.18	111.55
46.0	VLCC	2,000,000	Dist at 0.2%S	0.20	3,600	55.6%	23.2	1.15	0.20	0.01	0.04	0.04	0.04	0.12	3,169	551	27.56	110.22	110.22	110.22	330.67
10.0	Panamax	350,000	Dist at 0.2%S	0.20	3,600	55.6%	11.0	1.15	0.20	0.01	0.04	0.04	0.04	0.12	327	57	2.84	11.36	11.36	11.36	34.08
52.0	Suezmax	1,000,000	Dist at 0.2%S	0.20	3,600	55.6%	15.3	1.15	0.20	0.01	0.04	0.04	0.04	0.12	2,362	411	20.54	82.17	82.17	82.17	246.51
<b>TOTAL</b>															<b>6,927</b>	<b>1,205</b>	<b>60</b>	<b>241</b>	<b>241</b>	<b>241</b>	<b>723</b>

Auxiliary Generator Post-Pumping

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NOx Emission Factor (lb/MW-hr)	CO Emission Factor (lb/MW-hr)	ROG Emission Factor (lb/MW-hr)	PM Emission Factor (lb/MW-hr)	PM10 Emission Factor (lb/MW-hr)	PM2.5 Emission Factor (lb/MW-hr)	SOx Emission Factor (lb/MW-hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
24.0	Aframax	700,000	Dist at 0.2%S	0.20	3,600	27.8%	1.0	1.15	0.20	0.01	0.04	0.04	0.04	0.12	36	6	0.31	1.24	1.24	1.24	3.72
46.0	VLCC	2,000,000	Dist at 0.2%S	0.20	3,600	27.8%	1.0	1.15	0.20	0.01	0.04	0.04	0.04	0.12	68	12	0.59	2.38	2.38	2.38	7.13
10.0	Panamax	350,000	Dist at 0.2%S	0.20	3,600	27.8%	1.0	1.15	0.20	0.01	0.04	0.04	0.04	0.12	15	3	0.13	0.52	0.52	0.52	1.55
52.0	Suezmax	1,000,000	Dist at 0.2%S	0.20	3,600	27.8%	1.0	1.15	0.20	0.01	0.04	0.04	0.04	0.12	77	13	0.67	2.69	2.69	2.69	8.06
<b>TOTAL</b>															<b>196</b>	<b>34</b>	<b>2</b>	<b>7</b>	<b>7</b>	<b>7</b>	<b>20</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Mit.AMP.2040-2. 2040 Reduced Project Alternative Summary of Berth Operations Average Daily Mitigated Emissions by AMP Electricity Consumption.

No AMP

Mode	Equipment	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Berth Operations	Aux Generator	7,613	1,324	66	265	265	265	794

Mitigated Emissions with AMP - Year 2040

AMP Reduction 70%

Mode	Equipment	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
Berth Operations	Aux Generator	2,284	397	20	79	79	79	238

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Berth Operations	Aux Generator	6	1	0	0	0	0	1

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Mit.AMP.2040-3. 2040 Reduced Project Alternative Berth Operations Maximum Daily Mitigated Emissions by AMP Electricity Consumption.

Auxiliary Generator Pre-Pumping

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NOx Emission Factors (lb/MW-hr)	CO Emission Factors (lb/MW-hr)	ROG Emission Factors (lb/MW-hr)	PM Emission Factors (lb/MW-hr)	PM10 Emission Factors (lb/MW-hr)	PM2.5 Emission Factors (lb/MW-hr)	SOx Emission Factors (lb/MW-hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)	
1.0	Aframax	700,000	Dist. at 0.20 %S	0.20	3,600	27.8%	2.5	1.15	0.20	0.01	0.04	0.04	0.04	0.12	4	1	0.03	0.13	0.13	0.13	0.13	0.38
1.0	VLCC	2,000,000	Dist. at 0.20 %S	0.20	3,600	27.8%	2.5	1.15	0.20	0.01	0.04	0.04	0.04	0.12	4	1	0.03	0.13	0.13	0.13	0.13	0.38
1.0	Panamax	350,000	Dist. at 0.20 %S	0.20	3,600	27.8%	2.5	1.15	0.20	0.01	0.04	0.04	0.04	0.12	4	1	0.03	0.13	0.13	0.13	0.13	0.38
1.0	Suezmax	1,000,000	Dist. at 0.20 %S	0.20	3,600	27.8%	2.5	1.15	0.20	0.01	0.04	0.04	0.04	0.12	4	1	0.03	0.13	0.13	0.13	0.13	0.38
<b>MAXIMUM</b>															<b>4</b>	<b>1</b>	<b>0.03</b>	<b>0.13</b>	<b>0.13</b>	<b>0.13</b>	<b>0.13</b>	<b>0.38</b>

Auxiliary Generator Pumping

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NOx Emission Factors (lb/MW-hr)	CO Emission Factors (lb/MW-hr)	ROG Emission Factors (lb/MW-hr)	PM Emission Factors (lb/MW-hr)	PM10 Emission Factors (lb/MW-hr)	PM2.5 Emission Factors (lb/MW-hr)	SOx Emission Factors (lb/MW-hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	700,000	Dist at 0.2%S	0.20	3,600	55.6%	15.0	1.15	0.20	0.01	0.04	0.04	0.04	0.12	43	8	0.38	1.50	1.50	1.50	4.50
1.0	VLCC	2,000,000	Dist at 0.2%S	0.20	3,600	55.6%	23.2	1.15	0.20	0.01	0.04	0.04	0.04	0.12	67	12	0.58	2.32	2.32	2.32	6.97
1.0	Panamax	350,000	Dist at 0.2%S	0.20	3,600	55.6%	11.0	1.15	0.20	0.01	0.04	0.04	0.04	0.12	32	6	0.28	1.10	1.10	1.10	3.30
1.0	Suezmax	1,000,000	Dist at 0.2%S	0.20	3,600	55.6%	15.3	1.15	0.20	0.01	0.04	0.04	0.04	0.12	44	8	0.38	1.53	1.53	1.53	4.59
<b>MAXIMUM</b>															<b>67</b>	<b>12</b>	<b>1</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>7</b>

Auxiliary Generator Post-Pumping

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NOx Emission Factors (lb/MW-hr)	CO Emission Factors (lb/MW-hr)	ROG Emission Factors (lb/MW-hr)	PM Emission Factors (lb/MW-hr)	PM10 Emission Factors (lb/MW-hr)	PM2.5 Emission Factors (lb/MW-hr)	SOx Emission Factors (lb/MW-hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	700,000	Dist at 0.2%S	0.20	3,600	27.8%	1.0	1.15	0.20	0.01	0.04	0.04	0.04	0.12	1	0.25	0.01	0.05	0.05	0.05	0.15
1.0	VLCC	2,000,000	Dist at 0.2%S	0.20	3,600	27.8%	1.0	1.15	0.20	0.01	0.04	0.04	0.04	0.12	1	0.25	0.01	0.05	0.05	0.05	0.15
1.0	Panamax	350,000	Dist at 0.2%S	0.20	3,600	27.8%	1.0	1.15	0.20	0.01	0.04	0.04	0.04	0.12	1	0.25	0.01	0.05	0.05	0.05	0.15
1.0	Suezmax	1,000,000	Dist at 0.2%S	0.20	3,600	27.8%	1.0	1.15	0.20	0.01	0.04	0.04	0.04	0.12	1	0.25	0.01	0.05	0.05	0.05	0.15
<b>MAXIMUM</b>															<b>1</b>	<b>0.25</b>	<b>0.01</b>	<b>0.05</b>	<b>0.05</b>	<b>0.05</b>	<b>0.15</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Mit.AMP.2040-4. 2040 Reduced Project Alternative Summary of Berth Operations Maximum Daily Mitigated Emissions by AMP Electricity Consumption.

No AMP

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Berth Operations	Aux Generator	71.79	12.48	0.62	2.50	2.50	2.50	7.49

Mitigated Emissions with AMP - Year 2040

AMP Reduction 70%

Mode	Equipment	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
Berth Operations	Aux Generator	21.54	3.75	0.19	0.75	0.75	0.75	2.25



Table H.2.RPA.Mit.AMP.2040-5. 2040 Reduced Project Alternative Berth Operations Average Daily Mitigated Emissions by AMP Electricity Consumption (Exxon Mobil).

**Auxiliary Generator Pre-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NOx Emission Factor (lb/MW-hr)	CO Emission Factor (lb/MW-hr)	ROG Emission Factor (lb/MW-hr)	PM Emission Factor (lb/MW-hr)	PM10 Emission Factor (lb/MW-hr)	PM2.5 Emission Factor (lb/MW-hr)	SOx Emission Factor (lb/MW-hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
27.0	Aframax	400,000	Dist at 0.2	0.20	3,600	27.8%	2.5	1.15	0.20	0.01	0.04	0.04	0.04	0.12	97	17	1	3	3	3	10

AMP Reduction 70%

Total 29.13 5.07 0.25 1.01 1.01 1.01 3.04

**Auxiliary Generator Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NOx Emission Factor (lb/MW-hr)	CO Emission Factor (lb/MW-hr)	ROG Emission Factor (lb/MW-hr)	PM Emission Factor (lb/MW-hr)	PM10 Emission Factor (lb/MW-hr)	PM2.5 Emission Factor (lb/MW-hr)	SOx Emission Factor (lb/MW-hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
27.0	Aframax	400,000	Dist at 0.2	0.20	3,600	55.6%	15.0	1.15	0.20	0.01	0.04	0.04	0.04	0.12	1,165	203	10	41	41	41	122

AMP Reduction 70%

Total 349.59 60.80 3.04 12.16 12.16 12.16 36.48

**Auxiliary Generator Post-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NOx Emission Factor (lb/MW-hr)	CO Emission Factor (lb/MW-hr)	ROG Emission Factor (lb/MW-hr)	PM Emission Factor (lb/MW-hr)	PM10 Emission Factor (lb/MW-hr)	PM2.5 Emission Factor (lb/MW-hr)	SOx Emission Factor (lb/MW-hr)	NO <sub>x</sub> Emissions (lb/yr)	CO Emissions (lb/yr)	ROG Emissions (lb/yr)	PM Emissions (lb/yr)	PM <sub>10</sub> Emissions (lb/yr)	PM <sub>2.5</sub> Emissions (lb/yr)	SO <sub>2</sub> Emissions (lb/yr)
27.0	Aframax	400,000	Dist at 0.2	0.20	3,600	27.8%	1.0	1.15	0.20	0.01	0.04	0.04	0.04	0.12	38.84	6.76	0.34	1.35	1.35	1.35	4.05

AMP Reduction 70%

Total 11.65 2.03 0.10 0.41 0.41 0.41 1.22

Table H.2.RPA.Mit.AMP.2040-6. 2040 Reduced Project Alternative Berth Operations Maximum Daily Mitigated Emissions by AMP Electricity Consumption (Exxon Mobil).

**Auxiliary Generator Pre-Pumping**

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NOx Emission Factor (lb/MW-hr)	CO Emission Factor (lb/MW-hr)	ROG Emission Factor (lb/MW-hr)	PM Emission Factor (lb/MW-hr)	PM10 Emission Factor (lb/MW-hr)	PM2.5 Emission Factor (lb/MW-hr)	SOx Emission Factor (lb/MW-hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	400,000	Dist at 0.2	0.20	3,600	27.8%	2.5	1.2	0.2	0.0	0.0	0.0	0.0	0.1	3.60	0.63	0.03	0.13	0.13	0.13	0.38

AMP Reduction 70% MAXIMUM 1.08 0.19 0.01 0.04 0.04 0.04 0.11

**Auxiliary Generator Pumping**

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NOx Emission Factor (lb/MW-hr)	CO Emission Factor (lb/MW-hr)	ROG Emission Factor (lb/MW-hr)	PM Emission Factor (lb/MW-hr)	PM10 Emission Factor (lb/MW-hr)	PM2.5 Emission Factor (lb/MW-hr)	SOx Emission Factor (lb/MW-hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	400,000	Dist at 0.2	0.20	3,600	55.6%	15.0	1.2	0.2	0.0	0.0	0.0	0.0	0.1	43.16	7.51	0.38	1.50	1.50	1.50	4.50

AMP Reduction 70% MAXIMUM 12.95 2.25 0.11 0.45 0.45 0.45 1.35

**Auxiliary Generator Post-Pumping**

Shipcalls (vessels/day)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	NOx Emission Factor (lb/MW-hr)	CO Emission Factor (lb/MW-hr)	ROG Emission Factor (lb/MW-hr)	PM Emission Factor (lb/MW-hr)	PM10 Emission Factor (lb/MW-hr)	PM2.5 Emission Factor (lb/MW-hr)	SOx Emission Factor (lb/MW-hr)	NO <sub>x</sub> Emissions (lb/day)	CO Emissions (lb/day)	ROG Emissions (lb/day)	PM Emissions (lb/day)	PM <sub>10</sub> Emissions (lb/day)	PM <sub>2.5</sub> Emissions (lb/day)	SO <sub>2</sub> Emissions (lb/day)
1.0	Aframax	400,000	Dist at 0.2	0.20	3,600	27.8%	1.0	1.2	0.2	0.0	0.0	0.0	0.0	0.1	1.44	0.25	0.01	0.05	0.05	0.05	0.15

AMP Reduction 70% MAXIMUM 0.43 0.075 0.004 0.02 0.02 0.02 0.05

**APPENDIX H.2 - SECTION 3**  
**GREENHOUSE GASES**

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**APPENDIX H.2 - SECTION 3.1**  
**OPERATIONAL GHG EMISSIONS**

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Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Un.GHG.2010-1. 2010 Proposed Project Main Engines Average Daily Unmitigated GHG Emissions.

Ship	Direction	Mode	Distance (nautical miles)	Ship speed (knots)	Activity (hours)	Maximum Speed (knots)	Load Factor	MCR (kW)	Energy (kW-hr)	Shipcalls (vessels/yr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)	
VLCC	North In	Cruising - CW to VSR	22	15.54	1.42	16.9	0.777	25,400	27,957	26.0	0.0055	620.00	0.0818	0.0040	450.67	0.0595	
		Cruising - VSR to PZ	21	12	1.75	16.9	0.358	25,400	15,913	26.0	0.0055	620.00	0.0818	0.0023	256.52	0.0338	
		Cruising - PZ to Pilot	4.7	7	0.67	16.9	0.071	25,400	1,212	26.0	0.0055	620.00	0.0818	0.0002	19.54	0.0026	
	North Out	Maneuvering - Pilot to Berth			3	1.00	16.9	0.006	25,400	142	26.0	0.0060	682.00	0.0902	0.0000	2.52	0.0003
		Maneuvering - Berth to Pilot			5	1.00	16.9	0.026	25,400	658	26.0	0.0060	682.00	0.0902	0.0001	11.66	0.0015
		Cruising - Pilot to PZ		3.8	7	0.54	16.9	0.071	25,400	980	26.0	0.0055	620.00	0.0818	0.0001	15.79	0.0021
		Cruising - PZ to VSR		21	12	1.75	16.9	0.358	25,400	15,913	26.0	0.0055	620.00	0.0818	0.0023	256.52	0.0338
		Cruising - VSR to CW		22	15.54	1.42	16.9	0.777	25,400	27,957	26.0	0.0055	620.00	0.0818	0.0040	450.67	0.0595
AFRAMAX	South In	Cruising - CW to VSR	23	14.7	1.56	16.1	0.761	12,477	14,859	32.0	0.0055	620.00	0.0818	0.0026	294.81	0.0389	
		Cruising - VSR to PZ	11	12	0.92	16.1	0.414	12,477	4,736	32.0	0.0055	620.00	0.0818	0.0008	93.96	0.0124	
		Cruising - PZ to Pilot	4.7	7	0.67	16.1	0.082	12,477	689	32.0	0.0055	620.00	0.0818	0.0001	13.66	0.0018	
	South Out	Maneuvering - Pilot to Berth			3	1.00	16.1	0.006	12,477	81	32.0	0.0060	682.00	0.0902	0.0000	1.76	0.0002
		Maneuvering - Berth to Pilot			5	1.00	16.1	0.030	12,477	374	32.0	0.0060	682.00	0.0902	0.0001	8.16	0.0011
		Cruising - Pilot to PZ		3.5	7	0.50	16.1	0.082	12,477	513	32.0	0.0055	620.00	0.0818	0.0001	10.17	0.0013
		Cruising - PZ to VSR		12.5	12	1.04	16.1	0.414	12,477	5,382	32.0	0.0055	620.00	0.0818	0.0009	106.77	0.0141
		Cruising - VSR to CW		24.5	14.7	1.67	16.1	0.761	12,477	15,828	32.0	0.0055	620.00	0.0818	0.0028	314.03	0.0414
PANAMAX	South In	Cruising - CW to VSR	23	14.7	1.56	15.8	0.805	10,300	12,979	26	0.0055	620.00	0.0818	0.0018	209.22	0.0276	
		Cruising - VSR to PZ	11	12	0.92	15.8	0.438	10,300	4,136	26	0.0055	620.00	0.0818	0.0006	66.68	0.0088	
		Cruising - PZ to Pilot	4.7	7	0.67	15.8	0.087	10,300	601	26	0.0055	620.00	0.0818	0.0001	9.69	0.0013	
	South Out	Maneuvering - Pilot to Berth			3	1.00	15.8	0.007	10,300	71	26	0.0060	682.00	0.0902	0.0000	1.25	0.0002
		Maneuvering - Berth to Pilot			5	1.00	15.8	0.032	10,300	326	26	0.0060	682.00	0.0902	0.0001	5.79	0.0008
		Cruising - Pilot to PZ		3.5	7	0.50	15.8	0.087	10,300	448	26	0.0055	620.00	0.0818	0.0001	7.22	0.0010
		Cruising - PZ to VSR		12.5	12	1.04	15.8	0.438	10,300	4,700	26	0.0055	620.00	0.0818	0.0007	75.77	0.0100
		Cruising - VSR to CW		24.5	14.7	1.67	15.8	0.805	10,300	13,825	26	0.0055	620.00	0.0818	0.0020	222.86	0.0294
SUEZMAX	North In	Cruising - CW to VSR	22	15.54	1.42	17	0.764	16,000	17,302	45	0.0055	620.00	0.0818	0.0042	482.73	0.0637	
		Cruising - VSR to PZ	21	12	1.75	17	0.352	16,000	9,848	45	0.0055	620.00	0.0818	0.0024	274.76	0.0363	
		Cruising - PZ to Pilot	4.7	7	0.67	17	0.070	16,000	750	45	0.0055	620.00	0.0818	0.0002	20.93	0.0028	
	North Out	Maneuvering - Pilot to Berth			3	1.00	17	0.005	16,000	88	45	0.0060	682.00	0.0902	0.0000	2.70	0.0004
		Maneuvering - Berth to Pilot			5	1.00	17	0.025	16,000	407	45	0.0060	682.00	0.0902	0.0001	12.49	0.0017
		Cruising - Pilot to PZ		3.8	7	0.54	17	0.070	16,000	606	45	0.0055	620.00	0.0818	0.0001	16.92	0.0022
		Cruising - PZ to VSR		21	12	1.75	17	0.352	16,000	9,848	45	0.0055	620.00	0.0818	0.0024	274.76	0.0363
		Cruising - VSR to CW		22	15.54	1.42	17	0.764	16,000	17,302	45	0.0055	620.00	0.0818	0.0042	482.73	0.0637
<b>TOTAL</b>														<b>0.0393</b>	<b>4473.71</b>	<b>0.5903</b>	

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Un.GHG.2010-2. 2010 Proposed Project Auxiliary Generator Average Daily Unmitigated GHG Emissions.

Ship	Direction	Mode	Activity (hours)	MCR (kW)	Load Factor	Energy (kW-hr)	Shipcalls (vessels/yr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
VLCC	North In	Cruising	3.84	3,600	0.278	3,840	26.0	0.0055	620.00	0.0818	0.0005	61.90	0.0082
		Maneuvering	2.00	3,600	0.278	2,002	26.0	0.0060	682.00	0.0902	0.0003	35.49	0.0047
	North Out	Maneuvering	1.50	3,600	0.278	1,501	26.0	0.0060	682.00	0.0902	0.0002	26.62	0.0035
		Cruising	3.71	3,600	0.278	3,712	26.0	0.0055	620.00	0.0818	0.0005	59.83	0.0079
AFRAMAX	South In	Cruising	3.15	3,600	0.278	3,155	32.0	0.0055	620.00	0.0818	0.0006	62.60	0.0083
		Maneuvering	2.00	3,600	0.278	2,002	32.0	0.0060	682.00	0.0902	0.0004	43.68	0.0058
	South Out	Maneuvering	1.50	3,600	0.278	1,501	32.0	0.0060	682.00	0.0902	0.0003	32.76	0.0043
		Cruising	3.21	3,600	0.278	3,211	32.0	0.0055	620.00	0.0818	0.0006	63.70	0.0084
PANAMAX	South In	Cruising	3.15	3,600	0.28	3,178	26	0.0055	620.00	0.0818	0.0005	51.23	0.0068
		Maneuvering	2.00	3,600	0.28	2,016	26	0.0060	682.00	0.0902	0.0003	35.75	0.0047
	South Out	Maneuvering	1.5	3,600	0.28	1,512	26	0.0060	682.00	0.0902	0.0002	26.81	0.0035
		Cruising	3.21	3,600	0.28	3,234	26	0.0055	620.00	0.0818	0.0005	52.13	0.0069
SUEZMAX	North In	Cruising	3.84	3,600	0.28	3,868	45	0.0055	620.00	0.0818	0.0009	107.91	0.0142
		Maneuvering	2.00	3,600	0.28	2,016	45	0.0060	682.00	0.0902	0.0005	61.87	0.0082
	North Out	Maneuvering	1.5	3,600	0.28	1,512	45	0.0060	682.00	0.0902	0.0004	46.40	0.0061
		Cruising	3.71	3,600	0.28	3,738	45	0.0055	620.00	0.0818	0.0009	104.30	0.0138
<b>TOTAL</b>											<b>0.0077</b>	<b>873.00</b>	<b>0.1153</b>



Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Un.GHG.2010-3. 2010 Proposed Project Boiler Warm-Up Average Daily Unmitigated GHG Emissions.

Shipcalls (vessels/yr)	Vessel Size	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	Fuel Consumpti on (gal/yr)	N <sub>2</sub> O Emission Factor (lb/ton)	CO <sub>2</sub> Emission Factor (lb/ton)	CH <sub>4</sub> Emission Factor (lb/ton)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
32.0	Aframax	HFO	2.70	107.96	30%	3	50,000	69,001	0.0627	6,360.00	0.8770	0.0063	635.32	0.0876
26.0	VLCC	HFO	2.70	84.93	30%	3	90,000	79,389	0.0627	6,360.00	0.8770	0.0072	730.96	0.1008
26.0	Panamax	HFO	2.70	63.30	30%	3	35,000	23,011	0.0627	6,360.00	0.8770	0.0021	211.87	0.0292
45.0	Suezmax	HFO	2.70	87.54	30%	3	70,000	110,154	0.0627	6,360.00	0.8770	0.0100	1,014.22	0.1399
<b>TOTAL</b>												<b>0.0256</b>	<b>2,592.37</b>	<b>0.3575</b>

Table H.2.PP.Un.GHG.2010-4. 2010 Proposed Project Berth Operations Average Daily Unmitigated GHG Emissions.

Auxiliary Generator Pre-Pumpin

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
32.0	Aframax	700,000	HFO	2.70	3,600	28%	2.5	0.0064	722.0	0.0952	0.0018	207.9360	0.0274
26.0	VLCC	2,000,000	HFO	2.70	3,600	28%	2.5	0.0064	722.0	0.0952	0.0015	168.9480	0.0223
26.0	Panamax	350,000	HFO	2.70	3,600	28%	2.5	0.0064	722.0	0.0952	0.0015	168.9480	0.0223
45.0	Suezmax	1,000,000	HFO	2.70	3,600	28%	2.5	0.0064	722.0	0.0952	0.0026	292.4100	0.0386
<b>TOTAL</b>											<b>0.007</b>	<b>838.242</b>	<b>0.111</b>

Boiler Pre-Pumping

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	Fuel Consumption (gal/yr)	N <sub>2</sub> O Emission Factor (lb/ton)	CO <sub>2</sub> Emission Factor (lb/ton)	CH <sub>4</sub> Emission Factor (lb/ton)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
32.0	Aframax	700,000	HFO	2.70	107.96	30%	2.5	50,000	57,501	0.0627	6,360.0	0.8770	0.0052	529.43	0.07
26.0	VLCC	2,000,000	HFO	2.70	84.93	30%	2.5	90,000	66,157	0.0627	6,360.0	0.8770	0.0060	609.13	0.08
26.0	Panamax	350,000	HFO	2.70	63.30	30%	2.5	35,000	18,149	0.0627	6,360.0	0.8770	0.0016	167.10	0.02
45.0	Suezmax	1,000,000	HFO	2.70	87.54	30%	2.5	70,000	86,877	0.0627	6,360.0	0.8770	0.0079	799.90	0.11
<b>TOTAL</b>													<b>0.0208</b>	<b>2,105.57</b>	<b>0.2903</b>

Auxiliary Generator Pumpin

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
32.0	Aframax	700,000	MDO	0.52	3,600	56%	15.0	0.0064	722.0	0.0952	0.011	1,247.616	0.165
26.0	VLCC	2,000,000	MDO	0.52	3,600	56%	23.2	0.0064	722.0	0.0952	0.014	1,569.339	0.207
26.0	Panamax	350,000	MDO	0.52	3,600	56%	11.0	0.0064	722.0	0.0952	0.007	743.371	0.098
45.0	Suezmax	1,000,000	MDO	0.52	3,600	56%	15.3	0.0064	722.0	0.0952	0.016	1,789.549	0.236
<b>TOTAL</b>											<b>0.0473</b>	<b>5,349.88</b>	<b>0.7054</b>

Boiler Pumping

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Inerting Fuel Consumption Savings (lb/1000 bbl offloaded)	Activity Time (hr)	Fuel Consumption (gal/yr)	N <sub>2</sub> O Emission Factor (lb/ton)	CO <sub>2</sub> Emission Factor (lb/ton)	CH <sub>4</sub> Emission Factor (lb/ton)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)	
32.0	Aframax	700,000	MDO	0.52	102.17	28.06	15.0	326,521	0.0627	6,360.0	0.8770	0.03	3,006.40	0.41	
26.0	VLCC	2,000,000	MDO	0.52	80.38	28.06	23.2	581,048	0.0627	6,360.0	0.8770	0.05	5,349.92	0.74	
26.0	Panamax	350,000	MDO	0.52	59.91	28.06	11.0	79,853	0.0627	6,360.0	0.8770	0.01	735.24	0.10	
45.0	Suezmax	1,000,000	MDO	0.52	82.85	28.06	15.3	531,685	0.0627	6,360.0	0.8770	0.05	4,895.42	0.68	
<b>TOTAL</b>													<b>0.1379</b>	<b>13,986.98</b>	<b>1.9287</b>

Auxiliary Generator Post-Pumpin

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
32.0	Aframax	700,000	HFO	2.70	3,600	28%	1.0	0.0064	722.0	0.0952	0.0007	83.1744	0.0110
26.0	VLCC	2,000,000	HFO	2.70	3,600	28%	1.0	0.0064	722.0	0.0952	0.0006	67.5792	0.0089
26.0	Panamax	350,000	HFO	2.70	3,600	28%	1.0	0.0064	722.0	0.0952	0.0006	67.5792	0.0089
45.0	Suezmax	1,000,000	HFO	2.70	3,600	28%	1.0	0.0064	722.0	0.0952	0.0010	116.9640	0.0154
<b>TOTAL</b>											<b>0.0030</b>	<b>335.2968</b>	<b>0.0442</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Un.GHG.2010-5. 2010 Proposed Project Summary of Average Daily Unmitigated Vessel GHG Emissions.

Mode	Equipment	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
Cruising	Main Engines	0.0389	4427.38	0.5841
Cruising	Aux Generator	0.0050	563.61	0.0744
Maneuvering	Main Engines	0.0004	46.33	0.0061
Maneuvering	Aux Generator	0.0027	309.39	0.0409
Boiler Warm-up	Boiler	0.0256	2592.37	0.3575
Berth Operations	Boiler	0.1586	16092.55	2.2191
Berth Operations	Aux Generator	0.0577	6523.41	0.8602
Propulsion	TOTAL	0.0470	5,347	0.7055
Non-Propulsion	TOTAL	0.2419	25,208	3.44
<b>Total Emissions</b>		<b>0.2889</b>	<b>30555.04</b>	<b>4.1422</b>

Mode	Equipment	N <sub>2</sub> O Emissions (tons/day)	CO <sub>2</sub> Emissions (tons/day)	CH <sub>4</sub> Emissions (tons/day)
Cruising	Main Engines	1.07E-04	12.1	1.60E-03
Cruising	Aux Generator	1.36E-05	1.5	2.04E-04
Maneuvering	Main Engines	1.12E-06	0.1	1.68E-05
Maneuvering	Aux Generator	7.47E-06	0.8	1.12E-04
Boiler Warm-up	Boiler	7.00E-05	7.1	9.79E-04
Berth Operations	Boiler	4.35E-04	44.1	6.08E-03
Berth Operations	Aux Generator	1.58E-04	17.9	2.36E-03
Propulsion	TOTAL	1.29E-04	14.6	1.93E-03
Non-Propulsion	TOTAL	6.63E-04	69.1	9.42E-03
<b>Total Emissions</b>		<b>7.91E-04</b>	<b>83.71</b>	<b>1.13E-02</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Un.GHG.2010-6. 2010 Proposed Project Tug Main Engines Average Daily Unmitigated GHG Emissions.

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Energy (kWh)	Energy (MMBtu)	Shipcalls (vessels/yr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
VLCC	Maneuvering - Pilot to Berth	1.00	4	4,800	0.50	2400	8.2	26.0	0.00636	645.0	0.0890	0.0004	40.2480	0.0056
	Maneuvering - Berth to Pilot	1.00	2	4,800	0.50	2400	8.2	26.0	0.00636	645.0	0.0890	0.0004	40.2480	0.0056
AFRAMAX	Maneuvering - Pilot to Berth	1.00	2	4,800	0.50	2400	8.2	32.0	0.00636	645.0	0.0890	0.0005	49.5360	0.0068
	Maneuvering - Berth to Pilot	1.00	2	4,800	0.50	2400	8.2	32.0	0.00636	645.0	0.0890	0.0005	49.5360	0.0068
PANAMAX	Maneuvering - Pilot to Berth	1.00	2	4,800	0.50	2400	8.2	26.0	0.00636	645.0	0.0890	0.0004	40.2480	0.0056
	Maneuvering - Berth to Pilot	1.00	2	4,800	0.50	2400	8.2	26.0	0.00636	645.0	0.0890	0.0004	40.2480	0.0056
SUEZMAX	Maneuvering - Pilot to Berth	1.00	3	4,800	0.50	2400	8.2	45.0	0.00636	645.0	0.0890	0.0007	69.6600	0.0096
	Maneuvering - Berth to Pilot	1.00	2	4,800	0.50	2400	8.2	45.0	0.00636	645.0	0.0890	0.0007	69.6600	0.0096
<b>TOTAL</b>												<b>0.0039</b>	<b>399.38</b>	<b>0.0551</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Un.GHG.2010-7. 2010 Proposed Project Tug Auxiliary Generator Engines Average Daily Unmitigated GHG Emissions.

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Energy (kWh)	Energy (MMBtu)	Shipcalls (vessels/yr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
VLCC	Maneuvering - Pilot to Berth	1.00	4	300	1.00	300	1.0	26.0	0.0068	690.0	0.0952	0.00005	5.38200	0.00074
	Maneuvering - Berth to Pilot	1.00	2	300	1.00	300	1.0	26.0	0.0068	690.0	0.0952	0.00005	5.38200	0.00074
AFRAMAX	Maneuvering - Pilot to Berth	1.00	2	300	1.00	300	1.0	32.0	0.0068	690.0	0.0952	0.00007	6.62400	0.00091
	Maneuvering - Berth to Pilc	1.00	2	300	1.00	300	1.0	32.0	0.0068	690.0	0.0952	0.00007	6.62400	0.00091
PANAMAX	Maneuvering - Pilot to Berth	1.00	2	300	1.00	300	1.0	26.0	0.0068	690.0	0.0952	0.00005	5.38200	0.00074
	Maneuvering - Berth to Pilot	1.00	2	300	1.00	300	1.0	26.0	0.0068	690.0	0.0952	0.00005	5.38200	0.00074
SUEZMAX	Maneuvering - Pilot to Berth	1.00	3	300	1.00	300	1.0	45.0	0.0068	690.0	0.0952	0.00009	9.31500	0.00129
	Maneuvering - Berth to Pilc	1.00	2	300	1.00	300	1.0	45.0	0.0068	690.0	0.0952	0.00009	9.31500	0.00129
<b>TOTAL</b>												<b>0.0005</b>	<b>53.41</b>	<b>0.0074</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Un.GHG.2010-8. 2010 Proposed Project Summary of Tug Average Daily Unmitigated GHG Emissions.

Mode	Equipment	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
Tug Assist	Main Engines	0.0039	399.38	0.0551
Tug Assist	Aux Generator	0.0005	53.41	0.0074

**TOTAL                    0.0045                    452.79                    0.0625**

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Un.GHG.2010-9. 2010 Proposed Project VDU Crude Average Daily Unmitigated GHG Emissions.

	Annual Vessel Calls	crude vapors from tanks(scf/call)	annual gas usage (mmscf/yr)	mw crude vapors	destruction efficiency
Aframax	32	224000	7.2	50	98%
VLCC	26	596,313	15.5	50	98%
Panamax	26	116,667	3.0		
Suezmax	45	333,333	15.0		
<b>TOTAL</b>	<b>129</b>		<b>40.7</b>		

Assumed Distribution based on tank storage	
Site 1	12.5%
Site 2	87.5%

Annual Average (tons/yr)

	N <sub>2</sub> O	CO <sub>2</sub>	CH <sub>4</sub>
EF (kg/MMBtu)	0.0001	52.78	0.0059
Aframax	0.0007	385.89	0.0431
VLCC	0.0016	834.67	0.0933
Panamax	0.0003	163.30	0.0183
Suezmax	0.0015	807.53	0.0903
<b>TOTAL</b>	<b>0.0042</b>	<b>2191.4031</b>	<b>0.2450</b>

Annual Average (tons/yr)

	N <sub>2</sub> O	CO <sub>2</sub>	CH <sub>4</sub>
Site 1	0.0005	273.93	0.03
Site 2	0.0036	1917.5	0.2

**Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR**

**Table H.2.PP.Un.GHG.2010-10. 2010 Proposed Project VDU Legs Average Daily Unmitigated GHG Emissions.**

	tanks	crude vapors from tanks on legs(scf/yr)	annual gas usage (mmscf/yr)	mw crude vapors	destruction efficiency
Site 1	4	8640000	34.6	50	98%
Site 2	14	8640000	121.0	50	98%
<b>TOTAL</b>	<b>18</b>		<b>155.5</b>		

  

<b>48</b>	<b>hr/event</b>
<b>6</b>	<b>events/yr</b>
<b>500</b>	<b>ft3/min</b>

Annual Average (tons/yr)

	<b>N<sub>2</sub>O</b>	<b>CO<sub>2</sub></b>	<b>CH<sub>4</sub></b>
EF (kg/MMBtu)	0.0001	52.78	0.0059
<b>TOTAL</b>	<b>0.016</b>	<b>8372.513</b>	<b>0.936</b>

*Assumed a ratio of 500/1000 based on the corresponding Btu values with respect to natural gas combustion emission factors.*

Annual Average (tons/yr)

	<b>N<sub>2</sub>O</b>	<b>CO<sub>2</sub></b>	<b>CH<sub>4</sub></b>
Site 1	0.0035	1860.6	0.2
Site 2	0.012	6512.0	0.7



Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Un.GHG.2010-11. 2010 Proposed Project VDU Average Daily Unmitigated GHG Emissions.

Annual Average (tons/yr)

	<b>N<sub>2</sub>O</b>	<b>CO<sub>2</sub></b>	<b>CH<sub>4</sub></b>
Site 1	0.004	2134	0.24
Site 2	0.016	8429	0.94
<b>Total</b>	<b>0.020</b>	<b>10,564</b>	<b>1.18</b>

Daily Average (tons/day)

	<b>N<sub>2</sub>O</b>	<b>CO<sub>2</sub></b>	<b>CH<sub>4</sub></b>
Site 1	1.11E-05	5.848	6.54E-04
Site 2	4.38E-05	23.094	2.58E-03
<b>Total</b>	<b>5.48E-05</b>	<b>29</b>	<b>3.24E-03</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Un.GHG.2015-1. 2015 Proposed Project Main Engines Average Daily Unmitigated GHG Emissions.

Ship	Direction	Mode	Distance (nautical miles)	Ship speed (knots)	Activity (hours)	Maximum Speed (knots)	Load Factor	MCR (kW)	Energy (kW-hr)	Energy (MMBtu)	Shipcalls (vessels/yr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
VLCC	North In	Cruising - CW to VSR	22	15.54	1.42	16.9	0.777	25,400	27,957	95	51.0	0.0055	620.00	0.0818	0.0078	884.02	0.1166
		Cruising - VSR to PZ	21	12	1.75	16.9	0.358	25,400	15,913	54	51.0	0.0055	620.00	0.0818	0.0044	503.17	0.0664
		Cruising - PZ to Pilot	4.7	7	0.67	16.9	0.071	25,400	1,212	4	51.0	0.0055	620.00	0.0818	0.0003	38.32	0.0051
		Maneuvering - Pilot to Berth		3	1.00	16.9	0.006	25,400	142	0	51.0	0.0060	682.00	0.0902	0.0000	4.94	0.0007
	North Out	Maneuvering - Berth to Pilot		5	1.00	16.9	0.026	25,400	658	2	51.0	0.0060	682.00	0.0902	0.0002	22.88	0.0030
		Cruising - Pilot to PZ	3.8	7	0.54	16.9	0.071	25,400	980	3	51.0	0.0055	620.00	0.0818	0.0003	30.98	0.0041
		Cruising - PZ to VSR	21	12	1.75	16.9	0.358	25,400	15,913	54	51.0	0.0055	620.00	0.0818	0.0044	503.17	0.0664
		Cruising - VSR to CW	22	15.54	1.42	16.9	0.777	25,400	27,957	95	51.0	0.0055	620.00	0.0818	0.0078	884.02	0.1166
AFRAMAX	South In	Cruising - CW to VSR	23	14.7	1.56	16.1	0.761	12,477	14,859	51	24.0	0.0055	620.00	0.0818	0.0019	221.10	0.0292
		Cruising - VSR to PZ	11	12	0.92	16.1	0.414	12,477	4,736	16	24.0	0.0055	620.00	0.0818	0.0006	70.47	0.0093
		Cruising - PZ to Pilot	4.7	7	0.67	16.1	0.082	12,477	689	2	24.0	0.0055	620.00	0.0818	0.0001	10.25	0.0014
		Maneuvering - Pilot to Berth		3	1.00	16.1	0.006	12,477	81	0	24.0	0.0060	682.00	0.0902	0.0000	1.32	0.0002
	South Out	Maneuvering - Berth to Pilot		5	1.00	16.1	0.030	12,477	374	1	24.0	0.0060	682.00	0.0902	0.0001	6.12	0.0008
		Cruising - Pilot to PZ	3.5	7	0.50	16.1	0.082	12,477	513	2	24.0	0.0055	620.00	0.0818	0.0001	7.63	0.0010
		Cruising - PZ to VSR	12.5	12	1.04	16.1	0.414	12,477	5,382	18	24.0	0.0055	620.00	0.0818	0.0007	80.08	0.0106
		Cruising - VSR to CW	24.5	14.7	1.67	16.1	0.761	12,477	15,828	54	24.0	0.0055	620.00	0.0818	0.0021	235.52	0.0311
PANAMAX	South In	Cruising - CW to VSR	23	14.7	1.56	15.8	0.805	10,300	12,979	44	12	0.0055	620.00	0.0818	0.0008	96.56	0.0127
		Cruising - VSR to PZ	11	12	0.92	15.8	0.438	10,300	4,136	14	12	0.0055	620.00	0.0818	0.0003	30.77	0.0041
		Cruising - PZ to Pilot	4.7	7	0.67	15.8	0.087	10,300	601	2	12	0.0055	620.00	0.0818	0.0000	4.47	0.0006
		Maneuvering - Pilot to Berth		3	1.00	15.8	0.007	10,300	71	0	12	0.0060	682.00	0.0902	0.0000	0.58	0.0001
	South Out	Maneuvering - Berth to Pilot		5	1.00	15.8	0.032	10,300	326	1	12	0.0060	682.00	0.0902	0.0000	2.67	0.0004
		Cruising - Pilot to PZ	3.5	7	0.50	15.8	0.087	10,300	448	2	12	0.0055	620.00	0.0818	0.0000	3.33	0.0004
		Cruising - PZ to VSR	12.5	12	1.04	15.8	0.438	10,300	4,700	16	12	0.0055	620.00	0.0818	0.0003	34.97	0.0046
		Cruising - VSR to CW	24.5	14.7	1.67	15.8	0.805	10,300	13,825	47	12	0.0055	620.00	0.0818	0.0009	102.86	0.0136
SUEZMAX	North In	Cruising - CW to VSR	22	15.54	1.42	17	0.764	16,000	17,302	59	60	0.0055	620.00	0.0818	0.0057	643.64	0.0849
		Cruising - VSR to PZ	21	12	1.75	17	0.352	16,000	9,848	34	60	0.0055	620.00	0.0818	0.0032	366.35	0.0483
		Cruising - PZ to Pilot	4.7	7	0.67	17	0.070	16,000	750	3	60	0.0055	620.00	0.0818	0.0002	27.90	0.0037
		Maneuvering - Pilot to Berth		3	1.00	17	0.005	16,000	88	0	60	0.0060	682.00	0.0902	0.0000	3.60	0.0005
	North Out	Maneuvering - Berth to Pilot		5	1.00	17	0.025	16,000	407	1	60	0.0060	682.00	0.0902	0.0001	16.66	0.0022
		Cruising - Pilot to PZ	3.8	7	0.54	17	0.070	16,000	606	2	60	0.0055	620.00	0.0818	0.0002	22.56	0.0030
		Cruising - PZ to VSR	21	12	1.75	17	0.352	16,000	9,848	34	60	0.0055	620.00	0.0818	0.0032	366.35	0.0483
		Cruising - VSR to CW	22	15.54	1.42	17	0.764	16,000	17,302	59	60	0.0055	620.00	0.0818	0.0057	643.64	0.0849
<b>TOTAL</b>															<b>0.0516</b>	<b>5870.90</b>	<b>0.7746</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Un.GHG.2015-2. 2015 Proposed Project Auxiliary Generator Average Daily Unmitigated GHG Emissions.

Ship	Direction	Mode	Activity (hours)	MCR (kW)	Load Factor	Energy (kW-hr)	Energy (MMBtu)	Shipcalls (vessels/yr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
VLCC	North In	Cruising	3.84	3,600	0.278	3,840	13	51.0	0.0055	620.00	0.0818	0.0011	121.43	0.0160
		Maneuvering	2.00	3,600	0.278	2,002	7	51.0	0.0060	682.00	0.0902	0.0006	69.62	0.0092
	North Out	Maneuvering	1.50	3,600	0.278	1,501	5	51.0	0.0060	682.00	0.0902	0.0005	52.21	0.0069
		Cruising	3.71	3,600	0.278	3,712	13	51.0	0.0055	620.00	0.0818	0.0010	117.36	0.0155
AFRAMAX	South In	Cruising	3.15	3,600	0.278	3,155	11	24.0	0.0055	620.00	0.0818	0.0004	46.95	0.0062
		Maneuvering	2.00	3,600	0.278	2,002	7	24.0	0.0060	682.00	0.0902	0.0003	32.76	0.0043
	South Out	Maneuvering	1.50	3,600	0.278	1,501	5	24.0	0.0060	682.00	0.0902	0.0002	24.57	0.0032
		Cruising	3.21	3,600	0.278	3,211	11	24.0	0.0055	620.00	0.0818	0.0004	47.78	0.0063
PANAMAX	South In	Cruising	3.15	3,600	0.28	3,178	11	12	0.0055	620.00	0.0818	0.0002	23.64	0.0031
		Maneuvering	2.00	3,600	0.28	2,016	7	12	0.0060	682.00	0.0902	0.0001	16.50	0.0022
	South Out	Maneuvering	1.5	3,600	0.28	1,512	5	12	0.0060	682.00	0.0902	0.0001	12.37	0.0016
		Cruising	3.21	3,600	0.28	3,234	11	12	0.0055	620.00	0.0818	0.0002	24.06	0.0032
SUEZMAX	North In	Cruising	3.84	3,600	0.28	3,868	13	60	0.0055	620.00	0.0818	0.0013	143.88	0.0190
		Maneuvering	2.00	3,600	0.28	2,016	7	60	0.0060	682.00	0.0902	0.0007	82.49	0.0109
	North Out	Maneuvering	1.5	3,600	0.28	1,512	5	60	0.0060	682.00	0.0902	0.0005	61.87	0.0082
		Cruising	3.71	3,600	0.28	3,738	13	60	0.0055	620.00	0.0818	0.0012	139.06	0.0183
<b>TOTAL</b>												<b>0.0089</b>	<b>1016.57</b>	<b>0.1342</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Un.GHG.2015-3. 2015 Proposed Project Boiler Warm-Up Average Daily Unmitigated GHG Emissions.

Shipcalls (vessels/yr)	Vessel Size	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	Fuel Consumption (gal/yr)	N <sub>2</sub> O Emission Factor (lb/ton)	CO <sub>2</sub> Emission Factor (lb/ton)	CH <sub>4</sub> Emission Factor (lb/ton)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
24.0	Aframax	HFO	2.70	107.96	30%	3	50,000	51,751	0.0627	6,360.00	0.8770	0.0047	476.49	0.0657
51.0	VLCC	HFO	2.70	84.93	30%	3	90,000	155,724	0.0627	6,360.00	0.8770	0.0141	1,433.81	0.1977
12.0	Panamax	HFO	2.70	63.30	30%	3	35,000	10,620	0.0627	6,360.00	0.8770	0.0010	97.78	0.0135
60.0	Suezmax	HFO	2.70	87.54	30%	3	70,000	146,871	0.0627	6,360.00	0.8770	0.0133	1,352.30	0.1865
<b>TOTAL</b>												<b>0.0331</b>	<b>3,360.38</b>	<b>0.4634</b>

Table H.2.PP.Un.GHG.2015-4. 2015 Proposed Project Berth Operations Average Daily Unmitigated GHG Emissions.

Auxiliary Generator Pre-Pumping

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	Energy (MMBtu)	Heating Value (MMBtu/1000 gal)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
24.0	Aframax	700,000	HFO	2.70	3,600	28%	2.5	8.5	150	0.0064	722.0	0.0952	0.0014	155.95	0.0206
51.0	VLCC	2,000,000	HFO	2.70	3,600	28%	2.5	8.5	150	0.0064	722.0	0.0952	0.0029	331.40	0.0437
12.0	Panamax	350,000	HFO	2.70	3,600	28%	2.5	8.6	150	0.0064	722.0	0.0952	0.0007	77.98	0.0103
60.0	Suezmax	1,000,000	HFO	2.70	3,600	28%	2.5	8.6	150	0.0064	722.0	0.0952	0.0034	389.88	0.0514
<b>TOTAL</b>													<b>0.0084</b>	<b>955.21</b>	<b>0.1259</b>

Boiler Pre-Pumping

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	Fuel Consumption (gal/yr)	N <sub>2</sub> O Emission Factor (lb/ton)	CO <sub>2</sub> Emission Factor (lb/ton)	CH <sub>4</sub> Emission Factor (lb/ton)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
24.0	Aframax	700,000	HFO	2.70	107.96	30%	2.5	50,000	43,126	0.0627	6,360.0	0.8770	0.0039	397.07	0.0548
51.0	VLCC	2,000,000	HFO	2.70	84.93	30%	2.5	90,000	129,770	0.0627	6,360.0	0.8770	0.0118	1194.84	0.1648
12.0	Panamax	350,000	HFO	2.70	59.91	30%	2.5	35,000	8,376	0.0627	6,360.0	0.8770	0.0008	77.12	0.0106
60.0	Suezmax	1,000,000	HFO	2.70	82.85	30%	2.5	70,000	115,836	0.0627	6,360.0	0.8770	0.0105	1066.54	0.1471
<b>TOTAL</b>													<b>0.0270</b>	<b>2735.58</b>	<b>0.3772</b>

Auxiliary Generator Pumping

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	Energy (MMBtu)	Heating Value (MMBtu/1000 gal)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
24.0	Aframax	700,000	MDO	0.52	3,600	56%	15.0	102.4	140	0.0064	722.0	0.0952	0.0082	935.71	0.1234
51.0	VLCC	2,000,000	MDO	0.52	3,600	56%	23.2	158.4	140	0.0064	722.0	0.0952	0.0273	3075.37	0.4055
12.0	Panamax	350,000	MDO	0.52	3,600	56%	11.0	75.7	140	0.0064	722.0	0.0952	0.0030	343.09	0.0452
60.0	Suezmax	1,000,000	MDO	0.52	3,600	56%	15.3	105.2	140	0.0064	722.0	0.0952	0.0212	2386.07	0.3146
<b>TOTAL</b>													<b>0.0597</b>	<b>6740.25</b>	<b>0.8887</b>

Boiler Pumping

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Inerting Fuel Consumption Savings (lb/1000 bbl offloaded)	Activity Time (hr)	Pumping Rate (bbl/hr)	Fuel Consumption (gal/yr)	N <sub>2</sub> O Emission Factor (lb/ton)	CO <sub>2</sub> Emission Factor (lb/ton)	CH <sub>4</sub> Emission Factor (lb/ton)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
24.0	Aframax	700,000	MDO	0.52	102.17	28.06	15.0	50,000	244,891	0.0627	6,360.0	0.8770	0.0222	2254.80	0.3109
51.0	VLCC	2,000,000	MDO	0.52	80.38	28.06	23.2	90,000	1,139,748	0.0627	6,360.0	0.8770	0.1035	10494.07	1.4471
12.0	Panamax	350,000	MDO	0.52	59.91	28.06	11.0	35,000	36,855	0.0627	6,360.0	0.8770	0.0033	339.34	0.0468
60.0	Suezmax	1,000,000	MDO	0.52	82.85	28.06	15.3	70,000	708,914	0.0627	6,360.0	0.8770	0.0643	6527.22	0.9001
<b>TOTAL</b>													<b>0.1934</b>	<b>19615.44</b>	<b>2.7048</b>

Auxiliary Generator Post-Pumping

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	Energy (MMBtu)	Heating Value (MMBtu/1000 gal)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
24.0	Aframax	700,000	HFO	2.70	3,600	28%	1.0	3.4	150	0.0064	722.0	0.0952	0.0005	62.38	0.0082
51.0	VLCC	2,000,000	HFO	2.70	3,600	28%	1.0	3.4	150	0.0064	722.0	0.0952	0.0012	132.56	0.0175
12.0	Panamax	350,000	HFO	2.70	3,600	28%	1.0	3.4	150	0.0064	722.0	0.0952	0.0003	31.19	0.0041
60.0	Suezmax	1,000,000	HFO	2.70	3,600	28%	1.0	3.4	150	0.0064	722.0	0.0952	0.0014	155.95	0.0206
<b>TOTAL</b>													<b>0.0034</b>	<b>382.08</b>	<b>0.0504</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Un.GHG.2015-5. 2015 Proposed Project Summary of Average Daily Unmitigated Vessel GHG Emissions.

Mode	Equipment	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
Cruising	Main Engines	0.0511	6311.20	0.8327
Cruising	Aux Generator	0.0051	803.70	0.1060
Maneuvering	Main Engines	0.0005	66.06	0.0087
Maneuvering	Aux Generator	0.0039	441.30	0.0584
Boiler Warm-up	Boiler	0.0365	3697.44	0.5099
Berth Operations	Boiler	0.2262	22947.06	3.1642
Berth Operations	Aux Generator	0.0822	9301.50	1.2265
Propulsion	TOTAL	0.0606	7622.25	1.0058
Non-Propulsion	TOTAL	0.3449	35946.00	4.9005
<b>Total Emissions</b>		<b>0.4055</b>	<b>43568.25</b>	<b>5.9064</b>

Mode	Equipment	N <sub>2</sub> O Emissions (tons/day)	CO <sub>2</sub> Emissions (tons/day)	CH <sub>4</sub> Emissions (tons/day)
Cruising	Main Engines	1.40E-04	17.3	2.28E-03
Cruising	Aux Generator	1.38E-05	2.2	2.91E-04
Maneuvering	Main Engines	1.42E-06	0.2	2.39E-05
Maneuvering	Aux Generator	1.07E-05	1.2	1.60E-04
Boiler Warm-up	Boiler	9.99E-05	10.1	1.40E-03
Berth Operations	Boiler	6.20E-04	62.9	8.67E-03
Berth Operations	Aux Generator	2.25E-04	25.5	3.36E-03
Propulsion	TOTAL	1.66E-04	20.9	2.76E-03
Non-Propulsion	TOTAL	9.45E-04	98.5	1.34E-02
<b>Total Emissions</b>		<b>1.11E-03</b>	<b>1.19E+02</b>	<b>1.62E-02</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Un.GHG.2015-6. 2015 Proposed Project Tug Main Engines Average Daily Unmitigated GHG Emissions.

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Energy (kWh)	Energy (MMBtu)	Shipcalls (vessels/yr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
VLCC	Maneuvering - Pilot to Berth	1.00	4	4,800	0.50	2400	8.2	51.0	0.00636	645.0	0.0890	0.0008	78.9480	0.0109
	Maneuvering - Berth to Pilot	1.00	2	4,800	0.50	2400	8.2	51.0	0.00636	645.0	0.0890	0.0008	78.9480	0.0109
AFRAMAX	Maneuvering - Pilot to Berth	1.00	2	4,800	0.50	2400	8.2	24.0	0.00636	645.0	0.0890	0.0004	37.1520	0.0051
	Maneuvering - Berth to Pilot	1.00	2	4,800	0.50	2400	8.2	24.0	0.00636	645.0	0.0890	0.0004	37.1520	0.0051
PANAMAX	Maneuvering - Pilot to Berth	1.00	2	4,800	0.50	2400	8.2	12.0	0.00636	645.0	0.0890	0.0002	18.5760	0.0026
	Maneuvering - Berth to Pilot	1.00	2	4,800	0.50	2400	8.2	12.0	0.00636	645.0	0.0890	0.0002	18.5760	0.0026
SUEZMAX	Maneuvering - Pilot to Berth	1.00	3	4,800	0.50	2400	8.2	60.0	0.00636	645.0	0.0890	0.0009	92.8800	0.0128
	Maneuvering - Berth to Pilot	1.00	2	4,800	0.50	2400	8.2	60.0	0.00636	645.0	0.0890	0.0009	92.8800	0.0128
<b>TOTAL</b>												<b>0.0045</b>	<b>455.1120</b>	<b>0.0628</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Un.GHG.2015-7. 2015 Proposed Project Tug Auxiliary Generator Engines Average Daily Unmitigated GHG Emissions.

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Energy (kWh)	Energy (MMBtu)	Shipcalls (vessels/yr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
VLCC	Maneuvering - Pilot to Berth	1.00	4	300	1.00	300	1.0	51.0	0.0068	690.0	0.0952	0.00010	10.56	0.00146
	Maneuvering - Berth to Pilot	1.00	2	300	1.00	300	1.0	51.0	0.0068	690.0	0.0952	0.00010	10.56	0.00146
AFRAMAX	Maneuvering - Pilot to Berth	1.00	2	300	1.00	300	1.0	24.0	0.0068	690.0	0.0952	0.00005	4.97	0.00069
	Maneuvering - Berth to Pilc	1.00	2	300	1.00	300	1.0	24.0	0.0068	690.0	0.0952	0.00005	4.97	0.00069
PANAMAX	Maneuvering - Pilot to Berth	1.00	2	300	1.00	300	1.0	12.0	0.0068	690.0	0.0952	0.00002	2.48	0.00034
	Maneuvering - Berth to Pilot	1.00	2	300	1.00	300	1.0	12.0	0.0068	690.0	0.0952	0.00002	2.48	0.00034
SUEZMAX	Maneuvering - Pilot to Berth	1.00	3	300	1.00	300	1.0	60.0	0.0068	690.0	0.0952	0.00012	12.42	0.00171
	Maneuvering - Berth to Pilc	1.00	2	300	1.00	300	1.0	60.0	0.0068	690.0	0.0952	0.00012	12.42	0.00171
<b>TOTAL</b>												<b>0.00060</b>	<b>60.86</b>	<b>0.00840</b>



Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Un.GHG.2015-8. 2015 Proposed Project Summary of Tug Average Daily Unmitigated GHG Emissions.

Mode	Equipment	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
Tug Assist	Main Engines	0.0045	455.11	0.0628
Tug Assist	Aux Generator	0.00060	60.86	0.00840
<b>TOTAL</b>		<b>0.0051</b>	<b>515.97</b>	<b>0.0712</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Un.GHG.2015-9. 2015 Proposed Project VDU Crude Average Daily Unmitigated GHG Emissions.

	Annual Vessel Calls	crude vapors from tanks(scf/call)	annual gas usage (mmscf/yr)	mw crude vapors	destruction efficiency
Aframax	24	224000	5.4	50	98%
VLCC	51	596,313	30.4	50	98%
Panamax	12	116,667	1.4		
Suezmax	60	333,333	20.0		
<b>TOTAL</b>	<b>147</b>		<b>57.2</b>		

Assumed Distribution based on tank storage	
Site 1	12.5%
Site 2	87.5%

Annual Average (tons/yr)

	N <sub>2</sub> O	CO <sub>2</sub>	CH <sub>4</sub>
EF (kg/MMBtu)	0.0001	52.78	0.0059
Aframax	0.0005	289.42	0.0324
VLCC	0.0031	1637.25	0.1830
Panamax	0.0001	75.37	0.0084
Suezmax	0.0020	1076.71	0.1204
<b>TOTAL</b>	<b>0.0058</b>	<b>3078.7474</b>	<b>0.3442</b>

Annual Average (tons/yr)

	N <sub>2</sub> O	CO <sub>2</sub>	CH <sub>4</sub>
Site 1	0.0007	384.84	0.04
Site 2	0.0051	2693.9	0.3

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Un.GHG.2015-10. 2015 Proposed Project VDU Legs Average Daily Unmitigated GHG Emissions.

	tanks	crude vapors from tanks on legs(scf/yr)	annual gas usage (mmscf/yr)	mw crude vapors	destruction efficiency
Site 1	4	8640000	34.6	50	98%
Site 2	14	8640000	121.0	50	98%
<b>TOTAL</b>	<b>18</b>		<b>155.5</b>		

<b>48</b>	<b>hr/event</b>
<b>6</b>	<b>events/yr</b>
<b>500</b>	<b>ft3/min</b>

Annual Average (tons/yr)

	<b>N<sub>2</sub>O</b>	<b>CO<sub>2</sub></b>	<b>CH<sub>4</sub></b>
EF (kg/MMBtu)	0.0001	52.78	0.0059
<b>TOTAL</b>	<b>0.016</b>	<b>8372.513</b>	<b>0.936</b>

*Assumed a ratio of 500/1000 based on the corresponding Btu values with respect to natural gas combustion emission factors.*

Annual Average (tons/yr)

	<b>N<sub>2</sub>O</b>	<b>CO<sub>2</sub></b>	<b>CH<sub>4</sub></b>
Site 1	0.0035	1860.6	0.2
Site 2	0.012	6512.0	0.7

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Un.GHG.2015-11. 2015 Proposed Project VDU Average Daily Unmitigated GHG Emissions.

Annual Average (tons/yr)

	<b>N<sub>2</sub>O</b>	<b>CO<sub>2</sub></b>	<b>CH<sub>4</sub></b>
Site 1	0.004	2251	0.25
Site 2	0.018	9245	1.03
<b>Total</b>	<b>0.022</b>	<b>11,496</b>	<b>1.29</b>

Daily Average (tons/day)

	<b>N<sub>2</sub>O</b>	<b>CO<sub>2</sub></b>	<b>CH<sub>4</sub></b>
Site 1	1.17E-05	6.167	6.89E-04
Site 2	4.80E-05	25.329	2.83E-03
<b>Total</b>	<b>5.97E-05</b>	<b>31</b>	<b>3.52E-03</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Un.GHG.2025-1. 2025 Proposed Project Main Engines Average Daily Unmitigated GHG Emissions.

Ship	Direction	Mode	Distance (nautical miles)	Ship speed (knots)	Activity (hours)	Maximum Speed (knots)	Load Factor	MCR (kW)	Energy (kW-hr)	Energy (MMBtu)	Shipcalls (vessels/yr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
VLCC	North In	Cruising - CW to VSR	22	15.54	1.42	16.9	0.777	25,400	27,957	95	69	0.0055	620.00	0.0818	0.0105	1196.02	0.1578
		Cruising - VSR to PZ	21	12	1.75	16.9	0.358	25,400	15,913	54	69	0.0055	620.00	0.0818	0.0060	680.76	0.0898
		Cruising - PZ to Pilot	4.7	7	0.67	16.9	0.071	25,400	1,212	4	69	0.0055	620.00	0.0818	0.0005	51.85	0.0068
		Maneuvering - Pilot to Berth		3	1.00	16.9	0.006	25,400	142	0	69	0.0060	682.00	0.0902	0.0001	6.69	0.0009
	North Out	Maneuvering - Berth to Pilot		5	1.00	16.9	0.026	25,400	658	2	69	0.0060	682.00	0.0902	0.0003	30.95	0.0041
		Cruising - Pilot to PZ	3.8	7	0.54	16.9	0.071	25,400	980	3	69	0.0055	620.00	0.0818	0.0004	41.92	0.0055
		Cruising - PZ to VSR	21	12	1.75	16.9	0.358	25,400	15,913	54	69	0.0055	620.00	0.0818	0.0060	680.76	0.0898
		Cruising - VSR to CW	22	15.54	1.42	16.9	0.777	25,400	27,957	95	69	0.0055	620.00	0.0818	0.0105	1196.02	0.1578
AFRAMAX	South In	Cruising - CW to VSR	23	14.7	1.56	16.1	0.761	12,477	14,859	51	36	0.0055	620.00	0.0818	0.0029	331.66	0.0438
		Cruising - VSR to PZ	11	12	0.92	16.1	0.414	12,477	4,736	16	36	0.0055	620.00	0.0818	0.0009	105.70	0.0139
		Cruising - PZ to Pilot	4.7	7	0.67	16.1	0.082	12,477	689	2	36	0.0055	620.00	0.0818	0.0001	15.37	0.0020
		Maneuvering - Pilot to Berth		3	1.00	16.1	0.006	12,477	81	0	36	0.0060	682.00	0.0902	0.0000	1.98	0.0003
	South Out	Maneuvering - Berth to Pilot		5	1.00	16.1	0.030	12,477	374	1	36	0.0060	682.00	0.0902	0.0001	9.18	0.0012
		Cruising - Pilot to PZ	3.5	7	0.50	16.1	0.082	12,477	513	2	36	0.0055	620.00	0.0818	0.0001	11.44	0.0015
		Cruising - PZ to VSR	12.5	12	1.04	16.1	0.414	12,477	5,382	18	36	0.0055	620.00	0.0818	0.0011	120.12	0.0158
		Cruising - VSR to CW	24.5	14.7	1.67	16.1	0.761	12,477	15,828	54	36	0.0055	620.00	0.0818	0.0031	353.29	0.0466
PANAMAX	South In	Cruising - CW to VSR	23	14.7	1.56	15.8	0.805	10,300	12,979	44	18	0.0055	620.00	0.0818	0.0013	144.84	0.0191
		Cruising - VSR to PZ	11	12	0.92	15.8	0.438	10,300	4,136	14	18	0.0055	620.00	0.0818	0.0004	46.16	0.0061
		Cruising - PZ to Pilot	4.7	7	0.67	15.8	0.087	10,300	601	2	18	0.0055	620.00	0.0818	0.0001	6.71	0.0009
		Maneuvering - Pilot to Berth		3	1.00	15.8	0.007	10,300	71	0	18	0.0060	682.00	0.0902	0.0000	0.87	0.0001
	South Out	Maneuvering - Berth to Pilot		5	1.00	15.8	0.032	10,300	326	1	18	0.0060	682.00	0.0902	0.0000	4.01	0.0005
		Cruising - Pilot to PZ	3.5	7	0.50	15.8	0.087	10,300	448	2	18	0.0055	620.00	0.0818	0.0000	5.00	0.0007
		Cruising - PZ to VSR	12.5	12	1.04	15.8	0.438	10,300	4,700	16	18	0.0055	620.00	0.0818	0.0005	52.46	0.0069
		Cruising - VSR to CW	24.5	14.7	1.67	15.8	0.805	10,300	13,825	47	18	0.0055	620.00	0.0818	0.0014	154.29	0.0204
SUEZMAX	North In	Cruising - CW to VSR	22	15.54	1.42	17	0.764	16,000	17,302	59	78	0.0055	620.00	0.0818	0.0074	836.73	0.1104
		Cruising - VSR to PZ	21	12	1.75	17	0.352	16,000	9,848	34	78	0.0055	620.00	0.0818	0.0042	476.26	0.0628
		Cruising - PZ to Pilot	4.7	7	0.67	17	0.070	16,000	750	3	78	0.0055	620.00	0.0818	0.0003	36.27	0.0048
		Maneuvering - Pilot to Berth		3	1.00	17	0.005	16,000	88	0	78	0.0060	682.00	0.0902	0.0000	4.68	0.0006
	North Out	Maneuvering - Berth to Pilot		5	1.00	17	0.025	16,000	407	1	78	0.0060	682.00	0.0902	0.0002	21.66	0.0029
		Cruising - Pilot to PZ	3.8	7	0.54	17	0.070	16,000	606	2	78	0.0055	620.00	0.0818	0.0003	29.33	0.0039
		Cruising - PZ to VSR	21	12	1.75	17	0.352	16,000	9,848	34	78	0.0055	620.00	0.0818	0.0042	476.26	0.0628
		Cruising - VSR to CW	22	15.54	1.42	17	0.764	16,000	17,302	59	78	0.0055	620.00	0.0818	0.0074	836.73	0.1104

TOTAL 0.0700 7965.93 1.0510

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Un.GHG.2025-2. 2025 Proposed Project Auxiliary Generator Average Daily Unmitigated GHG Emissions

Ship	Direction	Mode	Activity (hours)	MCR (kW)	Load Factor	Energy (kW-hr)	Energy (MMBtu)	Shipcalls (vessels/yr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
VLCC	North In	Cruising	3.84	3,600	0.278	3,840	13	69	0.0055	620.00	0.0818	0.0014	164.28	0.0217
		Maneuvering	2.00	3,600	0.278	2,002	7	69	0.0060	682.00	0.0902	0.0008	94.19	0.0125
	North Out	Maneuvering	1.50	3,600	0.278	1,501	5	69	0.0060	682.00	0.0902	0.0006	70.64	0.0093
		Cruising	3.71	3,600	0.278	3,712	13	69	0.0055	620.00	0.0818	0.0014	158.78	0.0209
AFRAMAX	South In	Cruising	3.15	3,600	0.278	3,155	11	36	0.0055	620.00	0.0818	0.0006	70.43	0.0093
		Maneuvering	2.00	3,600	0.278	2,002	7	36	0.0060	682.00	0.0902	0.0004	49.14	0.0065
	South Out	Maneuvering	1.50	3,600	0.278	1,501	5	36	0.0060	682.00	0.0902	0.0003	36.86	0.0049
		Cruising	3.21	3,600	0.278	3,211	11	36	0.0055	620.00	0.0818	0.0006	71.67	0.0095
PANAMAX	South In	Cruising	3.15	3,600	0.28	3,178	11	18	0.0055	620.00	0.0818	0.0003	35.47	0.0047
		Maneuvering	2.00	3,600	0.28	2,016	7	18	0.0060	682.00	0.0902	0.0002	24.75	0.0033
	South Out	Maneuvering	1.5	3,600	0.28	1,512	5	18	0.0060	682.00	0.0902	0.0002	18.56	0.0025
		Cruising	3.21	3,600	0.28	3,234	11	18	0.0055	620.00	0.0818	0.0003	36.09	0.0048
SUEZMAX	North In	Cruising	3.84	3,600	0.28	3,868	13	78	0.0055	620.00	0.0818	0.0016	187.05	0.0247
		Maneuvering	2.00	3,600	0.28	2,016	7	78	0.0060	682.00	0.0902	0.0009	107.24	0.0142
	North Out	Maneuvering	1.5	3,600	0.28	1,512	5	78	0.0060	682.00	0.0902	0.0007	80.43	0.0106
		Cruising	3.71	3,600	0.28	3,738	13	78	0.0055	620.00	0.0818	0.0016	180.78	0.0239

TOTAL

0.0122

1386.36

0.1831

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Un.GHG.2025-3. 2025 Proposed Project Boiler Warm-Up Average Daily Unmitigated GHG Emissions.

Shipcalls (vessels/yr)	Vessel Size	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	Fuel Consumption (gal/yr)	N <sub>2</sub> O Emission Factor (lb/ton)	CO <sub>2</sub> Emission Factor (lb/ton)	CH <sub>4</sub> Emission Factor (lb/ton)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
36.0	Aframax	HFO	2.70	107.96	30%	3	50,000	77,626	0.0627	6,360.00	0.8770	0.0070	714.73	0.0986
69.0	VLCC	HFO	2.70	84.93	30%	3	90,000	210,685	0.0627	6,360.00	0.8770	0.0191	1,939.86	0.2675
18.0	Panamax	HFO	2.70	63.30	30%	3	35,000	15,930	0.0627	6,360.00	0.8770	0.0014	146.68	0.0202
78.0	Suezmax	HFO	2.70	87.54	30%	3	70,000	190,933	0.0627	6,360.00	0.8770	0.0173	1,757.99	0.2424
<b>TOTAL</b>												<b>0.0449</b>	<b>4,559.25</b>	<b>0.6287</b>

Table H.2.PP.Un.GHG.2025-4. 2025 Proposed Project Berth Operations Average Daily Unmitigated GHG Emissions.

Auxiliary Generator Pre-Pumpin

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	Energy (MMBtu)	Heating Value (MMBtu/1000 gal)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
36.0	Aframax	700,000	HFO	2.70	3,600	28%	2.5	8.5	150	0.0064	722.0	0.0952	0.0021	233.93	0.0308
69.0	VLCC	2,000,000	HFO	2.70	3,600	28%	2.5	8.5	150	0.0064	722.0	0.0952	0.0039	448.36	0.0591
18.0	Panamax	350,000	HFO	2.70	3,600	28%	2.5	8.6	150	0.0064	722.0	0.0952	0.0010	116.96	0.0154
78.0	Suezmax	1,000,000	HFO	2.70	3,600	28%	2.5	8.6	150	0.0064	722.0	0.0952	0.0045	506.84	0.0668
<b>TOTAL</b>													<b>0.0115</b>	<b>1306.10</b>	<b>0.1722</b>

Boiler Pre-Pumpin

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	Fuel Consumption (gal/yr)	N <sub>2</sub> O Emission Factor (lb/ton)	CO <sub>2</sub> Emission Factor (lb/ton)	CH <sub>4</sub> Emission Factor (lb/ton)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
36.0	Aframax	700,000	HFO	2.70	107.96	30%	2.5	50,000	64,689	0.0627	6,360.0	0.8770	0.0059	595.61	0.0821
69.0	VLCC	2,000,000	HFO	2.70	84.93	30%	2.5	90,000	175,571	0.0627	6,360.0	0.8770	0.0159	1616.55	0.2229
18.0	Panamax	350,000	HFO	2.70	59.91	30%	2.5	35,000	12,564	0.0627	6,360.0	0.8770	0.0011	115.68	0.0160
78.0	Suezmax	1,000,000	HFO	2.70	82.85	30%	2.5	70,000	150,586	0.0627	6,360.0	0.8770	0.0137	1386.50	0.1912
<b>TOTAL</b>													<b>0.0366</b>	<b>3714.34</b>	<b>0.5122</b>

Auxiliary Generator Pumpin

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	Energy (MMBtu)	Heating Value (MMBtu/1000 gal)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
36.0	Aframax	700,000	MDO	0.52	3,600	56%	15.0	102.4	140	0.0064	722.0	0.0952	0.0123	1403.57	0.1851
69.0	VLCC	2,000,000	MDO	0.52	3,600	56%	23.2	158.4	140	0.0064	722.0	0.0952	0.0369	4160.80	0.5486
18.0	Panamax	350,000	MDO	0.52	3,600	56%	11.0	75.7	140	0.0064	722.0	0.0952	0.0046	514.64	0.0679
78.0	Suezmax	1,000,000	MDO	0.52	3,600	56%	15.3	105.2	140	0.0064	722.0	0.0952	0.0275	3101.89	0.4090
<b>TOTAL</b>													<b>0.0813</b>	<b>9180.89</b>	<b>1.2106</b>

Boiler Pumpin

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Inerting Fuel Consumption Savings (lb/1000 bbl offloaded)	Activity Time (hr)	Pumping Rate (bbl/hr)	Fuel Consumption (gal/yr)	N <sub>2</sub> O Emission Factor (lb/ton)	CO <sub>2</sub> Emission Factor (lb/ton)	CH <sub>4</sub> Emission Factor (lb/ton)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
36.0	Aframax	700,000	MDO	0.52	102.17	28.06	15.0	50,000	367,337	0.0627	6,360.0	0.8770	0.0333	3382.20	0.4664
69.0	VLCC	2,000,000	MDO	0.52	80.38	28.06	23.2	90,000	1,542,012	0.0627	6,360.0	0.8770	0.1400	14197.86	1.9578
18.0	Panamax	350,000	MDO	0.52	59.91	28.06	11.0	35,000	55,283	0.0627	6,360.0	0.8770	0.0050	509.01	0.0702
78.0	Suezmax	1,000,000	MDO	0.52	82.85	28.06	15.3	70,000	921,588	0.0627	6,360.0	0.8770	0.0837	8485.39	1.1701
<b>TOTAL</b>													<b>0.2620</b>	<b>26574.47</b>	<b>3.6644</b>

Auxiliary Generator Post-Pumpin

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	Energy (MMBtu)	Heating Value (MMBtu/1000 gal)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
36.0	Aframax	700,000	HFO	2.70	3,600	28%	1.0	3.4	150	0.0064	722.0	0.0952	0.0008	93.57	0.0123
69.0	VLCC	2,000,000	HFO	2.70	3,600	28%	1.0	3.4	150	0.0064	722.0	0.0952	0.0016	179.34	0.0236
18.0	Panamax	350,000	HFO	2.70	3,600	28%	1.0	3.4	150	0.0064	722.0	0.0952	0.0004	46.79	0.0062
78.0	Suezmax	1,000,000	HFO	2.70	3,600	28%	1.0	3.4	150	0.0064	722.0	0.0952	0.0018	202.74	0.0267
<b>TOTAL</b>													<b>0.0046</b>	<b>522.44</b>	<b>0.0689</b>



Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Un.GHG.2025-5. 2025 Proposed Project Summary of Average Daily Unmitigated Vessel GHG Emissions.

Mode	Equipment	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
Cruising	Main Engines	0.0693	7885.93	1.0404
Cruising	Aux Generator	0.0080	904.54	0.1193
Maneuvering	Main Engines	0.0007	80.00	0.0106
Maneuvering	Aux Generator	0.0042	481.82	0.0637
Boiler Warm-up	Boiler	0.0449	4559.25	0.6287
Berth Operations	Boiler	0.2986	30288.81	4.1766
Berth Operations	Aux Generator	0.0974	11009.43	1.4517
Propulsion	TOTAL	0.0822	9352.29	1.2341
Non-Propulsion	TOTAL	0.4409	45857.49	6.26
<b>Total Emissions</b>		<b>0.5232</b>	<b>55209.79</b>	<b>7.4910</b>

Mode	Equipment	N <sub>2</sub> O Emissions (tons/day)	CO <sub>2</sub> Emissions (tons/day)	CH <sub>4</sub> Emissions (tons/day)
Cruising	Main Engines	1.90E-04	21.61	2.85E-03
Cruising	Aux Generator	2.18E-05	2.48	3.27E-04
Maneuvering	Main Engines	1.93E-06	0.22	2.90E-05
Maneuvering	Aux Generator	1.16E-05	1.32	1.75E-04
Boiler Warm-up	Boiler	1.23E-04	12.49	1.72E-03
Berth Operations	Boiler	8.18E-04	82.98	1.14E-02
Berth Operations	Aux Generator	2.67E-04	30.16	3.98E-03
Propulsion	TOTAL	2.25E-04	25.62	3.38E-03
Non-Propulsion	TOTAL	1.21E-03	125.64	1.71E-02
<b>Total Emissions</b>		<b>1.43E-03</b>	<b>151.26</b>	<b>2.05E-02</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Un.GHG.2025-6. 2025 Proposed Project Tug Main Engines Average Daily Unmitigated GHG Emissions.

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Energy (kWh)	Energy (MMBtu)	Shipcalls (vessels/yr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
VLCC	Maneuvering - Pilot to Berth	1.00	4	4,800	0.50	2400	8.2	69	0.00636	645.0	0.0890	0.0011	106.8120	0.0147
	Maneuvering - Berth to Pilot	1.00	2	4,800	0.50	2400	8.2	69	0.00636	645.0	0.0890	0.0011	106.8120	0.0147
AFRAMAX	Maneuvering - Pilot to Berth	1.00	2	4,800	0.50	2400	8.2	36	0.00636	645.0	0.0890	0.0005	55.7280	0.0077
	Maneuvering - Berth to Pilot	1.00	2	4,800	0.50	2400	8.2	36	0.00636	645.0	0.0890	0.0005	55.7280	0.0077
PANAMAX	Maneuvering - Pilot to Berth	1.00	2	4,800	0.50	2400	8.2	18	0.00636	645.0	0.0890	0.0003	27.8640	0.0038
	Maneuvering - Berth to Pilot	1.00	2	4,800	0.50	2400	8.2	18	0.00636	645.0	0.0890	0.0003	27.8640	0.0038
SUEZMAX	Maneuvering - Pilot to Berth	1.00	3	4,800	0.50	2400	8.2	78	0.00636	645.0	0.0890	0.0012	120.7440	0.0167
	Maneuvering - Berth to Pilot	1.00	2	4,800	0.50	2400	8.2	78	0.00636	645.0	0.0890	0.0012	120.7440	0.0167
<b>TOTAL</b>												<b>0.0061</b>	<b>622.2960</b>	<b>0.0859</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Un.GHG.2025-7. 2025 Proposed Project Tug Auxiliary Generator Engines Average Daily Unmitigated GHG Emissions.

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Energy (kWh)	Energy (MMBtu)	Shipcalls (vessels/yr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
VLCC	Maneuvering - Pilot to Berth	1.00	4	300	1.00	300	1.0	69	0.0068	690.0	0.0952	0.00014	14.28	0.00197
	Maneuvering - Berth to Pilot	1.00	2	300	1.00	300	1.0	69	0.0068	690.0	0.0952	0.00014	14.28	0.00197
AFRAMAX	Maneuvering - Pilot to Berth	1.00	2	300	1.00	300	1.0	36	0.0068	690.0	0.0952	0.00007	7.45	0.00103
	Maneuvering - Berth to Pilot	1.00	2	300	1.00	300	1.0	36	0.0068	690.0	0.0952	0.00007	7.45	0.00103
PANAMAX	Maneuvering - Pilot to Berth	1.00	2	300	1.00	300	1.0	18	0.0068	690.0	0.0952	0.00004	3.73	0.00051
	Maneuvering - Berth to Pilot	1.00	2	300	1.00	300	1.0	18	0.0068	690.0	0.0952	0.00004	3.73	0.00051
SUEZMAX	Maneuvering - Pilot to Berth	1.00	3	300	1.00	300	1.0	78	0.0068	690.0	0.0952	0.00016	16.15	0.00223
	Maneuvering - Berth to Pilot	1.00	2	300	1.00	300	1.0	78	0.0068	690.0	0.0952	0.00016	16.15	0.00223

**TOTAL** **0.00082** **83.21** **0.01148**

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

**Table H.2.PP.Un.GHG.2025-8. 2025 Proposed Project Summary of Tug Average Daily Unmitigated GHG Emissions.**

<b>Mode</b>	<b>Equipment</b>	<b>N<sub>2</sub>O Emissions (tons/yr)</b>	<b>CO<sub>2</sub> Emissions (tons/yr)</b>	<b>CH<sub>4</sub> Emissions (tons/yr)</b>
Tug Assist	Main Engines	0.0061	622.30	0.0859
Tug Assist	Aux Generator	0.00082	83.21	0.01148

**TOTAL            0.0070            705.51            0.0973**

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

**Table H.2.PP.Un.GHG.2025-9. 2025 Proposed Project VDU Crude Average Daily Unmitigated GHG Emissions.**

	Annual Vessel Calls	crude vapors from tanks(scf/call)	annual gas usage (mmscf/yr)	mw crude vapors	destruction efficiency
Aframax	36	224000	8.1	50	98%
VLCC	69	596,313	41.1	50	98%
Panamax	18	116,667	2.1		
Suezmax	78	333,333	26.0		
<b>TOTAL</b>	<b>201</b>		<b>77.3</b>		

Assumed Distribution based on tank storage	
Site 1	12.5%
Site 2	87.5%

Annual Average (tons/yr)

	N <sub>2</sub> O	CO <sub>2</sub>	CH <sub>4</sub>
EF (kg/MMBtu)	0.0001	52.78	0.0059
Aframax	0.0008	434.13	0.0485
VLCC	0.0042	2215.10	0.2476
Panamax	0.0002	113.06	0.0126
Suezmax	0.0027	1399.72	0.1565
<b>TOTAL</b>	<b>0.0079</b>	<b>4162.0075</b>	<b>0.4652</b>

Annual Average (tons/yr)

	N <sub>2</sub> O	CO <sub>2</sub>	CH <sub>4</sub>
Site 1	0.0010	520.25	0.06
Site 2	0.0069	3641.8	0.4

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Un.GHG.2025-10. 2025 Proposed Project VDU Legs Average Daily Unmitigated GHG Emissions.

	tanks	crude vapors from tanks on legs(scf/yr)	annual gas usage (mmscf/yr)	mw crude vapors	destruction efficiency
Site 1	4	8640000	34.6	50	98%
Site 2	14	8640000	121.0	50	98%
<b>TOTAL</b>	<b>18</b>		<b>155.5</b>		

<b>48</b>	<b>hr/event</b>
<b>6</b>	<b>events/yr</b>
<b>500</b>	<b>ft3/min</b>

Annual Average (tons/yr)

	<b>N<sub>2</sub>O</b>	<b>CO<sub>2</sub></b>	<b>CH<sub>4</sub></b>
EF (kg/MMBtu)	0.0001	52.78	0.0059
<b>TOTAL</b>	<b>0.016</b>	<b>8372.513</b>	<b>0.936</b>

*Assumed a ratio of 500/1000 based on the corresponding Btu values with respect to natural gas combustion emission factors.*

Annual Average (tons/yr)

	<b>N<sub>2</sub>O</b>	<b>CO<sub>2</sub></b>	<b>CH<sub>4</sub></b>
Site 1	0.0035	1860.6	0.2
Site 2	0.012	6512.0	0.7

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Un.GHG.2025-11. 2025 Proposed Project VDU Average Daily Unmitigated GHG Emissions.

Annual Average (tons/yr)

	<b>N<sub>2</sub>O</b>	<b>CO<sub>2</sub></b>	<b>CH<sub>4</sub></b>
Site 1	0.004	2251	0.25
Site 2	0.018	9245	1.03
<b>Total</b>	<b>0.022</b>	<b>11,496</b>	<b>1.29</b>

Daily Average (tons/day)

	<b>N<sub>2</sub>O</b>	<b>CO<sub>2</sub></b>	<b>CH<sub>4</sub></b>
Site 1	1.17E-05	6.167	6.89E-04
Site 2	4.80E-05	25.329	2.83E-03
<b>Total</b>	<b>5.97E-05</b>	<b>31</b>	<b>3.52E-03</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Un.GHG.2040-1. 2040 Proposed Project Main Engines Average Daily Unmitigated GHG Emissions.

Ship	Direction	Mode	Distance (nautical miles)	Ship speed (knots)	Activity (hours)	Maximum Speed (knots)	Load Factor	MCR (kW)	Energy (kW-hr)	Energy (MMBtu)	Shipcalls (vessels/yr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
VLCC	North In	Cruising - CW to VSR	22	15.54	1.42	16.9	0.777	25,400	27,957	95	69	0.0055	620.00	0.0818	0.0105	1196.02	0.1578
		Cruising - VSR to PZ	21	12	1.75	16.9	0.358	25,400	15,913	54	69	0.0055	620.00	0.0818	0.0060	680.76	0.0898
		Cruising - PZ to Pilot	4.7	7	0.67	16.9	0.071	25,400	1,212	4	69	0.0055	620.00	0.0818	0.0005	51.85	0.0068
		Maneuvering - Pilot to Berth		3	1.00	16.9	0.006	25,400	142	0	69	0.0060	682.00	0.0902	0.0001	6.69	0.0009
	North Out	Maneuvering - Berth to Pilot		5	1.00	16.9	0.026	25,400	658	2	69	0.0060	682.00	0.0902	0.0003	30.95	0.0041
		Cruising - Pilot to PZ	3.8	7	0.54	16.9	0.071	25,400	980	3	69	0.0055	620.00	0.0818	0.0004	41.92	0.0055
		Cruising - PZ to VSR	21	12	1.75	16.9	0.358	25,400	15,913	54	69	0.0055	620.00	0.0818	0.0060	680.76	0.0898
		Cruising - VSR to CW	22	15.54	1.42	16.9	0.777	25,400	27,957	95	69	0.0055	620.00	0.0818	0.0105	1196.02	0.1578
AFRAMAX	South In	Cruising - CW to VSR	23	14.7	1.56	16.1	0.761	12,477	14,859	51	36	0.0055	620.00	0.0818	0.0029	331.66	0.0438
		Cruising - VSR to PZ	11	12	0.92	16.1	0.414	12,477	4,736	16	36	0.0055	620.00	0.0818	0.0009	105.70	0.0139
		Cruising - PZ to Pilot	4.7	7	0.67	16.1	0.082	12,477	689	2	36	0.0055	620.00	0.0818	0.0001	15.37	0.0020
		Maneuvering - Pilot to Berth		3	1.00	16.1	0.006	12,477	81	0	36	0.0060	682.00	0.0902	0.0000	1.98	0.0003
	South Out	Maneuvering - Berth to Pilot		5	1.00	16.1	0.030	12,477	374	1	36	0.0060	682.00	0.0902	0.0001	9.18	0.0012
		Cruising - Pilot to PZ	3.5	7	0.50	16.1	0.082	12,477	513	2	36	0.0055	620.00	0.0818	0.0001	11.44	0.0015
		Cruising - PZ to VSR	12.5	12	1.04	16.1	0.414	12,477	5,382	18	36	0.0055	620.00	0.0818	0.0011	120.12	0.0158
		Cruising - VSR to CW	24.5	14.7	1.67	16.1	0.761	12,477	15,828	54	36	0.0055	620.00	0.0818	0.0031	353.29	0.0466
PANAMAX	South In	Cruising - CW to VSR	23	14.7	1.56	15.8	0.805	10,300	12,979	44	18	0.0055	620.00	0.0818	0.0013	144.84	0.0191
		Cruising - VSR to PZ	11	12	0.92	15.8	0.438	10,300	4,136	14	18	0.0055	620.00	0.0818	0.0004	46.16	0.0061
		Cruising - PZ to Pilot	4.7	7	0.67	15.8	0.087	10,300	601	2	18	0.0055	620.00	0.0818	0.0001	6.71	0.0009
		Maneuvering - Pilot to Berth		3	1.00	15.8	0.007	10,300	71	0	18	0.0060	682.00	0.0902	0.0000	0.87	0.0001
	South Out	Maneuvering - Berth to Pilot		5	1.00	15.8	0.032	10,300	326	1	18	0.0060	682.00	0.0902	0.0000	4.01	0.0005
		Cruising - Pilot to PZ	3.5	7	0.50	15.8	0.087	10,300	448	2	18	0.0055	620.00	0.0818	0.0000	5.00	0.0007
		Cruising - PZ to VSR	12.5	12	1.04	15.8	0.438	10,300	4,700	16	18	0.0055	620.00	0.0818	0.0005	52.46	0.0069
		Cruising - VSR to CW	24.5	14.7	1.67	15.8	0.805	10,300	13,825	47	18	0.0055	620.00	0.0818	0.0014	154.29	0.0204
SUEZMAX	North In	Cruising - CW to VSR	22	15.54	1.42	17	0.764	16,000	17,302	59	78	0.0055	620.00	0.0818	0.0074	836.73	0.1104
		Cruising - VSR to PZ	21	12	1.75	17	0.352	16,000	9,848	34	78	0.0055	620.00	0.0818	0.0042	476.26	0.0628
		Cruising - PZ to Pilot	4.7	7	0.67	17	0.070	16,000	750	3	78	0.0055	620.00	0.0818	0.0003	36.27	0.0048
		Maneuvering - Pilot to Berth		3	1.00	17	0.005	16,000	88	0	78	0.0060	682.00	0.0902	0.0000	4.68	0.0006
	North Out	Maneuvering - Berth to Pilot		5	1.00	17	0.025	16,000	407	1	78	0.0060	682.00	0.0902	0.0002	21.66	0.0029
		Cruising - Pilot to PZ	3.8	7	0.54	17	0.070	16,000	606	2	78	0.0055	620.00	0.0818	0.0003	29.33	0.0039
		Cruising - PZ to VSR	21	12	1.75	17	0.352	16,000	9,848	34	78	0.0055	620.00	0.0818	0.0042	476.26	0.0628
		Cruising - VSR to CW	22	15.54	1.42	17	0.764	16,000	17,302	59	78	0.0055	620.00	0.0818	0.0074	836.73	0.1104
<b>TOTAL</b>															<b>0.0700</b>	<b>7965.93</b>	<b>1.0510</b>



Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Un.GHG.2040-2. 2040 Proposed Project Auxiliary Generator Average Daily Unmitigated GHG Emissions

Ship	Direction	Mode	Activity (hours)	MCR (kW)	Load Factor	Energy (kW-hr)	Energy (MMBtu)	Fuel Type	Shipcalls (vessels/yr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
VLCC	North In	Cruising	3.84	3,600	0.278	3,840	13	HFO	69	0.0055	620.00	0.0818	0.0014	164.28	0.0217
		Maneuvering	2.00	3,600	0.278	2,002	7	HFO	69	0.0060	682.00	0.0902	0.0008	94.19	0.0125
	North Out	Maneuvering	1.50	3,600	0.278	1,501	5	HFO	69	0.0060	682.00	0.0902	0.0006	70.64	0.0093
		Cruising	3.71	3,600	0.278	3,712	13	HFO	69	0.0055	620.00	0.0818	0.0014	158.78	0.0209
AFRAMAX	South In	Cruising	3.15	3,600	0.278	3,155	11	HFO	36	0.0055	620.00	0.0818	0.0006	70.43	0.0093
		Maneuvering	2.00	3,600	0.278	2,002	7	HFO	36	0.0060	682.00	0.0902	0.0004	49.14	0.0065
	South Out	Maneuvering	1.50	3,600	0.278	1,501	5	HFO	36	0.0060	682.00	0.0902	0.0003	36.86	0.0049
		Cruising	3.21	3,600	0.278	3,211	11	HFO	36	0.0055	620.00	0.0818	0.0006	71.67	0.0095
PANAMAX	South In	Cruising	3.15	3,600	0.28	3,178	11	HFO	18	0.0055	620.00	0.0818	0.0003	35.47	0.0047
		Maneuvering	2.00	3,600	0.28	2,016	7	HFO	18	0.0060	682.00	0.0902	0.0002	24.75	0.0033
	South Out	Maneuvering	1.5	3,600	0.28	1,512	5	HFO	18	0.0060	682.00	0.0902	0.0002	18.56	0.0025
		Cruising	3.21	3,600	0.28	3,234	11	HFO	18	0.0055	620.00	0.0818	0.0003	36.09	0.0048
SUEZMAX	North In	Cruising	3.84	3,600	0.28	3,868	13	HFO	78	0.0055	620.00	0.0818	0.0016	187.05	0.0247
		Maneuvering	2.00	3,600	0.28	2,016	7	HFO	78	0.0060	682.00	0.0902	0.0009	107.24	0.0142
	North Out	Maneuvering	1.5	3,600	0.28	1,512	5	HFO	78	0.0060	682.00	0.0902	0.0007	80.43	0.0106
		Cruising	3.71	3,600	0.28	3,738	13	HFO	78	0.0055	620.00	0.0818	0.0016	180.78	0.0239

**TOTAL** **0.0122** **1386.36** **0.1831**

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Un.GHG.2040-3. 2040 Proposed Project Boiler Warm-Up Average Daily Unmitigated GHG Emissions.

Shipcalls (vessels/yr)	Vessel Size	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	Fuel Consumption (gal/yr)	N <sub>2</sub> O Emission Factor (lb/ton)	CO <sub>2</sub> Emission Factor (lb/ton)	CH <sub>4</sub> Emission Factor (lb/ton)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
36	Aframax	2.70	107.96	30%	3	50,000	77,626	0.0627	6,360.00	0.8770	0.0070	714.73	0.0986
69	VLCC	2.70	84.93	30%	3	90,000	210,685	0.0627	6,360.00	0.8770	0.0191	1,939.86	0.2675
18	Panamax	2.70	63.30	30%	3	35,000	15,930	0.0627	6,360.00	0.8770	0.0014	146.68	0.0202
78	Suezmax	2.70	87.54	30%	3	70,000	190,933	0.0627	6,360.00	0.8770	0.0173	1,757.99	0.2424
<b>TOTAL</b>											<b>0.0449</b>	<b>4,559.25</b>	<b>0.6287</b>

Table H.2.PP.Un.GHG.2040-4. 2040 Proposed Project Berth Operations Average Daily Unmitigated GHG Emissions.

**Auxiliary Generator Pre-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	Energy (MMBtu)	Heating Value (MMBtu/1000 gal)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
36	Aframax	700,000	2.70	3,600	28%	2.5	8.5	150	0.0064	722.0	0.0952	0.0021	233.93	0.0308
69	VLCC	2,000,000	2.70	3,600	28%	2.5	8.5	150	0.0064	722.0	0.0952	0.0039	448.36	0.0591
18	Panamax	350,000	2.70	3,600	28%	2.5	8.6	150	0.0064	722.0	0.0952	0.0010	116.96	0.0154
78	Suezmax	1,000,000	2.70	3,600	28%	2.5	8.6	150	0.0064	722.0	0.0952	0.0045	506.84	0.0668
<b>TOTAL</b>												<b>0.0115</b>	<b>1306.10</b>	<b>0.1722</b>

**Boiler Pre-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	Fuel Consumption (gal/yr)	N <sub>2</sub> O Emission Factor (lb/ton)	CO <sub>2</sub> Emission Factor (lb/ton)	CH <sub>4</sub> Emission Factor (lb/ton)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
36	Aframax	700,000	2.70	107.96	30%	2.5	50,000	64,689	0.0627	6,360.0	0.8770	0.0059	595.61	0.0821
69	VLCC	2,000,000	2.70	84.93	30%	2.5	90,000	175,571	0.0627	6,360.0	0.8770	0.0159	1616.55	0.2229
18	Panamax	350,000	2.70	59.91	30%	2.5	35,000	12,564	0.0627	6,360.0	0.8770	0.0011	115.68	0.0160
78	Suezmax	1,000,000	2.70	82.85	30%	2.5	70,000	150,586	0.0627	6,360.0	0.8770	0.0137	1386.50	0.1912
<b>TOTAL</b>												<b>0.0366</b>	<b>3714.34</b>	<b>0.5122</b>

**Auxiliary Generator Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	Energy (MMBtu)	Heating Value (MMBtu/1000 gal)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
36	Aframax	700,000	0.52	3,600	56%	15.0	102.4	140	0.0064	722.0	0.0952	0.0123	1403.57	0.1851
69	VLCC	2,000,000	0.52	3,600	56%	23.2	158.4	140	0.0064	722.0	0.0952	0.0369	4160.80	0.5486
18	Panamax	350,000	0.52	3,600	56%	11.0	75.7	140	0.0064	722.0	0.0952	0.0046	514.64	0.0679
78	Suezmax	1,000,000	0.52	3,600	56%	15.3	105.2	140	0.0064	722.0	0.0952	0.0275	3101.89	0.4090
<b>TOTAL</b>												<b>0.0813</b>	<b>9180.89</b>	<b>1.2106</b>

**Boiler Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Inerting Fuel Consumption Savings (lb/1000 bbl offloaded)	Activity Time (hr)	Pumping Rate (bbl/hr)	Fuel Consumption (gal/yr)	N <sub>2</sub> O Emission Factor (lb/ton)	CO <sub>2</sub> Emission Factor (lb/ton)	CH <sub>4</sub> Emission Factor (lb/ton)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
36	Aframax	700,000	0.52	102.17	28.06	15.0	50,000	367,337	0.0627	6,360.0	0.8770	0.0333	3382.20	0.4664
69	VLCC	2,000,000	0.52	80.38	28.06	23.2	90,000	1,542,012	0.0627	6,360.0	0.8770	0.1400	14197.86	1.9578
18	Panamax	350,000	0.52	59.91	28.06	11.0	35,000	55,283	0.0627	6,360.0	0.8770	0.0050	509.01	0.0702
78	Suezmax	1,000,000	0.52	82.85	28.06	15.3	70,000	921,588	0.0627	6,360.0	0.8770	0.0837	8485.39	1.1701
<b>TOTAL</b>												<b>0.2620</b>	<b>26574.47</b>	<b>3.6644</b>

**Auxiliary Generator Post-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	Energy (MMBtu)	Heating Value (MMBtu/1000 gal)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
36	Aframax	700,000	2.70	3,600	28%	1.0	3.4	150	0.0064	722.0	0.0952	0.0008	93.57	0.0123
69	VLCC	2,000,000	2.70	3,600	28%	1.0	3.4	150	0.0064	722.0	0.0952	0.0016	179.34	0.0236
18	Panamax	350,000	2.70	3,600	28%	1.0	3.4	150	0.0064	722.0	0.0952	0.0004	46.79	0.0062
78	Suezmax	1,000,000	2.70	3,600	28%	1.0	3.4	150	0.0064	722.0	0.0952	0.0018	202.74	0.0267
<b>TOTAL</b>												<b>0.0046</b>	<b>522.44</b>	<b>0.0689</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Un.GHG.2040-5. 2040 Proposed Project Summary of Average Daily Unmitigated Vessel GHG Emissions.

Mode	Equipment	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
Cruising	Main Engines	0.0693	7885.93	1.0404
Cruising	Aux Generator	0.0080	904.54	0.1193
Maneuvering	Main Engines	0.0007	80.00	0.0106
Maneuvering	Aux Generator	0.0042	481.82	0.0637
Boiler Warm-up	Boiler	0.0449	4559.25	0.6287
Berth Operations	Boiler	0.2986	30288.81	4.1766
Berth Operations	Aux Generator	0.0974	11009.43	1.4517
Propulsion	TOTAL	0.0822	9352.29	1.2341
Non-Propulsion	TOTAL	0.4409	45857.49	6.2570
<b>Total Emissions</b>		<b>0.5232</b>	<b>55209.79</b>	<b>7.4910</b>

Mode	Equipment	N <sub>2</sub> O Emissions (tons/day)	CO <sub>2</sub> Emissions (tons/day)	CH <sub>4</sub> Emissions (tons/day)
Cruising	Main Engines	1.90E-04	21.61	2.85E-03
Cruising	Aux Generator	2.18E-05	2.48	3.27E-04
Maneuvering	Main Engines	1.93E-06	0.22	2.90E-05
Maneuvering	Aux Generator	1.16E-05	1.32	1.75E-04
Boiler Warm-up	Boiler	1.23E-04	12.49	1.72E-03
Berth Operations	Boiler	8.18E-04	82.98	1.14E-02
Berth Operations	Aux Generator	2.67E-04	30.16	3.98E-03
Propulsion	TOTAL	2.25E-04	25.62	3.38E-03
Non-Propulsion	TOTAL	1.21E-03	125.64	1.71E-02
<b>Total Emissions</b>		<b>1.43E-03</b>	<b>151.26</b>	<b>2.05E-02</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Un.GHG.2040-6. 2040 Proposed Project Tug Main Engines Average Daily Unmitigated GHG Emissions.

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Energy (kWh)	Energy (MMBtu)	Shipcalls (vessels/yr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
VLCC	Maneuvering - Pilot to Berth	1.00	4	4,800	0.50	2400	8.2	69	0.00636	645.0	0.0890	0.0011	106.8120	0.0147
	Maneuvering - Berth to Pilot	1.00	2	4,800	0.50	2400	8.2	69	0.00636	645.0	0.0890	0.0011	106.8120	0.0147
AFRAMAX	Maneuvering - Pilot to Berth	1.00	2	4,800	0.50	2400	8.2	36	0.00636	645.0	0.0890	0.0005	55.7280	0.0077
	Maneuvering - Berth to Pilot	1.00	2	4,800	0.50	2400	8.2	36	0.00636	645.0	0.0890	0.0005	55.7280	0.0077
PANAMAX	Maneuvering - Pilot to Berth	1.00	2	4,800	0.50	2400	8.2	18	0.00636	645.0	0.0890	0.0003	27.8640	0.0038
	Maneuvering - Berth to Pilot	1.00	2	4,800	0.50	2400	8.2	18	0.00636	645.0	0.0890	0.0003	27.8640	0.0038
SUEZMAX	Maneuvering - Pilot to Berth	1.00	3	4,800	0.50	2400	8.2	78	0.00636	645.0	0.0890	0.0012	120.7440	0.0167
	Maneuvering - Berth to Pilot	1.00	2	4,800	0.50	2400	8.2	78	0.00636	645.0	0.0890	0.0012	120.7440	0.0167
<b>TOTAL</b>												<b>0.0061</b>	<b>622.2960</b>	<b>0.0859</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Un.GHG.2040-7. 2040 Proposed Project Tug Auxiliary Generator Engines Average Daily Unmitigated GHG Emissions

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Energy (kWh)	Energy (MMBtu)	Shipcalls (vessels/yr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
VLCC	Maneuvering - Pilot to Berth	1.00	4	300	1.00	300	1.0	69	0.0068	690.0	0.0952	0.00014	14.28	0.00197
	Maneuvering - Berth to Pilot	1.00	2	300	1.00	300	1.0	69	0.0068	690.0	0.0952	0.00014	14.28	0.00197
AFRAMAX	Maneuvering - Pilot to Berth	1.00	2	300	1.00	300	1.0	36	0.0068	690.0	0.0952	0.00007	7.45	0.00103
	Maneuvering - Berth to Pilot	1.00	2	300	1.00	300	1.0	36	0.0068	690.0	0.0952	0.00007	7.45	0.00103
PANAMAX	Maneuvering - Pilot to Berth	1.00	2	300	1.00	300	1.0	18	0.0068	690.0	0.0952	0.00004	3.73	0.00051
	Maneuvering - Berth to Pilot	1.00	2	300	1.00	300	1.0	18	0.0068	690.0	0.0952	0.00004	3.73	0.00051
SUEZMAX	Maneuvering - Pilot to Berth	1.00	3	300	1.00	300	1.0	78	0.0068	690.0	0.0952	0.00016	16.15	0.00223
	Maneuvering - Berth to Pilot	1.00	2	300	1.00	300	1.0	78	0.0068	690.0	0.0952	0.00016	16.15	0.00223
<b>TOTAL</b>												<b>0.00082</b>	<b>83.21</b>	<b>0.01148</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Un.GHG.2040-8. 2040 Proposed Project Summary of Tug Average Daily Unmitigated GHG Emissions.

Mode	Equipment	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
Tug Assist	Main Engines	0.0061	622.30	0.0859
Tug Assist	Aux Generator	0.00082	83.21	0.01148

**TOTAL                    0.0070                    705.51                    0.0973**

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Un.GHG.2040-9. 2040 Proposed Project VDU Crude Average Daily Unmitigated GHG Emissions.

	Annual Vessel Calls	crude vapors from tanks(scf/call)	annual gas usage (mmscf/yr)	mw crude vapors	destruction efficiency
Aframax	36	224000	8.1	50	98%
VLCC	69	596,313	41.1	50	98%
Panamax	18	116,667	2.1		
Suezmax	78	333,333	26.0		
<b>TOTAL</b>	<b>201</b>		<b>77.3</b>		

Assumed Distribution based on tank storage volume:  
 Site 1 12.5%  
 Site 2 87.5%

Annual Average (tons/yr)

	N <sub>2</sub> O	CO <sub>2</sub>	CH <sub>4</sub>
EF (kg/MMBtu)	0.0001	52.78	0.0059
Aframax	0.0008	434.13	0.0485
VLCC	0.0042	2215.10	0.2476
Panamax	0.0002	113.06	0.0126
Suezmax	0.0027	1399.72	0.1565
<b>TOTAL</b>	<b>0.0079</b>	<b>4162.0075</b>	<b>0.4652</b>

Annual Average (tons/yr)

	N <sub>2</sub> O	CO <sub>2</sub>	CH <sub>4</sub>
Site 1	0.0010	520.25	0.06
Site 2	0.0069	3641.8	0.4



Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Un.GHG.2040-10. 2040 Proposed Project VDU Legs Average Daily Unmitigated GHG Emissions.

	tanks	crude vapors from tanks on legs(scf/yr)	annual gas usage (mmscf/yr)	mw crude vapors	destruction efficiency
Site 1	4	8640000	34.6	50	98%
Site 2	14	8640000	121.0	50	98%
<b>TOTAL</b>	<b>18</b>		<b>155.5</b>		

48	hr/event
6	events/yr
500	ft3/min

Annual Average (tons/yr)

	N <sub>2</sub> O	CO <sub>2</sub>	CH <sub>4</sub>
EF (kg/MMBtu)	0.0001	52.78	0.0059
<b>TOTAL</b>	<b>0.016</b>	<b>8372.513</b>	<b>0.936</b>

*Assumed a ratio of 500/1000 based on the corresponding Btu values with respect to natural gas combustion emission factors.*

Annual Average (tons/yr)

	N <sub>2</sub> O	CO <sub>2</sub>	CH <sub>4</sub>
Site 1	0.0035	1860.6	0.2
Site 2	0.012	6512.0	0.7

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Un.GHG.2040-11. 2040 Proposed Project VDU Average Daily Unmitigated GHG Emissions.

Annual Average (tons/yr)

	<b>N<sub>2</sub>O</b>	<b>CO<sub>2</sub></b>	<b>CH<sub>4</sub></b>
Site 1	0.004	2251	0.25
Site 2	0.018	9245	1.03
<b>Total</b>	<b>0.022</b>	<b>11,496</b>	<b>1.29</b>

Daily Average (tons/day)

	<b>N<sub>2</sub>O</b>	<b>CO<sub>2</sub></b>	<b>CH<sub>4</sub></b>
Site 1	1.17E-05	6.17	6.89E-04
Site 2	4.80E-05	25.33	2.83E-03
<b>Total</b>	<b>5.97E-05</b>	<b>31.50</b>	<b>3.52E-03</b>

Table H.2.PP.Mit.GHG.2010-1. 2010 Proposed Project Main Engines Average Daily Mitigated GHG Emissions.

Ship	Direction	Mode	Distance (nautical miles)	Ship speed (knots)	Activity (hours)	Maximum Speed (knots)	Load Factor	MCR (kW)	Energy (kW-hr)	Annual Shipcalls (vessels/yr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
VLCC	North In	Cruising - CW to VSR	22	12	1.83	16.9	0.358	25,400	16,671	26.0	0.0055	620.00	0.0818	0.0024	268.73	0.0355
		Cruising - VSR to PZ	21	12	1.75	16.9	0.358	25,400	15,913	26.0	0.0055	620.00	0.0818	0.0023	256.52	0.0338
		Cruising - PZ to Pilot	4.7	7	0.67	16.9	0.071	25,400	1,212	26.0	0.0055	620.00	0.0818	0.0002	19.54	0.0026
		Maneuvering - Pilot to Berth		3	1.00	16.9	0.006	25,400	142	26.0	0.0060	682.00	0.0902	0.0000	2.52	0.0003
<b>TOTAL</b>											<b>0.0225</b>	<b>2542.00</b>	<b>0.3356</b>	<b>0.0049</b>	<b>547.31</b>	<b>0.0722</b>
	North Out	Maneuvering - Berth to Pilot		5	1.00	16.9	0.026	25,400	658	26.0	0.0060	682.00	0.0902	0.0001	11.66	0.0015
		Cruising - Pilot to PZ	3.8	7	0.54	16.9	0.071	25,400	960	26.0	0.0055	620.00	0.0818	0.0001	15.79	0.0021
		Cruising - PZ to VSR	21	12	1.75	16.9	0.358	25,400	15,913	26.0	0.0055	620.00	0.0818	0.0023	256.52	0.0338
		Cruising - VSR to CW	22	12	1.83	16.9	0.358	25,400	16,671	26.0	0.0055	620.00	0.0818	0.0024	268.73	0.0355
<b>TOTAL</b>											<b>0.0225</b>	<b>2542.00</b>	<b>0.3356</b>	<b>0.0049</b>	<b>552.71</b>	<b>0.0729</b>
AFRAMAX	South In	Cruising - CW to VSR	23	12	1.92	16.1	0.414	12,477	9,902	32.0	0.0055	620.00	0.0818	0.0017	196.46	0.0259
		Cruising - VSR to PZ	11	12	0.92	16.1	0.414	12,477	4,736	32.0	0.0055	620.00	0.0818	0.0008	93.96	0.0124
		Cruising - PZ to Pilot	4.7	7	0.67	16.1	0.082	12,477	689	32.0	0.0055	620.00	0.0818	0.0001	13.66	0.0018
		Maneuvering - Pilot to Berth		3	1.00	16.1	0.006	12,477	81	32.0	0.0060	682.00	0.0902	0.0000	1.76	0.0002
<b>TOTAL</b>											<b>0.0225</b>	<b>2542.00</b>	<b>0.3356</b>	<b>0.0027</b>	<b>305.83</b>	<b>0.0404</b>
	South Out	Maneuvering - Berth to Pilot	3.5	5	1.00	16.1	0.030	12,477	374	32.0	0.0060	682.00	0.0902	0.0001	8.16	0.0011
		Cruising - Pilot to PZ		7	0.50	16.1	0.082	12,477	513	32.0	0.0055	620.00	0.0818	0.0001	10.17	0.0013
		Cruising - PZ to VSR	12.5	12	1.04	16.1	0.414	12,477	5,382	32.0	0.0055	620.00	0.0818	0.0009	106.77	0.0141
		Cruising - VSR to CW	24.5	12	2.04	16.1	0.414	12,477	10,548	32.0	0.0055	620.00	0.0818	0.0019	209.27	0.0276
<b>TOTAL</b>											<b>0.0225</b>	<b>2542.00</b>	<b>0.3356</b>	<b>0.0030</b>	<b>334.37</b>	<b>0.0441</b>
PANAMAX	South In	Cruising - CW to VSR	23	12	1.92	15.8	0.438	10,300	8,649	26	0.0055	620.00	0.0818	0.0012	139.42	0.0184
		Cruising - VSR to PZ	11	12	0.92	15.8	0.438	10,300	4,136	26	0.0055	620.00	0.0818	0.0006	66.68	0.0088
		Cruising - PZ to Pilot	4.7	7	0.67	15.8	0.087	10,300	601	26	0.0055	620.00	0.0818	0.0001	9.69	0.0013
		Maneuvering - Pilot to Berth		3	1.00	15.8	0.007	10,300	71	26	0.0060	682.00	0.0902	0.0000	1.25	0.0002
<b>TOTAL</b>											<b>0.0225</b>	<b>2542.00</b>	<b>0.3356</b>	<b>0.0019</b>	<b>217.04</b>	<b>0.0286</b>
	South Out	Maneuvering - Berth to Pilot		5	1.00	15.8	0.032	10,300	326	26	0.0060	682.00	0.0902	0.0001	5.79	0.0008
		Cruising - Pilot to PZ	3.5	7	0.50	15.8	0.087	10,300	448	26	0.0055	620.00	0.0818	0.0001	7.22	0.0010
		Cruising - PZ to VSR	12.5	12	1.04	15.8	0.438	10,300	4,700	26	0.0055	620.00	0.0818	0.0007	75.77	0.0100
		Cruising - VSR to CW	24.5	12	2.04	15.8	0.438	10,300	9,213	26	0.0055	620.00	0.0818	0.0013	148.51	0.0196
<b>TOTAL</b>											<b>0.0225</b>	<b>2542.00</b>	<b>0.3356</b>	<b>0.0021</b>	<b>237.29</b>	<b>0.0313</b>
SUEZMAX	North In	Cruising - CW to VSR	22	12	1.83	17	0.352	16,000	10,317	45	0.0055	620.00	0.0818	0.0026	287.85	0.0380
		Cruising - VSR to PZ	21	12	1.75	17	0.352	16,000	9,848	45	0.0055	620.00	0.0818	0.0024	274.76	0.0363
		Cruising - PZ to Pilot	4.7	7	0.67	17	0.070	16,000	750	45	0.0055	620.00	0.0818	0.0002	20.93	0.0028
		Maneuvering - Pilot to Berth		3	1.00	17	0.005	16,000	88	45	0.0060	682.00	0.0902	0.0000	2.70	0.0004
<b>TOTAL</b>											<b>0.0225</b>	<b>2542.00</b>	<b>0.3356</b>	<b>0.0052</b>	<b>586.24</b>	<b>0.0773</b>
	North Out	Maneuvering - Berth to Pilot	3.8	5	1.00	17	0.025	16,000	407	45	0.0060	682.00	0.0902	0.0001	12.49	0.0017
		Cruising - Pilot to PZ		7	0.54	17	0.070	16,000	606	45	0.0055	620.00	0.0818	0.0002	16.92	0.0022
		Cruising - PZ to VSR	21	12	1.75	17	0.352	16,000	9,848	45	0.0055	620.00	0.0818	0.0024	274.76	0.0363
		Cruising - VSR to CW	22	12	1.83	17	0.352	16,000	10,317	45	0.0055	620.00	0.0818	0.0026	287.85	0.0380
<b>TOTAL</b>											<b>0.0225</b>	<b>2542.00</b>	<b>0.3356</b>	<b>0.0053</b>	<b>592.02</b>	<b>0.0781</b>
<b>GRAND TOTAL</b>											<b>0.1800</b>	<b>20336.00</b>	<b>2.6848</b>	<b>0.0299</b>	<b>3372.81</b>	<b>0.4450</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Mit.GHG.2010-2. 2010 Proposed Project Auxiliary Generator Average Daily Mitigated GHG Emissions.

Ship	Direction	Mode	Activity (hours)	MCR (kW)	Load Factor	Energy (kW-hr)	Annual Shipcalls (vessels/yr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
VLCC	North In	Cruising	4.25	3,600	0.280	4,289	26.0	0.0064	722.00	0.0952	0.0007	80.51	0.0106
		Maneuvering	2.00	3,600	0.280	2,016	26.0	0.0064	722.00	0.0952	0.0003	37.84	0.0050
	North Out	Maneuvering	1.50	3,600	0.280	1,512	26.0	0.0068	690.00	0.0952	0.0003	27.13	0.0037
		Cruising	4.13	3,600	0.280	4,159	26.0	0.0068	690.00	0.0952	0.0007	74.62	0.0103
							<b>TOTAL</b>	<b>0.0128</b>	<b>1444.00</b>	<b>0.1904</b>	<b>0.0010</b>	<b>118.35</b>	<b>0.0156</b>
AFRAMAX	South In	Cruising	3.50	3,600	0.280	3,533	32.0	0.0064	722.00	0.0952	0.0007	81.62	0.0108
		Maneuvering	2.00	3,600	0.280	2,016	32.0	0.0064	722.00	0.0952	0.0004	46.58	0.0061
	South Out	Maneuvering	1.50	3,600	0.278	1,501	32.0	0.0068	690.00	0.0952	0.0003	33.15	0.0046
		Cruising	3.58	3,600	0.278	3,586	32.0	0.0068	690.00	0.0952	0.0008	79.18	0.0109
							<b>TOTAL</b>	<b>0.0136</b>	<b>1380.00</b>	<b>0.1904</b>	<b>0.0010</b>	<b>101.74</b>	<b>0.0140</b>
PANAMAX	South In	Cruising	3.50	3,600	0.28	3,533	26	0.0064	722.00	0.0952	0.0006	66.32	0.0087
		Maneuvering	2.00	3,600	0.28	2,016	26	0.0064	722.00	0.0952	0.0003	37.84	0.0050
	South Out	Maneuvering	1.5	3,600	0.28	1,512	26	0.0068	690.00	0.0952	0.0003	27.13	0.0037
		Cruising	3.58	3,600	0.28	3,612	26	0.0068	690.00	0.0952	0.0006	64.80	0.0089
							<b>TOTAL</b>	<b>0.0136</b>	<b>1380.00</b>	<b>0.1904</b>	<b>0.0009</b>	<b>91.92</b>	<b>0.0127</b>
SUEZMAX	North In	Cruising	4.25	3,600	0.28	4,289	45	0.0064	722.00	0.0952	0.0012	139.34	0.0184
		Maneuvering	2.00	3,600	0.28	2,016	45	0.0064	722.00	0.0952	0.0006	65.50	0.0086
	North Out	Maneuvering	1.5	3,600	0.28	1,512	45	0.0068	690.00	0.0952	0.0005	46.95	0.0065
		Cruising	4.13	3,600	0.28	4,159	45	0.0068	690.00	0.0952	0.0013	129.14	0.0178
							<b>TOTAL</b>	<b>0.0128</b>	<b>1444.00</b>	<b>0.1904</b>	<b>0.0018</b>	<b>204.84</b>	<b>0.0270</b>
<b>TOTAL</b>								<b>0.0136</b>	<b>1380.00</b>	<b>0.1904</b>	<b>0.0017</b>	<b>176.09</b>	<b>0.0243</b>
<b>GRAND TOTAL</b>								<b>0.1056</b>	<b>11296.00</b>	<b>1.5232</b>	<b>0.0097</b>	<b>1037.64</b>	<b>0.1398</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

**Table H.2.PP.Mit.GHG.2010-3. 2010 Proposed Project Summary of Average Daily Mitigated Vessel GHG Emissions.**

<b>Mode</b>	<b>Equipment</b>	<b>N<sub>2</sub>O Emissions (tons/yr)</b>	<b>CO<sub>2</sub> Emissions (tons/yr)</b>	<b>CH<sub>4</sub> Emissions (tons/yr)</b>
Cruising	Main Engines	0.0295	3,326.48	0.4389
Cruising	Aux Generator	0.0067	715.53	0.0965
Maneuvering	Main Engines	0.0004	46.3312	0.0061
Maneuvering	Aux Generator	0.0030	322.11	0.0433
<b>Maneuvering</b>	<b>TOTAL</b>	<b>0.0034</b>	<b>368.44</b>	<b>0.0494</b>
<b>Propulsion</b>				
	<b>TOTAL</b>	<b>0.0396</b>	<b>4,410.46</b>	<b>0.5848</b>

<b>Mode</b>	<b>Equipment</b>	<b>N<sub>2</sub>O Emissions (tons/day)</b>	<b>CO<sub>2</sub> Emissions (tons/day)</b>	<b>CH<sub>4</sub> Emissions (tons/day)</b>
Cruising	Main Engines	8.08E-05	9.11E+00	1.20E-03
Cruising	Aux Generator	1.83E-05	1.96E+00	2.64E-04
Maneuvering	Main Engines	1.12E-06	1.27E-01	1.68E-05
Maneuvering	Aux Generator	8.19E-06	8.82E-01	1.19E-04
<b>Maneuvering</b>	<b>TOTAL</b>	<b>9.30E-06</b>	<b>1.01E+00</b>	<b>1.35E-04</b>
<b>Propulsion</b>				
	<b>TOTAL</b>	<b>1.08E-04</b>	<b>1.21E+01</b>	<b>1.60E-03</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Mit.GHG.2010-4. 2010 Proposed Project Boiler Warm-Up Average Daily Mitigated GHG Emissions.

Shipcalls (vessels/yr)	Vessel Size	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	Fuel Consumption (gal/yr)	N <sub>2</sub> O Emission Factor (lb/ton)	CO <sub>2</sub> Emission Factor (lb/ton)	CH <sub>4</sub> Emission Factor (lb/ton)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
32.0	Aframax	MDO	0.52	102.17	30%	3	50,000	65,304	0.0627	6360.00	0.8770	0.0059	601.28	0.0829
26.0	VLCC	MDO	0.52	80.38	30%	3	90,000	75,135	0.0627	6360.00	0.8770	0.0068	691.80	0.0954
26.0	Panamax	MDO	0.52	59.91	30%	3	35,000	21,778	0.0627	6360.00	0.8770	0.0020	200.52	0.0277
45.0	Suezmax	MDO	0.52	82.85	30%	3	70,000	104,252	0.0627	6360.00	0.8770	0.0095	959.89	0.1324
<b>TOTAL</b>												<b>0.0242</b>	<b>2453.49</b>	<b>0.3383</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Mit.GHG.2010-5. 2010 Proposed Project Summary of Boiler Warm-Up Average Daily Mitigated GHG Emissions.

Mode	Equipment	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
Boiler Warm-up	Boiler	0.0242	2,453.49	0.3383

Table H.2.PP.Mit.GHG.2010-6. 2010 Proposed Project Berth Operations Average Daily Mitigated GHG Emissions.

**Auxiliary Generator Pre-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	Energy (MMBtu)	Heating Value (MMBtu/1000 gal)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
32.0	Aframax	700,000	Dist at 0.2%S	0.20	3,600	28%	2.5	8.6	140.0	0.0068	690.0	0.0952	0.0020	198.7200	0.0274
26.0	VLCC	2,000,000	Dist at 0.2%S	0.20	3,600	28%	2.5	8.6	140.0	0.0068	690.0	0.0952	0.0016	161.4600	0.0223
26.0	Panamax	350,000	Dist at 0.2%S	0.20	3,600	28%	2.5	8.6	140.0	0.0068	690.0	0.0952	0.0016	161.4600	0.0223
45.0	Suezmax	1,000,000	Dist at 0.2%S	0.20	3,600	28%	2.5	8.6	140.0	0.0068	690.0	0.0952	0.0028	279.4500	0.0386
<b>TOTAL</b>													<b>0.0079</b>	<b>801.0900</b>	<b>0.1105</b>

**Boiler Pre-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	Fuel Consumption (gal/yr)	N <sub>2</sub> O Emission Factor (lb/ton)	CO <sub>2</sub> Emission Factor (lb/ton)	CH <sub>4</sub> Emission Factor (lb/ton)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
32.0	Aframax	700,000	Dist at 0.2%S	0.20	102.17	30%	2.5	50,000	54,420.2	0.0627	6,360.00	0.8770	0.0049	501.0669	0.0691
26.0	VLCC	2,000,000	Dist at 0.2%S	0.20	80.38	30%	2.5	90,000	62,612.9	0.0627	6,360.00	0.8770	0.0057	576.4998	0.0795
26.0	Panamax	350,000	Dist at 0.2%S	0.20	59.91	30%	2.5	35,000	18,148.5	0.0627	6,360.00	0.8770	0.0016	167.0998	0.0230
45.0	Suezmax	1,000,000	Dist at 0.2%S	0.20	82.85	30%	2.5	70,000	86,876.7	0.0627	6,360.00	0.8770	0.0079	799.9050	0.1103
<b>TOTAL</b>													<b>0.0202</b>	<b>2,044.5715</b>	<b>0.2819</b>

**Auxiliary Generator Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	Energy (MMBtu)	Heating Value (MMBtu/1000 gal)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
32.0	Aframax	700,000	Dist at 0.2%S	0.20	3,600	56%	15.0	102.4	140.0	0.0068	690.0	0.0952	0.0118	1,192.3200	0.1645
26.0	VLCC	2,000,000	Dist at 0.2%S	0.20	3,600	56%	23.2	158.4	140.0	0.0068	690.0	0.0952	0.0148	1,498.3488	0.2067
26.0	Panamax	350,000	Dist at 0.2%S	0.20	3,600	56%	11.0	75.7	140.0	0.0068	690.0	0.0952	0.0070	710.4240	0.0980
45.0	Suezmax	1,000,000	Dist at 0.2%S	0.20	3,600	56%	15.3	105.2	140.0	0.0068	690.0	0.0952	0.0169	1,710.2340	0.2360
<b>TOTAL</b>													<b>0.0504</b>	<b>5,111.3268</b>	<b>0.7052</b>

**Boiler Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Inerting Fuel Consumption Savings (lb/1000 bbl offloaded)	Activity Time (hr)	Pumping Rate (bbl/hr)	Fuel Consumption (gal/yr)	N <sub>2</sub> O Emission Factor (lb/ton)	CO <sub>2</sub> Emission Factor (lb/ton)	CH <sub>4</sub> Emission Factor (lb/ton)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
32.0	Aframax	700,000	Dist at 0.2%S	0.20	102.17	28.06	15.0	50,000	326,521.4	0.0627	6,360.00	0.8770	0.0296	3,006.4013	0.4146
26.0	VLCC	2,000,000	Dist at 0.2%S	0.20	80.38	28.06	23.2	90,000	581,047.9	0.0627	6,360.00	0.8770	0.0527	5,349.9184	0.7377
26.0	Panamax	350,000	Dist at 0.2%S	0.20	59.91	28.06	11.0	35,000	79,853.4	0.0627	6,360.00	0.8770	0.0072	735.2393	0.1014
45.0	Suezmax	1,000,000	Dist at 0.2%S	0.20	82.85	28.06	15.3	70,000	531,685.2	0.0627	6,360.00	0.8770	0.0483	4,895.4184	0.6750
<b>TOTAL</b>													<b>0.1379</b>	<b>13,986.9775</b>	<b>1.9287</b>

**Auxiliary Generator Post-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	Energy (MMBtu)	Heating Value (MMBtu/1000 gal)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
32.0	Aframax	700,000	Dist at 0.2%S	0.20	3,600	28%	1.0	3.4	140.0	0.0068	690.0	0.0952	0.0008	79.4880	0.0110
26.0	VLCC	2,000,000	Dist at 0.2%S	0.20	3,600	28%	1.0	3.4	140.0	0.0068	690.0	0.0952	0.0006	64.5840	0.0089
26.0	Panamax	350,000	Dist at 0.2%S	0.20	3,600	28%	1.0	3.4	140.0	0.0068	690.0	0.0952	0.0006	64.5840	0.0089
45.0	Suezmax	1,000,000	Dist at 0.2%S	0.20	3,600	28%	1.0	3.4	140.0	0.0068	690.0	0.0952	0.0011	111.7800	0.0154
<b>TOTAL</b>													<b>0.0032</b>	<b>320.4360</b>	<b>0.0442</b>



Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

**Table H.2.PP.Mit.GHG.2010-7. 2010 Proposed Project Summary of Berth Operations Average Daily Mitigated GHG Emissions. Year 2010 (No AMP)**

<b>Mode</b>	<b>Equipment</b>	<b>N<sub>2</sub>O Emissions (tons/yr)</b>	<b>CO<sub>2</sub> Emissions (tons/yr)</b>	<b>CH<sub>4</sub> Emissions (tons/yr)</b>
Berth Operations	Boiler	0.1580	16031.55	2.2106
Berth Operations	Aux Generator	0.0614	6232.85	0.8600

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Mit.GHG.2015-1. 2015 Proposed Project Main Engines Average Daily Mitigated GHG Emissions.

Ship	Direction	Mode	Distance (nautical miles)	Ship speed (knots)	Activity (hours)	Maximum Speed (knots)	Load Factor	MCR (kW)	Energy (kW-hr)	Annual Shipcalls (vessels/yr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
VLCC	North In	Cruising - CW to VSR	22	12	1.83	16.9	0.358	25,400	16,671	51.0	0.0058	588.00	0.0811	0.0049	499.93	0.0690
		Cruising - VSR to PZ	21	12	1.75	16.9	0.358	25,400	15,913	51.0	0.0058	588.00	0.0811	0.0047	477.20	0.0658
		Cruising - PZ to Pilot	4.7	7	0.67	16.9	0.071	25,400	1,212	51.0	0.0058	588.00	0.0811	0.0004	36.34	0.0050
		Maneuvering - Pilot to Berth		3	1.00	16.9	0.006	25,400	142	51.0	0.0064	647.00	0.0895	0.0000	4.69	0.0006
		<b>TOTAL</b>									<b>0.0238</b>	<b>2411.00</b>	<b>0.3328</b>	<b>0.0100</b>	<b>1018.16</b>	<b>0.1404</b>
	North Out	Maneuvering - Berth to Pilot		5	1.00	16.9	0.026	25,400	658	51.0	0.0064	647.00	0.0895	0.0002	21.70	0.0030
		Cruising - Pilot to PZ	3.8	7	0.54	16.9	0.071	25,400	980	51.0	0.0058	588.00	0.0811	0.0003	29.38	0.0041
		Cruising - PZ to VSR	21	12	1.75	16.9	0.358	25,400	15,913	51.0	0.0058	588.00	0.0811	0.0047	477.20	0.0658
		Cruising - VSR to CW	22	12	1.83	16.9	0.358	25,400	16,671	51.0	0.0058	588.00	0.0811	0.0049	499.93	0.0690
		<b>TOTAL</b>									<b>0.0238</b>	<b>2411.00</b>	<b>0.3328</b>	<b>0.0101</b>	<b>1028.22</b>	<b>0.1418</b>
AFRAMAX	South In	Cruising - CW to VSR	23	12	1.92	16.1	0.414	12,477	9,902	24.0	0.0058	588.00	0.0811	0.0014	139.74	0.0193
		Cruising - VSR to PZ	11	12	0.92	16.1	0.414	12,477	4,736	24.0	0.0058	588.00	0.0811	0.0007	66.83	0.0092
		Cruising - PZ to Pilot	4.7	7	0.67	16.1	0.082	12,477	689	24.0	0.0058	588.00	0.0811	0.0001	9.72	0.0013
		Maneuvering - Pilot to Berth		3	1.00	16.1	0.006	12,477	81	24.0	0.0064	647.00	0.0895	0.0000	1.25	0.0002
		<b>TOTAL</b>									<b>0.0238</b>	<b>2411.00</b>	<b>0.3328</b>	<b>0.0021</b>	<b>217.54</b>	<b>0.0300</b>
	South Out	Maneuvering - Berth to Pilot		5	1.00	16.1	0.030	12,477	374	24.0	0.0064	647.00	0.0895	0.0001	5.80	0.0008
		Cruising - Pilot to PZ	3.5	7	0.50	16.1	0.082	12,477	513	24.0	0.0058	588.00	0.0811	0.0001	7.24	0.0010
		Cruising - PZ to VSR	12.5	12	1.04	16.1	0.414	12,477	5,382	24.0	0.0058	588.00	0.0811	0.0007	75.94	0.0105
		Cruising - VSR to CW	24.5	12	2.04	16.1	0.414	12,477	10,548	24.0	0.0058	588.00	0.0811	0.0015	148.85	0.0205
		<b>TOTAL</b>									<b>0.0238</b>	<b>2411.00</b>	<b>0.3328</b>	<b>0.0023</b>	<b>237.83</b>	<b>0.0328</b>
PANAMAX	South In	Cruising - CW to VSR	23	12	1.92	15.8	0.438	10,300	8,649	12	0.0058	588.00	0.0811	0.0006	61.03	0.0084
		Cruising - VSR to PZ	11	12	0.92	15.8	0.438	10,300	4,136	12	0.0058	588.00	0.0811	0.0003	29.19	0.0040
		Cruising - PZ to Pilot	4.7	7	0.67	15.8	0.087	10,300	601	12	0.0058	588.00	0.0811	0.0000	4.24	0.0006
		Maneuvering - Pilot to Berth		3	1.00	15.8	0.007	10,300	71	12	0.0064	647.00	0.0895	0.0000	0.55	0.0001
		<b>TOTAL</b>									<b>0.0238</b>	<b>2411.00</b>	<b>0.3328</b>	<b>0.0009</b>	<b>95.00</b>	<b>0.0131</b>
	South Out	Maneuvering - Berth to Pilot		5	1.00	15.8	0.032	10,300	326	12	0.0064	647.00	0.0895	0.0000	2.53	0.0004
		Cruising - Pilot to PZ	3.5	7	0.50	15.8	0.087	10,300	448	12	0.0058	588.00	0.0811	0.0000	3.16	0.0004
		Cruising - PZ to VSR	12.5	12	1.04	15.8	0.438	10,300	4,700	12	0.0058	588.00	0.0811	0.0003	33.17	0.0046
		Cruising - VSR to CW	24.5	12	2.04	15.8	0.438	10,300	9,213	12	0.0058	588.00	0.0811	0.0006	65.01	0.0090
		<b>TOTAL</b>									<b>0.0238</b>	<b>2411.00</b>	<b>0.3328</b>	<b>0.0010</b>	<b>103.87</b>	<b>0.0143</b>
SUEZMAX	North In	Cruising - CW to VSR	22	12	1.83	17	0.352	16,000	10,317	60	0.0058	588.00	0.0811	0.0036	363.99	0.0502
		Cruising - VSR to PZ	21	12	1.75	17	0.352	16,000	9,848	60	0.0058	588.00	0.0811	0.0034	347.44	0.0479
		Cruising - PZ to Pilot	4.7	7	0.67	17	0.070	16,000	750	60	0.0058	588.00	0.0811	0.0003	26.46	0.0036
		Maneuvering - Pilot to Berth		3	1.00	17	0.005	16,000	88	60	0.0064	647.00	0.0895	0.0000	3.41	0.0005
		<b>TOTAL</b>									<b>0.0238</b>	<b>2411.00</b>	<b>0.3328</b>	<b>0.0073</b>	<b>741.30</b>	<b>0.1022</b>
	North Out	Maneuvering - Berth to Pilot		5	1.00	17	0.025	16,000	407	60	0.0064	647.00	0.0895	0.0002	15.80	0.0022
		Cruising - Pilot to PZ	3.8	7	0.54	17	0.070	16,000	606	60	0.0058	588.00	0.0811	0.0002	21.39	0.0030
		Cruising - PZ to VSR	21	12	1.75	17	0.352	16,000	9,848	60	0.0058	588.00	0.0811	0.0034	347.44	0.0479
		Cruising - VSR to CW	22	12	1.83	17	0.352	16,000	10,317	60	0.0058	588.00	0.0811	0.0036	363.99	0.0502
		<b>TOTAL</b>									<b>0.0238</b>	<b>2411.00</b>	<b>0.3328</b>	<b>0.0074</b>	<b>748.63</b>	<b>0.1033</b>
<b>GRAND TOTAL</b>											<b>0.1904</b>	<b>19288.00</b>	<b>2.6624</b>	<b>0.0413</b>	<b>4190.55</b>	<b>0.5780</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Mit.GHG.2015-2. 2015 Proposed Project Auxiliary Generator Average Daily Mitigated GHG Emissions.

Ship	Direction	Mode	Activity (hours)	MCR (kW)	Load Factor	Energy (kW-hr)	Annual Shipcalls (vessels/yr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)	
VLCC	North In	Cruising	4.25	3,600	0.280	4,289	51.0	0.0068	690.00	0.0952	0.0015	150.92	0.0208	
		Maneuvering	2.00	3,600	0.280	2,016	51.0	0.0068	690.00	0.0952	0.0007	70.94	0.0098	
	North Out	Maneuvering	1.50	3,600	0.280	1,512	51.0	0.0068	690.00	0.0952	0.0005	53.21	0.0073	
		Cruising	4.13	3,600	0.280	4,159	51.0	0.0068	690.00	0.0952	0.0014	146.36	0.0202	
							<b>TOTAL</b>	<b>0.0136</b>	<b>1380.00</b>	<b>0.1904</b>	<b>0.0022</b>	<b>221.87</b>	<b>0.0306</b>	
AFRAMAX	South In	Cruising	3.50	3,600	0.280	3,533	24.0	0.0068	690.00	0.0952	0.0006	58.50	0.0081	
		Maneuvering	2.00	3,600	0.280	2,016	24.0	0.0068	690.00	0.0952	0.0003	33.38	0.0046	
	South Out	Maneuvering	1.50	3,600	0.278	1,501	24.0	0.0068	690.00	0.0952	0.0002	24.86	0.0034	
		Cruising	3.58	3,600	0.278	3,586	24.0	0.0068	690.00	0.0952	0.0006	59.39	0.0082	
								<b>TOTAL</b>	<b>0.0136</b>	<b>1380.00</b>	<b>0.1904</b>	<b>0.0008</b>	<b>84.25</b>	<b>0.0116</b>
	PANAMAX	South In	Cruising	3.50	3,600	0.28	3,533	12	0.0068	690.00	0.0952	0.0003	29.25	0.0040
Maneuvering			2.00	3,600	0.28	2,016	12	0.0068	690.00	0.0952	0.0002	16.69	0.0023	
South Out		Maneuvering	1.5	3,600	0.28	1,512	12	0.0068	690.00	0.0952	0.0001	12.52	0.0017	
		Cruising	3.58	3,600	0.28	3,612	12	0.0068	690.00	0.0952	0.0003	29.91	0.0041	
							<b>TOTAL</b>	<b>0.0136</b>	<b>1380.00</b>	<b>0.1904</b>	<b>0.0004</b>	<b>42.43</b>	<b>0.0059</b>	
SUEZMAX	North In	Cruising	4.25	3,600	0.28	4,289	60	0.0068	690.00	0.0952	0.0017	177.56	0.0245	
		Maneuvering	2.00	3,600	0.28	2,016	60	0.0068	690.00	0.0952	0.0008	83.46	0.0115	
	North Out	Maneuvering	1.5	3,600	0.28	1,512	60	0.0068	690.00	0.0952	0.0006	62.60	0.0086	
		Cruising	4.13	3,600	0.28	4,159	60	0.0068	690.00	0.0952	0.0017	172.19	0.0238	
							<b>TOTAL</b>	<b>0.0136</b>	<b>1380.00</b>	<b>0.1904</b>	<b>0.0023</b>	<b>234.79</b>	<b>0.0324</b>	
<b>GRAND TOTAL</b>								<b>0.1088</b>	<b>11040.00</b>	<b>1.5232</b>	<b>0.0116</b>	<b>1181.75</b>	<b>0.1630</b>	

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Mit.GHG.2015-3. 2015 Proposed Project Summary of Average Daily Mitigated Vessel GHG Emissions.

Mode	Equipment	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
Cruising	Main Engines	0.0408	4,135	0.5703
Cruising	Aux Generator	0.0081	824	0.1137
Maneuvering	Main Engines	0.0006	56	0.0077
Maneuvering	Aux Generator	0.0035	358	0.0493
<b>Maneuvering</b>	<b>TOTAL</b>	<b>0.0041</b>	<b>413</b>	<b>0.0571</b>
<b>Propulsion</b>	<b>TOTAL</b>	<b>0.0530</b>	<b>5,372</b>	<b>0.7411</b>

Mode	Equipment	N <sub>2</sub> O Emissions (tons/day)	CO <sub>2</sub> Emissions (tons/day)	CH <sub>4</sub> Emissions (tons/day)
Cruising	Main Engines	0.0001	11	0.0016
Cruising	Aux Generator	0.0000	2	0.0003
Maneuvering	Main Engines	0.0000	0	0.0000
Maneuvering	Aux Generator	0.0000	1	0.0001
<b>Maneuvering</b>	<b>TOTAL</b>	<b>0.0000</b>	<b>1</b>	<b>0.0002</b>
<b>Propulsion</b>	<b>TOTAL</b>	<b>0.0001</b>	<b>15</b>	<b>0.0020</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Mit.GHG.2015-4. 2015 Proposed Project Boiler Warm-Up Average Daily Mitigated GHG Emissions.

Shipcalls (vessels/yr)	Vessel Size	Fuel Type	Sulfur Content (%)	Fuel Consump- tion (lb/1000 bbl offloaded )	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	Fuel Consump- tion (gal/yr)	N <sub>2</sub> O Emission Factor (lb/ton)	CO <sub>2</sub> Emission Factor (lb/ton)	CH <sub>4</sub> Emission Factor (lb/ton)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
24.0	Aframax	Dist at 0.2	0.20	102.17	30%	3	50,000	48,978	0.0068	690.00	0.0952	0.0005	48.92	0.0068
51.0	VLCC	Dist at 0.2	0.20	80.38	30%	3	90,000	147,381	0.0068	690.00	0.0952	0.0015	147.22	0.0203
12	Panamax	Dist at 0.2	0.20	59.91	30%	3	35,000	8,376	0.0068	690.00	0.0952	0.0001	8.37	0.0012
60	Suezmax	Dist at 0.2	0.20	82.85	30%	3	70,000	115,836	0.0068	690.00	0.0952	0.0011	115.71	0.0160
<b>TOTAL</b>									<b>0.0272</b>	<b>2,760.00</b>	<b>0.3808</b>	<b>0.0032</b>	<b>320.22</b>	<b>0.0442</b>

**Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR**

**Table H.2.PP.Mit.GHG.2015-5. 2015 Proposed Project Summary of Boiler Warm-Up Average Daily Mitigated GHG Emissions.**

<b>Mode</b>	<b>Equipment</b>	<b>N<sub>2</sub>O Emissions (tons/yr)</b>	<b>CO<sub>2</sub> Emissions (tons/yr)</b>	<b>CH<sub>4</sub> Emissions (tons/yr)</b>
Boiler Warm-up	Boiler	0.0032	320.22	0.0442

Table H.2.PP.Mit.GHG.2015-6. 2015 Proposed Project Berth Operations Average Daily Mitigated GHG Emissions.

**Auxiliary Generator Pre-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bb/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	Energy (MMBtu)	Heating Value (MMBtu/1000 gal)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
24.0	Aframax	700,000	Dist at 0.2	0.20	3,600	28%	2.5	8.5	150	0.0064	722.0	0.0952	0.0014	155.95	0.0206
51.0	VLCC	2,000,000	Dist at 0.2	0.20	3,600	28%	2.5	8.5	150	0.0064	722.0	0.0952	0.0029	331.40	0.0437
12.0	Panamax	350,000	Dist at 0.2	0.20	3,600	28%	2.5	8.6	150	0.0064	722.0	0.0952	0.0007	77.98	0.0103
60.0	Suezmax	1,000,000	Dist at 0.2	0.20	3,600	28%	2.5	8.6	150	0.0064	722.0	0.0952	0.0034	389.88	0.0514
<b>TOTAL</b>													<b>0.0084</b>	<b>955.21</b>	<b>0.1259</b>

**Boiler Pre-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bb/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	Fuel Consumption (gal/yr)	N <sub>2</sub> O Emission Factor (lb/ton)	CO <sub>2</sub> Emission Factor (lb/ton)	CH <sub>4</sub> Emission Factor (lb/ton)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
24.0	Aframax	700,000	Dist at 0.2	0.20	102.17	30%	2.5	50,000	40,815	0.0627	6,360.0	0.8770	0.0037	375.80	0.0518
51.0	VLCC	2,000,000	Dist at 0.2	0.20	80.38	30%	2.5	90,000	122,818	0.0627	6,360.0	0.8770	0.0111	1130.83	0.1559
12.0	Panamax	350,000	Dist at 0.2	0.20	59.91	30%	2.5	35,000	9,376	0.0627	6,360.0	0.8770	0.0008	77.12	0.0106
60.0	Suezmax	1,000,000	Dist at 0.2	0.20	82.85	30%	2.5	70,000	115,836	0.0627	6,360.0	0.8770	0.0105	1066.54	0.1471
<b>TOTAL</b>													<b>0.0261</b>	<b>2650.29</b>	<b>0.3655</b>

**Auxiliary Generator Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bb/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	Energy (MMBtu)	Heating Value (MMBtu/1000 gal)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
24.0	Aframax	700,000	Dist at 0.2	0.20	3,600	56%	15.0	102.4	140	0.0064	722.0	0.0952	0.0082	935.71	0.1234
51.0	VLCC	2,000,000	Dist at 0.2	0.20	3,600	56%	23.2	158.4	140	0.0064	722.0	0.0952	0.0273	3075.37	0.4055
12.0	Panamax	350,000	Dist at 0.2	0.20	3,600	56%	11.0	75.7	140	0.0064	722.0	0.0952	0.0030	343.09	0.0452
60.0	Suezmax	1,000,000	Dist at 0.2	0.20	3,600	56%	15.3	105.2	140	0.0064	722.0	0.0952	0.0212	2386.07	0.3146
<b>TOTAL</b>													<b>0.0597</b>	<b>6740.25</b>	<b>0.8887</b>

**Boiler Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bb/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Inerting Fuel Consumption Savings (lb/1000 bbl offloaded)	Activity Time (hr)	Pumping Rate (bbl/hr)	Fuel Consumption (gal/yr)	N <sub>2</sub> O Emission Factor (lb/ton)	CO <sub>2</sub> Emission Factor (lb/ton)	CH <sub>4</sub> Emission Factor (lb/ton)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
24.0	Aframax	700,000	Dist at 0.2	0.20	102.17	28.06	15.0	50,000	244,891	0.0627	6,360.0	0.8770	0.0222	2254.80	0.3109
51.0	VLCC	2,000,000	Dist at 0.2	0.20	80.38	28.06	23.2	90,000	1,139,748	0.0627	6,360.0	0.8770	0.1035	10494.07	1.4471
12.0	Panamax	350,000	Dist at 0.2	0.20	59.91	28.06	11.0	35,000	36,855	0.0627	6,360.0	0.8770	0.0033	339.34	0.0468
60.0	Suezmax	1,000,000	Dist at 0.2	0.20	82.85	28.06	15.3	70,000	708,914	0.0627	6,360.0	0.8770	0.0643	6527.22	0.9001
<b>TOTAL</b>													<b>0.1934</b>	<b>19615.44</b>	<b>2.7048</b>

**Auxiliary Generator Post-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bb/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	Energy (MMBtu)	Heating Value (MMBtu/1000 gal)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
24.0	Aframax	700,000	Dist at 0.2	0.20	3,600	28%	1.0	3.4	150	0.0064	722.0	0.0952	0.0005	62.38	0.0082
51.0	VLCC	2,000,000	Dist at 0.2	0.20	3,600	28%	1.0	3.4	150	0.0064	722.0	0.0952	0.0012	132.56	0.0175
12.0	Panamax	350,000	Dist at 0.2	0.20	3,600	28%	1.0	3.4	150	0.0064	722.0	0.0952	0.0003	31.19	0.0041
60.0	Suezmax	1,000,000	Dist at 0.2	0.20	3,600	28%	1.0	3.4	150	0.0064	722.0	0.0952	0.0014	155.95	0.0206
<b>TOTAL</b>													<b>0.0034</b>	<b>382.08</b>	<b>0.0504</b>

**Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR**

**Table H.2.PP.Mit.GHG.2015-7. 2015 Proposed Project Summary of Berth Operations Average Daily Mitigated GHG Emissions.**

**No AMP**

<b>Mode</b>	<b>Equipment</b>	<b>N<sub>2</sub>O Emissions (tons/yr)</b>	<b>CO<sub>2</sub> Emissions (tons/yr)</b>	<b>CH<sub>4</sub> Emissions (tons/yr)</b>
Berth Operations	Boiler	0.2195	22265.73	3.0703
Berth Operations	Aux Generator	0.0715	8077.5338	1.0651

**Mitigated Emissions with AMP - Year 2015**

AMP Reduction            15%

Berth Operations	Boiler	0.2195	22265.73	3.0703
Berth Operations	Aux Generator	0.0607	6865.90	0.9053



Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Mit.GHG.2025-1. 2025 Proposed Project Main Engines Average Daily Mitigated GHG Emissions.

Ship	Direction	Mode	Distance (nautical miles)	Ship speed (knots)	Activity (hours)	Maximum Speed (knots)	Load Factor	MCR (kW)	Energy (kW-hr)	Annual Shipcalls (vessels/yr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
VLCC	North In	Cruising - CW to VSR	22	12	1.83	16.9	0.358	25,400	16,671	69.0	0.0058	588.00	0.0811	0.0067	676.37	0.0933
		Cruising - VSR to PZ	21	12	1.75	16.9	0.358	25,400	15,913	69.0	0.0058	588.00	0.0811	0.0064	645.63	0.0890
		Cruising - PZ to Pilot	4.7	7	0.67	16.9	0.071	25,400	1,212	69.0	0.0058	588.00	0.0811	0.0005	49.17	0.0068
		Maneuvering - Pilot to Berth		3	1.00	16.9	0.006	25,400	142	69.0	0.0064	647.00	0.0895	0.0001	6.34	0.0009
		<b>TOTAL</b>								<b>0.0238</b>	<b>2411.00</b>	<b>0.3328</b>	<b>0.0136</b>	<b>1377.51</b>	<b>0.1900</b>	
	North Out	Maneuvering - Berth to Pilot		5	1.00	16.9	0.026	25,400	658	69.0	0.0064	647.00	0.0895	0.0003	29.37	0.0041
		Cruising - Pilot to PZ	3.8	7	0.54	16.9	0.071	25,400	980	69.0	0.0058	588.00	0.0811	0.0004	39.75	0.0055
		Cruising - PZ to VSR	21	12	1.75	16.9	0.358	25,400	15,913	69.0	0.0058	588.00	0.0811	0.0064	645.63	0.0890
		Cruising - VSR to CW	22	12	1.83	16.9	0.358	25,400	16,671	69.0	0.0058	588.00	0.0811	0.0067	676.37	0.0933
		<b>TOTAL</b>								<b>0.0238</b>	<b>2411.00</b>	<b>0.3328</b>	<b>0.0137</b>	<b>1391.12</b>	<b>0.1919</b>	
AFRAMAX	South In	Cruising - CW to VSR	23	12	1.92	16.1	0.414	12,477	9,902	36.0	0.0058	588.00	0.0811	0.0021	209.61	0.0289
		Cruising - VSR to PZ	11	12	0.92	16.1	0.414	12,477	4,736	36.0	0.0058	588.00	0.0811	0.0010	100.25	0.0138
		Cruising - PZ to Pilot	4.7	7	0.67	16.1	0.082	12,477	689	36.0	0.0058	588.00	0.0811	0.0001	14.57	0.0020
		Maneuvering - Pilot to Berth		3	1.00	16.1	0.006	12,477	81	36.0	0.0064	647.00	0.0895	0.0000	1.88	0.0003
		<b>TOTAL</b>								<b>0.0238</b>	<b>2411.00</b>	<b>0.3328</b>	<b>0.0032</b>	<b>326.31</b>	<b>0.0450</b>	
	South Out	Maneuvering - Berth to Pilot		5	1.00	16.1	0.030	12,477	374	36.0	0.0064	647.00	0.0895	0.0001	8.70	0.0012
		Cruising - Pilot to PZ	3.5	7	0.50	16.1	0.082	12,477	513	36.0	0.0058	588.00	0.0811	0.0001	10.85	0.0015
		Cruising - PZ to VSR	12.5	12	1.04	16.1	0.414	12,477	5,382	36.0	0.0058	588.00	0.0811	0.0011	113.92	0.0157
		Cruising - VSR to CW	24.5	12	2.04	16.1	0.414	12,477	10,548	36.0	0.0058	588.00	0.0811	0.0022	223.28	0.0308
		<b>TOTAL</b>								<b>0.0238</b>	<b>2411.00</b>	<b>0.3328</b>	<b>0.0035</b>	<b>356.75</b>	<b>0.0492</b>	
PANAMAX	South In	Cruising - CW to VSR	23	12	1.92	15.8	0.438	10,300	8,649	18	0.0058	588.00	0.0811	0.0009	91.54	0.0126
		Cruising - VSR to PZ	11	12	0.92	15.8	0.438	10,300	4,136	18	0.0058	588.00	0.0811	0.0004	43.78	0.0060
		Cruising - PZ to Pilot	4.7	7	0.67	15.8	0.087	10,300	601	18	0.0058	588.00	0.0811	0.0001	6.37	0.0009
		Maneuvering - Pilot to Berth		3	1.00	15.8	0.007	10,300	71	18	0.0064	647.00	0.0895	0.0000	0.82	0.0001
		<b>TOTAL</b>								<b>0.0238</b>	<b>2411.00</b>	<b>0.3328</b>	<b>0.0014</b>	<b>142.50</b>	<b>0.0197</b>	
	South Out	Maneuvering - Berth to Pilot		5	1.00	15.8	0.032	10,300	326	18	0.0064	647.00	0.0895	0.0000	3.80	0.0005
		Cruising - Pilot to PZ	3.5	7	0.50	15.8	0.087	10,300	448	18	0.0058	588.00	0.0811	0.0000	4.74	0.0007
		Cruising - PZ to VSR	12.5	12	1.04	15.8	0.438	10,300	4,700	18	0.0058	588.00	0.0811	0.0005	49.75	0.0069
		Cruising - VSR to CW	24.5	12	2.04	15.8	0.438	10,300	9,213	18	0.0058	588.00	0.0811	0.0010	97.51	0.0134
		<b>TOTAL</b>								<b>0.0238</b>	<b>2411.00</b>	<b>0.3328</b>	<b>0.0015</b>	<b>155.80</b>	<b>0.0215</b>	
SUEZMAX	North In	Cruising - CW to VSR	22	12	1.83	17	0.352	16,000	10,317	78	0.0058	588.00	0.0811	0.0047	473.18	0.0653
		Cruising - VSR to PZ	21	12	1.75	17	0.352	16,000	9,848	78	0.0058	588.00	0.0811	0.0045	451.68	0.0623
		Cruising - PZ to Pilot	4.7	7	0.67	17	0.070	16,000	750	78	0.0058	588.00	0.0811	0.0003	34.40	0.0047
		Maneuvering - Pilot to Berth		3	1.00	17	0.005	16,000	88	78	0.0064	647.00	0.0895	0.0000	4.44	0.0006
		<b>TOTAL</b>								<b>0.0238</b>	<b>2411.00</b>	<b>0.3328</b>	<b>0.0095</b>	<b>963.70</b>	<b>0.1329</b>	
	North Out	Maneuvering - Berth to Pilot		5	1.00	17	0.025	16,000	407	78	0.0064	647.00	0.0895	0.0002	20.54	0.0028
		Cruising - Pilot to PZ	3.8	7	0.54	17	0.070	16,000	606	78	0.0058	588.00	0.0811	0.0003	27.81	0.0038
		Cruising - PZ to VSR	21	12	1.75	17	0.352	16,000	9,848	78	0.0058	588.00	0.0811	0.0045	451.68	0.0623
		Cruising - VSR to CW	22	12	1.83	17	0.352	16,000	10,317	78	0.0058	588.00	0.0811	0.0047	473.18	0.0653
		<b>TOTAL</b>								<b>0.0238</b>	<b>2411.00</b>	<b>0.3328</b>	<b>0.0096</b>	<b>973.22</b>	<b>0.1342</b>	
<b>GRAND TOTAL</b>											<b>0.1904</b>	<b>19288.00</b>	<b>2.6624</b>	<b>0.0561</b>	<b>5686.90</b>	<b>0.7844</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Mit.GHG.2025-2. 2025 Proposed Project Auxiliary Generator Average Daily Mitigated GHG Emissions.

Ship	Direction	Mode	Activity (hours)	MCR (kW)	Load Factor	Energy (kW-hr)	Annual Shipcalls (vessels/yr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
VLCC	North In	Cruising	4.25	3,600	0.280	4,289	69.0	0.0068	690.00	0.0952	0.0020	204.19	0.0282
		Maneuvering	2.00	3,600	0.280	2,016	69.0	0.0068	690.00	0.0952	0.0009	95.98	0.0132
	North Out	Maneuvering	1.50	3,600	0.280	1,512	69.0	0.0068	690.00	0.0952	0.0007	71.99	0.0099
		Cruising	4.13	3,600	0.280	4,159	69.0	0.0068	690.00	0.0952	0.0020	198.02	0.0273
							<b>TOTAL</b>	<b>0.0136</b>	<b>1380.00</b>	<b>0.1904</b>	<b>0.0030</b>	<b>300.17</b>	<b>0.0414</b>
AFRAMAX	South In	Cruising	3.50	3,600	0.280	3,533	36.0	0.0068	690.00	0.0952	0.0009	87.75	0.0121
		Maneuvering	2.00	3,600	0.280	2,016	36.0	0.0068	690.00	0.0952	0.0005	50.08	0.0069
	South Out	Maneuvering	1.50	3,600	0.278	1,501	36.0	0.0068	690.00	0.0952	0.0004	37.29	0.0051
		Cruising	3.58	3,600	0.278	3,586	36.0	0.0068	690.00	0.0952	0.0009	89.08	0.0123
							<b>TOTAL</b>	<b>0.0136</b>	<b>1380.00</b>	<b>0.1904</b>	<b>0.0014</b>	<b>137.83</b>	<b>0.0190</b>
PANAMAX	South In	Cruising	3.50	3,600	0.28	3,533	18	0.0068	690.00	0.0952	0.0004	43.88	0.0061
		Maneuvering	2.00	3,600	0.28	2,016	18	0.0068	690.00	0.0952	0.0002	25.04	0.0035
	South Out	Maneuvering	1.5	3,600	0.28	1,512	18	0.0068	690.00	0.0952	0.0002	18.78	0.0026
		Cruising	3.58	3,600	0.28	3,612	18	0.0068	690.00	0.0952	0.0004	44.86	0.0062
							<b>TOTAL</b>	<b>0.0136</b>	<b>1380.00</b>	<b>0.1904</b>	<b>0.0006</b>	<b>63.64</b>	<b>0.0088</b>
SUEZMAX	North In	Cruising	4.25	3,600	0.28	4,289	78	0.0068	690.00	0.0952	0.0023	230.82	0.0318
		Maneuvering	2.00	3,600	0.28	2,016	78	0.0068	690.00	0.0952	0.0011	108.50	0.0150
	North Out	Maneuvering	1.5	3,600	0.28	1,512	78	0.0068	690.00	0.0952	0.0008	81.38	0.0112
		Cruising	4.13	3,600	0.28	4,159	78	0.0068	690.00	0.0952	0.0022	223.85	0.0309
							<b>TOTAL</b>	<b>0.0136</b>	<b>1380.00</b>	<b>0.1904</b>	<b>0.0030</b>	<b>305.22</b>	<b>0.0421</b>
<b>GRAND TOTAL</b>								<b>0.1088</b>	<b>11040.00</b>	<b>1.5232</b>	<b>0.0159</b>	<b>1611.49</b>	<b>0.2223</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Mit.GHG.2025-3. 2025 Proposed Project Summary of Average Daily Mitigated Vessel GHG Emissions.

Mode	Equipment	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
Cruising	Main Engines	0.0553	5611.00	0.7739
Cruising	Aux Generator	0.0111	1122.46	0.1549
Maneuvering	Main Engines	0.0008	75.90	0.0105
Maneuvering	Aux Generator	0.0048	489.03	0.0675
<b>Maneuvering</b>	<b>TOTAL</b>	<b>0.0056</b>	<b>564.93</b>	<b>0.0780</b>
<b>Propulsion</b>	<b>TOTAL</b>	<b>0.0720</b>	<b>7,298</b>	<b>1.0067</b>

Mode	Equipment	N <sub>2</sub> O Emissions (tons/day)	CO <sub>2</sub> Emissions (tons/day)	CH <sub>4</sub> Emissions (tons/day)
Cruising	Main Engines	1.52E-04	1.54E+01	2.12E-03
Cruising	Aux Generator	3.03E-05	3.08E+00	4.24E-04
Maneuvering	Main Engines	2.06E-06	2.08E-01	2.88E-05
Maneuvering	Aux Generator	1.32E-05	1.34E+00	1.85E-04
<b>Maneuvering</b>	<b>TOTAL</b>	<b>1.53E-05</b>	<b>1.55E+00</b>	<b>2.14E-04</b>
<b>Propulsion</b>	<b>TOTAL</b>	<b>1.97E-04</b>	<b>2.00E+01</b>	<b>2.76E-03</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Mit.GHG.2025-4. 2025 Proposed Project Boiler Warm-Up Average Daily Mitigated GHG Emissions.

Shipcalls (vessels/yr)	Vessel Size	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	Fuel Consumption (gal/yr)	N <sub>2</sub> O Emission Factor (lb/ton)	CO <sub>2</sub> Emission Factor (lb/ton)	CH <sub>4</sub> Emission Factor (lb/ton)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
36.0	Aframax	0.20	102.17	30%	3	50,000	73,467	0.0068	690.00	0.0952	0.0007	73.39	0.0101
69.0	VLCC	0.20	80.38	30%	3	90,000	199,398	0.0068	690.00	0.0952	0.0020	199.18	0.0275
18	Panamax	0.20	59.91	30%	3	35,000	12,564	0.0068	690.00	0.0952	0.0001	12.55	0.0017
78	Suezmax	0.20	82.85	30%	3	70,000	150,586	0.0068	690.00	0.0952	0.0015	150.42	0.0208
<b>TOTAL</b>								<b>0.0272</b>	<b>2,760.00</b>	<b>0.3808</b>	<b>0.0043</b>	<b>435.54</b>	<b>0.0601</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Mit.GHG.2025-5. 2025 Proposed Project Summary of Boiler Warm-Up Average Daily Mitigated GHG Emissions.

Mode	Equipment	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
Boiler Warm-up	Boiler	0.0043	435.54	0.0601

Table H.2.PP.Mit.GHG.2025-6. 2025 Proposed Project Berth Operations Average Daily Mitigated GHG Emissions.

**Auxiliary Generator Pre-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	Energy (MMBtu)	Heating Value (MMBtu/1000 gal)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
36.0	Aframax	700,000	Dist at 0.2	0.20	3,600	28%	2.5	8.5	150	0.0064	722.0	0.0952	0.0021	233.93	0.0308
69.0	VLCC	2,000,000	Dist at 0.2	0.20	3,600	28%	2.5	8.5	150	0.0064	722.0	0.0952	0.0039	448.36	0.0591
18.0	Panamax	350,000	Dist at 0.2	0.20	3,600	28%	2.5	8.6	150	0.0064	722.0	0.0952	0.0010	116.36	0.0154
78.0	Suezmax	1,000,000	Dist at 0.2	0.20	3,600	28%	2.5	8.6	150	0.0064	722.0	0.0952	0.0045	506.84	0.0668
<b>TOTAL</b>													<b>0.0115</b>	<b>1306.10</b>	<b>0.1722</b>

**Auxiliary Generator Usage per Ship Visit**

Shipcalls (vessels/yr)	Vessel Type	Auxiliary kW per Vessel	Load Factor	Hours/visit	kW-Hrs/Visit	AMP Reduction	AMPed kW-Hr per year
36.0	Aframax	3,600	28%	2.5	9,000	0.4	194,400
69.0	VLCC	3,600	28%	2.5	9,000	0.4	372,600
18.0	Panamax	3,600	28%	2.5	9,000	0.4	97,200
78.0	Suezmax	3,600	28%	2.5	9,000	0.4	421,200
<b>TOTAL</b>							<b>1,085,400</b>

**Boiler Pre-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	Fuel Consumption (gal/yr)	N <sub>2</sub> O Emission Factor (lb/ton)	CO <sub>2</sub> Emission Factor (lb/ton)	CH <sub>4</sub> Emission Factor (lb/ton)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
36.0	Aframax	700,000	Dist at 0.2	0.20	102.17	30%	2.5	50,000	61,223	0.0627	6,360.0	0.8770	0.0056	563.70	0.0777
69.0	VLCC	2,000,000	Dist at 0.2	0.20	80.38	30%	2.5	90,000	166,165	0.0627	6,360.0	0.8770	0.0151	1529.94	0.2110
18.0	Panamax	350,000	Dist at 0.2	0.20	59.91	30%	2.5	35,000	12,564	0.0627	6,360.0	0.8770	0.0011	115.68	0.0160
78.0	Suezmax	1,000,000	Dist at 0.2	0.20	82.85	30%	2.5	70,000	150,586	0.0627	6,360.0	0.8770	0.0137	1386.50	0.1912
<b>TOTAL</b>													<b>0.0354</b>	<b>3595.83</b>	<b>0.4958</b>

**Auxiliary Generator Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	Energy (MMBtu)	Heating Value (MMBtu/1000 gal)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
36.0	Aframax	700,000	Dist at 0.2	0.20	3,600	56%	15.0	102.4	140	0.0064	722.0	0.0952	0.0123	1403.57	0.1851
69.0	VLCC	2,000,000	Dist at 0.2	0.20	3,600	56%	15.0	158.4	140	0.0064	722.0	0.0952	0.0369	4160.80	0.5486
18.0	Panamax	350,000	Dist at 0.2	0.20	3,600	56%	11.0	75.7	140	0.0064	722.0	0.0952	0.0046	514.64	0.0679
78.0	Suezmax	1,000,000	Dist at 0.2	0.20	3,600	56%	15.3	105.2	140	0.0064	722.0	0.0952	0.0275	3101.89	0.4090
<b>TOTAL</b>													<b>0.0813</b>	<b>9180.89</b>	<b>1.2106</b>

**Auxiliary Generator Usage per Ship Visit**

Shipcalls (vessels/yr)	Vessel Type	Auxiliary kW per Vessel	Load Factor	Hours/visit	kW-Hrs/Visit	AMP Reduction	AMPed kW-Hr per year
36.0	Aframax	3,600	56%	15.0	54,000	0.4	1,166,400
69.0	VLCC	3,600	56%	23.2	83,520	0.4	3,457,728
18.0	Panamax	3,600	56%	11.0	39,600	0.4	427,680
78.0	Suezmax	3,600	56%	15.3	55,080	0.4	2,577,744
<b>TOTAL</b>							<b>7,629,552</b>

**Boiler Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Inerting Fuel Consumption Savings (lb/1000 bbl offloaded)	Activity Time (hr)	Pumping Rate (bbl/hr)	Fuel Consumption (gal/yr)	N <sub>2</sub> O Emission Factor (lb/ton)	CO <sub>2</sub> Emission Factor (lb/ton)	CH <sub>4</sub> Emission Factor (lb/ton)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
36.0	Aframax	700,000	Dist at 0.2	0.20	102.17	28.06	15.0	50,000	367,337	0.0627	6,360.0	0.8770	0.0333	3382.20	0.4664
69.0	VLCC	2,000,000	Dist at 0.2	0.20	80.38	28.06	23.2	90,000	1,542,012	0.0627	6,360.0	0.8770	0.1400	14197.86	1.9578
18.0	Panamax	350,000	Dist at 0.2	0.20	59.91	28.06	11.0	35,000	55,283	0.0627	6,360.0	0.8770	0.0050	509.01	0.0702
78.0	Suezmax	1,000,000	Dist at 0.2	0.20	82.85	28.06	15.3	70,000	921,588	0.0627	6,360.0	0.8770	0.0837	8485.39	1.1701
<b>TOTAL</b>													<b>0.2620</b>	<b>26574.47</b>	<b>3.6644</b>

**Auxiliary Generator Post-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	Energy (MMBtu)	Heating Value (MMBtu/1000 gal)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
36.0	Aframax	700,000	Dist at 0.2	0.20	3,600	28%	1.0	3.4	150	0.0064	722.0	0.0952	0.0008	93.57	0.0123
69.0	VLCC	2,000,000	Dist at 0.2	0.20	3,600	28%	1.0	3.4	150	0.0064	722.0	0.0952	0.0016	179.34	0.0236
18.0	Panamax	350,000	Dist at 0.2	0.20	3,600	28%	1.0	3.4	150	0.0064	722.0	0.0952	0.0004	46.79	0.0062
78.0	Suezmax	1,000,000	Dist at 0.2	0.20	3,600	28%	1.0	3.4	150	0.0064	722.0	0.0952	0.0018	202.74	0.0267
<b>TOTAL</b>													<b>0.0046</b>	<b>522.44</b>	<b>0.0689</b>

**Auxiliary Generator Usage per Ship Visit**

Shipcalls (vessels/yr)	Vessel Type	Auxiliary kW per Vessel	Load Factor	Hours/visit	kW-Hrs/Visit	AMP Reduction	AMPed kW-Hr per year
36.0	Aframax	3,600	28%	1.0	3,600	0.4	77,760
69.0	VLCC	3,600	28%	1.0	3,600	0.4	149,040
18.0	Panamax	3,600	28%	1.0	3,600	0.4	38,880
78.0	Suezmax	3,600	28%	1.0	3,600	0.4	168,480
<b>TOTAL</b>							<b>434,160</b>
<b>Total AMPed kW-Hr per year</b>							<b>9,149,112</b>

**GHG Emissions from AMPed Electricity**

	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O
<i>Emission Factors</i>			
Lb/MW-Hrs	804.54	0.0037	0.01
<i>Pounds Per Year</i>			
2025	7,360,827	34	61

**Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR**

**Table H.2.PP.Mit.GHG.2025-7. 2025 Proposed Project Summary of Berth Operations Average Daily Mitigated GHG Emissions.**

**No AMP**

<b>Mode</b>	<b>Equipment</b>	<b>N<sub>2</sub>O Emissions (tons/yr)</b>	<b>CO<sub>2</sub> Emissions (tons/yr)</b>	<b>CH<sub>4</sub> Emissions (tons/yr)</b>
Berth Operations	Boiler	0.2974	30170.29	4.1603
Berth Operations	Aux Generator	0.0974	11009.4314	1.4517

**Mitigated Emissions with AMP - Year 2025**

**AMP Reduction            40%**

Berth Operations	Boiler	0.2974	30170.29	4.1603
Berth Operations	Aux Generator	0.0584	6605.66	0.8710

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Mit.GHG.2040-1. 2040 Proposed Project Main Engines Average Daily Mitigated GHG Emissions.

Ship	Direction	Mode	Distance (nautical miles)	Ship speed (knots)	Activity (hours)	Maximum Speed (knots)	Load Factor	MCR (kW)	Energy (kW-hr)	Annual Shipcalls (vessels/yr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
VLCC	North In	Cruising - CW to VSR	22	12	1.83	16.9	0.358	25,400	16,671	69.0	0.0058	588.00	0.0811	0.0067	676.37	0.0933
		Cruising - VSR to PZ	21	12	1.75	16.9	0.358	25,400	15,913	69.0	0.0058	588.00	0.0811	0.0064	645.63	0.0890
		Cruising - PZ to Pilot	4.7	7	0.67	16.9	0.071	25,400	1,212	69.0	0.0058	588.00	0.0811	0.0005	49.17	0.0068
		Maneuvering - Pilot to Berth		3	1.00	16.9	0.006	25,400	142	69.0	0.0064	647.00	0.0895	0.0001	6.34	0.0009
		<b>TOTAL</b>								<b>0.0238</b>	<b>2411.00</b>	<b>0.3328</b>	<b>0.0136</b>	<b>1377.51</b>	<b>0.1900</b>	
	North Out	Maneuvering - Berth to Pilot		5	1.00	16.9	0.026	25,400	658	69.0	0.0064	647.00	0.0895	0.0003	29.37	0.0041
		Cruising - Pilot to PZ	3.8	7	0.54	16.9	0.071	25,400	980	69.0	0.0058	588.00	0.0811	0.0004	39.75	0.0055
		Cruising - PZ to VSR	21	12	1.75	16.9	0.358	25,400	15,913	69.0	0.0058	588.00	0.0811	0.0064	645.63	0.0890
		Cruising - VSR to CW	22	12	1.83	16.9	0.358	25,400	16,671	69.0	0.0058	588.00	0.0811	0.0067	676.37	0.0933
		<b>TOTAL</b>								<b>0.0238</b>	<b>2411.00</b>	<b>0.3328</b>	<b>0.0137</b>	<b>1391.12</b>	<b>0.1919</b>	
AFRAMAX	South In	Cruising - CW to VSR	23	12	1.92	16.1	0.414	12,477	9,902	36.0	0.0058	588.00	0.0811	0.0021	209.61	0.0289
		Cruising - VSR to PZ	11	12	0.92	16.1	0.414	12,477	4,736	36.0	0.0058	588.00	0.0811	0.0010	100.25	0.0138
		Cruising - PZ to Pilot	4.7	7	0.67	16.1	0.082	12,477	689	36.0	0.0058	588.00	0.0811	0.0001	14.57	0.0020
		Maneuvering - Pilot to Berth		3	1.00	16.1	0.006	12,477	81	36.0	0.0064	647.00	0.0895	0.0000	1.88	0.0003
		<b>TOTAL</b>								<b>0.0238</b>	<b>2411.00</b>	<b>0.3328</b>	<b>0.0032</b>	<b>326.31</b>	<b>0.0450</b>	
	South Out	Maneuvering - Berth to Pilot		5	1.00	16.1	0.030	12,477	374	36.0	0.0064	647.00	0.0895	0.0001	8.70	0.0012
		Cruising - Pilot to PZ	3.5	7	0.50	16.1	0.082	12,477	513	36.0	0.0058	588.00	0.0811	0.0001	10.85	0.0015
		Cruising - PZ to VSR	12.5	12	1.04	16.1	0.414	12,477	5,382	36.0	0.0058	588.00	0.0811	0.0011	113.92	0.0157
		Cruising - VSR to CW	24.5	12	2.04	16.1	0.414	12,477	10,548	36.0	0.0058	588.00	0.0811	0.0022	223.28	0.0308
		<b>TOTAL</b>								<b>0.0238</b>	<b>2411.00</b>	<b>0.3328</b>	<b>0.0035</b>	<b>356.75</b>	<b>0.0492</b>	
PANAMAX	South In	Cruising - CW to VSR	23	12	1.92	15.8	0.438	10,300	8,649	18	0.0058	588.00	0.0811	0.0009	91.54	0.0126
		Cruising - VSR to PZ	11	12	0.92	15.8	0.438	10,300	4,136	18	0.0058	588.00	0.0811	0.0004	43.78	0.0060
		Cruising - PZ to Pilot	4.7	7	0.67	15.8	0.087	10,300	601	18	0.0058	588.00	0.0811	0.0001	6.37	0.0009
		Maneuvering - Pilot to Berth		3	1.00	15.8	0.007	10,300	71	18	0.0064	647.00	0.0895	0.0000	0.82	0.0001
		<b>TOTAL</b>								<b>0.0238</b>	<b>2411.00</b>	<b>0.3328</b>	<b>0.0014</b>	<b>142.50</b>	<b>0.0197</b>	
	South Out	Maneuvering - Berth to Pilot		5	1.00	15.8	0.032	10,300	326	18	0.0064	647.00	0.0895	0.0000	3.80	0.0005
		Cruising - Pilot to PZ	3.5	7	0.50	15.8	0.087	10,300	448	18	0.0058	588.00	0.0811	0.0000	4.74	0.0007
		Cruising - PZ to VSR	12.5	12	1.04	15.8	0.438	10,300	4,700	18	0.0058	588.00	0.0811	0.0005	49.75	0.0069
		Cruising - VSR to CW	24.5	12	2.04	15.8	0.438	10,300	9,213	18	0.0058	588.00	0.0811	0.0010	97.51	0.0134
		<b>TOTAL</b>								<b>0.0238</b>	<b>2411.00</b>	<b>0.3328</b>	<b>0.0015</b>	<b>155.80</b>	<b>0.0215</b>	
SUEZMAX	North In	Cruising - CW to VSR	22	12	1.83	17	0.352	16,000	10,317	78	0.0058	588.00	0.0811	0.0047	473.18	0.0653
		Cruising - VSR to PZ	21	12	1.75	17	0.352	16,000	9,848	78	0.0058	588.00	0.0811	0.0045	451.68	0.0623
		Cruising - PZ to Pilot	4.7	7	0.67	17	0.070	16,000	750	78	0.0058	588.00	0.0811	0.0003	34.40	0.0047
		Maneuvering - Pilot to Berth		3	1.00	17	0.005	16,000	88	78	0.0064	647.00	0.0895	0.0000	4.44	0.0006
		<b>TOTAL</b>								<b>0.0238</b>	<b>2411.00</b>	<b>0.3328</b>	<b>0.0095</b>	<b>963.70</b>	<b>0.1329</b>	
	North Out	Maneuvering - Berth to Pilot		5	1.00	17	0.025	16,000	407	78	0.0064	647.00	0.0895	0.0002	20.54	0.0028
		Cruising - Pilot to PZ	3.8	7	0.54	17	0.070	16,000	606	78	0.0058	588.00	0.0811	0.0003	27.81	0.0038
		Cruising - PZ to VSR	21	12	1.75	17	0.352	16,000	9,848	78	0.0058	588.00	0.0811	0.0045	451.68	0.0623
		Cruising - VSR to CW	22	12	1.83	17	0.352	16,000	10,317	78	0.0058	588.00	0.0811	0.0047	473.18	0.0653
		<b>TOTAL</b>								<b>0.0238</b>	<b>2411.00</b>	<b>0.3328</b>	<b>0.0096</b>	<b>973.22</b>	<b>0.1342</b>	
<b>GRAND</b>																
<b>TOTAL</b>											<b>0.1904</b>	<b>19288.00</b>	<b>2.6624</b>	<b>0.0561</b>	<b>5686.90</b>	<b>0.7844</b>



Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Mit.GHG.2040-2. 2040 Proposed Project Auxiliary Generator Average Daily Mitigated GHG Emissions.

Ship	Direction	Mode	Activity (hours)	MCR (kW)	Load Factor	Energy (kW-hr)	Annual Shipcalls (vessels/yr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
VLCC	North In	Cruising	4.25	3,600	0.280	4,289	69.0	0.0068	690.00	0.0952	0.0020	204.19	0.0282
		Maneuvering	2.00	3,600	0.280	2,016	69.0	0.0068	690.00	0.0952	0.0009	95.98	0.0132
	North Out	Maneuvering	1.50	3,600	0.280	1,512	69.0	0.0068	690.00	0.0952	0.0007	71.99	0.0099
		Cruising	4.13	3,600	0.280	4,159	69.0	0.0068	690.00	0.0952	0.0020	198.02	0.0273
<b>TOTAL</b>							<b>0.0136</b>	<b>1380.00</b>	<b>0.1904</b>	<b>0.0030</b>	<b>300.17</b>	<b>0.0414</b>	
AFRAMAX	South In	Cruising	3.50	3,600	0.280	3,533	36.0	0.0068	690.00	0.0952	0.0009	87.75	0.0121
		Maneuvering	2.00	3,600	0.280	2,016	36.0	0.0068	690.00	0.0952	0.0005	50.08	0.0069
	South Out	Maneuvering	1.50	3,600	0.278	1,501	36.0	0.0068	690.00	0.0952	0.0004	37.29	0.0051
		Cruising	3.58	3,600	0.278	3,586	36.0	0.0068	690.00	0.0952	0.0009	89.08	0.0123
	<b>TOTAL</b>							<b>0.0136</b>	<b>1380.00</b>	<b>0.1904</b>	<b>0.0014</b>	<b>137.83</b>	<b>0.0190</b>
	<b>TOTAL</b>							<b>0.0136</b>	<b>1380.00</b>	<b>0.1904</b>	<b>0.0012</b>	<b>126.37</b>	<b>0.0174</b>
PANAMAX	South In	Cruising	3.50	3,600	0.28	3,533	18	0.0068	690.00	0.0952	0.0004	43.88	0.0061
		Maneuvering	2.00	3,600	0.28	2,016	18	0.0068	690.00	0.0952	0.0002	25.04	0.0035
	South Out	Maneuvering	1.5	3,600	0.28	1,512	18	0.0068	690.00	0.0952	0.0002	18.78	0.0026
		Cruising	3.58	3,600	0.28	3,612	18	0.0068	690.00	0.0952	0.0004	44.86	0.0062
<b>TOTAL</b>							<b>0.0136</b>	<b>1380.00</b>	<b>0.1904</b>	<b>0.0006</b>	<b>63.64</b>	<b>0.0088</b>	
SUEZMAX	North In	Cruising	4.25	3,600	0.28	4,289	78	0.0068	690.00	0.0952	0.0023	230.82	0.0318
		Maneuvering	2.00	3,600	0.28	2,016	78	0.0068	690.00	0.0952	0.0011	108.50	0.0150
	North Out	Maneuvering	1.5	3,600	0.28	1,512	78	0.0068	690.00	0.0952	0.0008	81.38	0.0112
		Cruising	4.13	3,600	0.28	4,159	78	0.0068	690.00	0.0952	0.0022	223.85	0.0309
<b>TOTAL</b>							<b>0.0136</b>	<b>1380.00</b>	<b>0.1904</b>	<b>0.0030</b>	<b>305.22</b>	<b>0.0421</b>	
<b>GRAND TOTAL</b>								<b>0.1088</b>	<b>11040.00</b>	<b>1.5232</b>	<b>0.0159</b>	<b>1611.49</b>	<b>0.2223</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Mit.GHG.2040-3. 2040 Proposed Project Summary of Average Daily Mitigated Vessel GHG Emissions.

Mode	Equipment	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
Cruising	Main Engines	0.0553	5611.00	0.7739
Cruising	Aux Generator	0.0111	1122.46	0.1549
Maneuvering	Main Engines	0.0008	75.90	0.0105
Maneuvering	Aux Generator	0.0048	489.03	0.0675
<b>Maneuvering</b>	<b>TOTAL</b>	<b>0.0056</b>	<b>564.93</b>	<b>0.0780</b>
<b>Propulsion</b>	<b>TOTAL</b>	<b>0.0720</b>	<b>7298.39</b>	<b>1.0067</b>

Mode	Equipment	N <sub>2</sub> O Emissions (tons/day)	CO <sub>2</sub> Emissions (tons/day)	CH <sub>4</sub> Emissions (tons/day)
Cruising	Main Engines	1.52E-04	1.54E+01	2.12E-03
Cruising	Aux Generator	3.03E-05	3.08E+00	4.24E-04
Maneuvering	Main Engines	2.06E-06	2.08E-01	2.88E-05
Maneuvering	Aux Generator	1.32E-05	1.34E+00	1.85E-04
<b>Maneuvering</b>	<b>TOTAL</b>	<b>1.53E-05</b>	<b>1.55E+00</b>	<b>2.14E-04</b>
<b>Propulsion</b>	<b>TOTAL</b>	<b>1.97E-04</b>	<b>2.00E+01</b>	<b>2.76E-03</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Mit.GHG.2040-4. 2040 Proposed Project Boiler Warm-Up Average Daily Mitigated GHG Emissions.

Shipcalls (vessels/yr)	Vessel Size	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded )	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	Fuel Consumption (gal/yr)	N <sub>2</sub> O Emission Factor (lb/ton)	CO <sub>2</sub> Emission Factor (lb/ton)	CH <sub>4</sub> Emission Factor (lb/ton)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
36.0	Aframax	0.20	102.17	30%	3	50,000	73,467	0.0068	690.00	0.0952	0.0007	73.39	0.0101
69.0	VLCC	0.20	80.38	30%	3	90,000	199,398	0.0068	690.00	0.0952	0.0020	199.18	0.0275
18	Panamax	0.20	59.91	30%	3	35,000	12,564	0.0068	690.00	0.0952	0.0001	12.55	0.0017
78	Suezmax	0.20	82.85	30%	3	70,000	150,586	0.0068	690.00	0.0952	0.0015	150.42	0.0208
<b>TOTAL</b>								<b>0.0272</b>	<b>2,760.00</b>	<b>0.3808</b>	<b>0.0043</b>	<b>435.54</b>	<b>0.0601</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Mit.GHG.2040-5. 2040 Proposed Project Summary of Boiler Warm-Up Average Daily Mitigated GHG Emissions.

Mode	Equipment	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
Boiler Warm-up	Boiler	0.0043	435.54	0.0601

Table H.2.PP.Mit.GHG.2040-6. 2040 Proposed Project Berth Operations Average Daily Mitigated GHG Emissions.

Auxiliary Generator Pre-Pumpin

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	Energy (MMBtu)	Heating Value (MMBtu/1000 gal)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
36.0	Aframax	700,000	0.20	3,600	28%	2.5	8.6	150	0.0064	722.0	0.0952	0.0021	233.93	0.0308
69.0	VLCC	2,000,000	0.20	3,600	28%	2.5	8.6	150	0.0064	722.0	0.0952	0.0039	448.36	0.0591
18.0	Panamax	350,000	0.20	3,600	28%	2.5	8.6	150	0.0064	722.0	0.0952	0.0010	116.96	0.0154
78.0	Suezmax	1,000,000	0.20	3,600	28%	2.5	8.6	150	0.0064	722.0	0.0952	0.0045	506.84	0.0668
<b>TOTAL</b>												<b>0.0115</b>	<b>1306.10</b>	<b>0.1722</b>

Boiler Pre-Pumpin

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	Fuel Consumption (gal/yr)	N <sub>2</sub> O Emission Factor (lb/ton)	CO <sub>2</sub> Emission Factor (lb/ton)	CH <sub>4</sub> Emission Factor (lb/ton)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
36.0	Aframax	700,000	0.20	102.17	30%	2.5	50,000	61,223	0.0627	6,360.0	0.8770	0.0056	563.70	0.0777
69.0	VLCC	2,000,000	0.20	80.38	30%	2.5	90,000	166,165	0.0627	6,360.0	0.8770	0.0151	1529.94	0.2110
18.0	Panamax	350,000	0.20	59.91	30%	2.5	35,000	12,564	0.0627	6,360.0	0.8770	0.0011	115.68	0.0160
78.0	Suezmax	1,000,000	0.20	82.85	30%	2.5	70,000	150,586	0.0627	6,360.0	0.8770	0.0137	1386.50	0.1912
<b>TOTAL</b>												<b>0.0354</b>	<b>3595.83</b>	<b>0.4958</b>

Auxiliary Generator Pumpin

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	Energy (MMBtu)	Heating Value (MMBtu/1000 gal)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
36.0	Aframax	700,000	0.20	3,600	56%	15.0	103.2	140	0.0064	722.0	0.0952	0.0123	1403.57	0.1851
69.0	VLCC	2,000,000	0.20	3,600	56%	23.2	159.6	140	0.0064	722.0	0.0952	0.0369	4160.80	0.5486
18.0	Panamax	350,000	0.20	3,600	56%	11.0	75.7	140	0.0064	722.0	0.0952	0.0046	514.64	0.0679
78.0	Suezmax	1,000,000	0.20	3,600	56%	15.3	105.2	140	0.0064	722.0	0.0952	0.0275	3101.89	0.4090
<b>TOTAL</b>												<b>0.0813</b>	<b>9180.89</b>	<b>1.2106</b>

Boiler Pumpin

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Inerting Fuel Consumption Savings (lb/1000 bbl offloaded)	Activity Time (hr)	Pumping Rate (bbl/hr)	Fuel Consumption (gal/yr)	N <sub>2</sub> O Emission Factor (lb/ton)	CO <sub>2</sub> Emission Factor (lb/ton)	CH <sub>4</sub> Emission Factor (lb/ton)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
36.0	Aframax	700,000	0.20	102.17	28.06	15.0	50,000	367,337	0.0627	6,360.0	0.8770	0.0333	3382.20	0.4664
69.0	VLCC	2,000,000	0.20	80.38	28.06	23.2	90,000	1,542,012	0.0627	6,360.0	0.8770	0.1400	14197.86	1.9578
18.0	Panamax	350,000	0.20	59.91	28.06	11.0	35,000	55,283	0.0627	6,360.0	0.8770	0.0050	509.01	0.0702
78.0	Suezmax	1,000,000	0.20	82.85	28.06	15.3	70,000	921,588	0.0627	6,360.0	0.8770	0.0837	8485.39	1.1701
<b>TOTAL</b>												<b>0.2620</b>	<b>26574.47</b>	<b>3.6644</b>

Auxiliary Generator Post-Pumpin

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	Energy (MMBtu)	Heating Value (MMBtu/1000 gal)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
36.0	Aframax	700,000	0.20	3,600	28%	1.0	3.4	150	0.0064	722.0	0.0952	0.0008	93.57	0.0123
69.0	VLCC	2,000,000	0.20	3,600	28%	1.0	3.4	150	0.0064	722.0	0.0952	0.0016	179.34	0.0236
18.0	Panamax	350,000	0.20	3,600	28%	1.0	3.4	150	0.0064	722.0	0.0952	0.0004	46.79	0.0062
78.0	Suezmax	1,000,000	0.20	3,600	28%	1.0	3.4	150	0.0064	722.0	0.0952	0.0018	202.74	0.0267
<b>TOTAL</b>												<b>0.0046</b>	<b>522.44</b>	<b>0.0689</b>

**Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR**

**Table H.2.PP.Mit.GHG.2040-7. 2040 Proposed Project Summary of Berth Operations Average Daily Mitigated GHG Emissions.**

**No AMP**

<b>Mode</b>	<b>Equipment</b>	<b>N<sub>2</sub>O Emissions (tons/yr)</b>	<b>CO<sub>2</sub> Emissions (tons/yr)</b>	<b>CH<sub>4</sub> Emissions (tons/yr)</b>
Berth Operations	Boiler	0.2974	30170.29	4.1603
Berth Operations	Aux Generator	0.0974	11009.43	1.4517

**Mitigated Emissions with AMP - Year 2040**

AMP Reduction            70%

Berth Operations	Boiler	0.2974	30170.29	4.1603
Berth Operations	Aux Generator	0.0292	3302.83	0.4355

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.NFA/NPA.BP.GHG.2010-1. 2010 No Federal Action/No Project Alternative Main Engines Average Daily GHG Emissions (BP).

Ship	Direction	Mode	Distance (nautical miles)	Ship speed (knots)	Activity (hours)	Maximum Speed (knots)	Load Factor	MCR (kW)	Energy (kW-hr)	Shipcalls (vessels/ yr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
AFRAMAX	South In	Cruising - CW to VSR	23	12	1.92	16.1	0.414	12,477	9,902	29	0.0058	588.00	0.0811	0.0017	168.85	0.0233
		Cruising - VSR to PZ	11	12	0.92	16.1	0.414	12,477	4,736	29	0.0058	588.00	0.0811	0.0008	80.75	0.0111
		Cruising - PZ to Pilot	4.7	7	0.67	16.1	0.082	12,477	689	29	0.0058	588.00	0.0811	0.0001	11.74	0.0016
		Maneuvering - Pilot to Berth		3	1.00	16.1	0.006	12,477	81	29	0.0064	647.00	0.0895	0.0000	1.51	0.0002
	South Out	Maneuvering - Berth to Pilot		5	1.00	16.1	0.030	12,477	374	29	0.0064	647.00	0.0895	0.0001	7.01	0.0010
		Cruising - Pilot to PZ	3.5	7	0.50	16.1	0.082	12,477	513	29	0.0058	588.00	0.0811	0.0001	8.74	0.0012
		Cruising - PZ to VSR	12.5	12	1.04	16.1	0.414	12,477	5,382	29	0.0058	588.00	0.0811	0.0009	91.77	0.0127
		Cruising - VSR to CW	24.5	12	2.04	16.1	0.414	12,477	10,548	29	0.0058	588.00	0.0811	0.0018	179.86	0.0248
<b>TOTAL</b>											<b>0</b>	<b>4,822</b>	<b>1</b>	<b>0.0054</b>	<b>550.24</b>	<b>0.0759</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.NFA/NPA.BP.GHG.2010-2. 2010 No Federal Action/No Project Alternative Auxiliary Generator Average Daily Unmitigated Emissions (BP).

Ship	Direction	Mode	Activity (hours)	MCR (kW)	Load Factor	Energy (kW-hr)	Shipcalls (vessels/yr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
AFRAMAX	South In	Cruising	3.50	3,600	0.28	3,533	29	0.0068	690.00	0.0952	0.0007	70.6913	0.0098
		Maneuvering	2.00	3,600	0.28	2,016	29	0.0068	690.00	0.0952	0.0004	40.3402	0.0056
	South Out	Maneuvering	1.5	3,600	0.28	1,512	29	0.0068	690.00	0.0952	0.0003	30.2551	0.0042
		Cruising	3.50	3,600	0.28	3,528	29	0.0068	690.00	0.0952	0.0007	70.5953	0.0097
<b>TOTAL</b>								<b>0</b>	<b>2,760</b>	<b>0</b>	<b>0.0021</b>	<b>211.88</b>	<b>0.0292</b>



Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.NFA/NPA.BP.GHG.2010-3. 2010 No Federal Action/No Project Alternative Boiler Warm-Up Average Daily GHG Emissions (BP).

Shipcalls (vessels/yr)	Vessel Size	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	Fuel Consumption (gal/yr)	N <sub>2</sub> O Emission Factor (lb/ton)	CO <sub>2</sub> Emission Factor (lb/ton)	CH <sub>4</sub> Emission Factor (lb/ton)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
29.0	Aframax	0.20	102.17	30%	3	50,000	59,180	0.0068	690.00	0.0952	0.00058	59.11531	0.00816
<b>TOTAL</b>								<b>0</b>	<b>690</b>	<b>0</b>	<b>0.00058</b>	<b>59.12</b>	<b>0.0082</b>

Table H.2.NFA/NPA.BP.GHG.2010-4. 2010 No Federal Action/No Project Alternative Berth Operations Average Daily GHG Emissions (BP).

Auxiliary Generator Pre-Pumping

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
29.0	Aframax	400,000	0.20	3,600	28%	2.5	0.0064	722.0	0.0952	0.00166	188.44	0.0248

AMP Reduction 0%

**TOTAL** 0 722 0 0.00166 188.44 0.0248

Boiler Pre-Pumping

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	Fuel Consumption (gal/yr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
29.0	Aframax	400,000	0.20	102.17	30%	2.5	50,000	49,316	0.0627	6,360.0	0.8770	0.00448	454.07	0.06261

**TOTAL** 0.0627 6,360.00 0.8770 0.00448 454.07 0.0626

Auxiliary Generator Pumping

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
29.0	Aframax	400,000	0.20	3,600	56%	15.0	0.0064	722.00	0.0952	0.0100	1,130.6520	0.1491

AMP Reduction 0%

**TOTAL** 0.0064 722.00 0.0952 0.0100 1,130.65 0.1491

Boiler Pumping

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Inerting Fuel Consumption Savings (lb/1000 bbl offloaded)	Activity Time (hr)	Pumping Rate (bbl/hr)	Fuel Consumption (gal/yr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
29.0	Aframax	400,000	0.20	102.17	28.06	15.0	50,000	295,898	0.0627	6,360.00	0.8770	0.0269	2,724.44	0.3757

**TOTAL** 0 6,360 1 0.0269 2,724.44 0.3757

Auxiliary Generator Post-Pumping

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
29.0	Aframax	400,000	0.20	3,600	28%	1.0	0.0064	722.00	0.0952	0.00067	75.37680	0.00994

AMP Reduction 0%

**TOTAL** 0.0064 722.00 0.0952 0.00067 75.38 0.0099

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.NFA/NPA.BP.GHG.2010-5.

2010 No Federal Action/No Project Alternative Summary of Berth Operations Average Daily GHG Emissions (BP).

Mode	Equipment	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
Cruising	Main Engines	0.0053	541.7133	0.0747
Cruising	Aux Generator	0.0014	141.2866	0.0195
Maneuvering	Main Engines	0.0001	8.5266	0.0012
Maneuvering	Aux Generator	0.0007	70.5953	0.0097
Boiler Warm-up	Boiler	0.0006	59.1153	0.0082
Berth Operations	Boiler	0.0313	3178.5186	0.4383
Berth Operations	Aux Generator	0.0123	1394.4708	0.1839
Propulsion	TOTAL	0.0075	762.12	0.1051
Non-Propulsion	TOTAL	0.0443	4632.10	0.6303
<b>Total Emissions</b>		<b>0.0518</b>	<b>5394.23</b>	<b>0.7355</b>

Mode	Equipment	N <sub>2</sub> O Emissions (tons/day)	CO <sub>2</sub> Emissions (tons/day)	CH <sub>4</sub> Emissions (tons/day)
Cruising	Main Engines	0.0000	1.48	0.0002
Cruising	Aux Generator	0.0000	0.39	0.0001
Maneuvering	Main Engines	0.0000	0.02	0.0000
Maneuvering	Aux Generator	0.0000	0.19	0.0000
Boiler Warm-up	Boiler	0.0000	0.16	0.0000
Berth Operations	Boiler	0.0001	8.71	0.0012
Berth Operations	Aux Generator	0.0000	3.82	0.0005
Propulsion	TOTAL	0.0000	2.09	0.0003
Non-Propulsion	TOTAL	0.0001	12.69	0.0017
<b>Total Emissions</b>		<b>0.0001</b>	<b>14.78</b>	<b>0.0020</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.NFA/NPA.BP.GHG.2010-6. 2010 No Federal Action/No Project Alternative Tug Main Engines Average Daily GHG Emissions (BP)

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Energy (kWh)	Energy (MMBtu)	Shipcalls (vessels/yr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
AFRAMAX	Maneuvering - Pilot to Berth	1.00	2	4,800	0.50	2400	8.2	29.0	0.00636	645.0	0.0890	0.0004	44.8920	0.0062
	Maneuvering - Berth to Pilot	1.00	2	4,800	0.50	2400	8.2	29.0	0.00636	645.0	0.0890	0.0004	44.8920	0.0062
TOTAL												0.0009	89.7840	0.0124

**Table H.2.NFA/NPA.BP.GHG.2010-7. 2010 No Federal Action/No Project Alternative Tug Auxiliary Generator Engines Average Daily Unmitigated Emissions (BP).**

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Energy (kWh)	Energy (MMBtu)	Shipcalls (vessels/yr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
AFRAMAX	Maneuvering - Pilot to Berth	1.00	2	300	1.00	300	1.0	29.0	0.0068	690.0	0.0952	0.00006	6.00300	0.00083
	Maneuvering - Berth to Pilot	1.00	2	300	1.00	300	1.0	29.0	0.0068	690.0	0.0952	0.00006	6.00300	0.00083
<b>TOTAL</b>												<b>0.00012</b>	<b>12.01</b>	<b>0.00166</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

**Table H.2.NFA/NPA.BP.GHG.2010-8.**

**2010 No Federal Action/No Project Alternative Summary of Tug Average Daily GHG Emissions (BP)**

<b>Mode</b>	<b>Equipment</b>	<b>N<sub>2</sub>O Emissions (tons/yr)</b>	<b>CO<sub>2</sub> Emissions (tons/yr)</b>	<b>CH<sub>4</sub> Emissions (tons/yr)</b>
Tug Assist	Main Engines	0.0009	89.7840	0.0124
Tug Assist	Aux Generator	0.00012	12.00600	0.00166
<b>TOTAL</b>		<b>0.0010</b>	<b>101.79</b>	<b>0.0140</b>

<b>Mode</b>	<b>Equipment</b>	<b>N<sub>2</sub>O Emissions (tons/day)</b>	<b>CO<sub>2</sub> Emissions (tons/day)</b>	<b>CH<sub>4</sub> Emissions (tons/day)</b>
Tug Assist	Main Engines	2.43E-06	2.46E-01	3.39E-05
Tug Assist	Aux Generator	3.24E-07	3.29E-02	4.54E-06
<b>TOTAL</b>		<b>2.75E-06</b>	<b>2.79E-01</b>	<b>3.85E-05</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.NFA/NPA.BP.GHG.2010-9. 2010 No Federal Action/No Project Alternative VDU Crude Average Daily GHG Emissions (BP).

	Annual Vessel Calls	crude vapors from tanks(scf/call)	annual gas usage (mmscf/yr)	mw crude vapors	destruction efficiency
Aframax	29	224000	6.5	50	98%
<b>TOTAL</b>	<b>29</b>		<b>6.5</b>		

Assumed Distribution based on tank storage volume:	
Site 1	12.5%
Site 2	87.5%

Annual Average (tons/yr)

	N <sub>2</sub> O	CO <sub>2</sub>	CH <sub>4</sub>
EF (kg/MMBtu)	0.0001	52.78	0.0059
Aframax	0.0007	349.72	0.0391
<b>TOTAL</b>	<b>0.0007</b>	<b>349.7161</b>	<b>0.0391</b>

Annual Average (tons/yr)

	N <sub>2</sub> O	CO <sub>2</sub>	CH <sub>4</sub>
Site 1	0.0001	43.71	0.00
Site 2	0.0006	306.0	0.0

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.NFA/NPA.BP.GHG.2010-10. 2010 No Federal Action/No Project Alternative VDU Legs Average Daily GHG Emissions (BP).

	tanks	crude vapors from tanks on legs(scf/yr)	annual gas usage (mmscf/yr)	mw crude vapors	destruction efficiency
Site 1	4	8640000	34.6	50	98%
Site 2	14	8640000	121.0	50	98%
<b>TOTAL</b>	<b>18</b>		<b>155.5</b>		

48	hr/event
6	events/yr
500	ft3/min

Annual Average (tons/yr)

	N <sub>2</sub> O	CO <sub>2</sub>	CH <sub>4</sub>
EF (kg/MMBtu)	0.0001	52.78	0.0059
<b>TOTAL</b>	<b>0.016</b>	<b>8372.513</b>	<b>0.936</b>

*Assumed a ratio of 500/1000 based on the corresponding Btu values with respect to natural gas combustion emission factors.*

Annual Average (tons/yr)

	N <sub>2</sub> O	CO <sub>2</sub>	CH <sub>4</sub>
Site 1	0.0035	1860.6	0.2
Site 2	0.012	6512.0	0.7



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**Table H.2.NFA/NPA.BP.GHG.2010-11.**

**2010 No Federal Action/No Project Alternative VDU Average Daily GHG Emissions (BP).**

Annual Average (tons/yr)

	<b>N<sub>2</sub>O</b>	<b>CO<sub>2</sub></b>	<b>CH<sub>4</sub></b>
Site 1	0.004	1904	0.21
Site 2	0.013	6818	0.76
<b>Total</b>	<b>0.017</b>	<b>8,722</b>	<b>0.98</b>

Daily Average (tons/day)

	<b>N<sub>2</sub>O</b>	<b>CO<sub>2</sub></b>	<b>CH<sub>4</sub></b>
Site 1	9.88E-06	5.217	5.83E-04
Site 2	3.54E-05	18.679	2.09E-03
<b>Total</b>	<b>4.53E-05</b>	<b>24</b>	<b>2.67E-03</b>

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Table H.2.NFA/NPA.BP.GHG.2010-12. 2010 No Federal Action/No Project Alternative BP Berth Summary.

Operation	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)	CO <sub>2</sub> e Emissions (tons/yr)
Tanker Cruising and Manuevering	0.0075	762.12	0.1051	766.66
Tanker Hoteling	0.0123	1,394.47	0.1839	1402.16
Offloading Emissions	0.0313	3,178.52	0.4383	3197.44
Transiting Operations	0.0006	59.12	0.0082	59.47
Tug Assistance	0.0010	101.79	0.0140	102.40
Tanks	---	---	---	---
Vapor Destruction Units	0.0165	8,722.23	0.9750	8747.83
Valves, Flanges, Pumps	---	---	---	---
<b>TOTAL</b>	<b>0.0693</b>	<b>14,218.25</b>	<b>1.7245</b>	<b>14275.95</b>

Operation	N <sub>2</sub> O Emissions (tons/day)	CO <sub>2</sub> Emissions (tons/day)	CH <sub>4</sub> Emissions (tons/day)	CO <sub>2</sub> e Emissions (tons/day)
Tanker Cruising and Manuevering	2.06E-05	2.09	2.88E-04	2.10
Tanker Hoteling	3.38E-05	3.82	5.04E-04	3.84
Offloading Emissions	8.59E-05	8.71	1.20E-03	8.76
Transiting Operations	1.60E-06	0.16	2.23E-05	0.16
Tug Assistance	2.75E-06	0.28	3.85E-05	0.28
Tanks	---	---	---	---
Vapor Destruction Units	4.53E-05	23.90	2.67E-03	23.97
Valves, Flanges, Pumps	---	---	---	---
<b>TOTAL</b>	<b>1.90E-04</b>	<b>38.95</b>	<b>4.72E-03</b>	<b>39.11</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.NFA/NPA.Ts.GHG.2010-1. 2010 No Federal Action/No Project Alternative Main Engines Average Daily GHG Emissions (Tesoro).

Ship	Direction	Mode	Distance (nautical miles)	Ship speed (knots)	Activity (hours)	Maximum Speed (knots)	Load Factor	MCR (kW)	Energy (kW-hr)	Shipcalls (vessels/ yr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
AFRAMAX	South In	Cruising - CW to VSR	23	12	1.92	16.1	0.414	12,477	9,902	75	0.0058	588.00	0.0811	0.0043	436.68	0.0602
		Cruising - VSR to PZ	11	12	0.92	16.1	0.414	12,477	4,736	75	0.0058	588.00	0.0811	0.0021	208.85	0.0288
		Cruising - PZ to Pilot	4.7	7	0.67	16.1	0.082	12,477	689	75	0.0058	588.00	0.0811	0.0003	30.36	0.0042
	South Out	Maneuvering - Pilot to Berth	3	1.00	16.1	0.006	12,477	81	75	0.0064	647.00	0.0895	0.0000	3.92	0.0005	
		Maneuvering - Berth to Pilot	5	1.00	16.1	0.030	12,477	374	75	0.0064	647.00	0.0895	0.0002	18.13	0.0025	
		Cruising - Pilot to PZ	3.5	7	0.50	16.1	0.082	12,477	513	75	0.0058	588.00	0.0811	0.0002	22.61	0.0031
		Cruising - PZ to VSR	12.5	12	1.04	16.1	0.414	12,477	5,382	75	0.0058	588.00	0.0811	0.0023	237.33	0.0327
		Cruising - VSR to CW	24.5	12	2.04	16.1	0.414	12,477	10,548	75	0.0058	588.00	0.0811	0.0046	465.16	0.0642
		<b>TOTAL</b>											<b>0</b>	<b>4,822</b>	<b>1</b>	<b>0.0140</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.NFA/NPA.Ts.GHG.2010-2. 2010 No Federal Action/No Project Alternative Auxiliary Generator Average Daily Unmitigated Emissions (Tesoro).

Ship	Direction	Mode	Activity (hours)	MCR (kW)	Load Factor	Energy (kW-hr)	Shipcalls (vessels/yr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
AFRAMAX	South In	Cruising	3.50	3,600	0.28	3,533	75	0.0068	690.00	0.0952	0.0018	182.8224	0.0252
		Maneuvering	2.00	3,600	0.28	2,016	75	0.0068	690.00	0.0952	0.0010	104.3280	0.0144
	South Out	Maneuvering	1.5	3,600	0.28	1,512	75	0.0068	690.00	0.0952	0.0008	78.2460	0.0108
		Cruising	3.50	3,600	0.28	3,528	75	0.0068	690.00	0.0952	0.0018	182.5740	0.0252
<b>TOTAL</b>								<b>0</b>	<b>2,760</b>	<b>0</b>	<b>0.0054</b>	<b>547.97</b>	<b>0.0756</b>

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Table H.2.NFA/NPA.Ts.GHG.2010-3. 2010 No Federal Action/No Project Alternative Boiler Warm-Up Average Daily GHG Emissions (Tesoro).

Shipcalls (vessels/yr)	Vessel Size	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	Fuel Consumption (gal/yr)	N <sub>2</sub> O Emission Factor (lb/ton)	CO <sub>2</sub> Emission Factor (lb/ton)	CH <sub>4</sub> Emission Factor (lb/ton)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
75.0	Aframax	0.20	102.17	30%	3	50,000	153,051	0.0068	690.00	0.0952	0.00151	152.88441	0.02109
TOTAL								0	690	0	0.00151	152.88	0.0211

Table H.2.NFA/NPA.Ts.GHG.2010-4. 2010 No Federal Action/No Project Alternative Berth Operations Average Daily GHG Emissions (Tesoro).

**Auxiliary Generator Pre-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
75.0	Aframax	400,000	0.20	3,600	28%	2.5	0.0064	722.00	0.0952	0.00429	487.35	0.0643

AMP Reduction 0%

TOTAL 0.0064 722.00 0.0952 0.00429 487.35 0.0643

**Boiler Pre-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	Fuel Consumption (gal/yr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
75.0	Aframax	400,000	0.20	102.17	30%	2.5	50,000	127542.44	0.0627	6,360.0	0.8770	0.01158	1,174.33	0.16193

TOTAL 0.0627 6,360.00 0.8770 0.01158 1,174.33 0.1619

**Auxiliary Generator Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
75.0	Aframax	400,000	0.20	3,600	56%	15.0	0.0064	722.00	0.0952	0.0259	2,924.1000	0.3856

AMP Reduction 0%

TOTAL 0.0064 722.00 0.0952 0.0259 2,924.10 0.3856

**Boiler Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Inerting Fuel Consumption Savings (lb/1000 bbl offloaded)	Activity Time (hr)	Pumping Rate (bbl/hr)	Fuel Consumption (gal/yr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
75.0	Aframax	400,000	0.20	102.17	28.06	15.0	50,000	765254.66	0.0627	6,360.00	0.8770	0.0695	7,045.98	0.9716

TOTAL 0 6,360 1 0.0695 7,045.98 0.9716

**Auxiliary Generator Post-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
75.0	Aframax	400,000	0.20	3,600	28%	1.0	0.0064	722.00	0.0952	0.00173	194.94000	0.02570

AMP Reduction 0%

TOTAL 0.0064 722.00 0.0952 0.00173 194.94 0.0257

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Table H.2.NFA/NPA.Ts.GHG.2010-5.

2010 No Federal Action/No Project Alternative Summary of Berth Operations Average Daily GHG Emissions (Tesoro).

Mode	Equipment	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
Cruising	Main Engines	0.0138	1400.98	0.1932
Cruising	Aux Generator	0.0036	365.40	0.0504
Maneuvering	Main Engines	0.0002	22.05	0.0031
Maneuvering	Aux Generator	0.0018	182.57	0.0252
Boiler Warm-up	Boiler	0.0015	152.88	0.0211
Berth Operations	Boiler	0.0810	8220.31	1.1335
Berth Operations	Aux Generator	0.0319	3606.39	0.4755
Propulsion	TOTAL	0.0194	1971.00	0.2719
Non-Propulsion	TOTAL	0.1145	11979.58	1.6301
<b>Total Emissions</b>		<b>0.1339</b>	<b>13950.59</b>	<b>1.9020</b>

Mode	Equipment	N <sub>2</sub> O Emissions (tons/day)	CO <sub>2</sub> Emissions (tons/day)	CH <sub>4</sub> Emissions (tons/day)
Cruising	Main Engines	3.79E-05	3.84	5.29E-04
Cruising	Aux Generator	9.87E-06	1.00	1.38E-04
Maneuvering	Main Engines	5.97E-07	0.06	8.36E-06
Maneuvering	Aux Generator	4.93E-06	0.50	6.90E-05
Boiler Warm-up	Boiler	4.13E-06	0.42	5.78E-05
Berth Operations	Boiler	2.22E-04	22.52	3.11E-03
Berth Operations	Aux Generator	8.75E-05	9.88	1.30E-03
Propulsion	TOTAL	5.33E-05	5.40	7.45E-04
Non-Propulsion	TOTAL	3.14E-04	32.82	4.47E-03
<b>Total Emissions</b>		<b>3.67E-04</b>	<b>38.22</b>	<b>5.21E-03</b>

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Table H.2.NFA/NPA.Ts.GHG.2010-6. 2010 No Federal Action/No Project Alternative Tug Main Engines Average Daily GHG Emissions (Tesoro).

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Energy (kWh)	Energy (MMBtu)	Shipcalls (vessels/yr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
AFRAMAX	Maneuvering - Pilot to Berth	1.00	2	4,800	0.50	2400	8.2	75.0	0.00636	645.0	0.0890	0.0011	116.1000	0.0160
	Maneuvering - Berth to Pilot	1.00	2	4,800	0.50	2400	8.2	75.0	0.00636	645.0	0.0890	0.0011	116.1000	0.0160
TOTAL												0.0023	232.2000	0.0320



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Table H.2.NFA/NPA.Ts.GHG.2010-7. 2010 No Federal Action/No Project Alternative Tug Auxiliary Generator Engines Average Daily Unmit Emissions (Tesoro).

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Energy (kWh)	Energy (MMBtu)	Shipcalls (vessels/yr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
AFRAMAX	Maneuvering - Pilot to Berth	1.00	2	300	1.00	300	1.0	75.0	0.0068	690.0	0.0952	0.00015	15.52500	0.00214
	Maneuvering - Berth to Pilot	1.00	2	300	1.00	300	1.0	75.0	0.0068	690.0	0.0952	0.00015	15.52500	0.00214
<b>TOTAL</b>												<b>0.00031</b>	<b>31.05</b>	<b>0.00428</b>

Table H.2.NFA/NPA.Ts.GHG.2010-8. 2010 No Federal Action/No Project Alternative Summary of Tug Average Daily GHG Emissions (Tesoro).

Mode	Equipment	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
Tug Assist	Main Engines	0.0023	232.2000	0.0320
Tug Assist	Aux Generator	0.00031	31.05000	0.00428
<b>TOTAL</b>		<b>0.0026</b>	<b>263.25</b>	<b>0.0363</b>

Mode	Equipment	N <sub>2</sub> O Emissions (tons/day)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
Tug Assist	Main Engines	6.27E-06	6.36E-01	8.78E-05
Tug Assist	Aux Generator	8.38E-07	8.51E-02	1.17E-05
<b>TOTAL</b>		<b>7.11E-06</b>	<b>7.21E-01</b>	<b>9.95E-05</b>

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Table H.2.NFA/NPA.Ts.GHG.2010-9. 2010 No Federal Action/No Project Alternative VDU Crude Average Daily GHG Emissions (Tesoro).

	Annual Vessel Calls	crude vapors from tanks(scf/call)	annual gas usage (mmscf/yr)	mw crude vapors	destruction efficiency
Aframax	75	224000	16.8	50	98%
<b>TOTAL</b>	<b>75</b>		<b>16.8</b>		

Assumed Distribution based on tank storage volume:  
 Site 1 12.5%  
 Site 2 87.5%

Annual Average (tons/yr)

	N <sub>2</sub> O	CO <sub>2</sub>	CH <sub>4</sub>
EF (kg/MMBtu)	0.0001	52.78	0.0059
Aframax	0.0017	904.44	0.1011
<b>TOTAL</b>	<b>0.0017</b>	<b>904.4381</b>	<b>0.1011</b>

Annual Average (tons/yr)

	N <sub>2</sub> O	CO <sub>2</sub>	CH <sub>4</sub>
Site 1	0.0002	113.05	0.01
Site 2	0.0015	791.4	0.1

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Table H.2.NFA/NPA.Ts.GHG.2010-10. 2010 No Federal Action/No Project Alternative VDU Legs Average Daily GHG Emissions (Tesoro).

	tanks	crude vapors from tanks on legs(scf/yr)	annual gas usage (mmscf/yr)	mw crude vapors	destruction efficiency
Site 1	4	8640000	34.6	50	98%
Site 2	14	8640000	121.0	50	98%
<b>TOTAL</b>	<b>18</b>		<b>155.5</b>		

48	hr/event
6	events/yr
500	ft3/min

Annual Average (tons/yr)

	N <sub>2</sub> O	CO <sub>2</sub>	CH <sub>4</sub>
EF (kg/MMBtu)	0.0001	52.78	0.0059
<b>TOTAL</b>	<b>0.016</b>	<b>8372.513</b>	<b>0.936</b>

*Assumed a ratio of 500/1000 based on the corresponding Btu values with respect to natural gas combustion emission factors.*

Annual Average (tons/yr)

	N <sub>2</sub> O	CO <sub>2</sub>	CH <sub>4</sub>
Site 1	0.0035	1860.6	0.2
Site 2	0.012	6512.0	0.7

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Table H.2.NFA/NPA.Ts.GHG.2010-11. 2010 No Federal Action/No Project Alternative VDU Average Daily GHG Emissions (Tesoro).

Annual Average (tons/yr)

	<b>N<sub>2</sub>O</b>	<b>CO<sub>2</sub></b>	<b>CH<sub>4</sub></b>
Site 1	0.004	1974	0.22
Site 2	0.014	7303	0.82
<b>Total</b>	<b>0.018</b>	<b>9,277</b>	<b>1.04</b>

Daily Average (tons/day)

	<b>N<sub>2</sub>O</b>	<b>CO<sub>2</sub></b>	<b>CH<sub>4</sub></b>
Site 1	1.02E-05	5.407	6.04E-04
Site 2	3.79E-05	20.009	2.24E-03
<b>Total</b>	<b>4.82E-05</b>	<b>25</b>	<b>2.84E-03</b>

**Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR**

**Table H.2.NFA/NPA.Ts.GHG.2010-12. 2010 No Federal Action/No Project Alternative Tesoro Berth Summary.**

<b>Operation</b>	<b>N<sub>2</sub>O Emissions (tons/yr)</b>	<b>CO<sub>2</sub> Emissions (tons/yr)</b>	<b>CH<sub>4</sub> Emissions (tons/yr)</b>	<b>CO<sub>2</sub>e Emissions (tons/yr)</b>
Tanker Cruising and Manuevering	0.0194	1,971.00	0.2719	1982.74
Tanker Hoteling	0.0319	3,606.39	0.4755	3626.28
Offloading Emissions	0.0810	8,220.31	1.1335	8269.23
Transiting Operations	0.0015	152.88	0.0211	153.79
Tug Assistance	0.0026	263.25	0.0363	264.82
Tanks	---	---	---	---
Vapor Destruction Units	0.0176	9,276.95	1.0370	9304.18
Valves, Flanges, Pumps	---	---	---	---
<b>TOTAL</b>	<b>0.1541</b>	<b>23,490.79</b>	<b>2.9754</b>	<b>23601.04</b>

<b>Operation</b>	<b>N<sub>2</sub>O Emissions (tons/day)</b>	<b>CO<sub>2</sub> Emissions (tons/day)</b>	<b>CH<sub>4</sub> Emissions (tons/day)</b>	<b>CO<sub>2</sub>e Emissions (tons/day)</b>
Tanker Cruising and Manuevering	5.33E-05	5.40	7.45E-04	5.43
Tanker Hoteling	8.75E-05	9.88	1.30E-03	9.94
Offloading Emissions	2.22E-04	22.52	3.11E-03	22.66
Transiting Operations	4.13E-06	0.42	5.78E-05	0.42
Tug Assistance	7.11E-06	0.72	9.95E-05	0.73
Tanks	---	---	---	---
Vapor Destruction Units	4.82E-05	25.42	2.84E-03	25.49
Valves, Flanges, Pumps	---	---	---	---
<b>TOTAL</b>	<b>4.22E-04</b>	<b>64.36</b>	<b>8.15E-03</b>	<b>64.66</b>

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Table H.2.NFA/NPA.Ex.GHG.2010-1. 2010 No Federal Action/No Project Alternative Main Engines Average Daily GHG Emissions (Exxon Mobil).

Ship	Direction	Mode	Distance (nautical miles)	Ship speed (knots)	Activity (hours)	Maximum Speed (knots)	Load Factor	MCR (kW)	Energy (kW-hr)	Energy (MMBtu)	Shipcalls (vessels/ yr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
PANAMAX	South In	Cruising - CW to VSR	23	12	1.92	15.8	0.438	10,300	8,649	30	125	0.0058	588.00	0.0811	0.0063	635.69	0.0877
		Cruising - VSR to PZ	11	12	0.92	15.8	0.438	10,300	4,136	14	125	0.0058	588.00	0.0811	0.0030	304.02	0.0419
		Cruising - PZ to Pilot	4.7	7	0.67	15.8	0.087	10,300	601	2	125	0.0058	588.00	0.0811	0.0004	44.20	0.0061
		Maneuvering - Pilot to Berth		3	1.00	15.8	0.007	10,300	71	0	125	0.0064	647.00	0.0895	0.0001	5.70	0.0008
PANAMAX	South Out	Maneuvering - Berth to Pilot		5	1.00	15.8	0.032	10,300	326	1	125	0.0064	647.00	0.0895	0.0003	26.40	0.0037
		Cruising - Pilot to PZ	3.5	7	0.50	15.8	0.087	10,300	448	2	125	0.0058	588.00	0.0811	0.0003	32.92	0.0045
		Cruising - PZ to VSR	12.5	12	1.04	15.8	0.438	10,300	4,700	16	125	0.0058	588.00	0.0811	0.0034	345.48	0.0477
		Cruising - VSR to CW	24.5	12	2.04	15.8	0.438	10,300	9,213	31	125	0.0058	588.00	0.0811	0.0067	677.15	0.0934
<b>TOTAL</b>															<b>0.0204</b>	<b>2071.56</b>	<b>0.2857</b>

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Table H.2.NFA/NPA.Ex.GHG.2010-2. 2010 No Federal Action/No Project Alternative Auxiliary Generator Average Daily Unmitigated Emissions (Exxon Mobil).

Ship	Direction	Mode	Activity (hours)	MCR (kW)	Load Factor	Energy (kW-hr)	Energy (MMBtu)	Shipcalls (vessels/yr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
PANAMAX	South In	Cruising	3.50	3,600	0.28	3,528	12	125	0.0068	690.00	0.0952	0.0030	304.29	0.0420
		Maneuvering	2.00	3,600	0.28	2,016	7	125	0.0068	690.00	0.0952	0.0017	173.88	0.0240
PANAMAX	South Out	Maneuvering	1.5	3,600	0.28	1,512	5	125	0.0068	690.00	0.0952	0.0013	130.41	0.0180
		Cruising	3.58	3,600	0.28	3,609	12	125	0.0068	690.00	0.0952	0.0031	311.25	0.0429
<b>TOTAL</b>												<b>0.0091</b>	<b>919.83</b>	<b>0.1269</b>



Table H.2.NFA/NPA.Ex.GHG.2010-3. 2010 No Federal Action/No Project Alternative Boiler Warm-Up Average Daily GHG Emissions (Exxon Mobil).

Shipcalls (vessels/yr)	Vessel Size	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	Fuel Consumption (gal/yr)	N <sub>2</sub> O Emission Factor (lb/ton)	CO <sub>2</sub> Emission Factor (lb/ton)	CH <sub>4</sub> Emission Factor (lb/ton)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
125.0	Panamax	0.20	59.91	30%	3	35,000	104,703	0.0068	690.00	0.0952	0.00103	104.59	0.0144
TOTAL											0.00103	104.59	0.0144

Table H.2.NFA/NPA.Ex.GHG.2010-4. 2010 No Federal Action/No Project Alternative Berth Operations Average Daily GHG Emissions (Exxon Mobil)

**Auxiliary Generator Pre-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	Energy (MMBtu)	Heating Value (MMBtu/1000 gal)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
125.0	Panamax	300,000	0.20	3,600	28%	2.5	8.6	150	0.0064	722.0	0.0952	0.0071	812.25	0.1071
TOTAL												0.0071	812.25	0.1071

**Boiler Pre-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bb/hr)	Fuel Consumption (gal/yr)	N <sub>2</sub> O Emission Factor (lb/ton)	CO <sub>2</sub> Emission Factor (lb/ton)	CH <sub>4</sub> Emission Factor (lb/ton)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
125.0	Panamax	300,000	0.20	59.91	30%	2.5	35,000	87,252	0.0627	6,360.0	0.8770	0.0079	803.36	0.1108
TOTAL												0.0079	803.36	0.1108

**Auxiliary Generator Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	Energy (MMBtu)	Heating Value (MMBtu/1000 gal)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
125.0	Panamax	300,000	0.20	3,600	56%	11.0	75.7	140	0.0064	722.0	0.0952	0.0317	3573.90	0.4712
TOTAL												0.0317	3573.90	0.4712

**Boiler Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Inerting Fuel Consumption Savings (lb/1000 bbl offloaded)	Activity Time (hr)	Pumping Rate (bb/hr)	Fuel Consumption (gal/yr)	N <sub>2</sub> O Emission Factor (lb/ton)	CO <sub>2</sub> Emission Factor (lb/ton)	CH <sub>4</sub> Emission Factor (lb/ton)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
125.0	Panamax	300,000	0.20	59.91	28.06	11.0	35,000	383,911	0.0627	6,360.0	0.8770	0.0348	3534.80	0.4874
TOTAL												0.0348	3534.80	0.4874

**Auxiliary Generator Post-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	Energy (MMBtu)	Heating Value (MMBtu/1000 gal)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
125.0	Panamax	300,000	0.20	3,600	28%	1.0	3.4	150	0.0064	722.0	0.0952	0.0029	324.90	0.0428
TOTAL												0.0029	324.90	0.0428

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Table H.2.NFA/NPA.Ex.GHG.2010-5.

2010 No Federal Action/No Project Alternative Summary of Berth Operations Average Daily GHG Emissions (Exxon Mobil).

Mode	Equipment	N <sub>2</sub> O	CO <sub>2</sub>	CH <sub>4</sub>
		Emissions (tons/yr)	Emissions (tons/yr)	Emissions (tons/yr)
Cruising	Main Engines	2.01E-02	2039.46	2.81E-01
Cruising	Aux Generator	6.07E-03	615.54	8.49E-02
Maneuvering	Main Engines	3.17E-04	32.10	4.44E-03
Maneuvering	Aux Generator	3.00E-03	304.29	4.20E-02
Boiler Warm-up	Boiler	1.03E-03	104.59	1.44E-02
Berth Operations	Boiler	4.28E-02	4338.17	5.98E-01
Berth Operations	Aux Generator	4.17E-02	4711.05	6.21E-01
Propulsion	TOTAL	2.95E-02	2991.39	4.13E-01
Non-Propulsion	TOTAL	0.09	9153.81	1.23
<b>Total Emissions</b>		<b>1.15E-01</b>	<b>12145.19</b>	<b>1.65E+00</b>

Mode	Equipment	N <sub>2</sub> O	CO <sub>2</sub>	CH <sub>4</sub>
		Emissions (tons/day)	Emissions (tons/day)	Emissions (tons/day)
Cruising	Main Engines	5.51E-05	5.59	7.71E-04
Cruising	Aux Generator	1.66E-05	1.69	2.33E-04
Maneuvering	Main Engines	8.69E-07	0.09	1.22E-05
Maneuvering	Aux Generator	8.22E-06	0.83	1.15E-04
Boiler Warm-up	Boiler	2.82E-06	0.29	3.95E-05
Berth Operations	Boiler	1.17E-04	11.89	1.64E-03
Berth Operations	Aux Generator	1.14E-04	12.91	1.70E-03
Propulsion	TOTAL	8.08E-05	8.20	1.13E-03
Non-Propulsion	TOTAL	2.34E-04	25.08	3.38E-03
<b>Total Emissions</b>		<b>3.15E-04</b>	<b>33.27</b>	<b>4.51E-03</b>

Table H.2.NFA/NPA.Ex.GHG.2010-6. 2010 No Federal Action/No Project Alternative Tug Main Engines Average Daily GHG Emissions (Exxon Mobil).

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Energy (kWh)	Energy (MMBtu)	Shipcalls (vessels/yr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
PANAMAX	Maneuvering - Pilot to Berth	1.00	2	4,800	0.50	2400	8.2	125.0	0.00636	645.0	0.0890	0.0019	193.50	0.0267
	Maneuvering - Berth to Pilot	1.00	2	4,800	0.50	2400	8.2	125.0	0.00636	645.0	0.0890	0.0019	193.50	0.0267
TOTAL												0.0038	387.00	0.0534

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Table H.2.NFA/NPA.Ex.GHG.2010-7. 2010 No Federal Action/No Project Alternative Tug Auxiliary Generator Engines Average Daily Unmitigated Emissions (Exxon Mobil).

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Energy (kWh)	Energy (MMBtu)	Shipcalls (vessels/yr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
PANAMAX	Maneuvering - Pilot to Berth	1.00	2	300	1.00	300	1.0	125.0	0.0068	690.0	0.0952	0.00026	25.87500	0.0036
	Maneuvering - Berth to Pilot	1.00	2	300	1.00	300	1.0	125.0	0.0068	690.0	0.0952	0.00026	25.87500	0.0036
TOTAL												0.00051	51.75	0.0071

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Table H.2.NFA/NPA.Ex.GHG.2010-8.

2010 No Federal Action/No Project Alternative Summary of Tug Average Daily GHG Emissions (Exxon Mobil).

Mode	Equipment	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
Tug Assist	Main Engines	0.0038	387.00	0.0534
Tug Assist	Aux Generator	0.00051	51.75	0.0071
<b>TOTAL</b>		<b>0.0043</b>	<b>438.75</b>	<b>0.0605</b>

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Table H.2.NFA/NPA.Ex.GHG.2010-9. 2010 No Federal Action/No Project Alternative VDU Crude Average Daily GHG Emissions (Exxon Mobil).

	Annual Vessel Calls	crude vapors from tanks(scf/call)	annual gas usage (mmscf/yr)	mw crude vapors	destruction efficiency
Aframax	125	224000	28.0	50	98%
<b>TOTAL</b>	<b>125</b>		<b>28.0</b>		

<b>Assumed Distribution based on tank storage volume:</b>	
<b>Site 1</b>	<b>12.5%</b>
<b>Site 2</b>	<b>87.5%</b>

Annual Average (tons/yr)

	N <sub>2</sub> O	CO <sub>2</sub>	CH <sub>4</sub>
EF (kg/MMBtu)	0.0001	52.78	0.0059
Aframax	0.0029	1507.40	0.1685
<b>TOTAL</b>	<b>0.0029</b>	<b>1507.3968</b>	<b>0.1685</b>

Annual Average (tons/yr)

	N <sub>2</sub> O	CO <sub>2</sub>	CH <sub>4</sub>
Site 1	0.0004	188.42	0.02
Site 2	0.0025	1319.0	0.1

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Table H.2.NFA/NPA.Ex.GHG.2010-10. 2010 No Federal Action/No Project Alternative VDU Legs Average Daily GHG Emissions (Exxon Mobil).

	tanks	crude vapors from tanks on legs(scf/yr)	annual gas usage (mmscf/yr)	mw crude vapors	destruction efficiency
Site 1	4	8640000	34.6	50	98%
Site 2	14	8640000	121.0	50	98%
<b>TOTAL</b>	<b>18</b>		<b>155.5</b>		

48	hr/event
6	events/yr
500	ft3/min

Annual Average (tons/yr)

	N <sub>2</sub> O	CO <sub>2</sub>	CH <sub>4</sub>
EF (kg/MMBtu)	0.0001	52.78	0.0059
<b>TOTAL</b>	<b>0.016</b>	<b>8372.513</b>	<b>0.936</b>

*Assumed a ratio of 500/1000 based on the corresponding Btu values with respect to natural gas combustion emission factors.*

Annual Average (tons/yr)

	N <sub>2</sub> O	CO <sub>2</sub>	CH <sub>4</sub>
Site 1	0.0035	1860.6	0.2
Site 2	0.012	6512.0	0.7



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Table H.2.NFA/NPA.Ex.GHG.2010-11. 2010 No Federal Action/No Project Alternative VDU Average Daily GHG Emissions (Exxon Mobil).

Annual Average (tons/yr)

	<b>N<sub>2</sub>O</b>	<b>CO<sub>2</sub></b>	<b>CH<sub>4</sub></b>
Site 1	0.004	2049	0.23
Site 2	0.015	7831	0.88
<b>Total</b>	<b>0.019</b>	<b>9,880</b>	<b>1.10</b>

Daily Average (tons/day)

	<b>N<sub>2</sub>O</b>	<b>CO<sub>2</sub></b>	<b>CH<sub>4</sub></b>
Site 1	1.06E-05	5.614	6.28E-04
Site 2	4.06E-05	21.455	2.40E-03
<b>Total</b>	<b>5.13E-05</b>	<b>27</b>	<b>3.03E-03</b>

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Table H.2.NFA/NPA.Ex.GHG.2010-12. 2010 No Federal Action/No Project Alternative Exxon Mobil Berth Summary.

Operation	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)	CO <sub>2</sub> e Emissions (tons/yr)
Tanker Cruising and Maneuvering	0.0295	2,991.39	0.4126	3009.20
Tanker Hoteling	0.0417	4,711.05	0.6212	4737.02
Offloading Emissions	0.0428	4,338.17	0.5982	4363.99
Transiting Operations	0.0010	104.59	0.0144	105.21
Tug Assistance	0.0043	438.75	0.0605	441.36
Tanks	---	---	---	---
Vapor Destruction Units	0.0187	9,879.91	1.1044	9908.91
Valves, Flanges, Pumps	---	---	---	---
<b>TOTAL</b>	<b>0.1380</b>	<b>22,463.85</b>	<b>2.8114</b>	<b>22565.69</b>

Operation	N <sub>2</sub> O Emissions (tons/day)	CO <sub>2</sub> Emissions (tons/day)	CH <sub>4</sub> Emissions (tons/day)	CO <sub>2</sub> e Emissions (tons/day)
Tanker Cruising and Maneuvering	8.08E-05	8.20	1.13E-03	8.24
Tanker Hoteling	1.14E-04	12.91	1.70E-03	12.98
Offloading Emissions	1.17E-04	11.89	1.64E-03	11.96
Transiting Operations	2.82E-06	0.29	3.95E-05	0.29
Tug Assistance	1.19E-05	1.20	1.66E-04	1.21
Tanks	---	---	---	---
Vapor Destruction Units	5.13E-05	27.07	3.03E-03	27.15
Valves, Flanges, Pumps	---	---	---	---
<b>TOTAL</b>	<b>3.78E-04</b>	<b>61.54</b>	<b>7.70E-03</b>	<b>61.82</b>

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Table H.2.NFA/NPA.BP.GHG.2015-1. 2015 No Federal Action/No Project Alternative Main Engines Average Daily GHG Emissions (BP).

Ship	Direction	Mode	Distance (nautical miles)	Ship speed (knots)	Activity (hours)	Maximum Speed (knots)	Load Factor	MCR (kW)	Energy (kW-hr)	Shipcalls (vessels/ yr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
AFRAMAX	South In	Cruising - CW to VSR	23	12	1.92	16.1	0.414	12,477	9,902	34	0.0058	588.00	0.0811	0.0020	197.96	0.0273
		Cruising - VSR to PZ	11	12	0.92	16.1	0.414	12,477	4,736	34	0.0058	588.00	0.0811	0.0009	94.68	0.0131
		Cruising - PZ to Pilot	4.7	7	0.67	16.1	0.082	12,477	689	34	0.0058	588.00	0.0811	0.0001	13.77	0.0019
	South Out	Maneuvering - Pilot to Berth	3	1.00	16.1	0.006	12,477	81	34	0.0064	647.00	0.0895	0.0000	1.78	0.0002	
		Maneuvering - Berth to Pilot	5	1.00	16.1	0.030	12,477	374	34	0.0064	647.00	0.0895	0.0001	8.22	0.0011	
		Cruising - Pilot to PZ	3.5	7	0.50	16.1	0.082	12,477	513	34	0.0058	588.00	0.0811	0.0001	10.25	0.0014
		Cruising - PZ to VSR	12.5	12	1.04	16.1	0.414	12,477	5,382	34	0.0058	588.00	0.0811	0.0011	107.59	0.0148
		Cruising - VSR to CW	24.5	12	2.04	16.1	0.414	12,477	10,548	34	0.0058	588.00	0.0811	0.0021	210.87	0.0291
		<b>TOTAL</b>											<b>0</b>	<b>4,822</b>	<b>1</b>	<b>0.0064</b>

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Table H.2.NFA/NPA.BP.GHG.2015-2. 2015 No Federal Action/No Project Alternative Auxiliary Generator Average Daily Unmitigated Emissions (BP).

Ship	Direction	Mode	Activity (hours)	MCR (kW)	Load Factor	Energy (kW-hr)	Shipcalls (vessels/yr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
AFRAMAX	South In	Cruising	3.50	3,600	0.28	3,533	34	0.0068	690.00	0.0952	0.0008	82.8795	0.0114
		Maneuvering	2.00	3,600	0.28	2,016	34	0.0068	690.00	0.0952	0.0005	47.2954	0.0065
	South Out	Maneuvering	1.5	3,600	0.28	1,512	34	0.0068	690.00	0.0952	0.0003	35.4715	0.0049
		Cruising	3.50	3,600	0.28	3,528	34	0.0068	690.00	0.0952	0.0008	82.7669	0.0114
<b>TOTAL</b>								<b>0</b>	<b>2,760</b>	<b>0</b>	<b>0.0024</b>	<b>248.41</b>	<b>0.0343</b>

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Table H.2.NFA/NPA.BP.GHG.2015-3. 2015 No Federal Action/No Project Alternative Boiler Warm-Up Average Daily GHG Emissions (BP).

Shipcalls (vessels/yr)	Vessel Size	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	Fuel Consumption (gal/yr)	N <sub>2</sub> O Emission Factor (lb/ton)	CO <sub>2</sub> Emission Factor (lb/ton)	CH <sub>4</sub> Emission Factor (lb/ton)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
34.0	Aframax	0.20	102.17	30%	3	50,000	69,383	0.0068	690.00	0.0952	0.00068	69.30760	0.00956
TOTAL								0	690	0	0.00068	69.31	0.0096

Table H.2.NFA/NPA.BP.GHG.2015-4. 2015 No Federal Action/No Project Alternative Berth Operations Average Daily GHG Emissions (BP).

**Auxiliary Generator Pre-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
34.0	Aframax	400,000	0.20	3,600	28%	2.5	0.0064	722.0	0.0952	0.00194	220.93	0.0291

AMP Reduction 0%

TOTAL 0 722 0 0.00194 220.93 0.0291

**Boiler Pre-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	Fuel Consumption (gal/yr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
34.0	Aframax	400,000	0.20	102.17	30%	2.5	50,000	57,819	0.0627	6,360.0	0.8770	0.00525	532.36	0.07341

TOTAL 0.0627 6,360.00 0.8770 0.00525 532.36 0.0734

**Auxiliary Generator Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
34.0	Aframax	400,000	0.20	3,600	56%	15.0	0.0064	722.00	0.0952	0.0118	1,325.5920	0.1748

AMP Reduction 0%

TOTAL 0.0064 722.00 0.0952 0.0118 1,325.59 0.1748

**Boiler Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Inerting Fuel Consumption Savings (lb/1000 bbl offloaded)	Activity Time (hr)	Pumping Rate (bbl/hr)	Fuel Consumption (gal/yr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
34.0	Aframax	400,000	0.20	102.17	28.06	15.0	50,000	346,915	0.0627	6,360.00	0.8770	0.0315	3,194.18	0.4405

TOTAL 0 6,360 1 0.0315 3,194.18 0.4405

**Auxiliary Generator Post-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
34.0	Aframax	400,000	0.20	3,600	28%	1.0	0.0064	722.00	0.0952	0.00078	88.37280	0.01165

AMP Reduction 0%

TOTAL 0.0064 722.00 0.0952 0.00078 88.37 0.0117

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

**Table H.2.NFA/NPA.BP.GHG.2015-5.  
2015 No Federal Action/No Project Alternative Summary of Berth Operations Average Daily GHG Emissions (BP).**

Mode	Equipment	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
Cruising	Main Engines	0.0063	635.1122	0.0876
Cruising	Aux Generator	0.0016	165.6464	0.0229
Maneuvering	Main Engines	0.0001	9.9968	0.0014
Maneuvering	Aux Generator	0.0008	82.7669	0.0114
Boiler Warm-up	Boiler	0.0007	69.3076	0.0096
Berth Operations	Boiler	0.0367	3726.5391	0.5139
Berth Operations	Aux Generator	0.0145	1634.8968	0.2156
Propulsion	TOTAL	0.0088	893.52	0.1233
Non-Propulsion	TOTAL	0.0519	5430.74	0.7390
<b>Total Emissions</b>		<b>0.0607</b>	<b>6324.27</b>	<b>0.8623</b>

Mode	Equipment	N <sub>2</sub> O Emissions (tons/day)	CO <sub>2</sub> Emissions (tons/day)	CH <sub>4</sub> Emissions (tons/day)
Cruising	Main Engines	0.0000	1.74	0.0002
Cruising	Aux Generator	0.0000	0.45	0.0001
Maneuvering	Main Engines	0.0000	0.03	0.0000
Maneuvering	Aux Generator	0.0000	0.23	0.0000
Boiler Warm-up	Boiler	0.0000	0.19	0.0000
Berth Operations	Boiler	0.0001	10.21	0.0014
Berth Operations	Aux Generator	0.0000	4.48	0.0006
Propulsion	TOTAL	0.0000	2.45	0.0003
Non-Propulsion	TOTAL	0.0001	14.88	0.0020
<b>Total Emissions</b>		<b>0.0002</b>	<b>17.33</b>	<b>0.0024</b>

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Table H.2.NFA/NPA.BP.GHG.2015-6. 2015 No Federal Action/No Project Alternative Tug Main Engines Average Daily GHG Emissions (BP).

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Energy (kWh)	Energy (MMBtu)	Shipcalls (vessels/yr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
AFRAMAX	Maneuvering - Pilot to Berth	1.00	2	4,800	0.50	2400	8.2	34.0	0.00636	645.0	0.0890	0.0005	52.6320	0.0073
	Maneuvering - Berth to Pilot	1.00	2	4,800	0.50	2400	8.2	34.0	0.00636	645.0	0.0890	0.0005	52.6320	0.0073
TOTAL												0.0010	105.2640	0.0145



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Table H.2.NFA/NPA.BP.GHG.2015-7. 2015 No Federal Action/No Project Alternative Tug Auxiliary Generator Engines Average Daily Unmitigated Emissions (BP).

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Energy (kWh)	Energy (MMBtu)	Shipcalls (vessels/yr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
AFRAMAX	Maneuvering - Pilot to Berth	1.00	2	300	1.00	300	1.0	34.0	0.0068	690.0	0.0952	0.00007	7.03800	0.00097
	Maneuvering - Berth to Pilot	1.00	2	300	1.00	300	1.0	34.0	0.0068	690.0	0.0952	0.00007	7.03800	0.00097
TOTAL												0.00014	14.08	0.00194

Table H.2.NFA/NPA.BP.GHG.2015-8. 2015 No Federal Action/No Project Alternative Summary of Tug Average Daily GHG Emissions (BP).

Mode	Equipment	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
Tug Assist	Main Engines	0.0010	105.2640	0.0145
Tug Assist	Aux Generator	0.00014	14.07600	0.00194
<b>TOTAL</b>		<b>0.0012</b>	<b>119.34</b>	<b>0.0165</b>

Mode	Equipment	N <sub>2</sub> O Emissions (tons/day)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
Tug Assist	Main Engines	2.84E-06	2.88E-01	3.98E-05
Tug Assist	Aux Generator	3.80E-07	3.86E-02	5.32E-06
<b>TOTAL</b>		<b>3.22E-06</b>	<b>3.27E-01</b>	<b>4.51E-05</b>

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Table H.2.NFA/NPA.BP.GHG.2015-9. 2015 No Federal Action/No Project Alternative VDU Crude Average Daily GHG Emissions (BP).

	Annual Vessel Calls	crude vapors from tanks(scf/call)	annual gas usage (mmscf/yr)	mw crude vapors	destruction efficiency
Aframax	34	224000	7.6	50	98%
<b>TOTAL</b>	<b>34</b>		<b>7.6</b>		

Assumed Distribution based on tank storage volume:	
Site 1	12.5%
Site 2	87.5%

Annual Average (tons/yr)

	N <sub>2</sub> O	CO <sub>2</sub>	CH <sub>4</sub>
EF (kg/MMBtu)	0.0001	52.78	0.0059
Aframax	0.0008	410.01	0.0458
<b>TOTAL</b>	<b>0.0008</b>	<b>410.0119</b>	<b>0.0458</b>

Annual Average (tons/yr)

	N <sub>2</sub> O	CO <sub>2</sub>	CH <sub>4</sub>
Site 1	0.0001	51.25	0.01
Site 2	0.0007	358.8	0.0

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Table H.2.NFA/NPA.BP.GHG.2015-10. 2015 No Federal Action/No Project Alternative VDU Legs Average Daily GHG Emissions (BP).

	tanks	crude vapors from tanks on legs(scf/yr)	annual gas usage (mmscf/yr)	mw crude vapors	destruction efficiency
Site 1	4	8640000	34.6	50	98%
Site 2	14	8640000	121.0	50	98%
<b>TOTAL</b>	<b>18</b>		<b>155.5</b>		

48	hr/event
6	events/yr
500	ft3/min

Annual Average (tons/yr)

	N <sub>2</sub> O	CO <sub>2</sub>	CH <sub>4</sub>
EF (kg/MMBtu)	0.0001	52.78	0.0059
TOTAL	0.016	8372.513	0.936

*Assumed a ratio of 500/1000 based on the corresponding Btu values with respect to natural gas combustion emission factors.*

Annual Average (tons/yr)

	N <sub>2</sub> O	CO <sub>2</sub>	CH <sub>4</sub>
Site 1	0.0035	1860.6	0.2
Site 2	0.012	6512.0	0.7

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Table H.2.NFA/NPA.BP.GHG.2015-11. 2015 No Federal Action/No Project Alternative VDU Average Daily GHG Emissions (BP).

Annual Average (tons/yr)

	<b>N<sub>2</sub>O</b>	<b>CO<sub>2</sub></b>	<b>CH<sub>4</sub></b>
Site 1	0.004	1912	0.21
Site 2	0.013	6871	0.77
<b>Total</b>	<b>0.017</b>	<b>8,783</b>	<b>0.98</b>

Daily Average (tons/day)

	<b>N<sub>2</sub>O</b>	<b>CO<sub>2</sub></b>	<b>CH<sub>4</sub></b>
Site 1	9.92E-06	5.238	5.86E-04
Site 2	3.57E-05	18.824	2.10E-03
<b>Total</b>	<b>4.56E-05</b>	<b>24</b>	<b>2.69E-03</b>

**Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR**

**Table H.2.NFA/NPA.BP.GHG.2015-12. 2015 No Federal Action/No Project Alternative BP Berth Summary.**

<b>Operation</b>	<b>N<sub>2</sub>O Emissions (tons/yr)</b>	<b>CO<sub>2</sub> Emissions (tons/yr)</b>	<b>CH<sub>4</sub> Emissions (tons/yr)</b>	<b>CO<sub>2</sub>e Emissions (tons/yr)</b>
Tanker Cruising and Manuevering	0.0088	893.52	0.12	898.84
Tanker Hoteling	0.0145	1,634.90	0.22	1643.91
Offloading Emissions	0.0367	3,726.54	0.51	3748.72
Transiting Operations	0.0007	69.31	0.01	69.72
Tug Assistance	0.0012	119.34	0.02	120.05
Tanks	---	---	---	---
Vapor Destruction Units	0.0166	8,782.52	0.98	8808.30
Valves, Flanges, Pumps	---	---	---	---
<b>TOTAL</b>	<b>0.0785</b>	<b>15,226.13</b>	<b>1.86</b>	<b>15289.54</b>

<b>Operation</b>	<b>N<sub>2</sub>O Emissions (tons/day)</b>	<b>CO<sub>2</sub> Emissions (tons/day)</b>	<b>CH<sub>4</sub> Emissions (tons/day)</b>	<b>CO<sub>2</sub>e Emissions (tons/day)</b>
Tanker Cruising and Manuevering	2.41E-05	2.45	3.38E-04	2.46
Tanker Hoteling	3.97E-05	4.48	5.91E-04	4.50
Offloading Emissions	1.01E-04	10.21	1.41E-03	10.27
Transiting Operations	1.87E-06	0.19	2.62E-05	0.19
Tug Assistance	3.22E-06	0.33	4.51E-05	0.33
Tanks	---	---	---	---
Vapor Destruction Units	4.56E-05	24.06	2.69E-03	24.13
Valves, Flanges, Pumps	---	---	---	---
<b>TOTAL</b>	<b>2.15E-04</b>	<b>41.72</b>	<b>5.10E-03</b>	<b>41.89</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.NFA/NPA.Ts.GHG.2015-1. 2015 No Federal Action/No Project Alternative Main Engines Average Daily GHG Emissions (Tesoro).

Ship	Direction	Mode	Distance (nautical miles)	Ship speed (knots)	Activity (hours)	Maximum Speed (knots)	Load Factor	MCR (kW)	Energy (kW-hr)	Shipcalls (vessels/ yr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
AFRAMAX	South In	Cruising - CW to VSR	23	12	1.92	16.1	0.414	12,477	9,902	87	0.0058	588.00	0.0811	0.0050	506.55	0.0699
		Cruising - VSR to PZ	11	12	0.92	16.1	0.414	12,477	4,736	87	0.0058	588.00	0.0811	0.0024	242.26	0.0334
		Cruising - PZ to Pilot	4.7	7	0.67	16.1	0.082	12,477	689	87	0.0058	588.00	0.0811	0.0003	35.22	0.0049
		Maneuvering - Pilot to Berth		3	1.00	16.1	0.006	12,477	81	87	0.0064	647.00	0.0895	0.0000	4.54	0.0006
	South Out	Maneuvering - Berth to Pilot		5	1.00	16.1	0.030	12,477	374	87	0.0064	647.00	0.0895	0.0002	21.04	0.0029
		Cruising - Pilot to PZ	3.5	7	0.50	16.1	0.082	12,477	513	87	0.0058	588.00	0.0811	0.0003	26.23	0.0036
		Cruising - PZ to VSR	12.5	12	1.04	16.1	0.414	12,477	5,382	87	0.0058	588.00	0.0811	0.0027	275.30	0.0380
		Cruising - VSR to CW	24.5	12	2.04	16.1	0.414	12,477	10,548	87	0.0058	588.00	0.0811	0.0053	539.58	0.0744
<b>TOTAL</b>											<b>0</b>	<b>4,822</b>	<b>1</b>	<b>0.0163</b>	<b>1,650.72</b>	<b>0.2277</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.NFA/NPA.Ts.GHG.2015-2. 2015 No Federal Action/No Project Alternative Auxiliary Generator Average Daily Unmitigated Emissions (Tesoro).

Ship	Direction	Mode	Activity (hours)	MCR (kW)	Load Factor	Energy (kW-hr)	Fuel Type	Shipcalls (vessels/yr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
AFRAMAX	South In	Cruising	3.50	3,600	0.28	3,533	Dist at 0.2	87	0.0068	690.00	0.0952	0.0021	212.0740	0.0293
		Maneuvering	2.00	3,600	0.28	2,016	Dist at 0.2	87	0.0068	690.00	0.0952	0.0012	121.0205	0.0167
	South Out	Maneuvering	1.5	3,600	0.28	1,512	Dist at 0.2	87	0.0068	690.00	0.0952	0.0009	90.7654	0.0125
		Cruising	3.50	3,600	0.28	3,528	Dist at 0.2	87	0.0068	690.00	0.0952	0.0021	211.7858	0.0292
<b>TOTAL</b>									<b>0</b>	<b>2,760</b>	<b>0</b>	<b>0.0063</b>	<b>635.65</b>	<b>0.0877</b>



Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.NFA/NPA.Ts.GHG.2015-3. 2015 No Federal Action/No Project Alternative Boiler Warm-Up Average Daily GHG Emissions (Tesoro).

Shipcalls (vessels/yr)	Vessel Size	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	Fuel Consumption (gal/yr)	N <sub>2</sub> O Emission Factor (lb/ton)	CO <sub>2</sub> Emission Factor (lb/ton)	CH <sub>4</sub> Emission Factor (lb/ton)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
87.0	Aframax	0.20	102.17	30%	3	50,000	177,539	0.0068	690.00	0.0952	0.00175	177.34592	0.02447
TOTAL								0	690	0	0.00175	177.35	0.0245

Table H.2.NFA/NPA.Ts.GHG.2015-4. 2015 No Federal Action/No Project Alternative Berth Operations Average Daily GHG Emissions (Tesoro).

**Auxiliary Generator Pre-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
87.0	Aframax	400,000	Dist at 0.2	0.20	3,600	28%	2.5	0.0064	722.00	0.0952	0.00497	565.33	0.0745

AMP Reduction 0%

TOTAL 0.0064 722.00 0.0952 0.00497 565.33 0.0745

**Boiler Pre-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	Fuel Consumption (gal/yr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
87.0	Aframax	400,000	Dist at 0.2	0.20	102.17	30%	2.5	50,000	147949.23	0.0627	6,360.0	0.8770	0.01343	1,362.22	0.18784

TOTAL 0.0627 6,360.00 0.8770 0.01343 1,362.22 0.1878

**Auxiliary Generator Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
87.0	Aframax	400,000	Dist at 0.2	0.20	3,600	56%	15.0	0.0064	722.00	0.0952	0.0301	3,391.9560	0.4472

AMP Reduction 0%

TOTAL 0.0064 722.00 0.0952 0.0301 3,391.96 0.4472

**Boiler Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Inerting Fuel Consumption Savings (lb/1000 bbl offloaded)	Activity Time (hr)	Pumping Rate (bbl/hr)	Fuel Consumption (gal/yr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
87.0	Aframax	400,000	Dist at 0.2	0.20	102.17	28.06	15.0	50,000	887695.41	0.0627	6,360.00	0.8770	0.0806	8,173.33	1.1270

TOTAL 0 6,360 1 0.0806 8,173.33 1.1270

**Auxiliary Generator Post-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
87.0	Aframax	400,000	Dist at 0.2	0.20	3,600	28%	1.0	0.0064	722.00	0.0952	0.00200	226.13040	0.02982

TOTAL 0.0064 722.00 0.0952 0.00200 226.13 0.0298

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Table H.2.NFA/NPA.Ts.GHG.2015-5.

2015 No Federal Action/No Project Alternative Summary of Berth Operations Average Daily GHG Emissions (Tesoro).

Mode	Equipment	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
Cruising	Main Engines	0.0160	1625.1399	0.2241
Cruising	Aux Generator	0.0042	423.8598	0.0585
Maneuvering	Main Engines	0.0003	25.5799	0.0035
Maneuvering	Aux Generator	0.0021	211.7858	0.0292
Boiler Warm-up	Boiler	0.0017	177.3459	0.0245
Berth Operations	Boiler	0.0134	1362.2223	0.1878
Berth Operations	Aux Generator	0.0370	4183.4124	0.5516
Propulsion	TOTAL	0.0225	2286.37	0.3154
Non-Propulsion	TOTAL	0.0522	5722.98	0.7639
<b>Total Emissions</b>		<b>0.0748</b>	<b>8009.35</b>	<b>1.0793</b>

Mode	Equipment	N <sub>2</sub> O Emissions (tons/day)	CO <sub>2</sub> Emissions (tons/day)	CH <sub>4</sub> Emissions (tons/day)
Cruising	Main Engines	4.39E-05	4.45E+00	6.14E-04
Cruising	Aux Generator	1.14E-05	1.16E+00	1.60E-04
Maneuvering	Main Engines	6.92E-07	7.01E-02	9.69E-06
Maneuvering	Aux Generator	5.72E-06	5.80E-01	8.01E-05
Boiler Warm-up	Boiler	4.79E-06	4.86E-01	6.70E-05
Berth Operations	Boiler	3.68E-05	3.73E+00	5.15E-04
Berth Operations	Aux Generator	1.01E-04	1.15E+01	1.51E-03
Propulsion	TOTAL	6.18E-05	6.26E+00	8.64E-04
Non-Propulsion	TOTAL	1.43E-04	1.57E+01	2.09E-03
<b>Total Emissions</b>		<b>0.0002</b>	<b>21.94</b>	<b>0.0030</b>

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Table H.2.NFA/NPA.Ts.GHG.2015-6. 2015 No Federal Action/No Project Alternative Tug Main Engines Average Daily GHG Emissions (Tesoro).

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Energy (kWh)	Energy (MMBtu)	Shipcalls (vessels/yr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
AFRAMAX	Maneuvering - Pilot to Berth	1.00	2	4,800	0.50	2400	8.2	87.0	0.00636	645.0	0.0890	0.0013	134.6760	0.0186
	Maneuvering - Berth to Pilot	1.00	2	4,800	0.50	2400	8.2	87.0	0.00636	645.0	0.0890	0.0013	134.6760	0.0186
TOTAL												0.0027	269.3520	0.0372

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Table H.2.NFA/NPA.Ts.GHG.2015-7. 2015 No Federal Action/No Project Alternative Tug Auxiliary Generator Engines Average Daily Unmitigated Emissions (Tesoro).

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Energy (kWh)	Energy (MMBtu)	Shipcalls (vessels/yr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
AFRAMAX	Maneuvering - Pilot to Berth	1.00	2	300	1.00	300	1.0	87.0	0.0068	690.0	0.0952	0.00018	18.00900	0.00248
	Maneuvering - Berth to Pilot	1.00	2	300	1.00	300	1.0	87.0	0.0068	690.0	0.0952	0.00018	18.00900	0.00248
<b>TOTAL</b>												<b>0.00035</b>	<b>36.02</b>	<b>0.00497</b>

Table H.2.NFA/NPA.Ts.GHG.2015-8. 2015 No Federal Action/No Project Alternative Summary of Tug Average Daily GHG Emissions (Tesoro).

Mode	Equipment	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
Tug Assist	Main Engines	0.0027	269.3520	0.0372
Tug Assist	Aux Generator	0.00035	36.01800	0.00497
<b>TOTAL</b>		<b>0.0030</b>	<b>305.37</b>	<b>0.0421</b>

Mode	Equipment	N <sub>2</sub> O Emissions (tons/day)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
Tug Assist	Main Engines	7.28E-06	7.38E-01	1.02E-04
Tug Assist	Aux Generator	9.72E-07	9.87E-02	1.36E-05
<b>TOTAL</b>		<b>8.25E-06</b>	<b>8.37E-01</b>	<b>1.15E-04</b>

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Table H.2.NFA/NPA.Ts.GHG.2015-9. 2015 No Federal Action/No Project Alternative VDU Crude Average Daily GHG Emissions (Tesoro).

	Annual Vessel Calls	crude vapors from tanks(scf/call)	annual gas usage (mmscf/yr)	mw crude vapors	destruction efficiency
Aframax	87	224000	19.5	50	98%
<b>TOTAL</b>	<b>87</b>		<b>19.5</b>		

Assumed Distribution based on tank storage volume:  
 Site 1 12.5%  
 Site 2 87.5%

Annual Average (tons/yr)

	N <sub>2</sub> O	CO <sub>2</sub>	CH <sub>4</sub>
EF (kg/MMBtu)	0.0001	52.78	0.0059
Aframax	0.0020	1049.15	0.1173
<b>TOTAL</b>	<b>0.0020</b>	<b>1049.1482</b>	<b>0.1173</b>

Annual Average (tons/yr)

	N <sub>2</sub> O	CO <sub>2</sub>	CH <sub>4</sub>
Site 1	0.0002	131.14	0.01
Site 2	0.0017	918.0	0.1

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Table H.2.NFA/NPA.Ts.GHG.2015-10. 2015 No Federal Action/No Project Alternative VDU Legs Average Daily GHG Emissions (Tesoro).

	tanks	crude vapors from tanks on legs(scf/yr)	annual gas usage (mmscf/yr)	mw crude vapors	destruction efficiency
Site 1	4	8640000	34.6	50	98%
Site 2	14	8640000	121.0	50	98%
<b>TOTAL</b>	<b>18</b>		<b>155.5</b>		

48	hr/event
6	events/yr
500	ft3/min

Annual Average (tons/yr)

	N <sub>2</sub> O	CO <sub>2</sub>	CH <sub>4</sub>
EF (kg/MMBtu)	0.0001	52.78	0.0059
<b>TOTAL</b>	<b>0.016</b>	<b>8372.513</b>	<b>0.936</b>

*Assumed a ratio of 500/1000 based on the corresponding Btu values with respect to natural gas combustion emission factors.*

Annual Average (tons/yr)

	N <sub>2</sub> O	CO <sub>2</sub>	CH <sub>4</sub>
Site 1	0.0035	1860.6	0.2
Site 2	0.012	6512.0	0.7



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Table H.2.NFA/NPA.Ts.GHG.2015-11. 2015 No Federal Action/No Project Alternative VDU Average Daily GHG Emissions (Tesoro).

Annual Average (tons/yr)

	<b>N<sub>2</sub>O</b>	<b>CO<sub>2</sub></b>	<b>CH<sub>4</sub></b>
Site 1	0.004	1992	0.22
Site 2	0.014	7430	0.83
<b>Total</b>	<b>0.018</b>	<b>9,422</b>	<b>1.05</b>

Daily Average (tons/day)

	<b>N<sub>2</sub>O</b>	<b>CO<sub>2</sub></b>	<b>CH<sub>4</sub></b>
Site 1	1.03E-05	5.457	6.10E-04
Site 2	3.86E-05	20.356	2.28E-03
<b>Total</b>	<b>4.89E-05</b>	<b>26</b>	<b>2.89E-03</b>

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Table H.2.NFA/NPA.Ts.GHG.2015-12. 2015 No Federal Action/No Project Alternative Tesoro Berth Summary.

Operation	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)	CO <sub>2</sub> e Emissions (tons/yr)
Tanker Cruising and Manuevering	0.0225	2,286.37	0.32	2299.98
Tanker Hoteling	0.0370	4,183.41	0.55	4206.48
Offloading Emissions	0.0134	1,362.22	0.19	1370.33
Transiting Operations	0.0017	177.35	0.02	178.40
Tug Assistance	0.0030	305.37	0.04	307.19
Tanks	---	---	---	---
Vapor Destruction Units	0.0179	9,421.66	1.05	9449.31
Valves, Flanges, Pumps	---	---	---	---
<b>TOTAL</b>	<b>0.0956</b>	<b>17,736.38</b>	<b>2.17</b>	<b>17811.69</b>

Operation	N <sub>2</sub> O Emissions (tons/day)	CO <sub>2</sub> Emissions (tons/day)	CH <sub>4</sub> Emissions (tons/day)	CO <sub>2</sub> e Emissions (tons/day)
Tanker Cruising and Manuevering	6.18E-05	6.26	8.64E-04	6.30
Tanker Hoteling	1.01E-04	11.46	1.51E-03	11.52
Offloading Emissions	3.68E-05	3.73	5.15E-04	3.75
Transiting Operations	4.79E-06	0.49	6.70E-05	0.49
Tug Assistance	8.25E-06	0.84	1.15E-04	0.84
Tanks	---	---	---	---
Vapor Destruction Units	4.89E-05	25.81	2.89E-03	25.89
Valves, Flanges, Pumps	---	---	---	---
<b>TOTAL</b>	<b>2.62E-04</b>	<b>48.59</b>	<b>5.96E-03</b>	<b>48.80</b>

Table H.2.NFA/NPA.Ex.GHG.2015-1. 2015 No Federal Action/No Project Alternative Main Engines Average Daily GHG Emissions (Exxon Mobil).

Ship	Direction	Mode	Distance (nautical miles)	Ship speed (knots)	Activity (hours)	Maximum Speed (knots)	Load Factor	MCR (kW)	Energy (kW-hr)	Energy (MMBtu)	Shipcalls (vessels/ yr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
PANAMAX	South In	Cruising - CW to VSR	23	12	1.92	15.8	0.438	10,300	8,649	30	146	0.0058	588.00	0.0811	0.0073	742.48	0.1024
		Cruising - VSR to PZ	11	12	0.92	15.8	0.438	10,300	4,136	14	146	0.0058	588.00	0.0811	0.0035	355.10	0.0490
		Cruising - PZ to Pilot	4.7	7	0.67	15.8	0.087	10,300	601	2	146	0.0058	588.00	0.0811	0.0005	51.63	0.0071
		Maneuvering - Pilot to Berth		3	1.00	15.8	0.007	10,300	71	0	146	0.0064	647.00	0.0895	0.0001	6.66	0.0009
PANAMAX	South Out	Maneuvering - Berth to Pilot		5	1.00	15.8	0.032	10,300	326	1	146	0.0064	647.00	0.0895	0.0003	30.83	0.0043
		Cruising - Pilot to PZ	3.5	7	0.50	15.8	0.087	10,300	448	2	146	0.0058	588.00	0.0811	0.0004	38.45	0.0053
		Cruising - PZ to VSR	12.5	12	1.04	15.8	0.438	10,300	4,700	16	146	0.0058	588.00	0.0811	0.0040	403.52	0.0557
		Cruising - VSR to CW	24.5	12	2.04	15.8	0.438	10,300	9,213	31	146	0.0058	588.00	0.0811	0.0078	790.91	0.1091
<b>TOTAL</b>															<b>0.0239</b>	<b>2419.58</b>	<b>0.3337</b>

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Table H.2.NFA/NPA.Ex.GHG.2015-2. 2015 No Federal Action/No Project Alternative Auxiliary Generator Average Daily Unmitigated Emissions (Exxon Mobil).

Ship	Direction	Mode	Activity (hours)	MCR (kW)	Load Factor	Energy (kW-hr)	Energy (MMBtu)	Shipcalls (vessels/yr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
PANAMAX	South In	Cruising	3.50	3,600	0.28	3,528	12	146	0.0068	690.00	0.0952	0.0035	355.41	0.0490
		Maneuvering	2.00	3,600	0.28	2,016	7	146	0.0068	690.00	0.0952	0.0020	203.09	0.0280
PANAMAX	South Out	Maneuvering	1.5	3,600	0.28	1,512	5	146	0.0068	690.00	0.0952	0.0015	152.32	0.0210
		Cruising	3.58	3,600	0.28	3,609	12	146	0.0068	690.00	0.0952	0.0036	363.53	0.0502
<b>TOTAL</b>												<b>0.0106</b>	<b>1074.36</b>	<b>0.1482</b>

Table H.2.NFA/NPA.Ex.GHG.2015-3. 2015 No Federal Action/No Project Alternative Boiler Warm-Up Average Daily GHG Emissions (Exxon Mobil).

Shipcalls (vessels/yr)	Vessel Size	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	Fuel Consumption (gal/yr)	N <sub>2</sub> O Emission Factor (lb/ton)	CO <sub>2</sub> Emission Factor (lb/ton)	CH <sub>4</sub> Emission Factor (lb/ton)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
146.0	Panamax	0.20	59.91	30%	3	35,000	122,293	0.0068	690.00	0.0952	0.00120	122.16	0.0169
TOTAL											0.00120	122.16	0.0169

Table H.2.NFA/NPA.Ex.GHG.2015-4. 2015 No Federal Action/No Project Alternative Berth Operations Average Daily GHG Emissions (Exxon Mobil)

**Auxiliary Generator Pre-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	Energy (MMBtu)	Heating Value (MMBtu/1000 gal)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
146.0	Panamax	300,000	0.20	3,600	28%	2.5	8.6	150	0.0064	722.0	0.0952	0.0083	948.71	0.1251

AMP Reduction 15% TOTAL 0.0071 806.40 0.1063

**Boiler Pre-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bb/hr)	Fuel Consumption (gal/yr)	N <sub>2</sub> O Emission Factor (lb/ton)	CO <sub>2</sub> Emission Factor (lb/ton)	CH <sub>4</sub> Emission Factor (lb/ton)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
146.0	Panamax	300,000	0.20	59.91	30%	2.5	35,000	101,911	0.0627	6,360.0	0.8770	0.0093	938.33	0.1294

TOTAL 0.0093 938.33 0.1294

**Auxiliary Generator Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	Energy (MMBtu)	Heating Value (MMBtu/1000 gal)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
146.0	Panamax	300,000	0.20	3,600	56%	11.0	75.7	140	0.0064	722.0	0.0952	0.0370	4174.32	0.5504

AMP Reduction 15% TOTAL 0.0315 3548.17 0.4678

**Boiler Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Inerting Fuel Consumption Savings (lb/1000 bbl offloaded)	Activity Time (hr)	Pumping Rate (bb/hr)	Fuel Consumption (gal/yr)	N <sub>2</sub> O Emission Factor (lb/ton)	CO <sub>2</sub> Emission Factor (lb/ton)	CH <sub>4</sub> Emission Factor (lb/ton)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
146.0	Panamax	300,000	0.20	59.91	28.06	11.0	35,000	448,408	0.0627	6,360.0	0.8770	0.0407	4128.65	0.5693

TOTAL 0.0407 4128.65 0.5693

**Auxiliary Generator Post-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	Energy (MMBtu)	Heating Value (MMBtu/1000 gal)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
146.0	Panamax	300,000	0.20	3,600	28%	1.0	3.4	150	0.0064	722.0	0.0952	0.0034	379.48	0.0500

AMP Reduction 15% TOTAL 0.0029 322.56 0.0425

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Table H.2.NFA/NPA.Ex.GHG.2015-5. 2015 No Federal Action/No Project Alternative Summary of Berth Operations Average Daily GHG Emissions (Exxon Mobil).

Mode	Equipment	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
Cruising	Main Engines	2.35E-02	2382.09	3.29E-01
Cruising	Aux Generator	7.09E-03	718.95	9.92E-02
Maneuvering	Main Engines	3.70E-04	37.49	5.19E-03
Maneuvering	Aux Generator	3.50E-03	355.41	4.90E-02
Boiler Warm-up	Boiler	1.20E-03	122.16	1.69E-02
Berth Operations	Boiler	5.00E-02	5066.98	6.99E-01
Berth Operations	Aux Generator	4.14E-02	4677.13	6.17E-01
Propulsion	TOTAL	3.45E-02	3493.94	4.82E-01
Non-Propulsion	TOTAL	0.09	9866.27	1.33
<b>Total Emissions</b>		<b>1.27E-01</b>	<b>13360.21</b>	<b>1.81E+00</b>

Mode	Equipment	N <sub>2</sub> O Emissions (tons/day)	CO <sub>2</sub> Emissions (tons/day)	CH <sub>4</sub> Emissions (tons/day)
Cruising	Main Engines	6.44E-05	6.53	9.00E-04
Cruising	Aux Generator	1.94E-05	1.97	2.72E-04
Maneuvering	Main Engines	1.01E-06	0.10	1.42E-05
Maneuvering	Aux Generator	9.60E-06	0.97	1.34E-04
Boiler Warm-up	Boiler	3.30E-06	0.33	4.62E-05
Berth Operations	Boiler	1.37E-04	13.88	1.91E-03
Berth Operations	Aux Generator	1.13E-04	12.81	1.69E-03
Propulsion	TOTAL	9.44E-05	9.57	1.32E-03
Non-Propulsion	TOTAL	2.54E-04	27.03	3.65E-03
<b>Total Emissions</b>		<b>3.48E-04</b>	<b>36.60</b>	<b>4.97E-03</b>

Table H.2.NFA/NPA.Ex.GHG.2015-6. 2015 No Federal Action/No Project Alternative Tug Main Engines Average Daily GHG Emissions (Exxon Mobil).

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Energy (kWh)	Energy (MMBtu)	Shipcalls (vessels/yr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
PANAMAX	Maneuvering - Pilot to Berth	1.00	2	4,800	0.50	2400	8.2	146.0	0.00636	645.0	0.0890	0.0022	226.01	0.0312
	Maneuvering - Berth to Pilot	1.00	2	4,800	0.50	2400	8.2	146.0	0.00636	645.0	0.0890	0.0022	226.01	0.0312
TOTAL												0.0045	452.02	0.0624



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Table H.2.NFA/NPA.Ex.GHG.2015-7. 2015 No Federal Action/No Project Alternative Tug Auxiliary Generator Engines Average Daily Unmitigated Emissions (Exxon Mobil).

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Energy (kWh)	Energy (MMBtu)	Shipcalls (vessels/yr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
PANAMAX	Maneuvering - Pilot to Berth	1.00	2	300	1.00	300	1.0	146.0	0.0068	690.0	0.0952	0.00030	30.22200	0.0042
	Maneuvering - Berth to Pilot	1.00	2	300	1.00	300	1.0	146.0	0.0068	690.0	0.0952	0.00030	30.22200	0.0042
TOTAL												0.00060	60.44	0.0083

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Table H.2.NFA/NPA.Ex.GHG.2015-8.

2015 No Federal Action/No Project Alternative Summary of Tug Average Daily GHG Emissions (Exxon Mobil).

Mode	Equipment	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
Tug Assist	Main Engines	0.0045	452.02	0.0624
Tug Assist	Aux Generator	0.00060	60.44	0.0083
<b>TOTAL</b>		<b>0.0051</b>	<b>512.46</b>	<b>0.0707</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.NFA/NPA.Ex.GHG.2015-9. 2015 No Federal Action/No Project Alternative VDU Crude Average Daily GHG Emissions (Exxon Mobil).

	Annual Vessel Calls	crude vapors from tanks(scf/call)	annual gas usage (mmscf/yr)	mw crude vapors	destruction efficiency
Panamax	146	224000	32.7	50	98%
<b>TOTAL</b>	<b>146</b>		<b>32.7</b>		

Assumed Distribution based on tank storage volume:	
Site 1	12.5%
Site 2	87.5%

Annual Average (tons/yr)

	N <sub>2</sub> O	CO <sub>2</sub>	CH <sub>4</sub>
EF (kg/MMBtu)	0.0001	52.78	0.0059
Panamax	0.0033	1760.64	0.1968
<b>TOTAL</b>	<b>0.0033</b>	<b>1760.6395</b>	<b>0.1968</b>

Annual Average (tons/yr)

	N <sub>2</sub> O	CO <sub>2</sub>	CH <sub>4</sub>
Site 1	0.0004	220.08	0.02
Site 2	0.0029	1540.6	0.2

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Table H.2.NFA/NPA.Ex.GHG.2015-10. 2015 No Federal Action/No Project Alternative VDU Legs Average Daily GHG Emissions (Exxon Mobil).

	tanks	crude vapors from tanks on legs(scf/yr)	annual gas usage (mmscf/yr)	mw crude vapors	destruction efficiency
Site 1	4	8640000	34.6	50	98%
Site 2	14	8640000	121.0	50	98%
<b>TOTAL</b>	<b>18</b>		<b>155.5</b>		

48	hr/event
6	events/yr
500	ft3/min

Annual Average (tons/yr)

	N <sub>2</sub> O	CO <sub>2</sub>	CH <sub>4</sub>
EF (kg/MMBtu)	0.0001	52.78	0.0059
<b>TOTAL</b>	<b>0.016</b>	<b>8372.513</b>	<b>0.936</b>

*Assumed a ratio of 500/1000 based on the corresponding Btu values with respect to natural gas combustion emission factors.*

Annual Average (tons/yr)

	N <sub>2</sub> O	CO <sub>2</sub>	CH <sub>4</sub>
Site 1	0.0035	1860.6	0.2
Site 2	0.012	6512.0	0.7

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**Table H.2.NFA/NPA.Ex.GHG.2015-11.**

**2015 No Federal Action/No Project Alternative VDU Average Daily GHG Emissions (Exxon Mobil).**

Annual Average (tons/yr)

	<b>N<sub>2</sub>O</b>	<b>CO<sub>2</sub></b>	<b>CH<sub>4</sub></b>
Site 1	0.004	2081	0.23
Site 2	0.015	8053	0.90
<b>Total</b>	<b>0.019</b>	<b>10,133</b>	<b>1.13</b>

Daily Average (tons/day)

	<b>N<sub>2</sub>O</b>	<b>CO<sub>2</sub></b>	<b>CH<sub>4</sub></b>
Site 1	1.08E-05	5.700	6.37E-04
Site 2	4.18E-05	22.062	2.47E-03
<b>Total</b>	<b>5.26E-05</b>	<b>28</b>	<b>3.10E-03</b>

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Table H.2.NFA/NPA.Ex.GHG.2015-12. 2015 No Federal Action/No Project Alternative Exxon Mobil Berth Summary.

Operation	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)	CO <sub>2</sub> e Emissions (tons/yr)
Tanker Cruising and Maneuvering	0.0345	3,493.94	0.48	3514.74
Tanker Hoteling	0.0414	4,677.13	0.62	4702.92
Offloading Emissions	0.0500	5,066.98	0.70	5097.14
Transiting Operations	0.0012	122.16	0.02	122.89
Tug Assistance	0.0051	512.46	0.07	515.51
Tanks	---	---	---	---
Vapor Destruction Units	0.0192	10,133.15	1.13	10162.89
Valves, Flanges, Pumps	---	---	---	---
<b>TOTAL</b>	<b>0.1513</b>	<b>24,005.82</b>	<b>3.02</b>	<b>24116.09</b>

Operation	N <sub>2</sub> O Emissions (tons/day)	CO <sub>2</sub> Emissions (tons/day)	CH <sub>4</sub> Emissions (tons/day)	CO <sub>2</sub> e Emissions (tons/day)
Tanker Cruising and Maneuvering	9.44E-05	9.57	1.32E-03	9.63
Tanker Hoteling	1.13E-04	12.81	1.69E-03	12.88
Offloading Emissions	1.37E-04	13.88	1.91E-03	13.96
Transiting Operations	3.30E-06	0.33	4.62E-05	0.34
Tug Assistance	1.38E-05	1.40	1.94E-04	1.41
Tanks	---	---	---	---
Vapor Destruction Units	5.26E-05	27.76	3.10E-03	27.84
Valves, Flanges, Pumps	---	---	---	---
<b>TOTAL</b>	<b>4.14E-04</b>	<b>65.77</b>	<b>8.27E-03</b>	<b>66.07</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.NFA/NPA.BP.GHG.2025-1. 2025 No Federal Action/No Project Alternative Main Engines Average Daily GHG Emissions (BP).

Ship	Direction	Mode	Distance (nautical miles)	Ship speed (knots)	Activity (hours)	Maximum Speed (knots)	Load Factor	MCR (kW)	Energy (kW-hr)	Shipcalls (vessels/ yr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
AFRAMAX	South In	Cruising - CW to VSR	23	12	1.92	16.1	0.414	12,477	9,902	34	0.0058	588.00	0.0811	0.0020	197.96	0.0273
		Cruising - VSR to PZ	11	12	0.92	16.1	0.414	12,477	4,736	34	0.0058	588.00	0.0811	0.0009	94.68	0.0131
		Cruising - PZ to Pilot	4.7	7	0.67	16.1	0.082	12,477	689	34	0.0058	588.00	0.0811	0.0001	13.77	0.0019
	South Out	Maneuvering - Pilot to Berth	3	3	1.00	16.1	0.006	12,477	81	34	0.0064	647.00	0.0895	0.0000	1.78	0.0002
		Maneuvering - Berth to Pilot	5	5	1.00	16.1	0.030	12,477	374	34	0.0064	647.00	0.0895	0.0001	8.22	0.0011
		Cruising - Pilot to PZ	3.5	7	0.50	16.1	0.082	12,477	513	34	0.0058	588.00	0.0811	0.0001	10.25	0.0014
		Cruising - PZ to VSR	12.5	12	1.04	16.1	0.414	12,477	5,382	34	0.0058	588.00	0.0811	0.0011	107.59	0.0148
		Cruising - VSR to CW	24.5	12	2.04	16.1	0.414	12,477	10,548	34	0.0058	588.00	0.0811	0.0021	210.87	0.0291
		<b>TOTAL</b>											<b>0</b>	<b>4,822</b>	<b>1</b>	<b>0.0064</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.NFA/NPA.BP.GHG.2025-2. 2025 No Federal Action/No Project Alternative Auxiliary Generator Average Daily Unmit Emissions (BP).

Ship	Direction	Mode	Activity (hours)	MCR (kW)	Load Factor	Energy (kW-hr)	Shipcalls (vessels/yr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
AFRAMAX	South In	Cruising	3.50	3,600	0.28	3,533	34	0.0068	690.00	0.0952	0.0008	82.8795	0.0114
		Maneuvering	2.00	3,600	0.28	2,016	34	0.0068	690.00	0.0952	0.0005	47.2954	0.0065
	South Out	Maneuvering	1.5	3,600	0.28	1,512	34	0.0068	690.00	0.0952	0.0003	35.4715	0.0049
		Cruising	3.50	3,600	0.28	3,528	34	0.0068	690.00	0.0952	0.0008	82.7669	0.0114
<b>TOTAL</b>								<b>0</b>	<b>2,760</b>	<b>0</b>	<b>0.0024</b>	<b>248.41</b>	<b>0.0343</b>



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Table H.2.NFA/NPA.BP.GHG.2025-3. 2025 No Federal Action/No Project Alternative Boiler Warm-Up Average Daily GHG Emissions (BI

Shipcalls (vessels/yr)	Vessel Size	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	Fuel Consumption (gal/yr)	N <sub>2</sub> O Emission Factor (lb/ton)	CO <sub>2</sub> Emission Factor (lb/ton)	CH <sub>4</sub> Emission Factor (lb/ton)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
34.0	Aframax	0.20	102.17	30%	3	50,000	69,383	0.0068	690.00	0.0952	0.00068	69.30760	0.00956
TOTAL								0	690	0	0.00068	69.31	0.0096

Table H.2.NFA/NPA.BP.GHG.2025-4. 2025 No Federal Action/No Project Alternative Berth Operations Average Daily GHG Emissions (BP).

**Auxiliary Generator Pre-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
34.0	Aframax	400,000	0.20	3,600	28%	2.5	0.0064	722.0	0.0952	0.00194	220.93	0.0291

AMP Reduction 0%  
**TOTAL** 0 722 0 0.00194 220.93 0.0291

**Boiler Pre-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	Fuel Consumption (gal/yr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
34.0	Aframax	400,000	0.20	102.17	30%	2.5	50,000	57,819	0.0627	6,360.0	0.8770	0.00525	532.36	0.07341

**TOTAL** 0.0627 6,360.00 0.8770 0.00525 532.36 0.0734

**Auxiliary Generator Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
34.0	Aframax	400,000	0.20	3,600	56%	15.0	0.0064	722.00	0.0952	0.0118	1,325.5920	0.1748

AMP Reduction 0%  
**TOTAL** 0.0064 722.00 0.0952 0.0118 1,325.59 0.1748

**Boiler Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Inerting Fuel Consumption Savings (lb/1000 bbl offloaded)	Activity Time (hr)	Pumping Rate (bbl/hr)	Fuel Consumption (gal/yr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
34.0	Aframax	400,000	0.20	102.17	28.06	15.0	50,000	346,915	0.0627	6,360.00	0.8770	0.0315	3,194.18	0.4405

**TOTAL** 0 6,360 1 0.0315 3,194.18 0.4405

**Auxiliary Generator Post-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
34.0	Aframax	400,000	0.20	3,600	28%	1.0	0.0064	722.00	0.0952	0.00078	88.37280	0.01165

AMP Reduction 0%  
**TOTAL** 0.0064 722.00 0.0952 0.00078 88.37 0.0117

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Table H.2.NFA/NPA.BP.GHG.2025-5.

2025 No Federal Action/No Project Alternative Summary of Berth Operations Average Daily GHG Emissions (BP).

Mode	Equipment	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
Cruising	Main Engines	0.0063	635.1122	0.0876
Cruising	Aux Generator	0.0016	165.6464	0.0229
Maneuvering	Main Engines	0.0001	9.9968	0.0014
Maneuvering	Aux Generator	0.0008	82.7669	0.0114
Boiler Warm-up	Boiler	0.0007	69.3076	0.0096
Berth Operations	Boiler	0.0367	3726.5391	0.5139
Berth Operations	Aux Generator	0.0145	1634.8968	0.2156
Propulsion	TOTAL	0.0088	893.52	0.1233
Non-Propulsion	TOTAL	0.0519	5430.74	0.7390
<b>Total Emissions</b>		<b>0.0607</b>	<b>6324.27</b>	<b>0.8623</b>

Mode	Equipment	N <sub>2</sub> O Emissions (tons/day)	CO <sub>2</sub> Emissions (tons/day)	CH <sub>4</sub> Emissions (tons/day)
Cruising	Main Engines	0.0000	1.74	0.0002
Cruising	Aux Generator	0.0000	0.45	0.0001
Maneuvering	Main Engines	0.0000	0.03	0.0000
Maneuvering	Aux Generator	0.0000	0.23	0.0000
Boiler Warm-up	Boiler	0.0000	0.19	0.0000
Berth Operations	Boiler	0.0001	10.21	0.0014
Berth Operations	Aux Generator	0.0000	4.48	0.0006
Propulsion	TOTAL	0.0000	2.45	0.0003
Non-Propulsion	TOTAL	0.0001	14.88	0.0020
<b>Total Emissions</b>		<b>0.0002</b>	<b>17.33</b>	<b>0.0024</b>

Table H.2.NFA/NPA.BP.GHG.2025-6. 2025 No Federal Action/No Project Alternative Tug Main Engines Average Daily GHG Emissions (BP).

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Energy (kWh)	Energy (MMBtu)	Shipcalls (vessels/yr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
AFRAMAX	Maneuvering - Pilot to Berth	1.00	2	4,800	0.50	2400	8.2	34.0	0.00636	645.0	0.0890	0.0005	52.6320	0.0073
	Maneuvering - Berth to Pilot	1.00	2	4,800	0.50	2400	8.2	34.0	0.00636	645.0	0.0890	0.0005	52.6320	0.0073
TOTAL												0.0010	105.2640	0.0145

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Table H.2.NFA/NPA.BP.GHG.2025-7. 2025 No Federal Action/No Project Alternative Tug Auxiliary Generator Engines Average Daily Unmit Emissions (BP).

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Energy (kWh)	Energy (MMBtu)	Shipcalls (vessels/yr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
AFRAMAX	Maneuvering - Pilot to Berth	1.00	2	300	1.00	300	1.0	34.0	0.0068	690.0	0.0952	0.00007	7.03800	0.00097
	Maneuvering - Berth to Pilot	1.00	2	300	1.00	300	1.0	34.0	0.0068	690.0	0.0952	0.00007	7.03800	0.00097
<b>TOTAL</b>												<b>0.00014</b>	<b>14.08</b>	<b>0.00194</b>

Table H.2.NFA/NPA.BP.GHG.2025-8. 2025 No Federal Action/No Project Alternative Summary of Tug Average Daily GHG Emissions (BP).

Mode	Equipment	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
Tug Assist	Main Engines	0.0010	105.2640	0.0145
Tug Assist	Aux Generator	0.00014	14.07600	0.00194
<b>TOTAL</b>		<b>0.0012</b>	<b>119.34</b>	<b>0.0165</b>

Mode	Equipment	N <sub>2</sub> O Emissions (tons/day)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
Tug Assist	Main Engines	2.84E-06	2.88E-01	3.98E-05
Tug Assist	Aux Generator	3.80E-07	3.86E-02	5.32E-06
<b>TOTAL</b>		<b>3.22E-06</b>	<b>3.27E-01</b>	<b>4.51E-05</b>

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Table H.2.NFA/NPA.BP.GHG.2025-9. 2025 No Federal Action/No Project Alternative VDU Crude Average Daily GHG Emissions (BP).

	Annual Vessel Calls	crude vapors from tanks(scf/call)	annual gas usage (mmscf/yr)	mw crude vapors	destruction efficiency
Aframax	34	224000	7.6	50	98%
<b>TOTAL</b>	<b>34</b>		<b>7.6</b>		

<b>Assumed Distribution based on tank storage volume:</b>	
<b>Site 1</b>	<b>12.5%</b>
<b>Site 2</b>	<b>87.5%</b>

Annual Average (tons/yr)

	N <sub>2</sub> O	CO <sub>2</sub>	CH <sub>4</sub>
EF (kg/MMBtu)	0.0001	52.78	0.0059
Aframax	0.0008	410.01	0.0458
<b>TOTAL</b>	<b>0.0008</b>	<b>410.0119</b>	<b>0.0458</b>

Annual Average (tons/yr)

	N <sub>2</sub> O	CO <sub>2</sub>	CH <sub>4</sub>
Site 1	0.0001	51.25	0.01
Site 2	0.0007	358.8	0.0

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.NFA/NPA.BP.GHG.2025-10. 2025 No Federal Action/No Project Alternative VDU Legs Average Daily GHG Emissions (BP).

	tanks	crude vapors from tanks on legs(scf/yr)	annual gas usage (mmscf/yr)	mw crude vapors	destruction efficiency
Site 1	4	8640000	34.6	50	98%
Site 2	14	8640000	121.0	50	98%
<b>TOTAL</b>	<b>18</b>		<b>155.5</b>		

48	hr/event
6	events/yr
500	ft3/min

Annual Average (tons/yr)

	N <sub>2</sub> O	CO <sub>2</sub>	CH <sub>4</sub>
EF (kg/MMBtu)	0.0001	52.78	0.0059
<b>TOTAL</b>	<b>0.016</b>	<b>8372.513</b>	<b>0.936</b>

*Assumed a ratio of 500/1000 based on the corresponding Btu values with respect to natural gas combustion emission factors.*

Annual Average (tons/yr)

	N <sub>2</sub> O	CO <sub>2</sub>	CH <sub>4</sub>
Site 1	0.0035	1860.6	0.2
Site 2	0.012	6512.0	0.7



Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.NFA/NPA.BP.GHG.2025-11. 2025 No Federal Action/No Project Alternative VDU Average Daily GHG Emissions (BP).

Annual Average (tons/yr)

	<b>N<sub>2</sub>O</b>	<b>CO<sub>2</sub></b>	<b>CH<sub>4</sub></b>
Site 1	0.004	1912	0.21
Site 2	0.013	6871	0.77
<b>Total</b>	<b>0.017</b>	<b>8,783</b>	<b>0.98</b>

Daily Average (tons/day)

	<b>N<sub>2</sub>O</b>	<b>CO<sub>2</sub></b>	<b>CH<sub>4</sub></b>
Site 1	9.92E-06	5.238	5.86E-04
Site 2	3.57E-05	18.824	2.10E-03
<b>Total</b>	<b>4.56E-05</b>	<b>24</b>	<b>2.69E-03</b>

**Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR**

**Table H.2.NFA/NPA.BP.GHG.2025-12. 2025 No Federal Action/No Project Alternative BP Berth Summary.**

<b>Operation</b>	<b>N<sub>2</sub>O Emissions (tons/yr)</b>	<b>CO<sub>2</sub> Emissions (tons/yr)</b>	<b>CH<sub>4</sub> Emissions (tons/yr)</b>	<b>CO<sub>2</sub>e Emissions (tons/yr)</b>
Tanker Cruising and Manuevering	0.0088	893.52	0.1233	898.84
Tanker Hoteling	0.0145	1634.90	0.2156	1643.91
Offloading Emissions	0.0367	3726.54	0.5139	3748.72
Transiting Operations	0.0007	69.31	0.0096	69.72
Tug Assistance	0.0012	119.34	0.0165	120.05
Tanks	---	---	---	---
Vapor Destruction Units	0.0166	8782.52	0.9818	8808.30
Valves, Flanges, Pumps	---	---	---	---
<b>TOTAL</b>	<b>0.0785</b>	<b>15226.13</b>	<b>1.8605</b>	<b>15289.54</b>

<b>Operation</b>	<b>N<sub>2</sub>O Emissions (tons/day)</b>	<b>CO<sub>2</sub> Emissions (tons/day)</b>	<b>CH<sub>4</sub> Emissions (tons/day)</b>	<b>CO<sub>2</sub>e Emissions (tons/day)</b>
Tanker Cruising and Manuevering	2.41E-05	2.45	3.38E-04	2.46
Tanker Hoteling	3.97E-05	4.48	5.91E-04	4.50
Offloading Emissions	1.01E-04	10.21	1.41E-03	10.27
Transiting Operations	1.87E-06	0.19	2.62E-05	0.19
Tug Assistance	3.22E-06	0.33	4.51E-05	0.33
Tanks	---	---	---	---
Vapor Destruction Units	4.56E-05	24.06	2.69E-03	24.13
Valves, Flanges, Pumps	---	---	---	---
<b>TOTAL</b>	<b>2.15E-04</b>	<b>41.72</b>	<b>5.10E-03</b>	<b>41.89</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.NFA/NPA.Ts.GHG.2025-1. 2025 No Federal Action/No Project Alternative Main Engines Average Daily GHG Emissions (Tesoro).

Ship	Direction	Mode	Distance (nautical miles)	Ship speed (knots)	Activity (hours)	Maximum Speed (knots)	Load Factor	MCR (kW)	Energy (kW-hr)	Shipcalls (vessels/ yr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
AFRAMAX	South In	Cruising - CW to VSR	23	12	1.92	16.1	0.414	12,477	9,902	87	0.0058	588.00	0.0811	0.0050	506.55	0.0699
		Cruising - VSR to PZ	11	12	0.92	16.1	0.414	12,477	4,736	87	0.0058	588.00	0.0811	0.0024	242.26	0.0334
		Cruising - PZ to Pilot	4.7	7	0.67	16.1	0.082	12,477	689	87	0.0058	588.00	0.0811	0.0003	35.22	0.0049
		Maneuvering - Pilot to Berth		3	1.00	16.1	0.006	12,477	81	87	0.0064	647.00	0.0895	0.0000	4.54	0.0006
	South Out	Maneuvering - Berth to Pilot		5	1.00	16.1	0.030	12,477	374	87	0.0064	647.00	0.0895	0.0002	21.04	0.0029
		Cruising - Pilot to PZ	3.5	7	0.50	16.1	0.082	12,477	513	87	0.0058	588.00	0.0811	0.0003	26.23	0.0036
		Cruising - PZ to VSR	12.5	12	1.04	16.1	0.414	12,477	5,382	87	0.0058	588.00	0.0811	0.0027	275.30	0.0380
		Cruising - VSR to CW	24.5	12	2.04	16.1	0.414	12,477	10,548	87	0.0058	588.00	0.0811	0.0053	539.58	0.0744
<b>TOTAL</b>											<b>0</b>	<b>4,822</b>	<b>1</b>	<b>0.0163</b>	<b>1,650.72</b>	<b>0.2277</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.NFA/NPA.Ts.GHG.2025-2. 2025 No Federal Action/No Project Alternative Auxiliary Generator Average Daily Unmitigated Emissions (Tesoro).

Ship	Direction	Mode	Activity (hours)	MCR (kW)	Load Factor	Energy (kW-hr)	Shipcalls (vessels/yr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
AFRAMAX	South In	Cruising	3.50	3,600	0.28	3,533	87	0.0068	690.00	0.0952	0.0021	212.0740	0.0293
		Maneuvering	2.00	3,600	0.28	2,016	87	0.0068	690.00	0.0952	0.0012	121.0205	0.0167
	South Out	Maneuvering	1.5	3,600	0.28	1,512	87	0.0068	690.00	0.0952	0.0009	90.7654	0.0125
		Cruising	3.50	3,600	0.28	3,528	87	0.0068	690.00	0.0952	0.0021	211.7858	0.0292
<b>TOTAL</b>								<b>0</b>	<b>2,760</b>	<b>0</b>	<b>0.0063</b>	<b>635.65</b>	<b>0.0877</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.NFA/NPA.Ts.GHG.2025-3. 2025 No Federal Action/No Project Alternative Boiler Warm-Up Average Daily GHG Emissions (Tesoro).

Shipcalls (vessels/yr)	Vessel Size	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	Fuel Consumption (gal/yr)	N <sub>2</sub> O Emission Factor (lb/ton)	CO <sub>2</sub> Emission Factor (lb/ton)	CH <sub>4</sub> Emission Factor (lb/ton)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
87.0	Aframax	0.20	102.17	30%	3	50,000	177,539	0.0068	690.00	0.0952	0.00175	177.34592	0.02447
TOTAL								0	690	0	0.00175	177.35	0.0245

Table H.2.NFA/NPA.Ts.GHG.2025-4. 2025 No Federal Action/No Project Alternative Berth Operations Average Daily GHG Emissions (Tesoro).

**Auxiliary Generator Pre-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)	
87.0	Aframax	400,000	0.20	3,600	28%	2.5	0.0064	722.00	0.0952	0.00497	565.33	0.0745	
0%							<b>TOTAL</b>	<b>0.0064</b>	<b>722.00</b>	<b>0.0952</b>	<b>0.00497</b>	<b>565.33</b>	<b>0.0745</b>

**Boiler Pre-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	Fuel Consumption (gal/yr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)	
87.0	Aframax	400,000	0.20	102.17	30%	2.5	50,000	147949.23	0.0627	6,360.0	0.8770	0.01343	1,362.22	0.18784	
0%									<b>TOTAL</b>	<b>0.0627</b>	<b>6,360.00</b>	<b>0.8770</b>	<b>0.01343</b>	<b>1,362.22</b>	<b>0.1878</b>

**Auxiliary Generator Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)	
87.0	Aframax	400,000	0.20	3,600	56%	15.0	0.0064	722.00	0.0952	0.0301	3,391.9560	0.4472	
0%							<b>TOTAL</b>	<b>0.0064</b>	<b>722.00</b>	<b>0.0952</b>	<b>0.0301</b>	<b>3,391.96</b>	<b>0.4472</b>

**Boiler Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Inerting Fuel Consumption Savings (lb/1000 bbl offloaded)	Activity Time (hr)	Pumping Rate (bbl/hr)	Fuel Consumption (gal/yr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)	
87.0	Aframax	400,000	0.20	102.17	28.06	15.0	50,000	887695.41	0.0627	6,360.00	0.8770	0.0806	8,173.33	1.1270	
0%									<b>TOTAL</b>	<b>0</b>	<b>6,360</b>	<b>1</b>	<b>0.0806</b>	<b>8,173.33</b>	<b>1.1270</b>

**Auxiliary Generator Post-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)	
87.0	Aframax	400,000	0.20	3,600	28%	1.0	0.0064	722.00	0.0952	0.00200	226.13040	0.02982	
0%							<b>TOTAL</b>	<b>0.0064</b>	<b>722.00</b>	<b>0.0952</b>	<b>0.00200</b>	<b>226.13</b>	<b>0.0298</b>

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Table H.2.NFA/NPA.Ts.GHG.2025-5. 2025 No Federal Action/No Project Alternative Summary of Berth Operations Average Daily GHG Emissions (Tesoro).

Mode	Equipment	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
Cruising	Main Engines	0.0160	1625.14	0.2241
Cruising	Aux Generator	0.0042	423.8598	0.0585
Maneuvering	Main Engines	0.0003	25.5799	0.0035
Maneuvering	Aux Generator	0.0021	211.7858	0.0292
Boiler Warm-up	Boiler	0.0017	177.3459	0.0245
Berth Operations	Boiler	0.0940	9535.5559	1.3149
Berth Operations	Aux Generator	0.0370	4183.4124	0.5516
Propulsion	TOTAL	0.0225	2286.37	0.3154
Non-Propulsion	TOTAL	0.1328	13896.31	1.8910
<b>Total Emissions</b>		<b>0.1553</b>	<b>16182.68</b>	<b>2.2064</b>

Mode	Equipment	N <sub>2</sub> O Emissions (tons/day)	CO <sub>2</sub> Emissions (tons/day)	CH <sub>4</sub> Emissions (tons/day)
Cruising	Main Engines	4.39E-05	4.45E+00	6.14E-04
Cruising	Aux Generator	1.14E-05	1.16E+00	1.60E-04
Maneuvering	Main Engines	6.92E-07	7.01E-02	9.69E-06
Maneuvering	Aux Generator	5.72E-06	5.80E-01	8.01E-05
Boiler Warm-up	Boiler	4.79E-06	4.86E-01	6.70E-05
Berth Operations	Boiler	2.58E-04	2.61E+01	3.60E-03
Berth Operations	Aux Generator	1.01E-04	1.15E+01	1.51E-03
Propulsion	TOTAL	6.18E-05	6.26E+00	8.64E-04
Non-Propulsion	TOTAL	3.64E-04	3.81E+01	5.18E-03
<b>Total Emissions</b>		<b>0.0004</b>	<b>44.34</b>	<b>0.0060</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.NFA/NPA.Ts.GHG.2025-6. 2025 No Federal Action/No Project Alternative Tug Main Engines Average Daily GHG Emissions (Tesoro).

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Energy (kWh)	Energy (MMBtu)	Shipcalls (vessels/yr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
AFRAMAX	Maneuvering - Pilot to Berth	1.00	2	4,800	0.50	2400	8.2	87.0	0.00636	645.0	0.0890	0.0013	134.6760	0.0186
	Maneuvering - Berth to Pilot	1.00	2	4,800	0.50	2400	8.2	87.0	0.00636	645.0	0.0890	0.0013	134.6760	0.0186
<b>TOTAL</b>												<b>0.0027</b>	<b>269.3520</b>	<b>0.0372</b>



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Table H.2.NFA/NPA.Ts.GHG.2025-7. 2025 No Federal Action/No Project Alternative Tug Auxiliary Generator Engines Average Daily Unmitigated Emissions (Tesoro).

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Energy (kWh)	Energy (MMBtu)	Shipcalls (vessels/yr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
AFRAMAX	Maneuvering - Pilot to Berth	1.00	2	300	1.00	300	1.0	87.0	0.0068	690.0	0.0952	0.00018	18.00900	0.00248
	Maneuvering - Berth to Pilot	1.00	2	300	1.00	300	1.0	87.0	0.0068	690.0	0.0952	0.00018	18.00900	0.00248
<b>TOTAL</b>												<b>0.00035</b>	<b>36.02</b>	<b>0.00497</b>

Table H.2.NFA/NPA.Ts.GHG.2025-8. 2025 No Federal Action/No Project Alternative Summary of Tug Average Daily GHG Emissions (Tesoro).

Mode	Equipment	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
Tug Assist	Main Engines	0.0027	269.3520	0.0372
Tug Assist	Aux Generator	0.00035	36.01800	0.00497
<b>TOTAL</b>		<b>0.0030</b>	<b>305.37</b>	<b>0.0421</b>

Mode	Equipment	N <sub>2</sub> O Emissions (tons/day)	CO <sub>2</sub> Emissions (tons/day)	CH <sub>4</sub> Emissions (tons/day)
Tug Assist	Main Engines	7.28E-06	7.38E-01	1.02E-04
Tug Assist	Aux Generator	9.72E-07	9.87E-02	1.36E-05
<b>TOTAL</b>		<b>8.25E-06</b>	<b>8.37E-01</b>	<b>1.15E-04</b>

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Table H.2.NFA/NPA.Ts.GHG.2025-9. 2025 No Federal Action/No Project Alternative VDU Crude Average Daily GHG Emissions (Tesoro).

	Annual Vessel Calls	crude vapors from tanks(scf/call)	annual gas usage (mmscf/yr)	mw crude vapors	destruction efficiency
Aframax	87	224000	19.5	50	98%
<b>TOTAL</b>	<b>87</b>		<b>19.5</b>		

<b>Assumed Distribution based on tank storage volume:</b>
<b>Site 1 12.5%</b>
<b>Site 2 87.5%</b>

Annual Average (tons/yr)

	N <sub>2</sub> O	CO <sub>2</sub>	CH <sub>4</sub>
EF (kg/MMBtu)	0.0001	52.78	0.0059
Aframax	0.0020	1049.15	0.1173
<b>TOTAL</b>	<b>0.0020</b>	<b>1049.1482</b>	<b>0.1173</b>

Annual Average (tons/yr)

	N <sub>2</sub> O	CO <sub>2</sub>	CH <sub>4</sub>
Site 1	0.0002	131.14	0.01
Site 2	0.0017	918.0	0.1

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.NFA/NPA.Ts.GHG.2025-10. 2025 No Federal Action/No Project Alternative VDU Legs Average Daily GHG Emissions (Tesoro).

	tanks	crude vapors from tanks on legs(scf/yr)	annual gas usage (mmscf/yr)	mw crude vapors	destruction efficiency
Site 1	4	8640000	34.6	50	98%
Site 2	14	8640000	121.0	50	98%
<b>TOTAL</b>	<b>18</b>		<b>155.5</b>		

48	hr/event
6	events/yr
500	ft3/min

Annual Average (tons/yr)

	N <sub>2</sub> O	CO <sub>2</sub>	CH <sub>4</sub>
EF (kg/MMBtu)	0.0001	52.78	0.0059
<b>TOTAL</b>	<b>0.016</b>	<b>8372.513</b>	<b>0.936</b>

*Assumed a ratio of 500/1000 based on the corresponding Btu values with respect to natural gas combustion emission factors.*

Annual Average (tons/yr)

	N <sub>2</sub> O	CO <sub>2</sub>	CH <sub>4</sub>
Site 1	0.0035	1860.6	0.2
Site 2	0.012	6512.0	0.7

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**Table H.2.NFA/NPA.Ts.GHG.2025-11. 2025 No Federal Action/No Project Alternative VDU Average Daily GHG Emissions (Tesoro).**

Annual Average (tons/yr)

	<b>N<sub>2</sub>O</b>	<b>CO<sub>2</sub></b>	<b>CH<sub>4</sub></b>
Site 1	0.004	1992	0.22
Site 2	0.014	7430	0.83
<b>Total</b>	<b>0.018</b>	<b>9,422</b>	<b>1.05</b>

Daily Average (tons/day)

	<b>N<sub>2</sub>O</b>	<b>CO<sub>2</sub></b>	<b>CH<sub>4</sub></b>
Site 1	1.03E-05	5.457	6.10E-04
Site 2	3.86E-05	20.356	2.28E-03
<b>Total</b>	<b>4.89E-05</b>	<b>26</b>	<b>2.89E-03</b>

**Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR**

**Table H.2.NFA/NPA.Ts.GHG.2025-12. 2025 No Federal Action/No Project Alternative Tesoro Berth Summary.**

<b>Operation</b>	<b>N<sub>2</sub>O Emissions (tons/yr)</b>	<b>CO<sub>2</sub> Emissions (tons/yr)</b>	<b>CH<sub>4</sub> Emissions (tons/yr)</b>	<b>CO<sub>2</sub>e Emissions (tons/yr)</b>
Tanker Cruising and Manuevering	0.0225	2286.37	0.3154	2299.98
Tanker Hoteling	0.0370	4183.41	0.5516	4206.48
Offloading Emissions	0.0940	9535.56	1.3149	9592.31
Transiting Operations	0.0017	177.35	0.0245	178.40
Tug Assistance	0.0030	305.37	0.0421	307.19
Tanks	---	---	---	---
Vapor Destruction Units	0.0179	9421.66	1.0532	9449.31
Valves, Flanges, Pumps	---	---	---	---
<b>TOTAL</b>	<b>0.1762</b>	<b>25909.71</b>	<b>3.3017</b>	<b>26033.67</b>

<b>Operation</b>	<b>N<sub>2</sub>O Emissions (tons/day)</b>	<b>CO<sub>2</sub> Emissions (tons/day)</b>	<b>CH<sub>4</sub> Emissions (tons/day)</b>	<b>CO<sub>2</sub>e Emissions (tons/day)</b>
Tanker Cruising and Manuevering	6.18E-05	6.26	8.64E-04	6.30
Tanker Hoteling	1.01E-04	11.46	1.51E-03	11.52
Offloading Emissions	2.58E-04	26.12	3.60E-03	26.28
Transiting Operations	4.79E-06	0.49	6.70E-05	0.49
Tug Assistance	8.25E-06	0.84	1.15E-04	0.84
Tanks	---	---	---	---
Vapor Destruction Units	4.89E-05	25.81	2.89E-03	25.89
Valves, Flanges, Pumps	---	---	---	---
<b>TOTAL</b>	<b>4.83E-04</b>	<b>70.99</b>	<b>9.05E-03</b>	<b>71.33</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.NFA/NPA.Ex.GHG.2025-1. 2025 No Federal Action/No Project Alternative Main Engines Average Daily GHG Emissions (Exxon Mobil).

Ship	Direction	Mode	Distance (nautical miles)	Ship speed (knots)	Activity (hours)	Maximum Speed (knots)	Load Factor	MCR (kW)	Energy (kW-hr)	Energy (MMBtu)	Shipcalls (vessels/ yr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
PANAMAX	South In	Cruising - CW to VSR	23	12	1.92	15.8	0.438	10,300	8,649	30	146	0.0058	588.00	0.0811	0.0073	742.48	0.1024
		Cruising - VSR to PZ	11	12	0.92	15.8	0.438	10,300	4,136	14	146	0.0058	588.00	0.0811	0.0035	355.10	0.0490
		Cruising - PZ to Pilot	4.7	7	0.67	15.8	0.087	10,300	601	2	146	0.0058	588.00	0.0811	0.0005	51.63	0.0071
		Maneuvering - Pilot to Berth		3	1.00	15.8	0.007	10,300	71	0	146	0.0064	647.00	0.0895	0.0001	6.66	0.0009
PANAMAX	South Out	Maneuvering - Berth to Pilot		5	1.00	15.8	0.032	10,300	326	1	146	0.0064	647.00	0.0895	0.0003	30.83	0.0043
		Cruising - Pilot to PZ	3.5	7	0.50	15.8	0.087	10,300	448	2	146	0.0058	588.00	0.0811	0.0004	38.45	0.0053
		Cruising - PZ to VSR	12.5	12	1.04	15.8	0.438	10,300	4,700	16	146	0.0058	588.00	0.0811	0.0040	403.52	0.0557
		Cruising - VSR to CW	24.5	12	2.04	15.8	0.438	10,300	9,213	31	146	0.0058	588.00	0.0811	0.0078	790.91	0.1091
<b>TOTAL</b>															<b>0.0239</b>	<b>2419.58</b>	<b>0.3337</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.NFA/NPA.Ex.GHG.2025-2. 2025 No Federal Action/No Project Alternative Auxiliary Generator Average Daily Unmitigated Emissions (Exxon Mobil).

Ship	Direction	Mode	Activity (hours)	MCR (kW)	Load Factor	Energy (kW-hr)	Energy (MMBtu)	Shipcalls (vessels/yr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
PANAMAX	South In	Cruising	3.50	3,600	0.28	3,528	12	146	0.0068	690.00	0.0952	0.0035	355.41	0.0490
		Maneuvering	2.00	3,600	0.28	2,016	7	146	0.0068	690.00	0.0952	0.0020	203.09	0.0280
PANAMAX	South Out	Maneuvering	1.5	3,600	0.28	1,512	5	146	0.0068	690.00	0.0952	0.0015	152.32	0.0210
		Cruising	3.58	3,600	0.28	3,609	12	146	0.0068	690.00	0.0952	0.0036	363.53	0.0502
<b>TOTAL</b>												<b>0.0106</b>	<b>1074.36</b>	<b>0.1482</b>



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Table H.2.NFA/NPA.Ex.GHG.2025-3. 2025 No Federal Action/No Project Alternative Boiler Warm-Up Average Daily GHG Emissions (Exxon Mobil).

Shipcalls (vessels/yr)	Vessel Size	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	Fuel Consumption (gal/yr)	N <sub>2</sub> O Emission Factor (lb/ton)	CO <sub>2</sub> Emission Factor (lb/ton)	CH <sub>4</sub> Emission Factor (lb/ton)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
146.0	Panamax	0.20	59.91	30%	3	35,000	122,293	0.0068	690.00	0.0952	0.00120	122.16	0.0169
<b>TOTAL</b>											<b>0.00120</b>	<b>122.16</b>	<b>0.0169</b>

Table H.2.NFA/NPA.Ex.GHG.2025-4. 2025 No Federal Action/No Project Alternative Berth Operations Average Daily GHG Emissions (Exxon Mobil)

**Auxiliary Generator Pre-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	Energy (MMBtu)	Heating Value (MMBtu/1000 gal)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
146.0	Panamax	300,000	0.20	3,600	28%	2.5	8.6	150	0.0064	722.0	0.0952	0.0083	948.71	0.1251

AMP Reduction 70% TOTAL 0.0025 284.61 0.0375

**Boiler Pre-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bb/hr)	Fuel Consumption (gal/yr)	N <sub>2</sub> O Emission Factor (lb/ton)	CO <sub>2</sub> Emission Factor (lb/ton)	CH <sub>4</sub> Emission Factor (lb/ton)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
146.0	Panamax	300,000	0.20	59.91	30%	2.5	35,000	101,911	0.0627	6,360.0	0.8770	0.0093	938.33	0.1294

TOTAL 0.0093 938.33 0.1294

**Auxiliary Generator Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	Energy (MMBtu)	Heating Value (MMBtu/1000 gal)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
146.0	Panamax	300,000	0.20	3,600	56%	11.0	75.7	140	0.0064	722.0	0.0952	0.0370	4174.32	0.5504

AMP Reduction 70% TOTAL 0.0111 1252.29 0.1651

**Boiler Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Inerting Fuel Consumption Savings (lb/1000 bbl offloaded)	Activity Time (hr)	Pumping Rate (bb/hr)	Fuel Consumption (gal/yr)	N <sub>2</sub> O Emission Factor (lb/ton)	CO <sub>2</sub> Emission Factor (lb/ton)	CH <sub>4</sub> Emission Factor (lb/ton)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
146.0	Panamax	300,000	0.20	59.91	28.06	11.0	35,000	448,408	0.0627	6,360.0	0.8770	0.0407	4128.65	0.5693

TOTAL 0.0407 4128.65 0.5693

**Auxiliary Generator Post-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	Energy (MMBtu)	Heating Value (MMBtu/1000 gal)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
146.0	Panamax	300,000	0.20	3,600	28%	1.0	3.4	150	0.0064	722.0	0.0952	0.0034	379.48	0.0500

AMP Reduction 70% TOTAL 0.0010 113.84 0.0150

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Table H.2.NFA/NPA.Ex.GHG.2025-5. 2025 No Federal Action/No Project Alternative Summary of Berth Operations Average Daily GHG Emissions (Exxon Mobil).

Mode	Equipment	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
Cruising	Main Engines	2.35E-02	2382.09	3.29E-01
Cruising	Aux Generator	7.09E-03	718.95	9.92E-02
Maneuvering	Main Engines	3.70E-04	37.49	5.19E-03
Maneuvering	Aux Generator	3.50E-03	355.41	4.90E-02
Boiler Warm-up	Boiler	1.20E-03	122.16	1.69E-02
Berth Operations	Boiler	5.00E-02	5066.98	6.99E-01
Berth Operations	Aux Generator	1.46E-02	1650.75	2.18E-01
Propulsion	TOTAL	3.45E-02	3493.94	4.82E-01
Non-Propulsion	TOTAL	0.07	6839.89	0.93
<b>Total Emissions</b>		<b>1.00E-01</b>	<b>10333.83</b>	<b>1.42E+00</b>

Mode	Equipment	N <sub>2</sub> O Emissions (tons/day)	CO <sub>2</sub> Emissions (tons/day)	CH <sub>4</sub> Emissions (tons/day)
Cruising	Main Engines	6.44E-05	6.53	9.00E-04
Cruising	Aux Generator	1.94E-05	1.97	2.72E-04
Maneuvering	Main Engines	1.01E-06	0.10	1.42E-05
Maneuvering	Aux Generator	9.60E-06	0.97	1.34E-04
Boiler Warm-up	Boiler	3.30E-06	0.33	4.62E-05
Berth Operations	Boiler	1.37E-04	13.88	1.91E-03
Berth Operations	Aux Generator	4.00E-05	4.52	5.96E-04
Propulsion	TOTAL	9.44E-05	9.57	1.32E-03
Non-Propulsion	TOTAL	1.80E-04	18.74	2.56E-03
<b>Total Emissions</b>		<b>2.75E-04</b>	<b>28.31</b>	<b>3.88E-03</b>

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Table H.2.NFA/NPA.Ex.GHG.2025-6. 2025 No Federal Action/No Project Alternative Tug Main Engines Average Daily GHG Emissions (Exxon Mobil).

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Energy (kWh)	Energy (MMBtu)	Shipcalls (vessels/yr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
PANAMAX	Maneuvering - Pilot to Berth	1.00	2	4,800	0.50	2400	8.2	146.0	0.00636	645.0	0.0890	0.0022	226.01	0.0312
	Maneuvering - Berth to Pilot	1.00	2	4,800	0.50	2400	8.2	146.0	0.00636	645.0	0.0890	0.0022	226.01	0.0312
TOTAL												0.0045	452.02	0.0624

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Table H.2.NFA/NPA.Ex.GHG.2025-7. 2025 No Federal Action/No Project Alternative Tug Auxiliary Generator Engines Average Daily Unmitigated Emissions (Exxon Mobil).

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Energy (kWh)	Energy (MMBtu)	Shipcalls (vessels/yr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
PANAMAX	Maneuvering - Pilot to Berth	1.00	2	300	1.00	300	1.0	146.0	0.0068	690.0	0.0952	0.00030	30.22200	0.0042
	Maneuvering - Berth to Pilot	1.00	2	300	1.00	300	1.0	146.0	0.0068	690.0	0.0952	0.00030	30.22200	0.0042
TOTAL												0.00060	60.44	0.0083

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Table H.2.NFA/NPA.Ex.GHG.2025-8. 2025 No Federal Action/No Project Alternative Summary of Tug Average Daily GHG Emissions (Exxon Mobil).

Mode	Equipment	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
Tug Assist	Main Engines	0.0045	452.02	0.0624
Tug Assist	Aux Generator	0.00060	60.44	0.0083
<b>TOTAL</b>		<b>0.0051</b>	<b>512.46</b>	<b>0.0707</b>

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Table H.2.NFA/NPA.Ex.GHG.2025-9. 2025 No Federal Action/No Project Alternative VDU Crude Average Daily GHG Emissions (Exxon Mobil).

	Annual Vessel Calls	crude vapors from tanks(scf/call)	annual gas usage (mmscf/yr)	mw crude vapors	destruction efficiency
Aframax	146	224000	32.7	50	98%
<b>TOTAL</b>	<b>146</b>		<b>32.7</b>		

Assumed Distribution based on tank storage volume:	
Site 1	12.5%
Site 2	87.5%

Annual Average (tons/yr)

	N <sub>2</sub> O	CO <sub>2</sub>	CH <sub>4</sub>
EF (kg/MMBtu)	0.0001	52.78	0.0059
Panamax	0.0033	1760.64	0.1968
<b>TOTAL</b>	<b>0.0033</b>	<b>1760.6395</b>	<b>0.1968</b>

Annual Average (tons/yr)

	N <sub>2</sub> O	CO <sub>2</sub>	CH <sub>4</sub>
Site 1	0.0004	220.08	0.02
Site 2	0.0029	1540.6	0.2

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Table H.2.NFA/NPA.Ex.GHG.2025-10. 2025 No Federal Action/No Project Alternative VDU Legs Average Daily GHG Emissions (Exxon Mobil).

	tanks	crude vapors from tanks on legs(scf/yr)	annual gas usage (mmscf/yr)	mw crude vapors	destruction efficiency
Site 1	4	8640000	34.6	50	98%
Site 2	14	8640000	121.0	50	98%
<b>TOTAL</b>	<b>18</b>		<b>155.5</b>		

48	hr/event
6	events/yr
500	ft3/min

Annual Average (tons/yr)

	N <sub>2</sub> O	CO <sub>2</sub>	CH <sub>4</sub>
EF (kg/MMBtu)	0.0001	52.78	0.0059
<b>TOTAL</b>	<b>0.016</b>	<b>8372.513</b>	<b>0.936</b>

*Assumed a ratio of 500/1000 based on the corresponding Btu values with respect to natural gas combustion emission factors.*

Annual Average (tons/yr)

	N <sub>2</sub> O	CO <sub>2</sub>	CH <sub>4</sub>
Site 1	0.0035	1860.6	0.2
Site 2	0.012	6512.0	0.7



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Table H.2.NFA/NPA.Ex.GHG.2025-11. 2025 No Federal Action/No Project Alternative VDU Average Daily GHG Emissions (Exxon Mobil).

Annual Average (tons/yr)

	<b>N<sub>2</sub>O</b>	<b>CO<sub>2</sub></b>	<b>CH<sub>4</sub></b>
Site 1	0.004	2081	0.23
Site 2	0.015	8053	0.90
<b>Total</b>	<b>0.019</b>	<b>10,133</b>	<b>1.13</b>

Daily Average (tons/day)

	<b>N<sub>2</sub>O</b>	<b>CO<sub>2</sub></b>	<b>CH<sub>4</sub></b>
Site 1	1.08E-05	5.700	6.37E-04
Site 2	4.18E-05	22.062	2.47E-03
<b>Total</b>	<b>5.26E-05</b>	<b>28</b>	<b>3.10E-03</b>

**Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR**

**Table H.2.NFA/NPA.Ex.GHG.2025-12. 2025 No Federal Action/No Project Alternative Exxon Mobil Berth Summary.**

<b>Operation</b>	<b>N<sub>2</sub>O Emissions (tons/yr)</b>	<b>CO<sub>2</sub> Emissions (tons/yr)</b>	<b>CH<sub>4</sub> Emissions (tons/yr)</b>	<b>CO<sub>2</sub>e Emissions (tons/yr)</b>
Tanker Cruising and Manuevering	0.0345	3493.94	0.4820	3514.74
Tanker Hoteling	0.0146	1650.75	0.2177	1659.85
Offloading Emissions	0.0500	5066.98	0.6987	5097.14
Transiting Operations	0.0012	122.16	0.0169	122.89
Tug Assistance	0.0051	512.46	0.0707	515.51
Tanks	---	---	---	---
Vapor Destruction Units	0.0192	10133.15	1.1327	10162.89
Valves, Flanges, Pumps	---	---	---	---
<b>TOTAL</b>	<b>0.1245</b>	<b>20979.44</b>	<b>2.6186</b>	<b>21073.02</b>

<b>Operation</b>	<b>N<sub>2</sub>O Emissions (tons/day)</b>	<b>CO<sub>2</sub> Emissions (tons/day)</b>	<b>CH<sub>4</sub> Emissions (tons/day)</b>	<b>CO<sub>2</sub>e Emissions (tons/day)</b>
Tanker Cruising and Manuevering	9.44E-05	9.57	1.32E-03	9.63
Tanker Hoteling	4.00E-05	4.52	5.96E-04	4.55
Offloading Emissions	1.37E-04	13.88	1.91E-03	13.96
Transiting Operations	3.30E-06	0.33	4.62E-05	0.34
Tug Assistance	1.38E-05	1.40	1.94E-04	1.41
Tanks	---	---	---	---
Vapor Destruction Units	5.26E-05	27.76	3.10E-03	27.84
Valves, Flanges, Pumps	---	---	---	---
<b>TOTAL</b>	<b>3.41E-04</b>	<b>57.48</b>	<b>7.17E-03</b>	<b>57.73</b>

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Table H.2.NFA/NPA.BP.GHG.2040-1. 2040 No Federal Action/No Project Alternative Main Engines Average Daily GHG Emissions (BP).

Ship	Direction	Mode	Distance (nautical miles)	Ship speed (knots)	Activity (hours)	Maximum Speed (knots)	Load Factor	MCR (kW)	Energy (kW-hr)	Shipcalls (vessels/ yr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
AFRAMAX	South In	Cruising - CW to VSR	23	12	1.92	16.1	0.414	12,477	9,902	34	0.0058	588.00	0.0811	0.0020	197.96	0.0273
		Cruising - VSR to PZ	11	12	0.92	16.1	0.414	12,477	4,736	34	0.0058	588.00	0.0811	0.0009	94.68	0.0131
		Cruising - PZ to Pilot	4.7	7	0.67	16.1	0.082	12,477	689	34	0.0058	588.00	0.0811	0.0001	13.77	0.0019
	South Out	Maneuvering - Pilot to Berth	3	3	1.00	16.1	0.006	12,477	81	34	0.0064	647.00	0.0895	0.0000	1.78	0.0002
		Maneuvering - Berth to Pilot	5	5	1.00	16.1	0.030	12,477	374	34	0.0064	647.00	0.0895	0.0001	8.22	0.0011
		Cruising - Pilot to PZ	3.5	7	0.50	16.1	0.082	12,477	513	34	0.0058	588.00	0.0811	0.0001	10.25	0.0014
		Cruising - PZ to VSR	12.5	12	1.04	16.1	0.414	12,477	5,382	34	0.0058	588.00	0.0811	0.0011	107.59	0.0148
		Cruising - VSR to CW	24.5	12	2.04	16.1	0.414	12,477	10,548	34	0.0058	588.00	0.0811	0.0021	210.87	0.0291
		<b>TOTAL</b>										<b>0</b>	<b>4,822</b>	<b>1</b>	<b>0.0064</b>	<b>645.11</b>

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Table H.2.NFA/NPA.BP.GHG.2040-2. 2040 No Federal Action/No Project Alternative Auxiliary Generator Average Daily Unmitigated Emissions (BP).

Ship	Direction	Mode	Activity (hours)	MCR (kW)	Load Factor	Energy (kW-hr)	Shipcalls (vessels/yr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
AFRAMAX	South In	Cruising	3.50	3,600	0.28	3,533	34	0.0068	690.00	0.0952	0.0008	82.8795	0.0114
		Maneuvering	2.00	3,600	0.28	2,016	34	0.0068	690.00	0.0952	0.0005	47.2954	0.0065
	South Out	Maneuvering	1.5	3,600	0.28	1,512	34	0.0068	690.00	0.0952	0.0003	35.4715	0.0049
		Cruising	3.50	3,600	0.28	3,528	34	0.0068	690.00	0.0952	0.0008	82.7669	0.0114
<b>TOTAL</b>								<b>0</b>	<b>2,760</b>	<b>0</b>	<b>0.0024</b>	<b>248.41</b>	<b>0.0343</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.NFA/NPA.BP.GHG.2040-3. 2040 No Federal Action/No Project Alternative Boiler Warm-Up Average Daily GHG Emissions (BI

Shipcalls (vessels/yr)	Vessel Size	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	Fuel Consumption (gal/yr)	N <sub>2</sub> O Emission Factor (lb/ton)	CO <sub>2</sub> Emission Factor (lb/ton)	CH <sub>4</sub> Emission Factor (lb/ton)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
34.0	Aframax	0.20	102.17	30%	3	50,000	69,383	0.0068	690.00	0.0952	0.00068	69.30760	0.00956
TOTAL								0	690	0	0.00068	69.31	0.0096

Table H.2.NFA/NPA.BP.GHG.2040-4. 2040 No Federal Action/No Project Alternative Berth Operations Average Daily GHG Emissions (BP).

Auxiliary Generator Pre-Pumpin

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
34.0	Aframax	400,000	0.20	3,600	28%	2.5	0.0064	722.0	0.0952	0.00194	220.93	0.0291

AMP Reduction 0%  
 TOTAL 0 722 0 0.00194 220.93 0.0291

Boiler Pre-Pumpin

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	Fuel Consumption (gal/yr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
34.0	Aframax	400,000	0.20	102.17	30%	2.5	50,000	57,819	0.0627	6,360.0	0.8770	0.00525	532.36	0.07341

TOTAL 0.0627 6,360.00 0.8770 0.00525 532.36 0.0734

Auxiliary Generator Pumpin

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
34.0	Aframax	400,000	0.20	3,600	56%	15.0	0.0064	722.00	0.0952	0.0118	1,325.5920	0.1748

AMP Reduction 0%  
 TOTAL 0.0064 722.00 0.0952 0.0118 1,325.59 0.1748

Boiler Pumpin

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Inerting Fuel Consumption Savings (lb/1000 bbl offloaded)	Activity Time (hr)	Pumping Rate (bbl/hr)	Fuel Consumption (gal/yr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
34.0	Aframax	400,000	0.20	102.17	28.06	15.0	50,000	346,915	0.0627	6,360.00	0.8770	0.0315	3,194.18	0.4405

TOTAL 0 6,360 1 0.0315 3,194.18 0.4405

Auxiliary Generator Post-Pumpin

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
34.0	Aframax	400,000	0.20	3,600	28%	1.0	0.0064	722.00	0.0952	0.00078	88.37280	0.01165

AMP Reduction 0%  
 TOTAL 0.0064 722.00 0.0952 0.00078 88.37 0.0117

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.NFA/NPA.BP.GHG.2040-5. 2040 No Federal Action/No Project Alternative Summary of Berth Operations Average Daily GHG Emissions (BP).

Mode	Equipment	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
Cruising	Main Engines	0.0063	635.1122	0.0876
Cruising	Aux Generator	0.0016	165.6464	0.0229
Maneuvering	Main Engines	0.0001	9.9968	0.0014
Maneuvering	Aux Generator	0.0008	82.7669	0.0114
Boiler Warm-up	Boiler	0.0007	69.3076	0.0096
Berth Operations	Boiler	0.0367	3726.5391	0.5139
Berth Operations	Aux Generator	0.0145	1634.8968	0.2156
Propulsion	TOTAL	0.0088	893.52	0.1233
Non-Propulsion	TOTAL	0.0519	5430.74	0.7390
<b>Total Emissions</b>		<b>0.0607</b>	<b>6324.27</b>	<b>0.8623</b>

Mode	Equipment	N <sub>2</sub> O Emissions (tons/day)	CO <sub>2</sub> Emissions (tons/day)	CH <sub>4</sub> Emissions (tons/day)
Cruising	Main Engines	0.0000	1.74	0.0002
Cruising	Aux Generator	0.0000	0.45	0.0001
Maneuvering	Main Engines	0.0000	0.03	0.0000
Maneuvering	Aux Generator	0.0000	0.23	0.0000
Boiler Warm-up	Boiler	0.0000	0.19	0.0000
Berth Operations	Boiler	0.0001	10.21	0.0014
Berth Operations	Aux Generator	0.0000	4.48	0.0006
Propulsion	TOTAL	0.0000	2.45	0.0003
Non-Propulsion	TOTAL	0.0001	14.88	0.0020
<b>Total Emissions</b>		<b>0.0002</b>	<b>17.33</b>	<b>0.0024</b>

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Table H.2.NFA/NPA.BP.GHG.2040-6. 2040 No Federal Action/No Project Alternative Tug Main Engines Average Daily GHG Emissions (BP).

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Energy (kWh)	Energy (MMBtu)	Shipcalls (vessels/yr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
AFRAMAX	Maneuvering - Pilot to Berth	1.00	2	4,800	0.50	2400	8.2	34.0	0.00636	645.0	0.0890	0.0005	52.6320	0.0073
	Maneuvering - Berth to Pilot	1.00	2	4,800	0.50	2400	8.2	34.0	0.00636	645.0	0.0890	0.0005	52.6320	0.0073
<b>TOTAL</b>												<b>0.0010</b>	<b>105.2640</b>	<b>0.0145</b>



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Table H.2.NFA/NPA.BP.GHG.2040-7. 2040 No Federal Action/No Project Alternative Tug Auxiliary Generator Engines Average Daily Unmitigated Emissions (BP).

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Energy (kWh)	Energy (MMBtu)	Shipcalls (vessels/yr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
AFRAMAX	Maneuvering - Pilot to Berth	1.00	2	300	1.00	300	1.0	34.0	0.0068	690.0	0.0952	0.00007	7.03800	0.00097
	Maneuvering - Berth to Pilot	1.00	2	300	1.00	300	1.0	34.0	0.0068	690.0	0.0952	0.00007	7.03800	0.00097
<b>TOTAL</b>												<b>0.00014</b>	<b>14.08</b>	<b>0.00194</b>

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**Table H.2.NFA/NPA.BP.GHG.2040-8.**

**2040 No Federal Action/No Project Alternative Summary of Tug Average Daily GHG Emissions (BP)**

<b>Mode</b>	<b>Equipment</b>	<b>N<sub>2</sub>O Emissions (tons/yr)</b>	<b>CO<sub>2</sub> Emissions (tons/yr)</b>	<b>CH<sub>4</sub> Emissions (tons/yr)</b>
Tug Assist	Main Engines	0.0010	105.2640	0.0145
Tug Assist	Aux Generator	0.00014	14.07600	0.00194
<b>TOTAL</b>		<b>0.0012</b>	<b>119.34</b>	<b>0.0165</b>

<b>Mode</b>	<b>Equipment</b>	<b>N<sub>2</sub>O Emissions (tons/day)</b>	<b>CO<sub>2</sub> Emissions (tons/day)</b>	<b>CH<sub>4</sub> Emissions (tons/day)</b>
Tug Assist	Main Engines	2.84E-06	2.88E-01	3.98E-05
Tug Assist	Aux Generator	3.80E-07	3.86E-02	5.32E-06
<b>TOTAL</b>		<b>3.22E-06</b>	<b>3.27E-01</b>	<b>4.51E-05</b>

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Table H.2.NFA/NPA.BP.GHG.2040-9. 2040 No Federal Action/No Project Alternative VDU Crude Average Daily GHG Emissions (BP).

	Annual Vessel Calls	crude vapors from tanks(scf/call)	annual gas usage (mmscf/yr)	mw crude vapors	destruction efficiency
Aframax	34	224000	7.6	50	98%
<b>TOTAL</b>	<b>34</b>		<b>7.6</b>		

<b>Assumed Distribution based on tank storage volume:</b>	
<b>Site 1</b>	<b>12.5%</b>
<b>Site 2</b>	<b>87.5%</b>

Annual Average (tons/yr)

	N <sub>2</sub> O	CO <sub>2</sub>	CH <sub>4</sub>
EF (kg/MMBtu)	0.0001	52.78	0.0059
Aframax	0.0008	410.01	0.0458
<b>TOTAL</b>	<b>0.0008</b>	<b>410.0119</b>	<b>0.0458</b>

Annual Average (tons/yr)

	N <sub>2</sub> O	CO <sub>2</sub>	CH <sub>4</sub>
Site 1	0.0001	51.25	0.01
Site 2	0.0007	358.8	0.0

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Table H.2.NFA/NPA.BP.GHG.2040-10. 2040 No Federal Action/No Project Alternative VDU Legs Average Daily GHG Emissions (BP).

	tanks	crude vapors from tanks on legs(scf/yr)	annual gas usage (mmscf/yr)	mw crude vapors	destruction efficiency
Site 1	4	8640000	34.6	50	98%
Site 2	14	8640000	121.0	50	98%
<b>TOTAL</b>	<b>18</b>		<b>155.5</b>		

48	hr/event
6	events/yr
500	ft3/min

Annual Average (tons/yr)

	N <sub>2</sub> O	CO <sub>2</sub>	CH <sub>4</sub>
EF (kg/MMBtu)	0.0001	52.78	0.0059
<b>TOTAL</b>	<b>0.016</b>	<b>8372.513</b>	<b>0.936</b>

*Assumed a ratio of 500/1000 based on the corresponding Btu values with respect to natural gas combustion emission factors.*

Annual Average (tons/yr)

	N <sub>2</sub> O	CO <sub>2</sub>	CH <sub>4</sub>
Site 1	0.0035	1860.6	0.2
Site 2	0.012	6512.0	0.7

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Table H.2.NFA/NPA.BP.GHG.2040-11. 2040 No Federal Action/No Project Alternative VDU Average Daily GHG Emissions (BP).

Annual Average (tons/yr)

	<b>N<sub>2</sub>O</b>	<b>CO<sub>2</sub></b>	<b>CH<sub>4</sub></b>
Site 1	0.004	1912	0.21
Site 2	0.013	6871	0.77
<b>Total</b>	<b>0.017</b>	<b>8,783</b>	<b>0.98</b>

Daily Average (tons/day)

	<b>N<sub>2</sub>O</b>	<b>CO<sub>2</sub></b>	<b>CH<sub>4</sub></b>
Site 1	9.92E-06	5.238	5.86E-04
Site 2	3.57E-05	18.824	2.10E-03
<b>Total</b>	<b>4.56E-05</b>	<b>24</b>	<b>2.69E-03</b>

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Table H.2.NFA/NPA.BP.GHG.2040-12. 2040 No Federal Action/No Project Alternative BP Berth Summary.

Operation	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)	CO <sub>2</sub> e Emissions (tons/yr)
Tanker Cruising and Manuevering	0.0088	893.52	0.1233	898.84
Tanker Hoteling	0.0145	1,634.90	0.2156	1643.91
Offloading Emissions	0.0367	3,726.54	0.5139	3748.72
Transiting Operations	0.0007	69.31	0.0096	69.72
Tug Assistance	0.0012	119.34	0.0165	120.05
Tanks	---	---	---	---
Vapor Destruction Units	0.0166	8,782.52	0.9818	8808.30
Valves, Flanges, Pumps	---	---	---	---
<b>TOTAL</b>	<b>0.0785</b>	<b>15,226.13</b>	<b>1.8605</b>	<b>15289.54</b>

Operation	N <sub>2</sub> O Emissions (tons/day)	CO <sub>2</sub> Emissions (tons/day)	CH <sub>4</sub> Emissions (tons/day)	CO <sub>2</sub> e Emissions (tons/day)
Tanker Cruising and Manuevering	2.41E-05	2.45	3.38E-04	2.46
Tanker Hoteling	3.97E-05	4.48	5.91E-04	4.50
Offloading Emissions	1.01E-04	10.21	1.41E-03	10.27
Transiting Operations	1.87E-06	0.19	2.62E-05	0.19
Tug Assistance	3.22E-06	0.33	4.51E-05	0.33
Tanks	---	---	---	---
Vapor Destruction Units	4.56E-05	24.06	2.69E-03	24.13
Valves, Flanges, Pumps	---	---	---	---
<b>TOTAL</b>	<b>2.15E-04</b>	<b>41.72</b>	<b>5.10E-03</b>	<b>41.89</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.NFA/NPA.Ts.GHG.2040-1. 2040 No Federal Action/No Project Alternative Main Engines Average Daily GHG Emissions (Tesoro).

Ship	Direction	Mode	Distance (nautical miles)	Ship speed (knots)	Activity (hours)	Maximum Speed (knots)	Load Factor	MCR (kW)	Energy (kW-hr)	Shipcalls (vessels/ yr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)	
AFRAMAX	South In	Cruising - CW to VSR	23	12	1.92	16.1	0.414	12,477	9,902	87	0.0058	588.00	0.0811	0.0050	506.55	0.0699	
		Cruising - VSR to PZ	11	12	0.92	16.1	0.414	12,477	4,736	87	0.0058	588.00	0.0811	0.0024	242.26	0.0334	
		Cruising - PZ to Pilot	4.7	7	0.67	16.1	0.082	12,477	689	87	0.0058	588.00	0.0811	0.0003	35.22	0.0049	
			Maneuvering - Pilot to Berth		3	1.00	16.1	0.006	12,477	81	87	0.0064	647.00	0.0895	0.0000	4.54	0.0006
	South Out	Maneuvering - Berth to Pilot		5	1.00	16.1	0.030	12,477	374	87	0.0064	647.00	0.0895	0.0002	21.04	0.0029	
		Cruising - Pilot to PZ	3.5	7	0.50	16.1	0.082	12,477	513	87	0.0058	588.00	0.0811	0.0003	26.23	0.0036	
		Cruising - PZ to VSR	12.5	12	1.04	16.1	0.414	12,477	5,382	87	0.0058	588.00	0.0811	0.0027	275.30	0.0380	
Cruising - VSR to CW		24.5	12	2.04	16.1	0.414	12,477	10,548	87	0.0058	588.00	0.0811	0.0053	539.58	0.0744		
<b>TOTAL</b>											<b>0</b>	<b>4,822</b>	<b>1</b>	<b>0.0163</b>	<b>1,650.72</b>	<b>0.2277</b>	

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.NFA/NPA.Ts.GHG.2040-2. 2040 No Federal Action/No Project Alternative Auxiliary Generator Average Daily Unmitigated Emissions (Tesoro).

Ship	Direction	Mode	Activity (hours)	MCR (kW)	Load Factor	Energy (kW-hr)	Shipcalls (vessels/yr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
AFRAMAX	South In	Cruising	3.50	3,600	0.28	3,533	87	0.0068	690.00	0.0952	0.0021	212.0740	0.0293
		Maneuvering	2.00	3,600	0.28	2,016	87	0.0068	690.00	0.0952	0.0012	121.0205	0.0167
	South Out	Maneuvering	1.5	3,600	0.28	1,512	87	0.0068	690.00	0.0952	0.0009	90.7654	0.0125
		Cruising	3.50	3,600	0.28	3,528	87	0.0068	690.00	0.0952	0.0021	211.7858	0.0292
<b>TOTAL</b>								<b>0</b>	<b>2,760</b>	<b>0</b>	<b>0.0063</b>	<b>635.65</b>	<b>0.0877</b>



Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.NFA/NPA.Ts.GHG.2040-3. 2040 No Federal Action/No Project Alternative Boiler Warm-Up Average Daily GHG Emissions (Tesoro).

Shipcalls (vessels/yr)	Vessel Size	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	Fuel Consumption (gal/yr)	N <sub>2</sub> O Emission Factor (lb/ton)	CO <sub>2</sub> Emission Factor (lb/ton)	CH <sub>4</sub> Emission Factor (lb/ton)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
87.0	Aframax	0.20	102.17	30%	3	50,000	177,539	0.0068	690.00	0.0952	0.00175	177.34592	0.02447
TOTAL								0	690	0	0.00175	177.35	0.0245

Table H.2.NFA/NPA.Ts.GHG.2040-4. 2040 No Federal Action/No Project Alternative Berth Operations Average Daily GHG Emissions (Tesoro).

**Auxiliary Generator Pre-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
87.0	Aframax	400,000	0.20	3,600	28%	2.5	0.0064	722.00	0.0952	0.00497	565.33	0.0745

AMP Reduction 0%

TOTAL 0.0064 722.00 0.0952 0.00497 565.33 0.0745

**Boiler Pre-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	Fuel Consumption (gal/yr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
87.0	Aframax	400,000	0.20	102.17	30%	2.5	50,000	147949.23	0.0627	6,360.0	0.8770	0.01343	1,362.22	0.18784

TOTAL 0.0627 6,360.00 0.8770 0.01343 1,362.22 0.18784

**Auxiliary Generator Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
87.0	Aframax	400,000	0.20	3,600	56%	15.0	0.0064	722.00	0.0952	0.0301	3,391.9560	0.4472

AMP Reduction 0%

TOTAL 0.0064 722.00 0.0952 0.0301 3,391.96 0.4472

**Boiler Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Inerting Fuel Consumption Savings (lb/1000 bbl offloaded)	Activity Time (hr)	Pumping Rate (bbl/hr)	Fuel Consumption (gal/yr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
87.0	Aframax	400,000	0.20	102.17	28.06	15.0	50,000	887695.41	0.0627	6,360.00	0.8770	0.0806	8,173.33	1.1270

TOTAL 0 6,360 1 0.0806 8,173.33 1.1270

**Auxiliary Generator Post-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
87.0	Aframax	400,000	0.20	3,600	28%	1.0	0.0064	722.00	0.0952	0.00200	226.13040	0.02982

AMP Reduction 0%

TOTAL 0.0064 722.00 0.0952 0.00200 226.13 0.0298

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.NFA/NPA.Ts.GHG.2040-5. 2040 No Federal Action/No Project Alternative Summary of Berth Operations Average Daily GHG Emissions (Tesoro).

Mode	Equipment	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
Cruising	Main Engines	0.0160	1625.1399	0.2241
Cruising	Aux Generator	0.0042	423.8598	0.0585
Maneuvering	Main Engines	0.0003	25.5799	0.0035
Maneuvering	Aux Generator	0.0021	211.7858	0.0292
Boiler Warm-up	Boiler	0.0017	177.3459	0.0245
Berth Operations	Boiler	0.0940	9535.5559	1.3149
Berth Operations	Aux Generator	0.0370	4183.4124	0.5516
Propulsion	TOTAL	0.0225	2286.37	0.3154
Non-Propulsion	TOTAL	0.1328	13896.31	1.8910
<b>Total Emissions</b>		<b>0.1553</b>	<b>16182.68</b>	<b>2.2064</b>

Mode	Equipment	N <sub>2</sub> O Emissions (tons/day)	CO <sub>2</sub> Emissions (tons/day)	CH <sub>4</sub> Emissions (tons/day)
Cruising	Main Engines	4.39E-05	4.45E+00	6.14E-04
Cruising	Aux Generator	1.14E-05	1.16E+00	1.60E-04
Maneuvering	Main Engines	6.92E-07	7.01E-02	9.69E-06
Maneuvering	Aux Generator	5.72E-06	5.80E-01	8.01E-05
Boiler Warm-up	Boiler	4.79E-06	4.86E-01	6.70E-05
Berth Operations	Boiler	2.58E-04	2.61E+01	3.60E-03
Berth Operations	Aux Generator	1.01E-04	1.15E+01	1.51E-03
Propulsion	TOTAL	6.18E-05	6.26E+00	8.64E-04
Non-Propulsion	TOTAL	3.64E-04	3.81E+01	5.18E-03
<b>Total Emissions</b>		<b>0.0004</b>	<b>44.34</b>	<b>0.0060</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.NFA/NPA.Ts.GHG.2040-6. 2040 No Federal Action/No Project Alternative Tug Main Engines Average Daily GHG Emissions (Tesoro).

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Energy (kWh)	Energy (MMBtu)	Shipcalls (vessels/yr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
AFRAMAX	Maneuvering - Pilot to Berth	1.00	2	4,800	0.50	2400	8.2	87.0	0.00636	645.0	0.0890	0.0013	134.6760	0.0186
	Maneuvering - Berth to Pilot	1.00	2	4,800	0.50	2400	8.2	87.0	0.00636	645.0	0.0890	0.0013	134.6760	0.0186
<b>TOTAL</b>												<b>0.0027</b>	<b>269.3520</b>	<b>0.0372</b>

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Table H.2.NFA/NPA.Ts.GHG.2040-7. 2040 No Federal Action/No Project Alternative Tug Auxiliary Generator Engines Average Daily Unmitigated Emissions (Tesoro).

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Energy (kWh)	Energy (MMBtu)	Shipcalls (vessels/yr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
AFRAMAX	Maneuvering - Pilot to Berth	1.00	2	300	1.00	300	1.0	87.0	0.0068	690.0	0.0952	0.00018	18.00900	0.00248
	Maneuvering - Berth to Pilot	1.00	2	300	1.00	300	1.0	87.0	0.0068	690.0	0.0952	0.00018	18.00900	0.00248
<b>TOTAL</b>												<b>0.00035</b>	<b>36.02</b>	<b>0.00497</b>

Table H.2.NFA/NPA.Ts.GHG.2040-8. 2040 No Federal Action/No Project Alternative Summary of Tug Average Daily GHG Emissions (Tesoro).

Mode	Equipment	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
Tug Assist	Main Engines	0.0027	269.3520	0.0372
Tug Assist	Aux Generator	0.00035	36.01800	0.00497
<b>TOTAL</b>		<b>0.0030</b>	<b>305.37</b>	<b>0.0421</b>

Mode	Equipment	N <sub>2</sub> O Emissions (tons/day)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
Tug Assist	Main Engines	7.28E-06	7.38E-01	1.02E-04
Tug Assist	Aux Generator	9.72E-07	9.87E-02	1.36E-05
<b>TOTAL</b>		<b>8.25E-06</b>	<b>8.37E-01</b>	<b>1.15E-04</b>

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Table H.2.NFA/NPA.Ts.GHG.2040-9. 2040 No Federal Action/No Project Alternative VDU Crude Average Daily GHG Emissions (Tesoro).

	Annual Vessel Calls	crude vapors from tanks(scf/call)	annual gas usage (mmscf/yr)	mw crude vapors	destruction efficiency
Aframax	87	224000	19.5	50	98%
<b>TOTAL</b>	<b>87</b>		<b>19.5</b>		

<b>Assumed Distribution based on tank storage volume:</b>	
<b>Site 1</b>	<b>12.5%</b>
<b>Site 2</b>	<b>87.5%</b>

Annual Average (tons/yr)

	N <sub>2</sub> O	CO <sub>2</sub>	CH <sub>4</sub>
EF (kg/MMBtu)	0.0001	52.78	0.0059
Aframax	0.0020	1049.15	0.1173
<b>TOTAL</b>	<b>0.0020</b>	<b>1049.1482</b>	<b>0.1173</b>

Annual Average (tons/yr)

	N <sub>2</sub> O	CO <sub>2</sub>	CH <sub>4</sub>
Site 1	0.0002	131.14	0.01
Site 2	0.0017	918.0	0.1

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Table H.2.NFA/NPA.Ts.GHG.2040-10. 2040 No Federal Action/No Project Alternative VDU Legs Average Daily GHG Emissions (Tesoro).

	tanks	crude vapors from tanks on legs(scf/yr)	annual gas usage (mmscf/yr)	mw crude vapors	destruction efficiency
Site 1	4	8640000	34.6	50	98%
Site 2	14	8640000	121.0	50	98%
<b>TOTAL</b>	<b>18</b>		<b>155.5</b>		

48	hr/event
6	events/yr
500	ft3/min

Annual Average (tons/yr)

	N <sub>2</sub> O	CO <sub>2</sub>	CH <sub>4</sub>
EF (kg/MMBtu)	0.0001	52.78	0.0059
<b>TOTAL</b>	<b>0.016</b>	<b>8372.513</b>	<b>0.936</b>

*Assumed a ratio of 500/1000 based on the corresponding Btu values with respect to natural gas combustion emission factors.*

Annual Average (tons/yr)

	N <sub>2</sub> O	CO <sub>2</sub>	CH <sub>4</sub>
Site 1	0.0035	1860.6	0.2
Site 2	0.012	6512.0	0.7



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Table H.2.NFA/NPA.Ts.GHG.2040-11. 2040 No Federal Action/No Project Alternative VDU Average Daily GHG Emissions (Tesoro).

Annual Average (tons/yr)

	<b>N<sub>2</sub>O</b>	<b>CO<sub>2</sub></b>	<b>CH<sub>4</sub></b>
Site 1	0.004	1992	0.22
Site 2	0.014	7430	0.83
<b>Total</b>	<b>0.018</b>	<b>9,422</b>	<b>1.05</b>

Daily Average (tons/day)

	<b>N<sub>2</sub>O</b>	<b>CO<sub>2</sub></b>	<b>CH<sub>4</sub></b>
Site 1	1.03E-05	5.457	6.10E-04
Site 2	3.86E-05	20.356	2.28E-03
<b>Total</b>	<b>4.89E-05</b>	<b>26</b>	<b>2.89E-03</b>

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Table H.2.NFA/NPA.Ts.GHG.2040-12. 2040 No Federal Action/No Project Alternative Tesoro Berth Summary.

Operation	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)	CO <sub>2</sub> e Emissions (tons/yr)
Tanker Cruising and Manuevering	0.0225	2,286.37	0.3154	2299.98
Tanker Hoteling	0.0370	4,183.41	0.5516	4206.48
Offloading Emissions	0.0940	9,535.56	1.3149	9592.31
Transiting Operations	0.0017	177.35	0.0245	178.40
Tug Assistance	0.0030	305.37	0.0421	307.19
Tanks	---	---	---	---
Vapor Destruction Units	0.0179	9,421.66	1.0532	9449.31
Valves, Flanges, Pumps	---	---	---	---
<b>TOTAL</b>	<b>0.1762</b>	<b>25,909.71</b>	<b>3.3017</b>	<b>26033.67</b>

Operation	N <sub>2</sub> O Emissions (tons/day)	CO <sub>2</sub> Emissions (tons/day)	CH <sub>4</sub> Emissions (tons/day)	CO <sub>2</sub> e Emissions (tons/day)
Tanker Cruising and Manuevering	6.18E-05	6.26	8.64E-04	6.30
Tanker Hoteling	1.01E-04	11.46	1.51E-03	11.52
Offloading Emissions	2.58E-04	26.12	3.60E-03	26.28
Transiting Operations	4.79E-06	0.49	6.70E-05	0.49
Tug Assistance	8.25E-06	0.84	1.15E-04	0.84
Tanks	---	---	---	---
Vapor Destruction Units	4.89E-05	25.81	2.89E-03	25.89
Valves, Flanges, Pumps	---	---	---	---
<b>TOTAL</b>	<b>4.83E-04</b>	<b>70.99</b>	<b>9.05E-03</b>	<b>71.33</b>

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Table H.2.NFA/NPA.Ex.GHG.2040-1. 2040 No Federal Action/No Project Alternative Main Engines Average Daily GHG Emissions (Exxon Mobil).

Ship	Direction	Mode	Distance (nautical miles)	Ship speed (knots)	Activity (hours)	Maximum Speed (knots)	Load Factor	MCR (kW)	Energy (kW-hr)	Energy (MMBtu)	Shipcalls (vessels/ yr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
PANAMAX	South In	Cruising - CW to VSR	23	12	1.92	15.8	0.438	10,300	8,649	30	146	0.0058	588.00	0.0811	0.0073	742.48	0.1024
		Cruising - VSR to PZ	11	12	0.92	15.8	0.438	10,300	4,136	14	146	0.0058	588.00	0.0811	0.0035	355.10	0.0490
		Cruising - PZ to Pilot	4.7	7	0.67	15.8	0.087	10,300	601	2	146	0.0058	588.00	0.0811	0.0005	51.63	0.0071
		Maneuvering - Pilot to Berth		3	1.00	15.8	0.007	10,300	71	0	146	0.0064	647.00	0.0895	0.0001	6.66	0.0009
PANAMAX	South Out	Maneuvering - Berth to Pilot		5	1.00	15.8	0.032	10,300	326	1	146	0.0064	647.00	0.0895	0.0003	30.83	0.0043
		Cruising - Pilot to PZ	3.5	7	0.50	15.8	0.087	10,300	448	2	146	0.0058	588.00	0.0811	0.0004	38.45	0.0053
		Cruising - PZ to VSR	12.5	12	1.04	15.8	0.438	10,300	4,700	16	146	0.0058	588.00	0.0811	0.0040	403.52	0.0557
		Cruising - VSR to CW	24.5	12	2.04	15.8	0.438	10,300	9,213	31	146	0.0058	588.00	0.0811	0.0078	790.91	0.1091
<b>TOTAL</b>															<b>0.0239</b>	<b>2419.58</b>	<b>0.3337</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.NFA/NPA.Ex.GHG.2040-2. 2040 No Federal Action/No Project Alternative Auxiliary Generator Average Daily Unmitigated Emissions (Exxon Mobil).

Ship	Direction	Mode	Activity (hours)	MCR (kW)	Load Factor	Energy (kW-hr)	Energy (MMBtu)	Shipcalls (vessels/yr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
PANAMAX	South In	Cruising	3.50	3,600	0.28	3,528	12	146	0.0068	690.00	0.0952	0.0035	355.41	0.0490
		Maneuvering	2.00	3,600	0.28	2,016	7	146	0.0068	690.00	0.0952	0.0020	203.09	0.0280
PANAMAX	South Out	Maneuvering	1.5	3,600	0.28	1,512	5	146	0.0068	690.00	0.0952	0.0015	152.32	0.0210
		Cruising	3.58	3,600	0.28	3,609	12	146	0.0068	690.00	0.0952	0.0036	363.53	0.0502
<b>TOTAL</b>												<b>0.0106</b>	<b>1074.36</b>	<b>0.1482</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.NFA/NPA.Ex.GHG.2040-3. 2040 No Federal Action/No Project Alternative Boiler Warm-Up Average Daily GHG Emissions (Exxon Mobil).

Shipcalls (vessels/yr)	Vessel Size	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	Fuel Consumption (gal/yr)	N <sub>2</sub> O Emission Factor (lb/ton)	CO <sub>2</sub> Emission Factor (lb/ton)	CH <sub>4</sub> Emission Factor (lb/ton)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
146.0	Panamax	0.20	59.91	30%	3	35,000	122,293	0.0068	690.00	0.0952	0.00120	122.16	0.0169
<b>TOTAL</b>											<b>0.00120</b>	<b>122.16</b>	<b>0.0169</b>

Table H.2.NFA/NPA.Ex.GHG.2040-4. 2040 No Federal Action/No Project Alternative Berth Operations Average Daily GHG Emissions (Exxon Mobil).

**Auxiliary Generator Pre-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	Energy (MMBtu)	Heating Value (MMBtu/1000 gal)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)		
146.0	Panamax	300,000	0.20	3,600	28%	2.5	8.6	150	0.0064	722.0	0.0952	0.0083	948.71	0.1251		
AMP Reduction 70%												TOTAL		0.0025	284.61	0.0375

**Boiler Pre-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	Fuel Consumption (gal/yr)	N <sub>2</sub> O Emission Factor (lb/ton)	CO <sub>2</sub> Emission Factor (lb/ton)	CH <sub>4</sub> Emission Factor (lb/ton)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
146.0	Panamax	300,000	0.20	59.91	30%	2.5	35,000	101,911	0.0627	6,360.0	0.8770	0.0093	938.33	0.1294
TOTAL												0.0093	938.33	0.1294

**Auxiliary Generator Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	Energy (MMBtu)	Heating Value (MMBtu/1000 gal)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)		
146.0	Panamax	300,000	0.20	3,600	56%	11.0	75.7	140	0.0064	722.0	0.0952	0.0370	4174.32	0.5504		
AMP Reduction 70%												TOTAL		0.0111	1252.29	0.1651

**Boiler Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Inerting Fuel Consumption Savings (lb/1000 bbl offloaded)	Activity Time (hr)	Pumping Rate (bbl/hr)	Fuel Consumption (gal/yr)	N <sub>2</sub> O Emission Factor (lb/ton)	CO <sub>2</sub> Emission Factor (lb/ton)	CH <sub>4</sub> Emission Factor (lb/ton)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
146.0	Panamax	300,000	0.20	59.91	28.06	11.0	35,000	448,408	0.0627	6,360.0	0.8770	0.0407	4128.65	0.5693
TOTAL												0.0407	4128.65	0.5693

**Auxiliary Generator Post-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	Energy (MMBtu)	Heating Value (MMBtu/1000 gal)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)		
146.0	Panamax	300,000	0.20	3,600	28%	1.0	3.4	150	0.0064	722.0	0.0952	0.0034	379.48	0.0500		
AMP Reduction 70%												TOTAL		0.0010	113.84	0.0150

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Table H.2.NFA/NPA.Ex.GHG.2040-5. 2040 No Federal Action/No Project Alternative Summary of Berth Operations Average Daily GHG Emissions (Exxon Mobil).

Mode	Equipment	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
Cruising	Main Engines	2.35E-02	2382.09	3.29E-01
Cruising	Aux Generator	7.09E-03	718.95	9.92E-02
Maneuvering	Main Engines	3.70E-04	37.49	5.19E-03
Maneuvering	Aux Generator	3.50E-03	355.41	4.90E-02
Boiler Warm-up	Boiler	1.20E-03	122.16	1.69E-02
Berth Operations	Boiler	5.00E-02	5066.98	6.99E-01
Berth Operations	Aux Generator	1.46E-02	1650.75	2.18E-01
Propulsion	TOTAL	3.45E-02	3493.94	4.82E-01
Non-Propulsion	TOTAL	0.07	6839.89	0.93
<b>Total Emissions</b>		<b>1.00E-01</b>	<b>10333.83</b>	<b>1.42E+00</b>

Mode	Equipment	N <sub>2</sub> O Emissions (tons/day)	CO <sub>2</sub> Emissions (tons/day)	CH <sub>4</sub> Emissions (tons/day)
Cruising	Main Engines	6.44E-05	6.53	9.00E-04
Cruising	Aux Generator	1.94E-05	1.97	2.72E-04
Maneuvering	Main Engines	1.01E-06	0.10	1.42E-05
Maneuvering	Aux Generator	9.60E-06	0.97	1.34E-04
Boiler Warm-up	Boiler	3.30E-06	0.33	4.62E-05
Berth Operations	Boiler	1.37E-04	13.88	1.91E-03
Berth Operations	Aux Generator	4.00E-05	4.52	5.96E-04
Propulsion	TOTAL	9.44E-05	9.57	1.32E-03
Non-Propulsion	TOTAL	1.80E-04	18.74	2.56E-03
<b>Total Emissions</b>		<b>2.75E-04</b>	<b>28.31</b>	<b>3.88E-03</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.NFA/NPA.Ex.GHG.2040-6. 2040 No Federal Action/No Project Alternative Tug Main Engines Average Daily GHG Emissions (Exxon Mobil).

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Energy (kWh)	Energy (MMBtu)	Shipcalls (vessels/yr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
PANAMAX	Maneuvering - Pilot to Berth	1.00	2	4,800	0.50	2400	8.2	146.0	0.00636	645.0	0.0890	0.0022	226.01	0.0312
	Maneuvering - Berth to Pilot	1.00	2	4,800	0.50	2400	8.2	146.0	0.00636	645.0	0.0890	0.0022	226.01	0.0312
<b>TOTAL</b>												<b>0.0045</b>	<b>452.02</b>	<b>0.0624</b>



Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.NFA/NPA.Ex.GHG.2040-7. 2040 No Federal Action/No Project Alternative Tug Auxiliary Generator Engines Average Daily Unmitigated Emissions (Exxon Mobil).

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Energy (kWh)	Energy (MMBtu)	Shipcalls (vessels/yr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
PANAMAX	Maneuvering - Pilot to Berth	1.00	2	300	1.00	300	1.0	146.0	0.0068	690.0	0.0952	0.00030	30.22200	0.0042
	Maneuvering - Berth to Pilot	1.00	2	300	1.00	300	1.0	146.0	0.0068	690.0	0.0952	0.00030	30.22200	0.0042
TOTAL												0.00060	60.44	0.0083

Table H.2.NFA/NPA.Ex.GHG.2040-8. 2040 No Federal Action/No Project Alternative Summary of Tug Average Daily GHG Emissions (Exxon Mobil).

Mode	Equipment	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
Tug Assist	Main Engines	0.0045	452.02	0.0624
Tug Assist	Aux Generator	0.00060	60.44	0.0083
TOTAL		0.0051	512.46	0.0707

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.NFA/NPA.Ex.GHG.2040-9. 2040 No Federal Action/No Project Alternative VDU Crude Average Daily GHG Emissions (Exxon Mobil).

	Annual Vessel Calls	crude vapors from tanks(scf/call)	annual gas usage (mmscf/yr)	mw crude vapors	destruction efficiency
Panamax	146	224000	32.7	50	98%
<b>TOTAL</b>	<b>146</b>		<b>32.7</b>		

Assumed Distribution based on tank storage volume:	
Site 1	12.5%
Site 2	87.5%

Annual Average (tons/yr)

	N <sub>2</sub> O	CO <sub>2</sub>	CH <sub>4</sub>
EF (kg/MMBtu)	0.0001	52.78	0.0059
Panamax	0.0033	1760.64	0.1968
<b>TOTAL</b>	<b>0.0033</b>	<b>1760.6395</b>	<b>0.1968</b>

Annual Average (tons/yr)

	N <sub>2</sub> O	CO <sub>2</sub>	CH <sub>4</sub>
Site 1	0.0004	220.08	0.02
Site 2	0.0029	1540.6	0.2

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.NFA/NPA.Ex.GHG.2040-10. 2040 No Federal Action/No Project Alternative VDU Legs Average Daily GHG Emissions (Exxon Mobil).

	tanks	crude vapors from tanks on legs(scf/yr)	annual gas usage (mmscf/yr)	mw crude vapors	destruction efficiency
Site 1	4	8640000	34.6	50	98%
Site 2	14	8640000	121.0	50	98%
<b>TOTAL</b>	<b>18</b>		<b>155.5</b>		

48	hr/event
6	events/yr
500	ft3/min

Annual Average (tons/yr)

	N <sub>2</sub> O	CO <sub>2</sub>	CH <sub>4</sub>
EF (kg/MMBtu)	0.0001	52.78	0.0059
<b>TOTAL</b>	<b>0.016</b>	<b>8372.513</b>	<b>0.936</b>

*Assumed a ratio of 500/1000 based on the corresponding Btu values with respect to natural gas combustion emission factors.*

Annual Average (tons/yr)

	N <sub>2</sub> O	CO <sub>2</sub>	CH <sub>4</sub>
Site 1	0.0035	1860.6	0.2
Site 2	0.012	6512.0	0.7

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.NFA/NPA.Ex.GHG.2040-11. 2040 No Federal Action/No Project Alternative VDU Average Daily GHG Emissions (Exxon Mobil).

Annual Average (tons/yr)

	<b>N<sub>2</sub>O</b>	<b>CO<sub>2</sub></b>	<b>CH<sub>4</sub></b>
Site 1	0.004	2081	0.23
Site 2	0.015	8053	0.90
<b>Total</b>	<b>0.019</b>	<b>10,133</b>	<b>1.13</b>

Daily Average (tons/day)

	<b>N<sub>2</sub>O</b>	<b>CO<sub>2</sub></b>	<b>CH<sub>4</sub></b>
Site 1	1.08E-05	5.700	6.37E-04
Site 2	4.18E-05	22.062	2.47E-03
<b>Total</b>	<b>5.26E-05</b>	<b>28</b>	<b>3.10E-03</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.NFA/NPA.Ex.GHG.2040-12. 2040 No Federal Action/No Project Alternative Exxon Mobil Berth Summary.

Operation	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)	CO <sub>2</sub> e Emissions (tons/yr)
Tanker Cruising and Manuevering	0.0345	3,493.94	0.4820	3514.74
Tanker Hoteling	0.0146	1,650.75	0.2177	1659.85
Offloading Emissions	0.0500	5,066.98	0.6987	5097.14
Transiting Operations	0.0012	122.16	0.0169	122.89
Tug Assistance	0.0051	512.46	0.0707	515.51
Tanks	---	---	---	---
Vapor Destruction Units	0.0192	10,133.15	1.1327	10162.89
Valves, Flanges, Pumps	---	---	---	---
<b>TOTAL</b>	<b>0.1245</b>	<b>20,979.44</b>	<b>2.6186</b>	<b>21073.02</b>

Operation	N <sub>2</sub> O Emissions (tons/day)	CO <sub>2</sub> Emissions (tons/day)	CH <sub>4</sub> Emissions (tons/day)	CO <sub>2</sub> e Emissions (tons/day)
Tanker Cruising and Manuevering	9.44E-05	9.57	1.32E-03	9.63
Tanker Hoteling	4.00E-05	4.52	5.96E-04	4.55
Offloading Emissions	1.37E-04	13.88	1.91E-03	13.96
Transiting Operations	3.30E-06	0.33	4.62E-05	0.34
Tug Assistance	1.38E-05	1.40	1.94E-04	1.41
Tanks	---	---	---	---
Vapor Destruction Units	5.26E-05	27.76	3.10E-03	27.84
Valves, Flanges, Pumps	---	---	---	---
<b>TOTAL</b>	<b>3.41E-04</b>	<b>57.48</b>	<b>7.17E-03</b>	<b>57.73</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Un.GHG.2010-1. 2010 Reduced Project Alternative Main Engines Average Daily Unmitigated GHG Emissions.

Ship	Direction	Mode	Distance (nautical miles)	Ship speed (knots)	Activity (hours)	Maximum Speed (knots)	Load Factor	MCR (kW)	Energy (kW-hr)	Shipcalls (vessels/ yr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)	
VLCC	North In	Cruising - CW to VSR	22	15.54	1.42	16.9	0.777	25,400	27,957	26.0	0.0055	620.00	0.0818	0.0040	450.67	0.0595	
		Cruising - VSR to PZ	21	12	1.75	16.9	0.358	25,400	15,913	26.0	0.0055	620.00	0.0818	0.0023	256.52	0.0338	
		Cruising - PZ to Pilot	4.7	7	0.67	16.9	0.071	25,400	1,212	26.0	0.0055	620.00	0.0818	0.0002	19.54	0.0026	
	North Out	Maneuvering - Pilot to Berth			3	1.00	16.9	0.006	25,400	142	26.0	0.0060	682.00	0.0902	0.0000	2.52	0.0003
		Maneuvering - Berth to Pilot			5	1.00	16.9	0.026	25,400	658	26.0	0.0060	682.00	0.0902	0.0001	11.66	0.0015
		Cruising - Pilot to PZ		3.8	7	0.54	16.9	0.071	25,400	980	26.0	0.0055	620.00	0.0818	0.0001	15.79	0.0021
		Cruising - PZ to VSR		21	12	1.75	16.9	0.358	25,400	15,913	26.0	0.0055	620.00	0.0818	0.0023	256.52	0.0338
		Cruising - VSR to CW		22	15.54	1.42	16.9	0.777	25,400	27,957	26.0	0.0055	620.00	0.0818	0.0040	450.67	0.0595
		AFRAMAX	South In	Cruising - CW to VSR	23	14.7	1.56	16.1	0.761	12,477	14,859	32.0	0.0055	620.00	0.0818	0.0026	294.81
South Out	Cruising - VSR to PZ		11	12	0.92	16.1	0.414	12,477	4,736	32.0	0.0055	620.00	0.0818	0.0008	93.96	0.0124	
	Cruising - PZ to Pilot		4.7	7	0.67	16.1	0.082	12,477	689	32.0	0.0055	620.00	0.0818	0.0001	13.66	0.0018	
	Maneuvering - Pilot to Berth			3	1.00	16.1	0.006	12,477	81	32.0	0.0060	682.00	0.0902	0.0000	1.76	0.0002	
	Maneuvering - Berth to Pilot			5	1.00	16.1	0.030	12,477	374	32.0	0.0060	682.00	0.0902	0.0001	8.16	0.0011	
	Cruising - Pilot to PZ		3.5	7	0.50	16.1	0.082	12,477	513	32.0	0.0055	620.00	0.0818	0.0001	10.17	0.0013	
	Cruising - PZ to VSR		12.5	12	1.04	16.1	0.414	12,477	5,382	32.0	0.0055	620.00	0.0818	0.0009	106.77	0.0141	
	Cruising - VSR to CW		24.5	14.7	1.67	16.1	0.761	12,477	15,828	32.0	0.0055	620.00	0.0818	0.0028	314.03	0.0414	
PANAMAX	South In	Cruising - CW to VSR	23	14.7	1.56	15.8	0.805	10,300	12,979	26	0.0055	620.00	0.0818	0.0018	209.22	0.0276	
	South Out	Cruising - VSR to PZ		11	12	0.92	15.8	0.438	10,300	4,136	26	0.0055	620.00	0.0818	0.0006	66.68	0.0088
		Cruising - PZ to Pilot		4.7	7	0.67	15.8	0.087	10,300	601	26	0.0055	620.00	0.0818	0.0001	9.69	0.0013
		Maneuvering - Pilot to Berth			3	1.00	15.8	0.007	10,300	71	26	0.0060	682.00	0.0902	0.0000	1.25	0.0002
		Maneuvering - Berth to Pilot			5	1.00	15.8	0.032	10,300	326	26	0.0060	682.00	0.0902	0.0001	5.79	0.0008
		Cruising - Pilot to PZ		3.5	7	0.50	15.8	0.087	10,300	448	26	0.0055	620.00	0.0818	0.0001	7.22	0.0010
		Cruising - PZ to VSR		12.5	12	1.04	15.8	0.438	10,300	4,700	26	0.0055	620.00	0.0818	0.0007	75.77	0.0100
Cruising - VSR to CW		24.5	14.7	1.67	15.8	0.805	10,300	13,825	26	0.0055	620.00	0.0818	0.0020	222.86	0.0294		
SUEZMAX	North In	Cruising - CW to VSR	22	15.54	1.42	17	0.764	16,000	17,302	45	0.0055	620.00	0.0818	0.0042	482.73	0.0637	
	North Out	Cruising - VSR to PZ		21	12	1.75	17	0.352	16,000	9,848	45	0.0055	620.00	0.0818	0.0024	274.76	0.0363
		Cruising - PZ to Pilot		4.7	7	0.67	17	0.070	16,000	750	45	0.0055	620.00	0.0818	0.0002	20.93	0.0028
		Maneuvering - Pilot to Berth			3	1.00	17	0.005	16,000	88	45	0.0060	682.00	0.0902	0.0000	2.70	0.0004
		Maneuvering - Berth to Pilot			5	1.00	17	0.025	16,000	407	45	0.0060	682.00	0.0902	0.0001	12.49	0.0017
		Cruising - Pilot to PZ		3.8	7	0.54	17	0.070	16,000	606	45	0.0055	620.00	0.0818	0.0001	16.92	0.0022
		Cruising - PZ to VSR		21	12	1.75	17	0.352	16,000	9,848	45	0.0055	620.00	0.0818	0.0024	274.76	0.0363
		Cruising - VSR to CW		22	15.54	1.42	17	0.764	16,000	17,302	45	0.0055	620.00	0.0818	0.0042	482.73	0.0637
		<b>TOTAL</b>											<b>0</b>	<b>20,336</b>	<b>3</b>	<b>0.0393</b>	<b>4473.71</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Un.GHG.2010-2. 2010 Reduced Project Alternative Auxiliary Generator Average Daily Unmitigated GHG Emissions.

Ship	Direction	Mode	Activity (hours)	MCR (kW)	Load Factor	Energy (kW-hr)	Shipcalls (vessels/yr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
VLCC	North In	Cruising	3.84	3,600	0.278	3,840	26.0	0.0055	620.00	0.0818	0.0005	61.90	0.0082
		Maneuvering	2.00	3,600	0.278	2,002	26.0	0.0060	682.00	0.0902	0.0003	35.49	0.0047
	North Out	Maneuvering	1.50	3,600	0.278	1,501	26.0	0.0060	682.00	0.0902	0.0002	26.62	0.0035
		Cruising	3.71	3,600	0.278	3,712	26.0	0.0055	620.00	0.0818	0.0005	59.83	0.0079
AFRAMAX	South In	Cruising	3.15	3,600	0.278	3,155	32.0	0.0055	620.00	0.0818	0.0006	62.60	0.0083
		Maneuvering	2.00	3,600	0.278	2,002	32.0	0.0060	682.00	0.0902	0.0004	43.68	0.0058
	South Out	Maneuvering	1.50	3,600	0.278	1,501	32.0	0.0060	682.00	0.0902	0.0003	32.76	0.0043
		Cruising	3.21	3,600	0.278	3,211	32.0	0.0055	620.00	0.0818	0.0006	63.70	0.0084
PANAMAX	South In	Cruising	3.15	3,600	0.28	3,178	26.0	0.0055	620.00	0.0818	0.0005	51.23	0.0068
		Maneuvering	2.00	3,600	0.28	2,016	26.0	0.0060	682.00	0.0902	0.0003	35.75	0.0047
	South Out	Maneuvering	1.5	3,600	0.28	1,512	26.0	0.0060	682.00	0.0902	0.0002	26.81	0.0035
		Cruising	3.21	3,600	0.28	3,234	26.0	0.0055	620.00	0.0818	0.0005	52.13	0.0069
SUEZMAX	North In	Cruising	3.84	3,600	0.28	3,868	45.0	0.0055	620.00	0.0818	0.0009	107.91	0.0142
		Maneuvering	2.00	3,600	0.28	2,016	45.0	0.0060	682.00	0.0902	0.0005	61.87	0.0082
	North Out	Maneuvering	1.5	3,600	0.28	1,512	45.0	0.0060	682.00	0.0902	0.0004	46.40	0.0061
		Cruising	3.71	3,600	0.28	3,738	45.0	0.0055	620.00	0.0818	0.0009	104.30	0.0138
<b>TOTAL</b>								<b>0</b>	<b>10,416</b>	<b>1</b>	<b>0.0077</b>	<b>873.00</b>	<b>0.1153</b>



Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Un.GHG.2010-3. 2010 Reduced Project Alternative Boiler Warm-Up Average Daily Unmitigated GHG Emissions.

Shipcalls (vessels/yr)	Vessel Size	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	Fuel Consumpti on (gal/yr)	N <sub>2</sub> O Emission Factor (lb/ton)	CO <sub>2</sub> Emission Factor (lb/ton)	CH <sub>4</sub> Emission Factor (lb/ton)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
32.0	Aframax	HFO	2.70	107.96	30%	3	50,000	69,001	0.0627	6,360.00	0.8770	0.0063	635.32	0.0876
26.0	VLCC	HFO	2.70	84.93	30%	3	90,000	79,389	0.0627	6,360.00	0.8770	0.0072	730.96	0.1008
26.0	Panamax	HFO	2.70	63.30	30%	3	35,000	23,011	0.0627	6,360.00	0.8770	0.0021	211.87	0.0292
45.0	Suezmax	HFO	2.70	87.54	30%	3	70,000	110,154	0.0627	6,360.00	0.8770	0.0100	1,014.22	0.1399
<b>TOTAL</b>												<b>0.0256</b>	<b>2,592.37</b>	<b>0.3575</b>

Table H.2.RPA.Un.GHG.2010-4. 2010 Reduced Project Alternative Berth Operations Average Daily Unmitigated GHG Emissions.

Auxiliary Generator Pre-Pumpin

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
32.0	Aframax	700,000	HFO	2.70	3,600	28%	2.5	0.0064	722.0	0.0952	0.0018	207.9360	0.0274
26.0	VLCC	2,000,000	HFO	2.70	3,600	28%	2.5	0.0064	722.0	0.0952	0.0015	168.9480	0.0223
26.0	Panamax	350,000	HFO	2.70	3,600	28%	2.5	0.0064	722.0	0.0952	0.0015	168.9480	0.0223
45.0	Suezmax	1,000,000	HFO	2.70	3,600	28%	2.5	0.0064	722.0	0.0952	0.0026	292.4100	0.0386
<b>TOTAL</b>								<b>0</b>	<b>2,888</b>	<b>0</b>	<b>0.007</b>	<b>838.242</b>	<b>0.111</b>

Boiler Pre-Pumpin

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	Fuel Consumption (gal/yr)	N <sub>2</sub> O Emission Factor (lb/ton)	CO <sub>2</sub> Emission Factor (lb/ton)	CH <sub>4</sub> Emission Factor (lb/ton)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
32.0	Aframax	700,000	HFO	2.70	107.96	30%	2.5	50,000	57,501	0.0627	6,360.0	0.8770	0.0052	529.43	0.07
26.0	VLCC	2,000,000	HFO	2.70	84.93	30%	2.5	90,000	66,157	0.0627	6,360.0	0.8770	0.0060	609.13	0.08
26.0	Panamax	350,000	HFO	2.70	63.30	30%	2.5	35,000	18,149	0.0627	6,360.0	0.8770	0.0016	167.10	0.02
45.0	Suezmax	1,000,000	HFO	2.70	87.54	30%	2.5	70,000	86,877	0.0627	6,360.0	0.8770	0.0079	799.90	0.11
<b>TOTAL</b>									<b>228,683</b>	<b>0</b>	<b>25,440</b>	<b>4</b>	<b>0.0208</b>	<b>2,105.57</b>	<b>0.2903</b>

Auxiliary Generator Pumpin

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
32.0	Aframax	700,000	MDO	0.52	3,600	56%	15.0	0.0064	722.0	0.0952	0.011	1,247.616	0.165
26.0	VLCC	2,000,000	MDO	0.52	3,600	56%	23.2	0.0064	722.0	0.0952	0.014	1,569.339	0.207
26.0	Panamax	350,000	MDO	0.52	3,600	56%	11.0	0.0064	722.0	0.0952	0.007	743.371	0.098
45.0	Suezmax	1,000,000	MDO	0.52	3,600	56%	15.3	0.0064	722.0	0.0952	0.016	1,789.549	0.236
<b>TOTAL</b>								<b>0</b>	<b>2,888</b>	<b>0</b>	<b>0.0473</b>	<b>5,349.88</b>	<b>0.7054</b>

Boiler Pumpin

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Inerting Fuel Consumption Savings (lb/1000 bbl offloaded)	Activity Time (hr)	Fuel Consumption (gal/yr)	N <sub>2</sub> O Emission Factor (lb/ton)	CO <sub>2</sub> Emission Factor (lb/ton)	CH <sub>4</sub> Emission Factor (lb/ton)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
32.0	Aframax	700,000	MDO	0.52	102.17	28.06	15.0	326,521	0.0627	6,360.0	0.8770	0.03	3,006.40	0.41
26.0	VLCC	2,000,000	MDO	0.52	80.38	28.06	23.2	581,048	0.0627	6,360.0	0.8770	0.05	5,349.92	0.74
26.0	Panamax	350,000	MDO	0.52	59.91	28.06	11.0	79,853	0.0627	6,360.0	0.8770	0.01	735.24	0.10
45.0	Suezmax	1,000,000	MDO	0.52	82.85	28.06	15.3	531,685	0.0627	6,360.0	0.8770	0.05	4,895.42	0.68
<b>TOTAL</b>								<b>1,519,108</b>	<b>0</b>	<b>25,440</b>	<b>4</b>	<b>0.1379</b>	<b>13,986.98</b>	<b>1.9287</b>

Auxiliary Generator Post-Pumpin

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
32.0	Aframax	700,000	HFO	2.70	3,600	28%	1.0	0.0064	722.0	0.0952	0.0007	83.1744	0.0110
26.0	VLCC	2,000,000	HFO	2.70	3,600	28%	1.0	0.0064	722.0	0.0952	0.0006	67.5792	0.0089
26.0	Panamax	350,000	HFO	2.70	3,600	28%	1.0	0.0064	722.0	0.0952	0.0006	67.5792	0.0089
45.0	Suezmax	1,000,000	HFO	2.70	3,600	28%	1.0	0.0064	722.0	0.0952	0.0010	116.9640	0.0154
<b>TOTAL</b>								<b>0</b>	<b>2,888</b>	<b>0</b>	<b>0.0030</b>	<b>335.2968</b>	<b>0.0442</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Un.GHG.2010-5. 2010 Reduced Project Alternative Summary of Average Daily Unmitigated Vessel GHG Emissions.

Mode	Equipment	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
Cruising	Main Engines	0.0389	4427.38	0.5841
Cruising	Aux Generator	0.0050	563.61	0.0744
Maneuvering	Main Engines	0.0004	46.33	0.0061
Maneuvering	Aux Generator	0.0027	309.39	0.0409
Boiler Warm-up	Boiler	0.0256	2592.37	0.3575
Berth Operations	Boiler	0.1586	16092.55	2.2191
Berth Operations	Aux Generator	0.0577	6523.41	0.8602
Propulsion	TOTAL	0.0470	5346.71	0.7055
Non-Propulsion	TOTAL	0.2419	25208.33	3.4367
<b>Total Emissions</b>		<b>0.2889</b>	<b>30,555.04</b>	<b>4.14</b>

Mode	Equipment	N <sub>2</sub> O Emissions (tons/day)	CO <sub>2</sub> Emissions (tons/day)	CH <sub>4</sub> Emissions (tons/day)
Cruising	Main Engines	1.07E-04	12.13	1.60E-03
Cruising	Aux Generator	1.36E-05	1.54	2.04E-04
Maneuvering	Main Engines	1.12E-06	0.13	1.68E-05
Maneuvering	Aux Generator	7.47E-06	0.85	1.12E-04
Boiler Warm-up	Boiler	7.00E-05	7.10	9.79E-04
Berth Operations	Boiler	4.35E-04	44.09	6.08E-03
Berth Operations	Aux Generator	1.58E-04	17.87	2.36E-03
Propulsion	TOTAL	1.29E-04	14.65	1.93E-03
Non-Propulsion	TOTAL	6.63E-04	69.06	9.42E-03
<b>Total Emissions</b>		<b>7.91E-04</b>	<b>83.71</b>	<b>1.13E-02</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Un.GHG.2010-6. 2010 Reduced Project Alternative Tug Main Engines Average Daily Unmitigated GHG Emissions.

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Energy (kWh)	Energy (MMBtu)	Shipcalls (vessels/yr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
VLCC	Maneuvering - Pilot to Berth	1.00	4	4,800	0.50	2400	8.2	26.0	0.00636	645.0	0.0890	0.0004	40.2480	0.0056
	Maneuvering - Berth to Pilot	1.00	2	4,800	0.50	2400	8.2	26.0	0.00636	645.0	0.0890	0.0004	40.2480	0.0056
AFRAMAX	Maneuvering - Pilot to Berth	1.00	2	4,800	0.50	2400	8.2	32.0	0.00636	645.0	0.0890	0.0005	49.5360	0.0068
	Maneuvering - Berth to Pilot	1.00	2	4,800	0.50	2400	8.2	32.0	0.00636	645.0	0.0890	0.0005	49.5360	0.0068
PANAMAX	Maneuvering - Pilot to Berth	1.00	2	4,800	0.50	2400	8.2	26.0	0.00636	645.0	0.0890	0.0004	40.2480	0.0056
	Maneuvering - Berth to Pilot	1.00	2	4,800	0.50	2400	8.2	26.0	0.00636	645.0	0.0890	0.0004	40.2480	0.0056
SUEZMAX	Maneuvering - Pilot to Berth	1.00	3	4,800	0.50	2400	8.2	45.0	0.00636	645.0	0.0890	0.0007	69.6600	0.0096
	Maneuvering - Berth to Pilot	1.00	2	4,800	0.50	2400	8.2	45.0	0.00636	645.0	0.0890	0.0007	69.6600	0.0096
<b>TOTAL</b>												<b>0.0039</b>	<b>399.38</b>	<b>0.0551</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Un.GHG.2010-7. 2010 Reduced Project Alternative Tug Auxiliary Generator Engines Average Daily Unmitigated GHG Emissions.

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Energy (kWh)	Energy (MMBtu)	Shipcalls (vessels/yr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
VLCC	Maneuvering - Pilot to Berth	1.00	4	300	1.00	300	1.0	26.0	0.0068	690.0	0.0952	0.00005	5.38200	0.00074
	Maneuvering - Berth to Pilot	1.00	2	300	1.00	300	1.0	26.0	0.0068	690.0	0.0952	0.00005	5.38200	0.00074
AFRAMAX	Maneuvering - Pilot to Berth	1.00	2	300	1.00	300	1.0	32.0	0.0068	690.0	0.0952	0.00007	6.62400	0.00091
	Maneuvering - Berth to Pilot	1.00	2	300	1.00	300	1.0	32.0	0.0068	690.0	0.0952	0.00007	6.62400	0.00091
PANAMAX	Maneuvering - Pilot to Berth	1.00	2	300	1.00	300	1.0	26.0	0.0068	690.0	0.0952	0.00005	5.38200	0.00074
	Maneuvering - Berth to Pilot	1.00	2	300	1.00	300	1.0	26.0	0.0068	690.0	0.0952	0.00005	5.38200	0.00074
SUEZMAX	Maneuvering - Pilot to Berth	1.00	3	300	1.00	300	1.0	45.0	0.0068	690.0	0.0952	0.00009	9.31500	0.00129
	Maneuvering - Berth to Pilot	1.00	2	300	1.00	300	1.0	45.0	0.0068	690.0	0.0952	0.00009	9.31500	0.00129
<b>TOTAL</b>												<b>0.0005</b>	<b>53.41</b>	<b>0.0074</b>

Table H.2.RPA.Un.GHG.2010-8. 2010 Reduced Project Alternative Summary of Tug Average Daily Unmitigated GHG Emissions.

<b>Mode</b>	<b>Equipment</b>	<b>N<sub>2</sub>O Emissions (tons/yr)</b>	<b>CO<sub>2</sub> Emissions (tons/yr)</b>	<b>CH<sub>4</sub> Emissions (tons/yr)</b>
Tug Assist	Main Engines	0.0039	399.38	0.0551
Tug Assist	Aux Generator	0.0005	53.41	0.0074
<b>TOTAL</b>		<b>0.0045</b>	<b>452.79</b>	<b>0.0625</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Un.GHG.2010-9. 2010 Reduced Project Alternative VDU Crude Average Daily Unmitigated GHG Emissions.

	Annual Vessel Calls	crude vapors from tanks(scf/call)	annual gas usage (mmscf/yr)	mw crude vapors	destruction efficiency
Aframax	32	224000	7.2	50	98%
VLCC	26	596,313	15.5	50	98%
Panamax	26	116,667	3.0		
Suezmax	45	333,333	15.0		
<b>TOTAL</b>	<b>129</b>		<b>40.7</b>		

<b>Assumed Distribution based on tank storage</b>	
<b>Site 1</b>	<b>12.5%</b>
<b>Site 2</b>	<b>87.5%</b>

Annual Average (tons/yr)

	<b>N<sub>2</sub>O</b>	<b>CO<sub>2</sub></b>	<b>CH<sub>4</sub></b>
EF (kg/MMBtu)	0.0001	52.78	0.0059
Aframax	0.0007	385.89	0.0431
VLCC	0.0016	834.67	0.0933
Panamax	0.0003	163.30	0.0183
Suezmax	0.0015	807.53	0.0903
<b>TOTAL</b>	<b>0.0042</b>	<b>2191.4031</b>	<b>0.2450</b>

Annual Average (tons/yr)

	<b>N<sub>2</sub>O</b>	<b>CO<sub>2</sub></b>	<b>CH<sub>4</sub></b>
Site 1	0.0005	273.93	0.03
Site 2	0.0036	1917.5	0.2

**Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR**

**Table H.2.RPA.Un.GHG.2010-10. 2010 Reduced Project Alternative VDU Legs Average Daily Unmitigated GHG Emissions.**

	tanks	crude vapors from tanks on legs(scf/yr)	annual gas usage (mmscf/yr)	mw crude vapors	destruction efficiency
Site 1	4	8640000	34.6	50	98%
Site 2	14	8640000	121.0	50	98%
<b>TOTAL</b>	<b>18</b>		<b>155.5</b>		

48	hr/event
6	events/yr
500	ft3/min

Annual Average (tons/yr)

	<b>N<sub>2</sub>O</b>	<b>CO<sub>2</sub></b>	<b>CH<sub>4</sub></b>
EF (kg/MMBtu)	0.0001	52.78	0.0059
<b>TOTAL</b>	<b>0.016</b>	<b>8372.513</b>	<b>0.936</b>

*Assumed a ratio of 500/1000 based on the corresponding Btu values with respect to natural gas combustion emission factors.*

Annual Average (tons/yr)

	<b>N<sub>2</sub>O</b>	<b>CO<sub>2</sub></b>	<b>CH<sub>4</sub></b>
Site 1	0.0035	1860.6	0.2
Site 2	0.012	6512.0	0.7



Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Un.GHG.2010-11. 2010 Reduced Project Alternative VDU Average Daily Unmitigated GHG Emissions.

Annual Average (tons/yr)

	<b>N<sub>2</sub>O</b>	<b>CO<sub>2</sub></b>	<b>CH<sub>4</sub></b>
Site 1	0.004	2134	0.24
Site 2	0.016	8429	0.94
<b>Total</b>	<b>0.020</b>	<b>10,564</b>	<b>1.18</b>

Daily Average (tons/day)

	<b>N<sub>2</sub>O</b>	<b>CO<sub>2</sub></b>	<b>CH<sub>4</sub></b>
Site 1	1.11E-05	5.848	6.54E-04
Site 2	4.38E-05	23.094	2.58E-03
<b>Total</b>	<b>5.48E-05</b>	<b>29</b>	<b>3.24E-03</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Un.GHG.2015-1. 2015 Reduced Project Alternative Main Engines Average Daily Unmitigated GHG Emissions.

Ship	Direction	Mode	Distance (nautical miles)	Ship speed (knots)	Activity (hours)	Maximum Speed (knots)	Load Factor	MCR (kW)	Energy (kW-hr)	Energy (MMBtu)	Shipcalls (vessels/yr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
VLCC	North In	Cruising - CW to VSR	22	15.54	1.42	16.9	0.777	25,400	27,957	95	46.0	0.0055	620.00	0.0818	0.0070	797.35	0.1052
		Cruising - VSR to PZ	21	12	1.75	16.9	0.358	25,400	15,913	54	46.0	0.0055	620.00	0.0818	0.0040	453.84	0.0599
		Cruising - PZ to Pilot	4.7	7	0.67	16.9	0.071	25,400	1,212	4	46.0	0.0055	620.00	0.0818	0.0003	34.56	0.0046
	North Out	Maneuvering - Pilot to Berth		3	1.00	16.9	0.006	25,400	142	0	46.0	0.0060	682.00	0.0902	0.0000	4.46	0.0006
		Maneuvering - Berth to Pilot		5	1.00	16.9	0.026	25,400	658	2	46.0	0.0060	682.00	0.0902	0.0002	20.64	0.0027
		Cruising - Pilot to PZ	3.8	7	0.54	16.9	0.071	25,400	980	3	46.0	0.0055	620.00	0.0818	0.0002	27.94	0.0037
		Cruising - PZ to VSR	21	12	1.75	16.9	0.358	25,400	15,913	54	46.0	0.0055	620.00	0.0818	0.0040	453.84	0.0599
		Cruising - VSR to CW	22	15.54	1.42	16.9	0.777	25,400	27,957	95	46.0	0.0055	620.00	0.0818	0.0070	797.35	0.1052
AFRAMAX	South In	Cruising - CW to VSR	23	14.7	1.56	16.1	0.761	12,477	14,859	51	24.0	0.0055	620.00	0.0818	0.0019	221.10	0.0292
		Cruising - VSR to PZ	11	12	0.92	16.1	0.414	12,477	4,736	16	24.0	0.0055	620.00	0.0818	0.0006	70.47	0.0093
		Cruising - PZ to Pilot	4.7	7	0.67	16.1	0.082	12,477	689	2	24.0	0.0055	620.00	0.0818	0.0001	10.25	0.0014
	South Out	Maneuvering - Pilot to Berth		3	1.00	16.1	0.006	12,477	81	0	24.0	0.0060	682.00	0.0902	0.0000	1.32	0.0002
		Maneuvering - Berth to Pilot		5	1.00	16.1	0.030	12,477	374	1	24.0	0.0060	682.00	0.0902	0.0001	6.12	0.0008
		Cruising - Pilot to PZ	3.5	7	0.50	16.1	0.082	12,477	513	2	24.0	0.0055	620.00	0.0818	0.0001	7.63	0.0010
		Cruising - PZ to VSR	12.5	12	1.04	16.1	0.414	12,477	5,382	18	24.0	0.0055	620.00	0.0818	0.0007	80.08	0.0106
		Cruising - VSR to CW	24.5	14.7	1.67	16.1	0.761	12,477	15,828	54	24.0	0.0055	620.00	0.0818	0.0021	235.52	0.0311
PANAMAX	South In	Cruising - CW to VSR	23	14.7	1.56	15.8	0.805	10,300	12,979	44	10	0.0055	620.00	0.0818	0.0007	80.47	0.0106
		Cruising - VSR to PZ	11	12	0.92	15.8	0.438	10,300	4,136	14	10	0.0055	620.00	0.0818	0.0002	25.65	0.0034
		Cruising - PZ to Pilot	4.7	7	0.67	15.8	0.087	10,300	601	2	10	0.0055	620.00	0.0818	0.0000	3.73	0.0005
	South Out	Maneuvering - Pilot to Berth		3	1.00	15.8	0.007	10,300	71	0	10	0.0060	682.00	0.0902	0.0000	0.48	0.0001
		Maneuvering - Berth to Pilot		5	1.00	15.8	0.032	10,300	326	1	10	0.0060	682.00	0.0902	0.0000	2.23	0.0003
		Cruising - Pilot to PZ	3.5	7	0.50	15.8	0.087	10,300	448	2	10	0.0055	620.00	0.0818	0.0000	2.78	0.0004
		Cruising - PZ to VSR	12.5	12	1.04	15.8	0.438	10,300	4,700	16	10	0.0055	620.00	0.0818	0.0003	29.14	0.0038
		Cruising - VSR to CW	24.5	14.7	1.67	15.8	0.805	10,300	13,825	47	10	0.0055	620.00	0.0818	0.0008	85.72	0.0113
SUEZMAX	North In	Cruising - CW to VSR	22	15.54	1.42	17	0.764	16,000	17,302	59	52	0.0055	620.00	0.0818	0.0049	557.82	0.0736
		Cruising - VSR to PZ	21	12	1.75	17	0.352	16,000	9,848	34	52	0.0055	620.00	0.0818	0.0028	317.50	0.0419
		Cruising - PZ to Pilot	4.7	7	0.67	17	0.070	16,000	750	3	52	0.0055	620.00	0.0818	0.0002	24.18	0.0032
	North Out	Maneuvering - Pilot to Berth		3	1.00	17	0.005	16,000	88	0	52	0.0060	682.00	0.0902	0.0000	3.12	0.0004
		Maneuvering - Berth to Pilot		5	1.00	17	0.025	16,000	407	1	52	0.0060	682.00	0.0902	0.0001	14.44	0.0019
		Cruising - Pilot to PZ	3.8	7	0.54	17	0.070	16,000	606	2	52	0.0055	620.00	0.0818	0.0002	19.55	0.0026
		Cruising - PZ to VSR	21	12	1.75	17	0.352	16,000	9,848	34	52	0.0055	620.00	0.0818	0.0028	317.50	0.0419
		Cruising - VSR to CW	22	15.54	1.42	17	0.764	16,000	17,302	59	52	0.0055	620.00	0.0818	0.0049	557.82	0.0736

TOTAL 0.0463 5264.58 0.6946

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

**Table H.2.RPA.Un.GHG.2015-2. 2015 Reduced Project Alternative Auxiliary Generator Average Daily Unmitigated GHG Emissions.**

Ship	Direction	Mode	Activity (hours)	MCR (kW)	Load Factor	Energy (kW-hr)	Energy (MMBtu)	Shipcalls (vessels/yr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
VLCC	North In	Cruising	3.84	3,600	0.278	3,840	13	46.0	0.0055	620.00	0.0818	0.0010	109.52	0.0144
		Maneuvering	2.00	3,600	0.278	2,002	7	46.0	0.0060	682.00	0.0902	0.0006	62.79	0.0083
	North Out	Maneuvering	1.50	3,600	0.278	1,501	5	46.0	0.0060	682.00	0.0902	0.0004	47.10	0.0062
		Cruising	3.71	3,600	0.278	3,712	13	46.0	0.0055	620.00	0.0818	0.0009	105.85	0.0140
AFRAMAX	South In	Cruising	3.15	3,600	0.278	3,155	11	24.0	0.0055	620.00	0.0818	0.0004	46.95	0.0062
		Maneuvering	2.00	3,600	0.278	2,002	7	24.0	0.0060	682.00	0.0902	0.0003	32.76	0.0043
	South Out	Maneuvering	1.50	3,600	0.278	1,501	5	24.0	0.0060	682.00	0.0902	0.0002	24.57	0.0032
		Cruising	3.21	3,600	0.278	3,211	11	24.0	0.0055	620.00	0.0818	0.0004	47.78	0.0063
PANAMAX	South In	Cruising	3.15	3,600	0.28	3,178	11	10	0.0055	620.00	0.0818	0.0002	19.70	0.0026
		Maneuvering	2.00	3,600	0.28	2,016	7	10	0.0060	682.00	0.0902	0.0001	13.75	0.0018
	South Out	Maneuvering	1.5	3,600	0.28	1,512	5	10	0.0060	682.00	0.0902	0.0001	10.31	0.0014
		Cruising	3.21	3,600	0.28	3,234	11	10	0.0055	620.00	0.0818	0.0002	20.05	0.0026
SUEZMAX	North In	Cruising	3.84	3,600	0.28	3,868	13	52	0.0055	620.00	0.0818	0.0011	124.70	0.0165
		Maneuvering	2.00	3,600	0.28	2,016	7	52	0.0060	682.00	0.0902	0.0006	71.50	0.0095
	North Out	Maneuvering	1.5	3,600	0.28	1,512	5	52	0.0060	682.00	0.0902	0.0005	53.62	0.0071
		Cruising	3.71	3,600	0.28	3,738	13	52	0.0055	620.00	0.0818	0.0011	120.52	0.0159

**TOTAL**

**0.0080**

**911.48**

**0.1204**

**Table H.2.RPA.Un.GHG.2015-3. 2015 Reduced Project Alternative Boiler Warm-Up Average Daily Unmitigated GHG Emissions.**

Shipcalls (vessels/yr)	Vessel Size	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	Fuel Consumption (gal/yr)	N <sub>2</sub> O Emission Factor (lb/ton)	CO <sub>2</sub> Emission Factor (lb/ton)	CH <sub>4</sub> Emission Factor (lb/ton)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
24.0	Aframax	HFO	2.70	107.96	30%	3	50,000	51,751	0.0627	6,360.00	0.8770	0.0047	476.49	0.0657
46.0	VLCC	HFO	2.70	84.93	30%	3	90,000	140,457	0.0627	6,360.00	0.8770	0.0127	1,293.24	0.1783
10.0	Panamax	HFO	2.70	63.30	30%	3	35,000	8,850	0.0627	6,360.00	0.8770	0.0008	81.49	0.0112
52.0	Suezmax	HFO	2.70	87.54	30%	3	70,000	127,289	0.0627	6,360.00	0.8770	0.0116	1,171.99	0.1616
<b>TOTAL</b>												<b>0.0298</b>	<b>3,023.20</b>	<b>0.4169</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Un.GHG.2015-4. 2015 Reduced Project Alternative Berth Operations Average Daily Unmitigated GHG Emissions.

Auxiliary Generator Pre-Pumpin

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	Energy (MMBtu)	Heating Value (MMBtu/1000 gal)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
24.0	Aframax	700,000	HFO	2.70	3,600	28%	2.5	8.5	150	0.0064	722.0	0.0952	0.0014	155.95	0.0206
46.0	VLCC	2,000,000	HFO	2.70	3,600	28%	2.5	8.5	150	0.0064	722.0	0.0952	0.0026	298.91	0.0394
10.0	Panamax	350,000	HFO	2.70	3,600	28%	2.5	8.6	150	0.0064	722.0	0.0952	0.0006	64.98	0.0086
52.0	Suezmax	1,000,000	HFO	2.70	3,600	28%	2.5	8.6	150	0.0064	722.0	0.0952	0.0030	337.90	0.0446
<b>TOTAL</b>													<b>0.0075</b>	<b>857.74</b>	<b>0.1131</b>

Boiler Pre-Pumpin

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	Fuel Consumption (gal/yr)	N <sub>2</sub> O Emission Factor (lb/ton)	CO <sub>2</sub> Emission Factor (lb/ton)	CH <sub>4</sub> Emission Factor (lb/ton)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
24.0	Aframax	700,000	HFO	2.70	107.96	30%	2.5	50,000	43,126	0.0627	6,360.0	0.8770	0.0039	397.07	0.0548
46.0	VLCC	2,000,000	HFO	2.70	84.93	30%	2.5	90,000	117,047	0.0627	6,360.0	0.8770	0.0106	1077.70	0.1486
10.0	Panamax	350,000	HFO	2.70	59.91	30%	2.5	35,000	6,980	0.0627	6,360.0	0.8770	0.0006	64.27	0.0089
52.0	Suezmax	1,000,000	HFO	2.70	82.85	30%	2.5	70,000	100,391	0.0627	6,360.0	0.8770	0.0091	924.33	0.1275
<b>TOTAL</b>													<b>0.0243</b>	<b>2463.38</b>	<b>0.3397</b>

Auxiliary Generator Pumpin

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	Energy (MMBtu)	Heating Value (MMBtu/1000 gal)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
24.0	Aframax	700,000	MDO	0.52	3,600	56%	15.0	102.4	140	0.0064	722.0	0.0952	0.0082	935.71	0.1234
46.0	VLCC	2,000,000	MDO	0.52	3,600	56%	23.2	158.4	140	0.0064	722.0	0.0952	0.0246	2773.87	0.3658
10.0	Panamax	350,000	MDO	0.52	3,600	56%	11.0	75.7	140	0.0064	722.0	0.0952	0.0025	285.91	0.0377
52.0	Suezmax	1,000,000	MDO	0.52	3,600	56%	15.3	105.2	140	0.0064	722.0	0.0952	0.0183	2067.92	0.2727
<b>TOTAL</b>													<b>0.0537</b>	<b>6063.41</b>	<b>0.7995</b>

Boiler Pumpin

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Inerting Fuel Consumption Savings (lb/1000 bbl offloaded)	Activity Time (hr)	Pumping Rate (bbl/hr)	Fuel Consumption (gal/yr)	N <sub>2</sub> O Emission Factor (lb/ton)	CO <sub>2</sub> Emission Factor (lb/ton)	CH <sub>4</sub> Emission Factor (lb/ton)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
24.0	Aframax	700,000	MDO	0.52	102.17	28.06	15.0	50,000	244,891	0.0627	6,360.0	0.8770	0.0222	2254.80	0.3109
46.0	VLCC	2,000,000	MDO	0.52	80.38	28.06	23.2	90,000	1,028,008	0.0627	6,360.0	0.8770	0.0933	9465.24	1.3052
10.0	Panamax	350,000	MDO	0.52	59.91	28.06	11.0	35,000	30,713	0.0627	6,360.0	0.8770	0.0028	282.78	0.0390
52.0	Suezmax	1,000,000	MDO	0.52	82.85	28.06	15.3	70,000	614,392	0.0627	6,360.0	0.8770	0.0558	5656.93	0.7801
<b>TOTAL</b>													<b>0.1741</b>	<b>17659.75</b>	<b>2.4352</b>

Auxiliary Generator Post-Pumpin

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	Energy (MMBtu)	Heating Value (MMBtu/1000 gal)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
24.0	Aframax	700,000	HFO	2.70	3,600	28%	1.0	3.4	150	0.0064	722.0	0.0952	0.0005	62.38	0.0082
46.0	VLCC	2,000,000	HFO	2.70	3,600	28%	1.0	3.4	150	0.0064	722.0	0.0952	0.0011	119.56	0.0158
10.0	Panamax	350,000	HFO	2.70	3,600	28%	1.0	3.4	150	0.0064	722.0	0.0952	0.0002	25.99	0.0034
52.0	Suezmax	1,000,000	HFO	2.70	3,600	28%	1.0	3.4	150	0.0064	722.0	0.0952	0.0012	135.16	0.0178
<b>TOTAL</b>													<b>0.0030</b>	<b>343.09</b>	<b>0.0452</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Un.GHG.2015-5. 2015 Reduced Project Alternative Summary of Average Daily Unmitigated Vessel GHG Emissions.

Mode	Equipment	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
Cruising	Main Engines	0.0458	5211.79	0.6876
Cruising	Aux Generator	0.0052	595.08	0.0785
Maneuvering	Main Engines	0.0005	52.7938	0.0070
Maneuvering	Aux Generator	0.0028	316.4016	0.0418
Boiler Warm-up	Boiler	0.0298	3023.20	0.4169
Berth Operations	Boiler	0.1984	20123.13	2.7748
Berth Operations	Aux Generator	0.0643	7264.24	0.9578
Propulsion	TOTAL	0.0543	6176.06	0.8150
Non-Propulsion	TOTAL	0.2925	30410.58	4.1496
<b>Total Emissions</b>		<b>0.3467</b>	<b>36586.6398</b>	<b>4.9645</b>

Mode	Equipment	N <sub>2</sub> O Emissions (tons/day)	CO <sub>2</sub> Emissions (tons/day)	CH <sub>4</sub> Emissions (tons/day)
Cruising	Main Engines	1.26E-04	14.3	1.88E-03
Cruising	Aux Generator	1.43E-05	1.6	2.15E-04
Maneuvering	Main Engines	1.27E-06	0.1	1.91E-05
Maneuvering	Aux Generator	7.64E-06	0.9	1.15E-04
Boiler Warm-up	Boiler	8.17E-05	8.3	1.14E-03
Berth Operations	Boiler	5.44E-04	55.1	7.60E-03
Berth Operations	Aux Generator	1.76E-04	19.9	2.62E-03
Propulsion	TOTAL	1.49E-04	16.9	2.23E-03
Non-Propulsion	TOTAL	8.01E-04	83.3	1.14E-02
<b>Total Emissions</b>		<b>9.50E-04</b>	<b>1.00E+02</b>	<b>1.36E-02</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Un.GHG.2015-6. 2015 Reduced Project Alternative Tug Main Engines Average Daily Unmitigated GHG Emissions.

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Energy (kWh)	Energy (MMBtu)	Shipcalls (vessels/yr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
VLCC	Maneuvering - Pilot to Berth	1.00	4	4,800	0.50	2400	8.2	46.0	0.00636	645.0	0.0890	0.0007	71.2080	0.0098
	Maneuvering - Berth to Pilot	1.00	2	4,800	0.50	2400	8.2	46.0	0.00636	645.0	0.0890	0.0007	71.2080	0.0098
AFRAMAX	Maneuvering - Pilot to Berth	1.00	2	4,800	0.50	2400	8.2	24.0	0.00636	645.0	0.0890	0.0004	37.1520	0.0051
	Maneuvering - Berth to Pilot	1.00	2	4,800	0.50	2400	8.2	24.0	0.00636	645.0	0.0890	0.0004	37.1520	0.0051
PANAMAX	Maneuvering - Pilot to Berth	1.00	2	4,800	0.50	2400	8.2	10.0	0.00636	645.0	0.0890	0.0002	15.4800	0.0021
	Maneuvering - Berth to Pilot	1.00	2	4,800	0.50	2400	8.2	10.0	0.00636	645.0	0.0890	0.0002	15.4800	0.0021
SUEZMAX	Maneuvering - Pilot to Berth	1.00	3	4,800	0.50	2400	8.2	52.0	0.00636	645.0	0.0890	0.0008	80.4960	0.0111
	Maneuvering - Berth to Pilot	1.00	2	4,800	0.50	2400	8.2	52.0	0.00636	645.0	0.0890	0.0008	80.4960	0.0111
<b>TOTAL</b>												<b>0.0040</b>	<b>408.6720</b>	<b>0.0564</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Un.GHG.2015-7. 2015 Reduced Project Alternative Tug Auxiliary Generator Engines Average Daily Unmitigated GHG Emissions.

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Energy (kWh)	Energy (MMBtu)	Shipcalls (vessels/yr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
VLCC	Maneuvering - Pilot to Berth	1.00	4	300	1.00	300	1.0	46.0	0.0068	690.0	0.0952	0.00009	9.52	0.00131
	Maneuvering - Berth to Pilot	1.00	2	300	1.00	300	1.0	46.0	0.0068	690.0	0.0952	0.00009	9.52	0.00131
AFRAMAX	Maneuvering - Pilot to Berth	1.00	2	300	1.00	300	1.0	24.0	0.0068	690.0	0.0952	0.00005	4.97	0.00069
	Maneuvering - Berth to Pilot	1.00	2	300	1.00	300	1.0	24.0	0.0068	690.0	0.0952	0.00005	4.97	0.00069
PANAMAX	Maneuvering - Pilot to Berth	1.00	2	300	1.00	300	1.0	10.0	0.0068	690.0	0.0952	0.00002	2.07	0.00029
	Maneuvering - Berth to Pilot	1.00	2	300	1.00	300	1.0	10.0	0.0068	690.0	0.0952	0.00002	2.07	0.00029
SUEZMAX	Maneuvering - Pilot to Berth	1.00	3	300	1.00	300	1.0	52.0	0.0068	690.0	0.0952	0.00011	10.76	0.00149
	Maneuvering - Berth to Pilot	1.00	2	300	1.00	300	1.0	52.0	0.0068	690.0	0.0952	0.00011	10.76	0.00149
<b>TOTAL</b>												<b>0.00054</b>	<b>54.65</b>	<b>0.00754</b>



Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Un.GHG.2015-8. 2015 Reduced Project Alternative Summary of Tug Average Daily Unmitigated GHG Emissions.

Mode	Equipment	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
Tug Assist	Main Engines	0.0040	408.67	0.0564
Tug Assist	Aux Generator	0.00054	54.65	0.00754
<b>TOTAL</b>		<b>0.0046</b>	<b>463.32</b>	<b>0.0639</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Un.GHG.2015-9. 2015 Reduced Project Alternative VDU Crude Average Daily Unmitigated GHG Emissions.

	Annual Vessel Calls	crude vapors from tanks(scf/call)	annual gas usage (mmscf/yr)	mw crude vapors	destruction efficiency
Aframax	24	224000	5.4	50	98%
VLCC	46	596,313	27.4	50	98%
Panamax	10	116,667	1.2		
Suezmax	52	333,333	17.3		
<b>TOTAL</b>	<b>132</b>		<b>51.3</b>		

Assumed Distribution based on tank storage	
Site 1	12.5%
Site 2	87.5%

Annual Average (tons/yr)

	N <sub>2</sub> O	CO <sub>2</sub>	CH <sub>4</sub>
EF (kg/MMBtu)	0.0001	52.78	0.0059
Aframax	0.0005	289.42	0.0324
VLCC	0.0028	1476.73	0.1651
Panamax	0.0001	62.81	0.0070
Suezmax	0.0018	933.15	0.1043
<b>TOTAL</b>	<b>0.0052</b>	<b>2762.1100</b>	<b>0.3088</b>

Annual Average (tons/yr)

	N <sub>2</sub> O	CO <sub>2</sub>	CH <sub>4</sub>
Site 1	0.0007	345.26	0.04
Site 2	0.0046	2416.8	0.3

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Un.GHG.2015-10. 2015 Reduced Project Alternative VDU Legs Average Daily Unmitigated GHG Emissions.

	tanks	crude vapors from tanks on legs(scf/yr)	annual gas usage (mmscf/yr)	mw crude vapors	destruction efficiency
Site 1	4	8640000	34.6	50	98%
Site 2	14	8640000	121.0	50	98%
<b>TOTAL</b>	<b>18</b>		<b>155.5</b>		

<b>48</b>	<b>hr/event</b>
<b>6</b>	<b>events/yr</b>
<b>500</b>	<b>ft3/min</b>

Annual Average (tons/yr)

	<b>N<sub>2</sub>O</b>	<b>CO<sub>2</sub></b>	<b>CH<sub>4</sub></b>
EF (kg/MMBtu)	0.0001	52.78	0.0059
<b>TOTAL</b>	<b>0.016</b>	<b>8372.513</b>	<b>0.936</b>

*Assumed a ratio of 500/1000 based on the corresponding Btu values with respect to natural gas combustion emission factors.*

Annual Average (tons/yr)

	<b>N<sub>2</sub>O</b>	<b>CO<sub>2</sub></b>	<b>CH<sub>4</sub></b>
Site 1	0.0035	1860.6	0.2
Site 2	0.012	6512.0	0.7

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Un.GHG.2015-11. 2015 Reduced Project Alternative VDU Average Daily Unmitigated GHG Emissions.

Annual Average (tons/yr)

	<b>N<sub>2</sub>O</b>	<b>CO<sub>2</sub></b>	<b>CH<sub>4</sub></b>
Site 1	0.004	2251	0.25
Site 2	0.018	9245	1.03
	0.022	11,496	1.29

Daily Average (tons/day)

	<b>N<sub>2</sub>O</b>	<b>CO<sub>2</sub></b>	<b>CH<sub>4</sub></b>
Site 1	1.17E-05	6.167	6.89E-04
Site 2	4.80E-05	25.329	2.83E-03
	5.97E-05	31	3.52E-03

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Un.GHG.2025-1. 2025 Reduced Project Alternative Main Engines Average Daily Unmitigated GHG Emissions.

Ship	Direction	Mode	Distance (nautical miles)	Ship speed (knots)	Activity (hours)	Maximum Speed (knots)	Load Factor	MCR (kW)	Energy (kW-hr)	Energy (MMBtu)	Shipcalls (vessels/yr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
VLCC	North In	Cruising - CW to VSR	22	15.54	1.42	16.9	0.777	25,400	27,957	95	46	0.0055	620.00	0.0818	0.0070	797.35	0.1052
		Cruising - VSR to PZ	21	12	1.75	16.9	0.358	25,400	15,913	54	46	0.0055	620.00	0.0818	0.0040	453.84	0.0599
		Cruising - PZ to Pilot	4.7	7	0.67	16.9	0.071	25,400	1,212	4	46	0.0055	620.00	0.0818	0.0003	34.56	0.0046
		Maneuvering - Pilot to Berth		3	1.00	16.9	0.006	25,400	142	0	46	0.0060	682.00	0.0902	0.0000	4.46	0.0006
	North Out	Maneuvering - Berth to Pilot		5	1.00	16.9	0.026	25,400	658	2	46	0.0060	682.00	0.0902	0.0002	20.64	0.0027
		Cruising - Pilot to PZ	3.8	7	0.54	16.9	0.071	25,400	980	3	46	0.0055	620.00	0.0818	0.0002	27.94	0.0037
		Cruising - PZ to VSR	21	12	1.75	16.9	0.358	25,400	15,913	54	46	0.0055	620.00	0.0818	0.0040	453.84	0.0599
		Cruising - VSR to CW	22	15.54	1.42	16.9	0.777	25,400	27,957	95	46	0.0055	620.00	0.0818	0.0070	797.35	0.1052
AFRAMAX	South In	Cruising - CW to VSR	23	14.7	1.56	16.1	0.761	12,477	14,859	51	24	0.0055	620.00	0.0818	0.0019	221.10	0.0292
		Cruising - VSR to PZ	11	12	0.92	16.1	0.414	12,477	4,736	16	24	0.0055	620.00	0.0818	0.0006	70.47	0.0093
		Cruising - PZ to Pilot	4.7	7	0.67	16.1	0.082	12,477	689	2	24	0.0055	620.00	0.0818	0.0001	10.25	0.0014
		Maneuvering - Pilot to Berth		3	1.00	16.1	0.006	12,477	81	0	24	0.0060	682.00	0.0902	0.0000	1.32	0.0002
	South Out	Maneuvering - Berth to Pilot		5	1.00	16.1	0.030	12,477	374	1	24	0.0060	682.00	0.0902	0.0001	6.12	0.0008
		Cruising - Pilot to PZ	3.5	7	0.50	16.1	0.082	12,477	513	2	24	0.0055	620.00	0.0818	0.0001	7.63	0.0010
		Cruising - PZ to VSR	12.5	12	1.04	16.1	0.414	12,477	5,382	18	24	0.0055	620.00	0.0818	0.0007	80.08	0.0106
		Cruising - VSR to CW	24.5	14.7	1.67	16.1	0.761	12,477	15,828	54	24	0.0055	620.00	0.0818	0.0021	235.52	0.0311
PANAMAX	South In	Cruising - CW to VSR	23	14.7	1.56	15.8	0.805	10,300	12,979	44	10	0.0055	620.00	0.0818	0.0007	80.47	0.0106
		Cruising - VSR to PZ	11	12	0.92	15.8	0.438	10,300	4,136	14	10	0.0055	620.00	0.0818	0.0002	25.65	0.0034
		Cruising - PZ to Pilot	4.7	7	0.67	15.8	0.087	10,300	601	2	10	0.0055	620.00	0.0818	0.0000	3.73	0.0005
		Maneuvering - Pilot to Berth		3	1.00	15.8	0.007	10,300	71	0	10	0.0060	682.00	0.0902	0.0000	0.48	0.0001
	South Out	Maneuvering - Berth to Pilot		5	1.00	15.8	0.032	10,300	326	1	10	0.0060	682.00	0.0902	0.0000	2.23	0.0003
		Cruising - Pilot to PZ	3.5	7	0.50	15.8	0.087	10,300	448	2	10	0.0055	620.00	0.0818	0.0000	2.78	0.0004
		Cruising - PZ to VSR	12.5	12	1.04	15.8	0.438	10,300	4,700	16	10	0.0055	620.00	0.0818	0.0003	29.14	0.0038
		Cruising - VSR to CW	24.5	14.7	1.67	15.8	0.805	10,300	13,825	47	10	0.0055	620.00	0.0818	0.0008	85.72	0.0113
SUEZMAX	North In	Cruising - CW to VSR	22	15.54	1.42	17	0.764	16,000	17,302	59	52	0.0055	620.00	0.0818	0.0049	557.82	0.0736
		Cruising - VSR to PZ	21	12	1.75	17	0.352	16,000	9,848	34	52	0.0055	620.00	0.0818	0.0028	317.50	0.0419
		Cruising - PZ to Pilot	4.7	7	0.67	17	0.070	16,000	750	3	52	0.0055	620.00	0.0818	0.0002	24.18	0.0032
		Maneuvering - Pilot to Berth		3	1.00	17	0.005	16,000	88	0	52	0.0060	682.00	0.0902	0.0000	3.12	0.0004
	North Out	Maneuvering - Berth to Pilot		5	1.00	17	0.025	16,000	407	1	52	0.0060	682.00	0.0902	0.0001	14.44	0.0019
		Cruising - Pilot to PZ	3.8	7	0.54	17	0.070	16,000	606	2	52	0.0055	620.00	0.0818	0.0002	19.55	0.0026
		Cruising - PZ to VSR	21	12	1.75	17	0.352	16,000	9,848	34	52	0.0055	620.00	0.0818	0.0028	317.50	0.0419
		Cruising - VSR to CW	22	15.54	1.42	17	0.764	16,000	17,302	59	52	0.0055	620.00	0.0818	0.0049	557.82	0.0736

TOTAL 0.0463 5264.58 0.6946



Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Un.GHG.2025-3. 2025 Reduced Project Alternative Boiler Warm-Up Average Daily Unmitigated GHG Emissions.

Shipcalls (vessels/yr)	Vessel Size	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	Fuel Consumption (gal/yr)	N <sub>2</sub> O Emission Factor (lb/ton)	CO <sub>2</sub> Emission Factor (lb/ton)	CH <sub>4</sub> Emission Factor (lb/ton)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
24.0	Aframax	2.70	107.96	30%	3	50,000	51,751	0.0627	6,360.00	0.8770	0.0047	476.49	0.0657
46.0	VLCC	2.70	84.93	30%	3	90,000	140,457	0.0627	6,360.00	0.8770	0.0127	1,293.24	0.1783
10.0	Panamax	2.70	63.30	30%	3	35,000	8,850	0.0627	6,360.00	0.8770	0.0008	81.49	0.0112
52.0	Suezmax	2.70	87.54	30%	3	70,000	127,289	0.0627	6,360.00	0.8770	0.0116	1,171.99	0.1616
<b>TOTAL</b>											<b>0.0298</b>	<b>3,023.20</b>	<b>0.4169</b>

Table H.2.RPA.Un.GHG.2025-4. 2025 Reduced Project Alternative Berth Operations Average Daily Unmitigated GHG Emissions.

**Auxiliary Generator Pre-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	Energy (MMBtu)	Heating Value (MMBtu/1000 gal)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
24.0	Aframax	700,000	HFO	2.70	3,600	28%	2.5	8.5	150	0.0064	722.0	0.0952	0.0014	155.95	0.0206
46.0	VLCC	2,000,000	HFO	2.70	3,600	28%	2.5	8.5	150	0.0064	722.0	0.0952	0.0026	298.91	0.0394
10.0	Panamax	350,000	HFO	2.70	3,600	28%	2.5	8.6	150	0.0064	722.0	0.0952	0.0006	64.98	0.0086
52.0	Suezmax	1,000,000	HFO	2.70	3,600	28%	2.5	8.6	150	0.0064	722.0	0.0952	0.0030	337.90	0.0446
<b>TOTAL</b>													<b>0.0075</b>	<b>857.74</b>	<b>0.1131</b>

**Boiler Pre-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	Fuel Consumption (gal/yr)	N <sub>2</sub> O Emission Factor (lb/ton)	CO <sub>2</sub> Emission Factor (lb/ton)	CH <sub>4</sub> Emission Factor (lb/ton)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
24.0	Aframax	700,000	HFO	2.70	107.96	30%	2.5	50,000	43,126	0.0627	6,360.0	0.8770	0.0039	397.07	0.0548
46.0	VLCC	2,000,000	HFO	2.70	84.93	30%	2.5	90,000	117,047	0.0627	6,360.0	0.8770	0.0106	1077.70	0.1486
10.0	Panamax	350,000	HFO	2.70	59.91	30%	2.5	35,000	6,980	0.0627	6,360.0	0.8770	0.0006	64.27	0.0089
52.0	Suezmax	1,000,000	HFO	2.70	82.85	30%	2.5	70,000	100,391	0.0627	6,360.0	0.8770	0.0091	924.33	0.1275
<b>TOTAL</b>													<b>0.0243</b>	<b>2463.38</b>	<b>0.3397</b>

**Auxiliary Generator Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	Energy (MMBtu)	Heating Value (MMBtu/1000 gal)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
24.0	Aframax	700,000	MDO	0.52	3,600	56%	15.0	102.4	140	0.0064	722.0	0.0952	0.0082	935.71	0.1234
46.0	VLCC	2,000,000	MDO	0.52	3,600	56%	23.2	158.4	140	0.0064	722.0	0.0952	0.0246	2773.87	0.3658
10.0	Panamax	350,000	MDO	0.52	3,600	56%	11.0	75.7	140	0.0064	722.0	0.0952	0.0025	285.91	0.0377
52.0	Suezmax	1,000,000	MDO	0.52	3,600	56%	15.3	105.2	140	0.0064	722.0	0.0952	0.0183	2067.92	0.2727
<b>TOTAL</b>													<b>0.0537</b>	<b>6063.41</b>	<b>0.7995</b>

**Boiler Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Inerting Fuel Consumption Savings (lb/1000 bbl offloaded)	Activity Time (hr)	Pumping Rate (bbl/hr)	Fuel Consumption (gal/yr)	N <sub>2</sub> O Emission Factor (lb/ton)	CO <sub>2</sub> Emission Factor (lb/ton)	CH <sub>4</sub> Emission Factor (lb/ton)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
24.0	Aframax	700,000	MDO	0.52	102.17	28.06	15.0	50,000	244,891	0.0627	6,360.0	0.8770	0.0222	2254.80	0.3109
46.0	VLCC	2,000,000	MDO	0.52	80.38	28.06	23.2	90,000	1,028,008	0.0627	6,360.0	0.8770	0.0933	9465.24	1.3052
10.0	Panamax	350,000	MDO	0.52	59.91	28.06	11.0	35,000	30,713	0.0627	6,360.0	0.8770	0.0028	282.78	0.0390
52.0	Suezmax	1,000,000	MDO	0.52	82.85	28.06	15.3	70,000	614,392	0.0627	6,360.0	0.8770	0.0558	5656.93	0.7801
<b>TOTAL</b>													<b>0.1741</b>	<b>17659.75</b>	<b>2.4352</b>

**Auxiliary Generator Post-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	Energy (MMBtu)	Heating Value (MMBtu/1000 gal)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
24.0	Aframax	700,000	HFO	2.70	3,600	28%	1.0	3.4	150	0.0064	722.0	0.0952	0.0005	62.38	0.0082
46.0	VLCC	2,000,000	HFO	2.70	3,600	28%	1.0	3.4	150	0.0064	722.0	0.0952	0.0011	119.56	0.0158
10.0	Panamax	350,000	HFO	2.70	3,600	28%	1.0	3.4	150	0.0064	722.0	0.0952	0.0002	25.99	0.0034
52.0	Suezmax	1,000,000	HFO	2.70	3,600	28%	1.0	3.4	150	0.0064	722.0	0.0952	0.0012	135.16	0.0178
<b>TOTAL</b>													<b>0.0030</b>	<b>343.09</b>	<b>0.0452</b>



Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Un.GHG.2025-5. 2025 Reduced Project Alternative Summary of Average Daily Unmitigated Vessel GHG Emissions.

Mode	Equipment	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
Cruising	Main Engines	0.0458	5211.79	0.6876
Cruising	Aux Generator	0.0052	595.08	0.0785
Maneuvering	Main Engines	0.0005	52.79	0.0070
Maneuvering	Aux Generator	0.0028	316.40	0.0418
Boiler Warm-up	Boiler	0.0298	3023.20	0.4169
Berth Operations	Boiler	0.1984	20123.13	2.7748
Berth Operations	Aux Generator	0.0643	7264.24	0.9578
Propulsion	TOTAL	0.0543	6176.06	0.8150
Non-Propulsion	TOTAL	0.2925	30410.58	4.1496
<b>Total Emissions</b>		<b>0.3467</b>	<b>36586.64</b>	<b>4.9645</b>

Mode	Equipment	N <sub>2</sub> O Emissions (tons/day)	CO <sub>2</sub> Emissions (tons/day)	CH <sub>4</sub> Emissions (tons/day)
Cruising	Main Engines	1.26E-04	14.28	1.88E-03
Cruising	Aux Generator	1.43E-05	1.63	2.15E-04
Maneuvering	Main Engines	1.27E-06	0.14	1.91E-05
Maneuvering	Aux Generator	7.64E-06	0.87	1.15E-04
Boiler Warm-up	Boiler	8.17E-05	8.28	1.14E-03
Berth Operations	Boiler	5.44E-04	55.13	7.60E-03
Berth Operations	Aux Generator	1.76E-04	19.90	2.62E-03
Propulsion	TOTAL	1.49E-04	16.92	2.23E-03
Non-Propulsion	TOTAL	8.01E-04	83.32	1.14E-02
<b>Total Emissions</b>		<b>9.50E-04</b>	<b>100.24</b>	<b>1.36E-02</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Un.GHG.2025-6. 2025 Reduced Project Alternative Tug Main Engines Average Daily Unmitigated GHG Emissions.

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Energy (kWh)	Energy (MMBtu)	Shipcalls (vessels/yr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
VLCC	Maneuvering - Pilot to Berth	1.00	4	4,800	0.50	2400	8.2	46.0	0.00636	645.0	0.0890	0.0007	71.2080	0.0098
	Maneuvering - Berth to Pilot	1.00	2	4,800	0.50	2400	8.2	46.0	0.00636	645.0	0.0890	0.0007	71.2080	0.0098
AFRAMAX	Maneuvering - Pilot to Berth	1.00	2	4,800	0.50	2400	8.2	24.0	0.00636	645.0	0.0890	0.0004	37.1520	0.0051
	Maneuvering - Berth to Pilot	1.00	2	4,800	0.50	2400	8.2	24.0	0.00636	645.0	0.0890	0.0004	37.1520	0.0051
PANAMAX	Maneuvering - Pilot to Berth	1.00	2	4,800	0.50	2400	8.2	10.0	0.00636	645.0	0.0890	0.0002	15.4800	0.0021
	Maneuvering - Berth to Pilot	1.00	2	4,800	0.50	2400	8.2	10.0	0.00636	645.0	0.0890	0.0002	15.4800	0.0021
SUEZMAX	Maneuvering - Pilot to Berth	1.00	3	4,800	0.50	2400	8.2	52.0	0.00636	645.0	0.0890	0.0008	80.4960	0.0111
	Maneuvering - Berth to Pilot	1.00	2	4,800	0.50	2400	8.2	52.0	0.00636	645.0	0.0890	0.0008	80.4960	0.0111
<b>TOTAL</b>												<b>0.0040</b>	<b>408.6720</b>	<b>0.0564</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Un.GHG.2025-7. 2025 Reduced Project Alternative Tug Auxiliary Generator Engines Average Daily Unmitigated GHG Emissions.

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Energy (kWh)	Energy (MMBtu)	Shipcalls (vessels/yr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
VLCC	Maneuvering - Pilot to Berth	1.00	4	300	1.00	300	1.0	46.0	0.0068	690.0	0.0952	0.00009	9.52	0.00131
	Maneuvering - Berth to Pilot	1.00	2	300	1.00	300	1.0	46.0	0.0068	690.0	0.0952	0.00009	9.52	0.00131
AFRAMAX	Maneuvering - Pilot to Berth	1.00	2	300	1.00	300	1.0	24.0	0.0068	690.0	0.0952	0.00005	4.97	0.00069
	Maneuvering - Berth to Pilot	1.00	2	300	1.00	300	1.0	24.0	0.0068	690.0	0.0952	0.00005	4.97	0.00069
PANAMAX	Maneuvering - Pilot to Berth	1.00	2	300	1.00	300	1.0	10.0	0.0068	690.0	0.0952	0.00002	2.07	0.00029
	Maneuvering - Berth to Pilot	1.00	2	300	1.00	300	1.0	10.0	0.0068	690.0	0.0952	0.00002	2.07	0.00029
SUEZMAX	Maneuvering - Pilot to Berth	1.00	3	300	1.00	300	1.0	52.0	0.0068	690.0	0.0952	0.00011	10.76	0.00149
	Maneuvering - Berth to Pilot	1.00	2	300	1.00	300	1.0	52.0	0.0068	690.0	0.0952	0.00011	10.76	0.00149
<b>TOTAL</b>												<b>0.00054</b>	<b>54.65</b>	<b>0.00754</b>

Table H.2.RPA.Un.GHG.2025-8. 2025 Reduced Project Alternative Summary of Tug Average Daily Unmitigated GHG Emissions.

<b>Mode</b>	<b>Equipment</b>	<b>N<sub>2</sub>O Emissions (tons/yr)</b>	<b>CO<sub>2</sub> Emissions (tons/yr)</b>	<b>CH<sub>4</sub> Emissions (tons/yr)</b>
Tug Assist	Main Engines	0.0040	408.67	0.0564
Tug Assist	Aux Generator	0.00054	54.65	0.00754
<b>TOTAL</b>		<b>0.0046</b>	<b>463.32</b>	<b>0.0639</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Un.GHG.2025-9. 2025 Reduced Project Alternative VDU Crude Average Daily Unmitigated GHG Emissions.

	Annual Vessel Calls	crude vapors from tanks(scf/call)	annual gas usage (mmscf/yr)	mw crude vapors	destruction efficiency
Aframax	24	224000	5.4	50	98%
VLCC	46	596,313	27.4	50	98%
Panamax	10	116,667	1.2		
Suezmax	52	333,333	17.3		
<b>TOTAL</b>	<b>132</b>		<b>51.3</b>		

Assumed Distribution based on tank storage	
Site 1	12.5%
Site 2	87.5%

Annual Average (tons/yr)

	N <sub>2</sub> O	CO <sub>2</sub>	CH <sub>4</sub>
EF (kg/MMBtu)	0.0001	52.78	0.0059
Aframax	0.0005	289.42	0.0324
VLCC	0.0028	1476.73	0.1651
Panamax	0.0001	62.81	0.0070
Suezmax	0.0018	933.15	0.1043
<b>TOTAL</b>	<b>0.0052</b>	<b>2762.1100</b>	<b>0.3088</b>

Annual Average (tons/yr)

	N <sub>2</sub> O	CO <sub>2</sub>	CH <sub>4</sub>
Site 1	0.0007	345.26	0.04
Site 2	0.0046	2416.8	0.3

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Un.GHG.2025-10. 2025 Reduced Project Alternative VDU Legs Average Daily Unmitigated GHG Emissions.

	tanks	crude vapors from tanks on legs(scf/yr)	annual gas usage (mmscf/yr)	mw crude vapors	destruction efficiency
Site 1	4	8640000	34.6	50	98%
Site 2	14	8640000	121.0	50	98%
<b>TOTAL</b>	<b>18</b>		<b>155.5</b>		

48	hr/event
6	events/yr
500	ft3/min

Annual Average (tons/yr)

	N <sub>2</sub> O	CO <sub>2</sub>	CH <sub>4</sub>
EF (kg/MMBtu)	0.0001	52.78	0.0059
<b>TOTAL</b>	<b>0.016</b>	<b>8372.513</b>	<b>0.936</b>

*Assumed a ratio of 500/1000 based on the corresponding Btu values with respect to natural gas combustion emission factors.*

Annual Average (tons/yr)

	N <sub>2</sub> O	CO <sub>2</sub>	CH <sub>4</sub>
Site 1	0.0035	1860.6	0.2
Site 2	0.012	6512.0	0.7

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Un.GHG.2025-11. 2025 Reduced Project Alternative VDU Average Daily Unmitigated GHG Emissio

Annual Average (tons/yr)

	<b>N<sub>2</sub>O</b>	<b>CO<sub>2</sub></b>	<b>CH<sub>4</sub></b>
Site 1	0.004	2251	0.25
Site 2	0.018	9245	1.03
<b>Total</b>	<b>0.022</b>	<b>11,496</b>	<b>1.29</b>

Daily Average (tons/day)

	<b>N<sub>2</sub>O</b>	<b>CO<sub>2</sub></b>	<b>CH<sub>4</sub></b>
Site 1	1.17E-05	6.167	6.89E-04
Site 2	4.80E-05	25.329	2.83E-03
<b>Total</b>	<b>5.97E-05</b>	<b>31</b>	<b>3.52E-03</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Un.GHG.2025-12. 2025 Reduced Project Alternative Main Engines Average Daily Unmitigated GHG Emissions (BP).

Ship	Direction	Mode	Distance (nautical miles)	Ship speed (knots)	Activity (hours)	Maximum Speed (knots)	Load Factor	MCR (kW)	Energy (kW-hr)	Fuel Type	Shipcalls (vessels/ yr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
AFRAMAX	South In	Cruising - CW to VSR	23	12	1.92	16.1	0.414	12,477	9,902	Dist at 0.2	27	0.0058	588.00	0.0811	0.0016	157.20	0.0217
		Cruising - VSR to PZ	11	12	0.92	16.1	0.414	12,477	4,736	Dist at 0.2	27	0.0058	588.00	0.0811	0.0007	75.18	0.0104
		Cruising - PZ to Pilot	4.7	7	0.67	16.1	0.082	12,477	689	Dist at 0.2	27	0.0058	588.00	0.0811	0.0001	10.93	0.0015
	South Out	Maneuvering - Pilot to Berth	3	1.00	16.1	0.006	12,477	81	Dist at 0.2	27	0.0064	647.00	0.0895	0.0000	1.41	0.0002	
		Maneuvering - Berth to Pilot	5	1.00	16.1	0.030	12,477	374	Dist at 0.2	27	0.0064	647.00	0.0895	0.0001	6.53	0.0009	
		Cruising - Pilot to PZ	3.5	7	0.50	16.1	0.082	12,477	513	Dist at 0.2	27	0.0058	588.00	0.0811	0.0001	8.14	0.0011
		Cruising - PZ to VSR	12.5	12	1.04	16.1	0.414	12,477	5,382	Dist at 0.2	27	0.0058	588.00	0.0811	0.0008	85.44	0.0118
		Cruising - VSR to CW	24.5	12	2.04	16.1	0.414	12,477	10,548	Dist at 0.2	27	0.0058	588.00	0.0811	0.0017	167.46	0.0231
		<b>TOTAL</b>															<b>0.0051</b>



Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Un.GHG.2025-13. 2025 Reduced Project Alternative Auxiliary Generator Average Daily Unmitigated GHG Emissions

Ship	Direction	Mode	Activity (hours)	MCR (kW)	Load Factor	Energy (kW-hr)	Fuel Type	Shipcalls (vessels/yr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
AFRAMAX	South In	Cruising	3.50	3,600	0.28	3,533	Dist at 0.2	27	0.0068	690.00	0.0952	0.0006	65.8161	0.0091
		Maneuvering	2.00	3,600	0.28	2,016	Dist at 0.2	27	0.0068	690.00	0.0952	0.0004	37.5581	0.0052
	South Out	Maneuvering	1.5	3,600	0.28	1,512	Dist at 0.2	27	0.0068	690.00	0.0952	0.0003	28.1686	0.0039
		Cruising	3.50	3,600	0.28	3,528	Dist at 0.2	27	0.0068	690.00	0.0952	0.0006	65.7266	0.0091

**TOTAL** **0.0019** **197.27** **0.0272**

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Un.GHG.2025-14. 2025 Reduced Project Alternative Boiler Warm-Up Average Daily Unmitigated GHG Emissions (BP).

Shipcalls (vessels/yr)	Vessel Size	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	Fuel Consumption (gal/yr)	N <sub>2</sub> O Emission Factor (lb/ton)	CO <sub>2</sub> Emission Factor (lb/ton)	CH <sub>4</sub> Emission Factor (lb/ton)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
27.0	Aframax	Dist at 0.2	0.20	102.17	30%	3	50,000	55,098	0.0068	690.00	0.0952	0.00054	55.03839	0.00759
<b>TOTAL</b>												<b>0.00054</b>	<b>55.04</b>	<b>0.0076</b>

Table H.2.RPA.Un.GHG.2025-15. 2025 Reduced Project Alternative Berth Operations Average Daily Unmitigated GHG Emissions (BP).

**Auxiliary Generator Pre-Pumpin**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
27.0	Aframax	400,000	Dist at 0.2	0.20	3,600	28%	2.5	0.0064	722.0	0.0952	0.00154	175.45	0.0231

AMP Reduction 0% TOTAL 0.00154 175.45 0.0231

**Boiler Pre-Pumpin**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	Fuel Consumption (gal/yr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
27.0	Aframax	400,000	Dist at 0.2	0.20	102.17	30%	2.5	50,000	45,915	0.0627	6,360.0	0.8770	0.00417	422.76	0.05830

TOTAL 0.00417 422.76 0.0583

**Auxiliary Generator Pumpin**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
27.0	Aframax	400,000	Dist at 0.2	0.20	3,600	56%	15.0	0.0064	722.00	0.0952	0.0093	1,052.6760	0.1388

AMP Reduction 0% TOTAL 0.0093 1,052.68 0.1388

**Boiler Pumpin**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Inerting Fuel Consumption Savings (lb/1000 bbl offloaded)	Activity Time (hr)	Pumping Rate (bbl/hr)	Fuel Consumption (gal/yr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
27.0	Aframax	400,000	Dist at 0.2	0.20	102.17	28.06	15.0	50,000	275,492	0.0627	6,360.00	0.8770	0.0250	2,536.55	0.3498

TOTAL 0.0250 2,536.55 0.3498

**Auxiliary Generator Post-Pumpin**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
27.0	Aframax	400,000	Dist at 0.2	0.20	3,600	28%	1.0	0.0064	722.00	0.0952	0.00062	70.17840	0.00925

AMP Reduction 0% TOTAL 0.00062 70.18 0.0093

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Un.GHG.2025-16. 2025 Reduced Project Alternative Summary of Average Daily Unmitigated Vessel GHG Emissions (BP).

Mode	Equipment	N <sub>2</sub> O	CO <sub>2</sub>	CH <sub>4</sub>
		Emissions (tons/yr)	Emissions (tons/yr)	Emissions (tons/yr)
Cruising	Main Engines	0.0050	504.35	0.0696
Cruising	Aux Generator	0.0013	131.54	0.0181
Maneuvering	Main Engines	0.0001	7.94	0.0011
Maneuvering	Aux Generator	0.0006	65.73	0.0091
Boiler Warm-up	Boiler	0.0005	55.04	0.0076
Berth Operations	Boiler	0.0292	2959.31	0.4081
Berth Operations	Aux Generator	0.0115	1298.30	0.1712
Propulsion	TOTAL	0.0070	709.56	0.0979
Non-Propulsion	TOTAL	0.0412	4312.65	0.5869
<b>Total Emissions</b>		<b>0.0482</b>	<b>5022.21</b>	<b>0.6847</b>

Mode	Equipment	N <sub>2</sub> O	CO <sub>2</sub>	CH <sub>4</sub>
		Emissions (tons/day)	Emissions (tons/day)	Emissions (tons/day)
Cruising	Main Engines	1.36E-05	1.38	1.91E-04
Cruising	Aux Generator	3.55E-06	0.36	4.97E-05
Maneuvering	Main Engines	2.15E-07	0.02	3.01E-06
Maneuvering	Aux Generator	1.77E-06	0.18	2.48E-05
Boiler Warm-up	Boiler	1.49E-06	0.15	2.08E-05
Berth Operations	Boiler	7.99E-05	8.11	1.12E-03
Berth Operations	Aux Generator	3.15E-05	3.56	4.69E-04
Propulsion	TOTAL	1.92E-05	1.94	2.68E-04
Non-Propulsion	TOTAL	1.13E-04	11.82	1.61E-03
<b>Total Emissions</b>		<b>1.32E-04</b>	<b>13.76</b>	<b>1.88E-03</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Un.GHG.2025-17. 2025 Reduced Project Alternative Tug Main Engines Average Daily Unmitigated GHG Emissions (BP).

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Energy (kWh)	Energy (MMBtu)	Shipcalls (vessels/yr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
AFRAMAX	Maneuvering - Pilot to Berth	1.00	2	4,800	0.50	MGO	2400	8.2	27.0	0.00636	645.0	0.0890	0.0004	41.7960	0.0058
	Maneuvering - Berth to Pilot	1.00	2	4,800	0.50	MGO	2400	8.2	27.0	0.00636	645.0	0.0890	0.0004	41.7960	0.0058
<b>TOTAL</b>													<b>0.0008</b>	<b>83.5920</b>	<b>0.0115</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Un.GHG.2025-18. 2025 Reduced Project Alternative Tug Auxiliary Generator Engines Average Daily Unmitigated GHG Emissions (BP).

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Energy (kWh)	Energy (MMBtu)	Shipcalls (vessels/yr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
AFRAMAX	Maneuvering - Pilot to Berth	1.00	2	300	1.00	MGO	300	1.0	27.0	0.0068	690.0	0.0952	0.00006	5.58900	0.00077
	Maneuvering - Berth to Pilot	1.00	2	300	1.00	MGO	300	1.0	27.0	0.0068	690.0	0.0952	0.00006	5.58900	0.00077
<b>TOTAL</b>													<b>0.00011</b>	<b>11.18</b>	<b>0.00154</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Un.GHG.2025-19. 2025 Reduced Project Alternative Summary of Tug Average Daily Unmitigated GHG Emissions (BP).

Mode	Equipment	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
Tug Assist	Main Engines	0.0008	83.5920	0.0115
Tug Assist	Aux Generator	0.00011	11.17800	0.00154
<b>TOTAL</b>		<b>0.0009</b>	<b>94.77</b>	<b>0.0131</b>

Mode	Equipment	N <sub>2</sub> O Emissions (tons/day)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
Tug Assist	Main Engines	2.26E-06	2.29E-01	3.16E-05
Tug Assist	Aux Generator	3.02E-07	3.06E-02	4.23E-06
<b>TOTAL</b>		<b>2.56E-06</b>	<b>2.60E-01</b>	<b>3.58E-05</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Un.GHG.2025-20. 2025 Reduced Project Alternative VDU Crude Average Daily Unmitigated GHG Emissions (BP).

	Annual Vessel Calls	crude vapors from tanks(scf/call)	annual gas usage (mmscf/yr)	mw crude vapors	destruction efficiency
Aframax	27	224000	6.0	50	98%
<b>TOTAL</b>	<b>27</b>		<b>6.0</b>		

Assumed Distribution based on tank storage volume:	
Site 1	12.5%
Site 2	87.5%

Annual Average (tons/yr)

	N <sub>2</sub> O	CO <sub>2</sub>	CH <sub>4</sub>
EF (kg/MMBtu)	0.0001	52.78	0.0059
Aframax	0.0006	325.60	0.0364
<b>TOTAL</b>	<b>0.0006</b>	<b>325.5977</b>	<b>0.0364</b>

Annual Average (tons/yr)

	N <sub>2</sub> O	CO <sub>2</sub>	CH <sub>4</sub>
Site 1	0.0001	40.70	0.00
Site 2	0.0005	284.9	0.0



Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Un.GHG.2025-21. 2025 Reduced Project Alternative VDU Legs Average Daily Unmitigated GHG Emissions (BP).

	tanks	crude vapors from tanks on legs(scf/yr)	annual gas usage (mmscf/yr)	mw crude vapors	destruction efficiency
Site 1	4	8640000	34.6	50	98%
Site 2	14	8640000	121.0	50	98%
<b>TOTAL</b>	<b>18</b>		<b>155.5</b>		

48	hr/event
6	events/yr
500	ft3/min

Annual Average (tons/yr)

	N <sub>2</sub> O	CO <sub>2</sub>	CH <sub>4</sub>
EF (kg/MMBtu)	0.0001	52.78	0.0059
<b>TOTAL</b>	<b>0.016</b>	<b>8372.513</b>	<b>0.936</b>

*Assumed a ratio of 500/1000 based on the corresponding Btu values with respect to natural gas combustion emission factors.*

Annual Average (tons/yr)

	N <sub>2</sub> O	CO <sub>2</sub>	CH <sub>4</sub>
Site 1	0.0035	1860.6	0.2
Site 2	0.012	6512.0	0.7

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

**Table H.2.RPA.Un.GHG.2025-22. 2025 Reduced Project Alternative VDU Average Daily Unmitigated GHG Emissions (BP).**

Annual Average (tons/yr)

	<b>N<sub>2</sub>O</b>	<b>CO<sub>2</sub></b>	<b>CH<sub>4</sub></b>
Site 1	0.004	1901	0.21
Site 2	0.013	6797	0.76
<b>Total</b>	<b>0.016</b>	<b>8,698</b>	<b>0.97</b>

Daily Average (tons/day)

	<b>N<sub>2</sub>O</b>	<b>CO<sub>2</sub></b>	<b>CH<sub>4</sub></b>
Site 1	9.87E-06	5.21	5.82E-04
Site 2	3.53E-05	18.62	2.08E-03
<b>Total</b>	<b>4.52E-05</b>	<b>23.83</b>	<b>2.66E-03</b>

**Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR**

**Table H.2.RPA.Un.GHG.2025-23. 2025 Reduced Project Alternative BP Berth Summary.**

<b>Operation</b>	<b>N<sub>2</sub>O Emissions (tons/yr)</b>	<b>CO<sub>2</sub> Emissions (tons/yr)</b>	<b>CH<sub>4</sub> Emissions (tons/yr)</b>	<b>CO<sub>2</sub>e Emissions (tons/yr)</b>
Tanker Cruising and Manuevering	0.0070	709.56	0.0979	713.79
Tanker Hoteling	0.0115	1,298.30	0.1712	1305.46
Offloading Emissions	0.0292	2,959.31	0.4081	2976.92
Transiting Operations	0.0005	55.04	0.0076	55.37
Tug Assistance	0.0009	94.77	0.0131	95.33
Tanks	---	---	---	---
Vapor Destruction Units	0.0165	8,698.11	0.9723	8723.64
Valves, Flanges, Pumps	---	---	---	---
<b>TOTAL</b>	<b>0.0656</b>	<b>13,815.09</b>	<b>1.6701</b>	<b>13870.51</b>

<b>Operation</b>	<b>N<sub>2</sub>O Emissions (tons/day)</b>	<b>CO<sub>2</sub> Emissions (tons/day)</b>	<b>CH<sub>4</sub> Emissions (tons/day)</b>	<b>CO<sub>2</sub>e Emissions (tons/yr)</b>
Tanker Cruising and Manuevering	1.92E-05	1.94E+00	2.68E-04	1.96
Tanker Hoteling	3.15E-05	3.56E+00	4.69E-04	3.58
Offloading Emissions	7.99E-05	8.11E+00	1.12E-03	8.16
Transiting Operations	1.49E-06	1.51E-01	2.08E-05	0.15
Tug Assistance	2.56E-06	2.60E-01	3.58E-05	0.26
Tanks	---	---	---	---
Vapor Destruction Units	4.52E-05	2.38E+01	2.66E-03	23.90
Valves, Flanges, Pumps	---	---	---	---
<b>TOTAL</b>	<b>1.80E-04</b>	<b>3.78E+01</b>	<b>4.58E-03</b>	<b>38.00</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Un.GHG.2025-24. 2025 Reduced Project Alternative Main Engines Average Daily Unmitigated GHG Emissions (Tesoro).

Ship	Direction	Mode	Distance (nautical miles)	Ship speed (knots)	Activity (hours)	Maximum Speed (knots)	Load Factor	MCR (kW)	Energy (kW-hr)	Shipcalls (vessels/ yr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)	
AFRAMAX	South In	Cruising - CW to VSR	23	12	1.92	16.1	0.414	12,477	9,902	68	0.0058	588.00	0.0811	0.0039	395.92	0.0546	
		Cruising - VSR to PZ	11	12	0.92	16.1	0.414	12,477	4,736	68	0.0058	588.00	0.0811	0.0019	189.35	0.0261	
		Cruising - PZ to Pilot	4.7	7	0.67	16.1	0.082	12,477	689	68	0.0058	588.00	0.0811	0.0003	27.53	0.0038	
		Maneuvering - Pilot to Berth		3	1.00	16.1	0.006	12,477	81	68	0.0064	647.00	0.0895	0.0000	3.55	0.0005	
	0%	Maneuvering - Berth to Pilot		5	1.00	16.1	0.030	12,477	374	68	0.0064	647.00	0.0895	0.0002	16.44	0.0023	
		Cruising - Pilot to PZ		3.5	7	0.50	16.1	0.082	12,477	513	68	0.0058	588.00	0.0811	0.0002	20.50	0.0028
		Cruising - PZ to VSR		12.5	12	1.04	16.1	0.414	12,477	5,382	68	0.0058	588.00	0.0811	0.0021	215.17	0.0297
		Cruising - VSR to CW		24.5	12	2.04	16.1	0.414	12,477	10,548	68	0.0058	588.00	0.0811	0.0042	421.74	0.0582
<b>TOTAL</b>											<b>0</b>	<b>4,822</b>	<b>1</b>	<b>0.0127</b>	<b>1,290.22</b>	<b>0.1780</b>	

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Un.GHG.2025-25. 2025 Reduced Project Alternative Auxiliary Generator Average Daily Unmitigated GHG Emissions (Tesoro).

Ship	Direction	Mode	Activity (hours)	MCR (kW)	Load Factor	Energy (kW-hr)	Shipcalls (vessels/yr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
AFRAMAX	South In	Cruising	3.50	3,600	0.28	3,533	68	0.0068	690.00	0.0952	0.0016	165.7590	0.0229
		Maneuvering	2.00	3,600	0.28	2,016	68	0.0068	690.00	0.0952	0.0009	94.5907	0.0131
	South Out	Maneuvering	1.5	3,600	0.28	1,512	68	0.0068	690.00	0.0952	0.0007	70.9430	0.0098
		Cruising	3.50	3,600	0.28	3,528	68	0.0068	690.00	0.0952	0.0016	165.5338	0.0228
<b>TOTAL</b>								<b>0</b>	<b>2,760</b>	<b>0</b>	<b>0.0049</b>	<b>496.83</b>	<b>0.0685</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Un.GHG.2025-26. 2025 Reduced Project Alternative Boiler Warm-Up Average Daily Unmitigated GHG Emissions (Tesor

Shipcalls (vessels/yr)	Vessel Size	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	Fuel Consumption (gal/yr)	N <sub>2</sub> O Emission Factor (lb/ton)	CO <sub>2</sub> Emission Factor (lb/ton)	CH <sub>4</sub> Emission Factor (lb/ton)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
68.0	Aframax	0.20	102.17	30%	3	50,000	138,766	0.0068	690.00	0.0952	0.00137	138.61520	0.01912
TOTAL								0	690	0	0.00137	138.62	0.0191

Table H.2.RPA.Un.GHG.2025-27. 2025 Reduced Project Alternative Berth Operations Average Daily Unmitigated GHG Emissions (Tesoro).

**Auxiliary Generator Pre-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
68.0	Aframax	400,000	0.20	3,600	28%	2.5	0.0064	722.00	0.0952	0.00389	441.86	0.0583

AMP Reduction 0%

**TOTAL** 0.0064 722.00 0.0952 0.00389 441.86 0.0583

**Boiler Pre-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	Fuel Consumption (gal/yr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
68.0	Aframax	400,000	0.20	102.17	30%	2.5	50,000	115638.48	0.0627	6,360.0	0.8770	0.01050	1,064.73	0.14682

AMP Reduction 0%

**TOTAL** 0.0627 6,360.00 0.8770 0.01050 1,064.73 0.1468

**Auxiliary Generator Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
68.0	Aframax	400,000	0.20	3,600	56%	15.0	0.0064	722.00	0.0952	0.0235	2,651.1840	0.3496

AMP Reduction 0%

**TOTAL** 0.0064 722.00 0.0952 0.0235 2,651.18 0.3496

**Boiler Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Inerting Fuel Consumption Savings (lb/1000 bbl offloaded)	Activity Time (hr)	Pumping Rate (bbl/hr)	Fuel Consumption (gal/yr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
68.0	Aframax	400,000	0.20	102.17	28.06	15.0	50,000	693830.89	0.0627	6,360.00	0.8770	0.0630	6,388.35	0.8809

AMP Reduction 0%

**TOTAL** 0 6,360 1 0.0630 6,388.35 0.8809

**Auxiliary Generator Post-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
68.0	Aframax	400,000	0.20	3,600	28%	1.0	0.0064	722.00	0.0952	0.00157	176.74560	0.02330

AMP Reduction 0%

**TOTAL** 0.0064 722.00 0.0952 0.00157 176.75 0.0233

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Un.GHG.2025-28. 2025 Reduced Project Alternative Summary of Average Daily Unmitigated Vessel GHG Emissions (Tesoro).

Mode	Equipment	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
Cruising	Main Engines	0.0125	1270.2243	0.1752
Cruising	Aux Generator	0.0033	331.2927	0.0457
Maneuvering	Main Engines	0.0002	19.9935	0.0028
Maneuvering	Aux Generator	0.0016	165.5338	0.0228
Boiler Warm-up	Boiler	0.0014	138.6152	0.0191
Berth Operations	Boiler	0.0000	7453.0782	1.0277
Berth Operations	Aux Generator	0.0290	3269.7936	0.4311
Propulsion	TOTAL	0.0176	1787.04	0.2465
Non-Propulsion	TOTAL	0.0303	10861.49	1.4780
<b>Total Emissions</b>		<b>0.0479</b>	<b>12648.53</b>	<b>1.7245</b>

Mode	Equipment	N <sub>2</sub> O Emissions (tons/day)	CO <sub>2</sub> Emissions (tons/day)	CH <sub>4</sub> Emissions (tons/day)
Cruising	Main Engines	3.43E-05	3.48E+00	4.80E-04
Cruising	Aux Generator	8.94E-06	9.08E-01	1.25E-04
Berth Operations	Boiler	0.0000	5.48E-02	7.58E-06
Maneuvering	Aux Generator	4.47E-06	4.54E-01	6.26E-05
Boiler Warm-up	Boiler	3.74E-06	3.80E-01	5.24E-05
Berth Operations	Boiler	0.00E+00	2.04E+01	2.82E-03
Berth Operations	Aux Generator	7.93E-05	8.96E+00	1.18E-03
Propulsion	TOTAL	4.77E-05	4.90E+00	6.75E-04
Non-Propulsion	TOTAL	8.31E-05	2.98E+01	4.05E-03
<b>Total Emissions</b>		<b>0.0001</b>	<b>34.65</b>	<b>0.0047</b>



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Table H.2.RPA.Un.GHG.2025-29. 2025 Reduced Project Alternative Tug Main Engines Average Daily Unmitigated GHG Emissions (Tesoro).

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Energy (kWh)	Energy (MMBtu)	Shipcalls (vessels/yr)	N2O Emission Factor (g/kWh)	CO2 Emission Factor (g/kWh)	CH4 Emission Factor (g/kWh)	N2O Emissions (tons/yr)	CO2 Emissions (tons/yr)	CH4 Emissions (tons/yr)
AFRAMAX	Maneuvering - Pilot to Berth	1.00	2	4,800	0.50	MGO	2400	8.2	68.0	0.00636	645.0	0.0890	0.0010	105.2640	0.0145
	Maneuvering - Berth to Pilot	1.00	2	4,800	0.50	MGO	2400	8.2	68.0	0.00636	645.0	0.0890	0.0010	105.2640	0.0145
TOTAL													0.0021	210.5280	0.0290

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Un.GHG.2025-30. 2025 Reduced Project Alternative Tug Auxiliary Generator Engines Average Daily Unmitigated GHG Emissions (Tesoro).

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Energy (kWh)	Energy (MMBtu)	Shipcalls (vessels/yr)	N2O Emission Factor (g/kWh)	CO2 Emission Factor (g/kWh)	CH4 Emission Factor (g/kWh)	N2O Emissions (tons/yr)	CO2 Emissions (tons/yr)	CH4 Emissions (tons/yr)
AFRAMAX	Maneuvering - Pilot to Berth	1.00	2	300	1.00	MGO	300	1.0	68.0	0.0068	690.0	0.0952	0.00014	14.07600	0.00194
	Maneuvering - Berth to Pilot	1.00	2	300	1.00	MGO	300	1.0	68.0	0.0068	690.0	0.0952	0.00014	14.07600	0.00194
<b>TOTAL</b>													<b>0.00028</b>	<b>28.15</b>	<b>0.00388</b>

Table H.2.RPA.Un.GHG.2025-31. 2025 Reduced Project Alternative Summary of Tug Average Daily Unmitigated GHG Emissions (Tesoro).

Mode	Equipment	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
Tug Assist	Main Engines	0.0021	210.5280	0.0290
Tug Assist	Aux Generator	0.00028	28.15200	0.00388
<b>TOTAL</b>		<b>0.0024</b>	<b>238.68</b>	<b>0.0329</b>

Mode	Equipment	N <sub>2</sub> O Emissions (tons/day)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
Tug Assist	Main Engines	5.69E-06	5.77E-01	7.96E-05
Tug Assist	Aux Generator	7.60E-07	7.71E-02	1.06E-05
<b>TOTAL</b>		<b>6.45E-06</b>	<b>6.54E-01</b>	<b>9.02E-05</b>

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Table H.2.RPA.Un.GHG.2025-32. 2025 Reduced Project Alternative VDU Crude Average Daily Unmitigated (

	Annual Vessel Calls	crude vapors from tanks(scf/call)	annual gas usage (mmscf/yr)	mw crude vapors	destruction efficiency
Aframax	68	224000	15.2	50	98%
<b>TOTAL</b>	<b>68</b>		<b>15.2</b>		

<b>Assumed Distribution based on tank storage</b>	
Site 1	12.5%
Site 2	87.5%

Annual Average (tons/yr)

	<b>N<sub>2</sub>O</b>	<b>CO<sub>2</sub></b>	<b>CH<sub>4</sub></b>
EF (kg/MMBtu)	0.0001	52.78	0.0059
Aframax	0.0016	820.02	0.0917
<b>TOTAL</b>	<b>0.0016</b>	<b>820.0239</b>	<b>0.0917</b>

Annual Average (tons/yr)

	<b>N<sub>2</sub>O</b>	<b>CO<sub>2</sub></b>	<b>CH<sub>4</sub></b>
Site 1	0.0002	102.50	0.01
Site 2	0.0014	717.5	0.1

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Un.GHG.2025-33. 2025 Reduced Project Alternative VDU Legs Average Daily Unmitigated GHG Emissions (Tesoro).

	tanks	crude vapors from tanks on legs(scf/yr)	annual gas usage (mmscf/yr)	mw crude vapors	destruction efficiency
Site 1	4	8640000	34.6	50	98%
Site 2	14	8640000	121.0	50	98%
<b>TOTAL</b>	<b>18</b>		<b>155.5</b>		

<b>48</b>	<b>hr/event</b>
<b>6</b>	<b>events/yr</b>
<b>500</b>	<b>ft3/min</b>

Annual Average (tons/yr)

	<b>N<sub>2</sub>O</b>	<b>CO<sub>2</sub></b>	<b>CH<sub>4</sub></b>
EF (kg/MMBtu)	0.0001	52.78	0.0059
<b>TOTAL</b>	<b>0.016</b>	<b>8372.513</b>	<b>0.936</b>

*Assumed a ratio of 500/1000 based on the corresponding Btu values with respect to natural gas combustion emission factors.*

Annual Average (tons/yr)

	<b>N<sub>2</sub>O</b>	<b>CO<sub>2</sub></b>	<b>CH<sub>4</sub></b>
Site 1	0.0035	1860.6	0.2
Site 2	0.012	6512.0	0.7

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Un.GHG.2025-34. 2025 Reduced Project Alternative VDU Average Daily Unmitigated GHG Emissions (Tesoro).

Annual Average (tons/yr)

	<b>N<sub>2</sub>O</b>	<b>CO<sub>2</sub></b>	<b>CH<sub>4</sub></b>
Site 1	0.004	1963	0.22
Site 2	0.014	7229	0.81
<b>Total</b>	<b>0.017</b>	<b>9,193</b>	<b>1.03</b>

Daily Average (tons/day)

	<b>N<sub>2</sub>O</b>	<b>CO<sub>2</sub></b>	<b>CH<sub>4</sub></b>
Site 1	1.02E-05	5.378	6.01E-04
Site 2	3.75E-05	19.807	2.21E-03
<b>Total</b>	<b>4.77E-05</b>	<b>25</b>	<b>2.82E-03</b>

**Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR**

**Table H.2.RPA.Un.GHG.2025-35. 2025 Reduced Project Alternative Tesoro Berth Summary.**

<b>Operation</b>	<b>N<sub>2</sub>O Emissions (tons/yr)</b>	<b>CO<sub>2</sub> Emissions (tons/yr)</b>	<b>CH<sub>4</sub> Emissions (tons/yr)</b>	<b>CO<sub>2</sub>e Emissions (tons/yr)</b>
Tanker Cruising and Manuevering	0.0176	1,787.04	0.2465	1797.68
Tanker Hoteling	0.0290	3,269.79	0.4311	3287.82
Offloading Emissions	0.0000	7,453.08	1.0277	7474.66
Transiting Operations	0.0014	138.62	0.0191	139.44
Tug Assistance	0.0024	238.68	0.0329	240.10
Tanks	---	---	---	---
Vapor Destruction Units	0.0174	9,192.54	1.0276	9219.51
Valves, Flanges, Pumps	---	---	---	---
<b>TOTAL</b>	<b>0.0677</b>	<b>22,079.75</b>	<b>2.7850</b>	<b>22159.22</b>

<b>Operation</b>	<b>N<sub>2</sub>O Emissions (tons/day)</b>	<b>CO<sub>2</sub> Emissions (tons/day)</b>	<b>CH<sub>4</sub> Emissions (tons/day)</b>	<b>CO<sub>2</sub>e Emissions (tons/day)</b>
Tanker Cruising and Manuevering	4.83E-05	4.90	6.75E-04	4.93
Tanker Hoteling	7.93E-05	8.96	1.18E-03	9.01
Offloading Emissions	0.00E+00	20.42	2.82E-03	20.48
Transiting Operations	3.74E-06	0.38	5.24E-05	0.38
Tug Assistance	6.45E-06	0.65	9.02E-05	0.66
Tanks	---	---	---	---
Vapor Destruction Units	4.77E-05	25.19	2.82E-03	25.26
Valves, Flanges, Pumps	---	---	---	---
<b>TOTAL</b>	<b>1.86E-04</b>	<b>60.49</b>	<b>7.63E-03</b>	<b>60.71</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Un.GHG.2025-36. 2025 Reduced Project Alternative Main Engines Average Daily Unmitigated GHG Emissions (Exxon Mobil).

Ship	Direction	Mode	Distance (nautical miles)	Ship speed (knots)	Activity (hours)	Maximum Speed (knots)	Load Factor	MCR (kW)	Energy (kW-hr)	Energy (MMBtu)	Shipcalls (vessels/ yr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
PANAMAX	South In	Cruising - CW to VSR	23	12	1.92	15.8	0.438	10,300	8,649	30	114	0.0058	588.00	0.0811	0.0057	579.75	0.0800
		Cruising - VSR to PZ	11	12	0.92	15.8	0.438	10,300	4,136	14	114	0.0058	588.00	0.0811	0.0027	277.27	0.0382
		Cruising - PZ to Pilot	4.7	7	0.67	15.8	0.087	10,300	601	2	114	0.0058	588.00	0.0811	0.0004	40.31	0.0056
		Maneuvering - Pilot to Berth		3	1.00	15.8	0.007	10,300	71	0	114	0.0064	647.00	0.0895	0.0001	5.20	0.0007
PANAMAX	South Out	Maneuvering - Berth to Pilot		5	1.00	15.8	0.032	10,300	326	1	114	0.0064	647.00	0.0895	0.0002	24.08	0.0033
		Cruising - Pilot to PZ	3.5	7	0.50	15.8	0.087	10,300	448	2	114	0.0058	588.00	0.0811	0.0003	30.02	0.0041
		Cruising - PZ to VSR	12.5	12	1.04	15.8	0.438	10,300	4,700	16	114	0.0058	588.00	0.0811	0.0031	315.08	0.0435
		Cruising - VSR to CW	24.5	12	2.04	15.8	0.438	10,300	9,213	31	114	0.0058	588.00	0.0811	0.0061	617.56	0.0852
<b>TOTAL</b>															<b>0.0186</b>	<b>1889.26</b>	<b>0.2606</b>



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Table H.2.RPA.Un.GHG.2025-37. 2025 Reduced Project Alternative Auxiliary Generator Average Daily Unmitigated GHG Emissions (Exxon Mobil).

Ship	Direction	Mode	Activity (hours)	MCR (kW)	Load Factor	Energy (kW-hr)	Energy (MMBtu)	Shipcalls (vessels/yr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
PANAMAX	South In	Cruising	3.50	3,600	0.28	3,528	12	114	0.0068	690.00	0.0952	0.0027	277.51	0.0383
		Maneuvering	2.00	3,600	0.28	2,016	7	114	0.0068	690.00	0.0952	0.0016	158.58	0.0219
PANAMAX	South Out	Maneuvering	1.5	3,600	0.28	1,512	5	114	0.0068	690.00	0.0952	0.0012	118.93	0.0164
		Cruising	3.58	3,600	0.28	3,609	12	114	0.0068	690.00	0.0952	0.0028	283.86	0.0392
<b>TOTAL</b>												<b>0.0083</b>	<b>838.88</b>	<b>0.1157</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Un.GHG.2025-38. 2025 Reduced Project Alternative Boiler Warm-Up Average Daily Unmitigated GHG Emissions (Exxon Mobil).

Shipcalls (vessels/yr)	Vessel Size	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	Fuel Consumption (gal/yr)	N <sub>2</sub> O Emission Factor (lb/ton)	CO <sub>2</sub> Emission Factor (lb/ton)	CH <sub>4</sub> Emission Factor (lb/ton)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
114.0	Panamax	0.20	59.91	30%	3	35,000	95,489	0.0068	690.00	0.0952	0.00094	95.39	0.0132
TOTAL											0.00094	95.39	0.0132

Table H.2.RPA.Un.GHG.2025-39. 2025 Reduced Project Alternative Berth Operations Average Daily Unmitigated GHG Emissions (Exxon Mobil).

**Auxiliary Generator Pre-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	Energy (MMBtu)	Heating Value (MMBtu/1000 gal)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
114.0	Panamax	300,000	0.20	3,600	28%	2.5	8.6	150	0.0064	722.0	0.0952	0.0065	740.77	0.0977

AMP Reduction 70% TOTAL 0.0020 222.2316 0.0293

**Boiler Pre-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	Fuel Consumption (gal/yr)	N <sub>2</sub> O Emission Factor (lb/ton)	CO <sub>2</sub> Emission Factor (lb/ton)	CH <sub>4</sub> Emission Factor (lb/ton)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
114.0	Panamax	300,000	0.20	59.91	30%	2.5	35,000	79,574	0.0627	6,360.0	0.8770	0.0072	732.67	0.1010

TOTAL 0.0072 732.67 0.1010

**Auxiliary Generator Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	Energy (MMBtu)	Heating Value (MMBtu/1000 gal)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
114.0	Panamax	300,000	0.20	3,600	56%	11.0	75.7	140	0.0064	722.0	0.0952	0.0289	3259.40	0.4298

AMP Reduction 70% TOTAL 0.0087 977.8190 0.1289

**Boiler Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Inerting Fuel Consumption Savings (lb/1000 bbl offloaded)	Activity Time (hr)	Pumping Rate (bbl/hr)	Fuel Consumption (gal/yr)	N <sub>2</sub> O Emission Factor (lb/ton)	CO <sub>2</sub> Emission Factor (lb/ton)	CH <sub>4</sub> Emission Factor (lb/ton)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
114.0	Panamax	300,000	0.20	59.91	28.06	11.0	35,000	350,126	0.0627	6,360.0	0.8770	0.0318	3223.74	0.4445

TOTAL 0.0318 3223.74 0.4445

**Auxiliary Generator Post-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	Energy (MMBtu)	Heating Value (MMBtu/1000 gal)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
114.0	Panamax	300,000	0.20	3,600	28%	1.0	3.4	150	0.0064	722.0	0.0952	0.0026	296.31	0.0391

AMP Reduction 70% TOTAL 0.0008 88.8926 0.0117

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Table H.2.RPA.Un.GHG.2025-40. 2025 Reduced Project Alternative Summary of Average Daily Unmitigated Vessel GHG Emissions (Exxon Mobil).

Mode	Equipment	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
Cruising	Main Engines	1.83E-02	1859.99	0.257
Cruising	Aux Generator	5.53E-03	561.37	0.077
Maneuvering	Main Engines	2.89E-04	29.28	0.004
Maneuvering	Aux Generator	2.73E-03	277.51	0.038
Boiler Warm-up	Boiler	9.40E-04	95.39	0.013
Berth Operations	Boiler	3.90E-02	3956.41	0.546
Berth Operations	Aux Generator	1.14E-02	1288.94	0.170
Propulsion	TOTAL	2.69E-02	2728.14	0.376
Non-Propulsion	TOTAL	0.05	5340.74	0.729
<b>Total</b>		<b>7.83E-02</b>	<b>8068.88</b>	<b>1.105</b>

Mode	Equipment	N <sub>2</sub> O Emissions (tons/day)	CO <sub>2</sub> Emissions (tons/day)	CH <sub>4</sub> Emissions (tons/day)
Cruising	Main Engines	5.03E-05	5.1	7.03E-04
Cruising	Aux Generator	1.52E-05	1.5	2.12E-04
Maneuvering	Main Engines	7.92E-07	0.1	1.11E-05
Maneuvering	Aux Generator	7.49E-06	0.8	1.05E-04
Boiler Warm-up	Boiler	2.58E-06	0.3	3.61E-05
Berth Operations	Boiler	1.07E-04	10.8	1.49E-03
Berth Operations	Aux Generator	3.13E-05	3.5	4.66E-04
Propulsion	TOTAL	7.37E-05	7.5	1.03E-03
Non-Propulsion	TOTAL	1.41E-04	14.6	2.00E-03
<b>Total</b>		<b>2.14E-04</b>	<b>2.21E+01</b>	<b>3.03E-03</b>

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Table H.2.RPA.Un.GHG.2025-41. 2025 Reduced Project Alternative Tug Main Engines Average Daily Unmitigated GHG Emissions (Exxon Mobil).

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Energy (kWh)	Energy (MMBtu)	Shipcalls (vessels/yr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
PANAMAX	Maneuvering - Pilot to Berth	1.00	2	4,800	0.50	MGO	2400	8.2	114.0	0.00636	645.0	0.0890	0.0017	176.47	0.0244
	Maneuvering - Berth to Pilot	1.00	2	4,800	0.50	MGO	2400	8.2	114.0	0.00636	645.0	0.0890	0.0017	176.47	0.0244
TOTAL													0.0035	352.94	0.0487

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Table H.2.RPA.Un.GHG.2025-42. 2025 Reduced Project Alternative Tug Auxiliary Generator Engines Average Daily Unmitigated GHG Emissions (Exxon Mobil).

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Energy (kWh)	Energy (MMBtu)	Shipcalls (vessels/yr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
PANAMAX	Maneuvering - Pilot to Berth	1.00	2	300	1.00	MGO	300	1.0	114.0	0.0068	690.0	0.0952	0.00023	23.59800	0.0033
	Maneuvering - Berth to Pilot	1.00	2	300	1.00	MGO	300	1.0	114.0	0.0068	690.0	0.0952	0.00023	23.59800	0.0033
<b>TOTAL</b>													<b>0.00047</b>	<b>47.20</b>	<b>0.0065</b>

Table H.2.RPA.Un.GHG.2025-43. 2025 Reduced Project Alternative Summary of Tug Average Daily Unmitigated GHG Emissions (Exxon Mobil).

<b>Mode</b>	<b>Equipment</b>	<b>N<sub>2</sub>O Emissions (tons/yr)</b>	<b>CO<sub>2</sub> Emissions (tons/yr)</b>	<b>CH<sub>4</sub> Emissions (tons/yr)</b>
Tug Assist	Main Engines	0.0035	352.94	0.0487
Tug Assist	Aux Generator	0.00047	47.20	0.0065
<b>TOTAL</b>		<b>0.0039</b>	<b>400.14</b>	<b>0.0552</b>

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Table H.2.RPA.Un.GHG.2025-44. 2025 Reduced Project Alternative VDU Crude Average Daily Unmitigated GHG Emissions (Exxon Mobil).

	Annual Vessel Calls	crude vapors from tanks(scft/call)	annual gas usage (mmscf/yr)	mw crude vapors	destruction efficiency
Panamax	114	116667	13.3	50	98%
TOTAL	114		13.3		

Assumed Distribution based on tank storage volume:	
Site 1	12.5%
Site 2	87.5%

Annual Average (tons/yr)

	N <sub>2</sub> O	CO <sub>2</sub>	CH <sub>4</sub>
EF (kg/MMBtu)	0.0001	52.78	0.0059
Aframax	0.0014	716.02	0.0800
TOTAL	0.0014	716.0155	0.0800

Annual Average (tons/yr)

	N <sub>2</sub> O	CO <sub>2</sub>	CH <sub>4</sub>
Site 1	0.0002	89.50	0.01
Site 2	0.0012	626.5	0.1



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Table H.2.RPA.Un.GHG.2025-45. 2025 Reduced Project Alternative VDU Legs Average Daily Unmitigated GHG Emissions (Exxon Mobil).

	tanks	crude vapors from tanks on legs(scf/yr)	annual gas usage (mmscf/yr)	mw crude vapors	destruction efficiency
Site 1	4	8640000	34.6	50	98%
Site 2	14	8640000	121.0	50	98%
<b>TOTAL</b>	<b>18</b>		<b>155.5</b>		

48	hr/event
6	events/yr
500	ft3/min

Annual Average (tons/yr)

	N <sub>2</sub> O	CO <sub>2</sub>	CH <sub>4</sub>
EF (kg/MMBtu)	0.0001	52.78	0.0059
<b>TOTAL</b>	<b>0.016</b>	<b>8372.513</b>	<b>0.936</b>

*Assumed a ratio of 500/1000 based on the corresponding Btu values with respect to natural gas combustion emission factors.*

Annual Average (tons/yr)

	N <sub>2</sub> O	CO <sub>2</sub>	CH <sub>4</sub>
Site 1	0.0035	1860.6	0.2
Site 2	0.012	6512.0	0.7

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Table H.2.RPA.Un.GHG.2025-46. 2025 Reduced Project Alternative VDU Average Daily Unmitigated GHG Emissions (Exxon Mobil).

Annual Average (tons/yr)

	<b>N<sub>2</sub>O</b>	<b>CO<sub>2</sub></b>	<b>CH<sub>4</sub></b>
Site 1	0.004	1950	0.22
Site 2	0.014	7138	0.80
<b>Total</b>	<b>0.017</b>	<b>9,089</b>	<b>1.02</b>

Daily Average (tons/day)

	<b>N<sub>2</sub>O</b>	<b>CO<sub>2</sub></b>	<b>CH<sub>4</sub></b>
Site 1	1.01E-05	5.343	5.97E-04
Site 2	3.71E-05	19.557	2.19E-03
<b>Total</b>	<b>4.72E-05</b>	<b>25</b>	<b>2.78E-03</b>

**Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR**

**Table H.2.RPA.Un.GHG.2025-47. 2025 Reduced Project Alternative Exxon Mobil Berth Summary.**

<b>Operation</b>	<b>N<sub>2</sub>O Emissions (tons/yr)</b>	<b>CO<sub>2</sub> Emissions (tons/yr)</b>	<b>CH<sub>4</sub> Emissions (tons/yr)</b>	<b>CO<sub>2</sub>e Emissions (tons/yr)</b>
Tanker Cruising and Manuevering	0.0269	2,728.14	0.3763	2744.39
Tanker Hoteling	0.0114	1,288.94	0.1700	1296.05
Offloading Emissions	0.0390	3,956.41	0.5456	3979.96
Transiting Operations	0.0009	95.39	0.0132	95.95
Tug Assistance	0.0039	400.14	0.0552	402.52
Tanks	---	---	---	---
Vapor Destruction Units	0.0172	9,088.53	1.0160	9115.20
Valves, Flanges, Pumps	---	---	---	---
<b>TOTAL</b>	<b>0.0994</b>	<b>17,557.55</b>	<b>2.1762</b>	<b>17634.07</b>

<b>Operation</b>	<b>N<sub>2</sub>O Emissions (tons/day)</b>	<b>CO<sub>2</sub> Emissions (tons/day)</b>	<b>CH<sub>4</sub> Emissions (tons/day)</b>	<b>CO<sub>2</sub>e Emissions (tons/day)</b>
Tanker Cruising and Manuevering	7.37E-05	7.47	1.03E-03	7.52
Tanker Hoteling	3.13E-05	3.53	4.66E-04	3.55
Offloading Emissions	1.07E-04	10.84	1.49E-03	10.90
Transiting Operations	2.58E-06	0.26	3.61E-05	0.26
Tug Assistance	1.08E-05	1.10	1.51E-04	1.10
Tanks	---	---	---	---
Vapor Destruction Units	4.72E-05	24.90	2.78E-03	24.97
Valves, Flanges, Pumps	---	---	---	---
<b>TOTAL</b>	<b>2.72E-04</b>	<b>48.10</b>	<b>5.96E-03</b>	<b>48.31</b>

Table H.2.RPA.Un.GHG.2025-48. 2025 Reduced Project Alternative Existing Berth Summary (BP, Tesoro and Exxon Mobil).

Operation	BP (tons/yr)	Tesoro (tons/yr)	Exxon (tons/yr)	Total (tons/yr)
<b>Tanker Cruising and Maneuvering</b>				
N <sub>2</sub> O	0.027	0.018	0.027	0.071
CO <sub>2</sub>	2728.143	1787.044	2728.143	7243.331
CH <sub>4</sub>	0.376	0.247	0.376	0.999
CO <sub>2</sub> e	2744.386	1797.684	2744.386	7286.457
<b>Tanker Hoteling</b>				
N <sub>2</sub> O	0.011	0.009	0.011	0.032
CO <sub>2</sub>	1288.943	980.938	1288.943	3558.825
CH <sub>4</sub>	0.170	0.129	0.170	0.469
CO <sub>2</sub> e	1296.049	986.347	1296.049	3578.446
<b>Offloading Emissions</b>				
N <sub>2</sub> O	0.039	0.073	0.039	0.151
CO <sub>2</sub>	3956.410	7453.078	3956.410	15365.898
CH <sub>4</sub>	0.546	1.028	0.546	2.119
CO <sub>2</sub> e	3979.958	7497.438	3979.958	15457.354
<b>Transiting Operations</b>				
N <sub>2</sub> O	0.001	0.001	0.001	0.003
CO <sub>2</sub>	95.385	138.615	95.385	329.385
CH <sub>4</sub>	0.013	0.019	0.013	0.045
CO <sub>2</sub> e	95.953	139.440	95.953	331.346
<b>Tug Assistance</b>				
N <sub>2</sub> O	0.004	0.002	0.004	0.010
CO <sub>2</sub>	400.140	238.680	400.140	1038.960
CH <sub>4</sub>	0.055	0.033	0.055	0.143
CO <sub>2</sub> e	402.523	240.101	402.523	1045.146
<b>Tanks</b>				
N <sub>2</sub> O	---	---	---	---
CO <sub>2</sub>	---	---	---	---
CH <sub>4</sub>	---	---	---	---
CO <sub>2</sub> e	---	---	---	---
<b>Vapor Destruction Units</b>				
N <sub>2</sub> O	114.000	0.017	114.000	228.017
CO <sub>2</sub>	60253.882	9192.536	60253.882	129700.301
CH <sub>4</sub>	6.735	1.028	6.735	14.499
CO <sub>2</sub> e	95735.327	9219.515	95735.327	200690.169
<b>Valves, Flanges, Pumps</b>				
N <sub>2</sub> O	---	---	---	---
CO <sub>2</sub>	---	---	---	---
CH <sub>4</sub>	---	---	---	---
CO <sub>2</sub> e	---	---	---	---

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Table H.2.RPA.Un.GHG.2040-1. 2040 Reduced Project Alternative Main Engines Average Daily Unmitigated GHG Emissions.

Ship	Direction	Mode	Distance (nautical miles)	Ship speed (knots)	Activity (hours)	Maximum Speed (knots)	Load Factor	MCR (kW)	Energy (kW-hr)	Energy (MMBtu)	Shipcalls (vessels/yr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
VLCC	North In	Cruising - CW to VSR	22	15.54	1.42	16.9	0.777	25,400	27,957	95	46.0	0.0055	620.00	0.0818	0.0070	797.35	0.1052
		Cruising - VSR to PZ	21	12	1.75	16.9	0.358	25,400	15,913	54	46.0	0.0055	620.00	0.0818	0.0040	453.84	0.0599
		Cruising - PZ to Pilot	4.7	7	0.67	16.9	0.071	25,400	1,212	4	46.0	0.0055	620.00	0.0818	0.0003	34.56	0.0046
		Maneuvering - Pilot to Berth		3	1.00	16.9	0.006	25,400	142	0	46.0	0.0060	682.00	0.0902	0.0000	4.46	0.0006
	North Out	Maneuvering - Berth to Pilot		5	1.00	16.9	0.026	25,400	658	2	46.0	0.0060	682.00	0.0902	0.0002	20.64	0.0027
		Cruising - Pilot to PZ	3.8	7	0.54	16.9	0.071	25,400	980	3	46.0	0.0055	620.00	0.0818	0.0002	27.94	0.0037
		Cruising - PZ to VSR	21	12	1.75	16.9	0.358	25,400	15,913	54	46.0	0.0055	620.00	0.0818	0.0040	453.84	0.0599
		Cruising - VSR to CW	22	15.54	1.42	16.9	0.777	25,400	27,957	95	46.0	0.0055	620.00	0.0818	0.0070	797.35	0.1052
AFRAMAX	South In	Cruising - CW to VSR	23	14.7	1.56	16.1	0.761	12,477	14,859	51	24.0	0.0055	620.00	0.0818	0.0019	221.10	0.0292
		Cruising - VSR to PZ	11	12	0.92	16.1	0.414	12,477	4,736	16	24.0	0.0055	620.00	0.0818	0.0006	70.47	0.0093
		Cruising - PZ to Pilot	4.7	7	0.67	16.1	0.082	12,477	689	2	24.0	0.0055	620.00	0.0818	0.0001	10.25	0.0014
		Maneuvering - Pilot to Berth		3	1.00	16.1	0.006	12,477	81	0	24.0	0.0060	682.00	0.0902	0.0000	1.32	0.0002
	South Out	Maneuvering - Berth to Pilot		5	1.00	16.1	0.030	12,477	374	1	24.0	0.0060	682.00	0.0902	0.0001	6.12	0.0008
		Cruising - Pilot to PZ	3.5	7	0.50	16.1	0.082	12,477	513	2	24.0	0.0055	620.00	0.0818	0.0001	7.63	0.0010
		Cruising - PZ to VSR	12.5	12	1.04	16.1	0.414	12,477	5,382	18	24.0	0.0055	620.00	0.0818	0.0007	80.08	0.0106
		Cruising - VSR to CW	24.5	14.7	1.67	16.1	0.761	12,477	15,828	54	24.0	0.0055	620.00	0.0818	0.0021	235.52	0.0311
PANAMAX	South In	Cruising - CW to VSR	23	14.7	1.56	15.8	0.805	10,300	12,979	44	10	0.0055	620.00	0.0818	0.0007	80.47	0.0106
		Cruising - VSR to PZ	11	12	0.92	15.8	0.438	10,300	4,136	14	10	0.0055	620.00	0.0818	0.0002	25.65	0.0034
		Cruising - PZ to Pilot	4.7	7	0.67	15.8	0.087	10,300	601	2	10	0.0055	620.00	0.0818	0.0000	3.73	0.0005
		Maneuvering - Pilot to Berth		3	1.00	15.8	0.007	10,300	71	0	10	0.0060	682.00	0.0902	0.0000	0.48	0.0001
	South Out	Maneuvering - Berth to Pilot		5	1.00	15.8	0.032	10,300	326	1	10	0.0060	682.00	0.0902	0.0000	2.23	0.0003
		Cruising - Pilot to PZ	3.5	7	0.50	15.8	0.087	10,300	448	2	10	0.0055	620.00	0.0818	0.0000	2.78	0.0004
		Cruising - PZ to VSR	12.5	12	1.04	15.8	0.438	10,300	4,700	16	10	0.0055	620.00	0.0818	0.0003	29.14	0.0038
		Cruising - VSR to CW	24.5	14.7	1.67	15.8	0.805	10,300	13,825	47	10	0.0055	620.00	0.0818	0.0008	85.72	0.0113
SUEZMAX	North In	Cruising - CW to VSR	22	15.54	1.42	17	0.764	16,000	17,302	59	52	0.0055	620.00	0.0818	0.0049	557.82	0.0736
		Cruising - VSR to PZ	21	12	1.75	17	0.352	16,000	9,848	34	52	0.0055	620.00	0.0818	0.0028	317.50	0.0419
		Cruising - PZ to Pilot	4.7	7	0.67	17	0.070	16,000	750	3	52	0.0055	620.00	0.0818	0.0002	24.18	0.0032
		Maneuvering - Pilot to Berth		3	1.00	17	0.005	16,000	88	0	52	0.0060	682.00	0.0902	0.0000	3.12	0.0004
	North Out	Maneuvering - Berth to Pilot		5	1.00	17	0.025	16,000	407	1	52	0.0060	682.00	0.0902	0.0001	14.44	0.0019
		Cruising - Pilot to PZ	3.8	7	0.54	17	0.070	16,000	606	2	52	0.0055	620.00	0.0818	0.0002	19.55	0.0026
		Cruising - PZ to VSR	21	12	1.75	17	0.352	16,000	9,848	34	52	0.0055	620.00	0.0818	0.0028	317.50	0.0419
		Cruising - VSR to CW	22	15.54	1.42	17	0.764	16,000	17,302	59	52	0.0055	620.00	0.0818	0.0049	557.82	0.0736
<b>TOTAL</b>															<b>0.0463</b>	<b>5264.58</b>	<b>0.6946</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Un.GHG.2040-2. 2040 Reduced Project Alternative Auxiliary Generator Average Daily Unmitigated GHG Emissions

Ship	Direction	Mode	Activity (hours)	MCR (kW)	Load Factor	Energy (kW-hr)	Energy (MMBtu)	Shipcalls (vessels/yr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
VLCC	North In	Cruising	3.84	3,600	0.278	3,840	13	46.0	0.0055	620.00	0.0818	0.0010	109.52	0.0144
		Maneuvering	2.00	3,600	0.278	2,002	7	46.0	0.0060	682.00	0.0902	0.0006	62.79	0.0083
	North Out	Maneuvering	1.50	3,600	0.278	1,501	5	46.0	0.0060	682.00	0.0902	0.0004	47.10	0.0062
		Cruising	3.71	3,600	0.278	3,712	13	46.0	0.0055	620.00	0.0818	0.0009	105.85	0.0140
AFRAMAX	South In	Cruising	3.15	3,600	0.278	3,155	11	24.0	0.0055	620.00	0.0818	0.0004	46.95	0.0062
		Maneuvering	2.00	3,600	0.278	2,002	7	24.0	0.0060	682.00	0.0902	0.0003	32.76	0.0043
	South Out	Maneuvering	1.50	3,600	0.278	1,501	5	24.0	0.0060	682.00	0.0902	0.0002	24.57	0.0032
		Cruising	3.21	3,600	0.278	3,211	11	24.0	0.0055	620.00	0.0818	0.0004	47.78	0.0063
PANAMAX	South In	Cruising	3.15	3,600	0.28	3,178	11	10	0.0055	620.00	0.0818	0.0002	19.70	0.0026
		Maneuvering	2.00	3,600	0.28	2,016	7	10	0.0060	682.00	0.0902	0.0001	13.75	0.0018
	South Out	Maneuvering	1.5	3,600	0.28	1,512	5	10	0.0060	682.00	0.0902	0.0001	10.31	0.0014
		Cruising	3.21	3,600	0.28	3,234	11	10	0.0055	620.00	0.0818	0.0002	20.05	0.0026
SUEZMAX	North In	Cruising	3.84	3,600	0.28	3,868	13	52	0.0055	620.00	0.0818	0.0011	124.70	0.0165
		Maneuvering	2.00	3,600	0.28	2,016	7	52	0.0060	682.00	0.0902	0.0006	71.50	0.0095
	North Out	Maneuvering	1.5	3,600	0.28	1,512	5	52	0.0060	682.00	0.0902	0.0005	53.62	0.0071
		Cruising	3.71	3,600	0.28	3,738	13	52	0.0055	620.00	0.0818	0.0011	120.52	0.0159

**TOTAL**

**0.0080**

**911.48**

**0.1204**

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Un.GHG.2040-3. 2040 Reduced Project Alternative Boiler Warm-Up Average Daily Unmitigated GHG Emissions.

Shipcalls (vessels/yr)	Vessel Size	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	Fuel Consumption (gal/yr)	N <sub>2</sub> O Emission Factor (lb/ton)	CO <sub>2</sub> Emission Factor (lb/ton)	CH <sub>4</sub> Emission Factor (lb/ton)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
24.0	Aframax	2.70	107.96	30%	3	50,000	51,751	0.0627	6,360.00	0.8770	0.0047	476.49	0.0657
46.0	VLCC	2.70	84.93	30%	3	90,000	140,457	0.0627	6,360.00	0.8770	0.0127	1,293.24	0.1783
10.0	Panamax	2.70	63.30	30%	3	35,000	8,850	0.0627	6,360.00	0.8770	0.0008	81.49	0.0112
52.0	Suezmax	2.70	87.54	30%	3	70,000	127,289	0.0627	6,360.00	0.8770	0.0116	1,171.99	0.1616
<b>TOTAL</b>											<b>0.0298</b>	<b>3,023.20</b>	<b>0.4169</b>

Table H.2.RPA.Un.GHG.2040-4. 2040 Reduced Project Alternative Berth Operations Average Daily Unmitigated GHG Emissions.

**Auxiliary Generator Pre-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	Energy (MMBtu)	Heating Value (MMBtu/1000 gal)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
24.0	Aframax	700,000	2.70	3,600	28%	2.5	8.5	150	0.0064	722.0	0.0952	0.0014	155.95	0.0206
46.0	VLCC	2,000,000	2.70	3,600	28%	2.5	8.5	150	0.0064	722.0	0.0952	0.0026	298.91	0.0394
10.0	Panamax	350,000	2.70	3,600	28%	2.5	8.6	150	0.0064	722.0	0.0952	0.0006	64.98	0.0086
52.0	Suezmax	1,000,000	2.70	3,600	28%	2.5	8.6	150	0.0064	722.0	0.0952	0.0030	337.90	0.0446
<b>TOTAL</b>												<b>0.0075</b>	<b>857.74</b>	<b>0.1131</b>

**Boiler Pre-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	Fuel Consumption (gal/yr)	N <sub>2</sub> O Emission Factor (lb/ton)	CO <sub>2</sub> Emission Factor (lb/ton)	CH <sub>4</sub> Emission Factor (lb/ton)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
24.0	Aframax	700,000	2.70	107.96	30%	2.5	50,000	43,126	0.0627	6,360.0	0.8770	0.0039	397.07	0.0548
46.0	VLCC	2,000,000	2.70	84.93	30%	2.5	90,000	117,047	0.0627	6,360.0	0.8770	0.0106	1077.70	0.1486
10.0	Panamax	350,000	2.70	59.91	30%	2.5	35,000	6,980	0.0627	6,360.0	0.8770	0.0006	64.27	0.0089
52.0	Suezmax	1,000,000	2.70	82.85	30%	2.5	70,000	100,391	0.0627	6,360.0	0.8770	0.0091	924.33	0.1275
<b>TOTAL</b>												<b>0.0243</b>	<b>2463.38</b>	<b>0.3397</b>

**Auxiliary Generator Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	Energy (MMBtu)	Heating Value (MMBtu/1000 gal)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
24.0	Aframax	700,000	0.52	3,600	56%	15.0	102.4	140	0.0064	722.0	0.0952	0.0082	935.71	0.1234
46.0	VLCC	2,000,000	0.52	3,600	56%	23.2	158.4	140	0.0064	722.0	0.0952	0.0246	2773.87	0.3658
10.0	Panamax	350,000	0.52	3,600	56%	11.0	75.7	140	0.0064	722.0	0.0952	0.0025	285.91	0.0377
52.0	Suezmax	1,000,000	0.52	3,600	56%	15.3	105.2	140	0.0064	722.0	0.0952	0.0183	2067.92	0.2727
<b>TOTAL</b>												<b>0.0537</b>	<b>6063.41</b>	<b>0.7995</b>

**Boiler Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Inerting Fuel Consumption Savings (lb/1000 bbl offloaded)	Activity Time (hr)	Pumping Rate (bbl/hr)	Fuel Consumption (gal/yr)	N <sub>2</sub> O Emission Factor (lb/ton)	CO <sub>2</sub> Emission Factor (lb/ton)	CH <sub>4</sub> Emission Factor (lb/ton)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
24.0	Aframax	700,000	0.52	102.17	28.06	15.0	50,000	244,891	0.0627	6,360.0	0.8770	0.0222	2254.80	0.3109
46.0	VLCC	2,000,000	0.52	80.38	28.06	23.2	90,000	1,028,008	0.0627	6,360.0	0.8770	0.0933	9465.24	1.3052
10.0	Panamax	350,000	0.52	59.91	28.06	11.0	35,000	30,713	0.0627	6,360.0	0.8770	0.0028	282.78	0.0390
52.0	Suezmax	1,000,000	0.52	82.85	28.06	15.3	70,000	614,392	0.0627	6,360.0	0.8770	0.0558	5656.93	0.7801
<b>TOTAL</b>												<b>0.1741</b>	<b>17659.75</b>	<b>2.4352</b>

**Auxiliary Generator Post-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	Energy (MMBtu)	Heating Value (MMBtu/1000 gal)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
24.0	Aframax	700,000	2.70	3,600	28%	1.0	3.4	150	0.0064	722.0	0.0952	0.0005	62.38	0.0082
46.0	VLCC	2,000,000	2.70	3,600	28%	1.0	3.4	150	0.0064	722.0	0.0952	0.0011	119.56	0.0158
10.0	Panamax	350,000	2.70	3,600	28%	1.0	3.4	150	0.0064	722.0	0.0952	0.0002	25.99	0.0034
52.0	Suezmax	1,000,000	2.70	3,600	28%	1.0	3.4	150	0.0064	722.0	0.0952	0.0012	135.16	0.0178
<b>TOTAL</b>												<b>0.0030</b>	<b>343.09</b>	<b>0.0452</b>



Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Un.GHG.2040-5. 2040 Reduced Project Alternative Summary of Average Daily Unmitigated Vessel GHG Emissions.

Mode	Equipment	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
Cruising	Main Engines	0.0458	5211.79	0.6876
Cruising	Aux Generator	0.0052	595.08	0.0785
Maneuvering	Main Engines	0.0005	52.79	0.0070
Maneuvering	Aux Generator	0.0028	316.40	0.0418
Boiler Warm-up	Boiler	0.0298	3023.20	0.4169
Berth Operations	Boiler	0.1984	20123.13	2.7748
Berth Operations	Aux Generator	0.0643	7264.24	0.9578
<b>Propulsion</b>	<b>TOTAL</b>	<b>0.0543</b>	<b>6176.06</b>	<b>0.8150</b>
<b>Non-Propulsion</b>	<b>TOTAL</b>	<b>0.2925</b>	<b>30410.58</b>	<b>4.1496</b>
<b>Total Emissions</b>		<b>0.35</b>	<b>36586.64</b>	<b>4.96</b>

Mode	Equipment	N <sub>2</sub> O Emissions (tons/day)	CO <sub>2</sub> Emissions (tons/day)	CH <sub>4</sub> Emissions (tons/day)
Cruising	Main Engines	1.26E-04	14.28	1.88E-03
Cruising	Aux Generator	1.43E-05	1.63	2.15E-04
Maneuvering	Main Engines	1.27E-06	0.14	1.91E-05
Maneuvering	Aux Generator	7.64E-06	0.87	1.15E-04
Boiler Warm-up	Boiler	8.17E-05	8.28	1.14E-03
Berth Operations	Boiler	5.44E-04	55.13	7.60E-03
Berth Operations	Aux Generator	1.76E-04	19.90	2.62E-03
<b>Propulsion</b>	<b>TOTAL</b>	<b>1.49E-04</b>	<b>16.92</b>	<b>2.23E-03</b>
<b>Non-Propulsion</b>	<b>TOTAL</b>	<b>8.01E-04</b>	<b>83.32</b>	<b>1.14E-02</b>
<b>Total Emissions</b>		<b>9.50E-04</b>	<b>100.24</b>	<b>1.36E-02</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Un.GHG.2040-6. 2040 Reduced Project Alternative Tug Main Engines Average Daily Unmitigated GHG Emissions.

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Energy (kWh)	Energy (MMBtu)	Shipcalls (vessels/yr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
VLCC	Maneuvering - Pilot to Berth	1.00	4	4,800	0.50	MGO	2400	8.2	46.0	0.00636	645.0	0.0890	0.0007	71.2080	0.0098
	Maneuvering - Berth to Pilot	1.00	2	4,800	0.50	MGO	2400	8.2	46.0	0.00636	645.0	0.0890	0.0007	71.2080	0.0098
AFRAMAX	Maneuvering - Pilot to Berth	1.00	2	4,800	0.50	MGO	2400	8.2	24.0	0.00636	645.0	0.0890	0.0004	37.1520	0.0051
	Maneuvering - Berth to Pilot	1.00	2	4,800	0.50	MGO	2400	8.2	24.0	0.00636	645.0	0.0890	0.0004	37.1520	0.0051
PANAMAX	Maneuvering - Pilot to Berth	1.00	2	4,800	0.50	MGO	2400	8.2	10.0	0.00636	645.0	0.0890	0.0002	15.4800	0.0021
	Maneuvering - Berth to Pilot	1.00	2	4,800	0.50	MGO	2400	8.2	10.0	0.00636	645.0	0.0890	0.0002	15.4800	0.0021
SUEZMAX	Maneuvering - Pilot to Berth	1.00	3	4,800	0.50	MGO	2400	8.2	52.0	0.00636	645.0	0.0890	0.0008	80.4960	0.0111
	Maneuvering - Berth to Pilot	1.00	2	4,800	0.50	MGO	2400	8.2	52.0	0.00636	645.0	0.0890	0.0008	80.4960	0.0111
<b>TOTAL</b>													<b>0.0040</b>	<b>408.6720</b>	<b>0.0564</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Un.GHG.2040-7. 2040 Reduced Project Alternative Tug Auxiliary Generator Engines Average Daily Unmitigated GHG Emissions.

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Energy (kWh)	Energy (MMBtu)	Shipcalls (vessels/yr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
VLCC	Maneuvering - Pilot to Berth	1.00	4	300	1.00	MGO	300	1.0	46.0	0.0068	690.0	0.0952	0.00009	9.52	0.00131
	Maneuvering - Berth to Pilot	1.00	2	300	1.00	MGO	300	1.0	46.0	0.0068	690.0	0.0952	0.00009	9.52	0.00131
AFRAMAX	Maneuvering - Pilot to Berth	1.00	2	300	1.00	MGO	300	1.0	24.0	0.0068	690.0	0.0952	0.00005	4.97	0.00069
	Maneuvering - Berth to Pilot	1.00	2	300	1.00	MGO	300	1.0	24.0	0.0068	690.0	0.0952	0.00005	4.97	0.00069
PANAMAX	Maneuvering - Pilot to Berth	1.00	2	300	1.00	MGO	300	1.0	10.0	0.0068	690.0	0.0952	0.00002	2.07	0.00029
	Maneuvering - Berth to Pilot	1.00	2	300	1.00	MGO	300	1.0	10.0	0.0068	690.0	0.0952	0.00002	2.07	0.00029
SUEZMAX	Maneuvering - Pilot to Berth	1.00	3	300	1.00	MGO	300	1.0	52.0	0.0068	690.0	0.0952	0.00011	10.76	0.00149
	Maneuvering - Berth to Pilot	1.00	2	300	1.00	MGO	300	1.0	52.0	0.0068	690.0	0.0952	0.00011	10.76	0.00149

**TOTAL** **0.00054** **54.65** **0.00754**

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Un.GHG.2040-8. 2040 Reduced Project Alternative Summary of Tug Average Daily Unmitigated GHG Emissions.

Mode	Equipment	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
Tug Assist	Main Engines	0.0040	408.67	0.0564
Tug Assist	Aux Generator	0.00054	54.65	0.00754
<b>TOTAL</b>		<b>0.0046</b>	<b>463.32</b>	<b>0.0639</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Un.GHG.2040-9. 2040 Reduced Project Alternative VDU Crude Average Daily Unmitigated GHG Emissions.

	Annual Vessel Calls	crude vapors from tanks(scf/call)	annual gas usage (mmscf/yr)	mw crude vapors	destruction efficiency
Aframax	24	224000	5.4	50	98%
VLCC	46	596,313	27.4	50	98%
Panamax	10	116,667	1.2		
Suezmax	52	333,333	17.3		
<b>TOTAL</b>	<b>132</b>		<b>51.3</b>		

Assumed Distribution based on tank storage volume:	
Site 1	12.5%
Site 2	87.5%

Annual Average (tons/yr)

	<b>N<sub>2</sub>O</b>	<b>CO<sub>2</sub></b>	<b>CH<sub>4</sub></b>
EF (kg/MMBtu)	0.0001	52.78	0.0059
Aframax	0.0005	289.42	0.0324
VLCC	0.0028	1476.73	0.1651
Panamax	0.0001	62.81	0.0070
Suezmax	0.0018	933.15	0.1043
<b>TOTAL</b>	<b>0.0052</b>	<b>2762.1100</b>	<b>0.3088</b>

Annual Average (tons/yr)

	<b>N<sub>2</sub>O</b>	<b>CO<sub>2</sub></b>	<b>CH<sub>4</sub></b>
Site 1	0.0007	345.26	0.04
Site 2	0.0046	2416.8	0.3

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Un.GHG.2040-10. 2040 Reduced Project Alternative VDU Legs Average Daily Unmitigated GHG Emissions.

	tanks	crude vapors from tanks on legs(scf/yr)	annual gas usage (mmscf/yr)	mw crude vapors	destruction efficiency
Site 1	4	8640000	34.6	50	98%
Site 2	14	8640000	121.0	50	98%
<b>TOTAL</b>	<b>18</b>		<b>155.5</b>		

<b>48</b>	<b>hr/event</b>
<b>6</b>	<b>events/yr</b>
<b>500</b>	<b>ft3/min</b>

Annual Average (tons/yr)

	<b>N<sub>2</sub>O</b>	<b>CO<sub>2</sub></b>	<b>CH<sub>4</sub></b>
<b>EF (kg/MMBtu)</b>	<b>0.0001</b>	<b>52.78</b>	<b>0.0059</b>
<b>TOTAL</b>	<b>0.016</b>	<b>8372.513</b>	<b>0.936</b>

*Assumed a ratio of 500/1000 based on the corresponding Btu values with respect to natural gas combustion emission factors.*

Annual Average (tons/yr)

	<b>N<sub>2</sub>O</b>	<b>CO<sub>2</sub></b>	<b>CH<sub>4</sub></b>
Site 1	0.0035	1860.6	0.2
Site 2	0.012	6512.0	0.7

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Table H.2.RPA.Un.GHG.2040-11. 2040 Reduced Project Alternative VDU Average Daily Unmitigated GHG Emissions.

Annual Average (tons/yr)

	<b>N<sub>2</sub>O</b>	<b>CO<sub>2</sub></b>	<b>CH<sub>4</sub></b>
Site 1	0.004	2251	0.25
Site 2	0.018	9245	1.03
<b>Total</b>	<b>0.022</b>	<b>11,496</b>	<b>1.29</b>

Daily Average (tons/day)

	<b>N<sub>2</sub>O</b>	<b>CO<sub>2</sub></b>	<b>CH<sub>4</sub></b>
Site 1	1.17E-05	6.167	6.89E-04
Site 2	4.80E-05	25.329	2.83E-03
<b>Total</b>	<b>5.97E-05</b>	<b>31</b>	<b>3.52E-03</b>

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Table H.2.RPA.Un.GHG.2040-12. 2040 Reduced Project Alternative Main Engines Average Daily Unmitigated GHG Emissions (BP).

Ship	Direction	Mode	Distance (nautical miles)	Ship speed (knots)	Activity (hours)	Maximum Speed (knots)	Load Factor	MCR (kW)	Energy (kW-hr)	Shipcalls (vessels/ yr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
AFRAMAX	South In	Cruising - CW to VSR	23	12	1.92	16.1	0.414	12,477	9,902	31	0.0058	588.00	0.0811	0.0018	180.49	0.0249
		Cruising - VSR to PZ	11	12	0.92	16.1	0.414	12,477	4,736	31	0.0058	588.00	0.0811	0.0009	86.32	0.0119
		Cruising - PZ to Pilot	4.7	7	0.67	16.1	0.082	12,477	689	31	0.0058	588.00	0.0811	0.0001	12.55	0.0017
		Maneuvering - Pilot to Berth		3	1.00	16.1	0.006	12,477	81	31	0.0064	647.00	0.0895	0.0000	1.62	0.0002
	South Out	Maneuvering - Berth to Pilot		5	1.00	16.1	0.030	12,477	374	31	0.0064	647.00	0.0895	0.0001	7.50	0.0010
		Cruising - Pilot to PZ	3.5	7	0.50	16.1	0.082	12,477	513	31	0.0058	588.00	0.0811	0.0001	9.35	0.0013
		Cruising - PZ to VSR	12.5	12	1.04	16.1	0.414	12,477	5,382	31	0.0058	588.00	0.0811	0.0010	98.09	0.0135
		Cruising - VSR to CW	24.5	12	2.04	16.1	0.414	12,477	10,548	31	0.0058	588.00	0.0811	0.0019	192.26	0.0265
<b>TOTAL</b>													<b>0.0058</b>	<b>588.19</b>	<b>0.0811</b>	



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Table H.2.RPA.Un.GHG.2040-13. 2040 Reduced Project Alternative Auxiliary Generator Average Daily Unmitigated GHG Emissions (BP).

Ship	Direction	Mode	Activity (hours)	MCR (kW)	Load Factor	Energy (kW-hr)	Shipcalls (vessels/yr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
AFRAMAX	South In	Cruising	3.50	3,600	0.28	3,533	31	0.0068	690.00	0.0952	0.0007	75.5666	0.0104
		Maneuvering	2.00	3,600	0.28	2,016	31	0.0068	690.00	0.0952	0.0004	43.1222	0.0059
	South Out	Maneuvering	1.5	3,600	0.28	1,512	31	0.0068	690.00	0.0952	0.0003	32.3417	0.0045
		Cruising	3.50	3,600	0.28	3,528	31	0.0068	690.00	0.0952	0.0007	75.4639	0.0104
<b>TOTAL</b>											<b>0.0022</b>	<b>226.49</b>	<b>0.0312</b>

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Table H.2.RPA.Un.GHG.2040-14. 2040 Reduced Project Alternative Boiler Warm-Up Average Daily Unmitigated GHG Emissions (BP).

Shipcalls (vessels/yr)	Vessel Size	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	Fuel Consumption (gal/yr)	N2O Emission Factor (lb/ton)	CO2 Emission Factor (lb/ton)	CH4 Emission Factor (lb/ton)	N2O Emissions (tons/yr)	CO2 Emissions (tons/yr)	CH4 Emissions (tons/yr)
31.0	Aframax	Dist at 0.2	0.20	102.17	30%	3	50,000	63,261	0.0068	690.00	0.0952	0.00062	63.19222	0.00872
TOTAL												0.00062	63.19	0.0087

Table H.2.RPA.Un.GHG.2040-15. 2040 Reduced Project Alternative Berth Operations Average Daily Unmitigated GHG Emissions (BP).

**Auxiliary Generator Pre-Pumpin**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
31.0	Aframax	400,000	Dist at 0.2	0.20	3,600	28%	2.5	0.0064	722.0	0.0952	0.00177	201.44	0.0266

TOTAL 0.00177 201.44 0.0266

**Boiler Pre-Pumpin**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	Fuel Consumption (gal/yr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
31.0	Aframax	400,000	Dist at 0.2	0.20	102.17	30%	2.5	50,000	52,718	0.0627	6,360.0	0.8770	0.00479	485.39	0.06693

TOTAL 0.00479 485.39 0.0669

**Auxiliary Generator Pumpin**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
31.0	Aframax	400,000	Dist at 0.2	0.20	3,600	56%	15.0	0.0064	722.00	0.0952	0.0107	1,208.6280	0.1594

TOTAL 0.0107 1,208.63 0.1594

**Boiler Pumpin**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Inerting Fuel Consumption Savings (lb/1000 bbl offloaded)	Activity Time (hr)	Pumping Rate (bbl/hr)	Fuel Consumption (gal/yr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
31.0	Aframax	400,000	Dist at 0.2	0.20	102.17	28.06	15.0	50,000	316,305	0.0627	6,360.00	0.8770	0.0287	2,912.34	0.4016

TOTAL 0.0287 2,912.34 0.4016

**Auxiliary Generator Post-Pumpin**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
31.0	Aframax	400,000	Dist at 0.2	0.20	3,600	28%	1.0	0.0064	722.00	0.0952	0.00071	80.57520	0.01062

TOTAL 0.00071 80.58 0.0106

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Table H.2.RPA.Un.GHG.2040-16. 2040 Reduced Project Alternative Summary of Average Daily Unmitigated Vessel GHG Emissions (BP).

Mode	Equipment	N <sub>2</sub> O	CO <sub>2</sub>	CH <sub>4</sub>
		Emissions (tons/yr)	Emissions (tons/yr)	Emissions (tons/yr)
Cruising	Main Engines	5.71E-03	579.07	7.99E-02
Cruising	Aux Generator	1.49E-03	151.03	2.08E-02
Maneuvering	Main Engines	9.00E-05	9.11	1.26E-03
Maneuvering	Aux Generator	7.44E-04	75.46	1.04E-02
Boiler Warm-up	Boiler	6.23E-04	63.19	8.72E-03
Berth Operations	Boiler	3.35E-02	3397.73	4.69E-01
Berth Operations	Aux Generator	1.32E-02	1490.64	1.97E-01
Propulsion	TOTAL	8.03E-03	814.68	1.12E-01
Non-Propulsion	TOTAL	4.73E-02	4951.56	6.74E-01
<b>Total Emissions</b>		<b>5.54E-02</b>	<b>5766.24</b>	<b>7.86E-01</b>

Mode	Equipment	N <sub>2</sub> O	CO <sub>2</sub>	CH <sub>4</sub>
		Emissions (tons/day)	Emissions (tons/day)	Emissions (tons/day)
Cruising	Main Engines	1.56E-05	1.59	2.19E-04
Cruising	Aux Generator	4.08E-06	0.41	5.71E-05
Maneuvering	Main Engines	2.47E-07	0.02	3.45E-06
Maneuvering	Aux Generator	2.04E-06	0.21	2.85E-05
Boiler Warm-up	Boiler	1.71E-06	0.17	2.39E-05
Berth Operations	Boiler	9.18E-05	9.31	1.28E-03
Berth Operations	Aux Generator	3.62E-05	4.08	5.38E-04
Propulsion	TOTAL	2.20E-05	2.23	3.08E-04
Non-Propulsion	TOTAL	1.30E-04	13.57	1.85E-03
<b>Total Emissions</b>		<b>1.52E-04</b>	<b>15.80</b>	<b>2.15E-03</b>

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Table H.2.RPA.Un.GHG.2040-17. 2040 Reduced Project Alternative Tug Main Engines Average Daily Unmitigated GHG Emissions (BP).

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Energy (kWh)	Energy (MMBtu)	Shipcalls (vessels/yr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
AFRAMAX	Maneuvering - Pilot to Berth	1.00	2	4,800	0.50	MGO	2400	8.2	31.0	0.00636	645.0	0.0890	0.0005	47.9880	0.0066
	Maneuvering - Berth to Pilot	1.00	2	4,800	0.50	MGO	2400	8.2	31.0	0.00636	645.0	0.0890	0.0005	47.9880	0.0066
<b>TOTAL</b>													<b>0.0009</b>	<b>95.9760</b>	<b>0.0132</b>

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Table H.2.RPA.Un.GHG.2040-18. 2040 Reduced Project Alternative Tug Auxiliary Generator Engines Average Daily Unmitigated GHG Emissions (BP).

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Energy (kWh)	Energy (MMBtu)	Shipcalls (vessels/yr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
AFRAMAX	Maneuvering - Pilot to Berth	1.00	2	300	1.00	MGO	300	1.0	31.0	0.0068	690.0	0.0952	0.00006	6.41700	0.00089
	Maneuvering - Berth to Pilot	1.00	2	300	1.00	MGO	300	1.0	31.0	0.0068	690.0	0.0952	0.00006	6.41700	0.00089
<b>TOTAL</b>													<b>0.00013</b>	<b>12.83</b>	<b>0.00177</b>

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Table H.2.RPA.Un.GHG.2040-19. 2040 Reduced Project Alternative Summary of Tug Average Daily Unmitigated GHG Emissions (BP).

Mode	Equipment	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
Tug Assist	Main Engines	0.0009	95.9760	0.0132
Tug Assist	Aux Generator	0.00013	12.83400	0.00177
<b>TOTAL</b>		<b>0.0011</b>	<b>108.81</b>	<b>0.0150</b>

Mode	Equipment	N <sub>2</sub> O Emissions (tons/day)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
Tug Assist	Main Engines	2.59E-06	2.63E-01	3.63E-05
Tug Assist	Aux Generator	3.47E-07	3.52E-02	4.85E-06
<b>TOTAL</b>		<b>2.94E-06</b>	<b>2.98E-01</b>	<b>4.11E-05</b>

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Table H.2.RPA.Un.GHG.2040-20. 2040 Reduced Project Alternative VDU Crude Average Daily Unmitigated GHG Emissions (BP).

	Annual Vessel Calls	crude vapors from tanks(scft/call)	annual gas usage (mmscf/yr)	mw crude vapors	destruction efficiency
Aframax	31	224000	6.9	50	98%
TOTAL	31		6.9		

Assumed Distribution based on tank storage volume:	
Site 1	12.5%
Site 2	87.5%

Annual Average (tons/yr)

	N <sub>2</sub> O	CO <sub>2</sub>	CH <sub>4</sub>
EF (kg/MMBtu)	0.0001	52.78	0.0059
Aframax	0.0007	373.83	0.0418
<b>TOTAL</b>	<b>0.0007</b>	<b>373.8344</b>	<b>0.0418</b>

Annual Average (tons/yr)

	N <sub>2</sub> O	CO <sub>2</sub>	CH <sub>4</sub>
Site 1	0.0001	46.73	0.01
Site 2	0.0006	327.1	0.0



Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Un.GHG.2040-21. 2040 Reduced Project Alternative VDU Legs Average Daily Unmitigated GHG Emissions (BP).

	tanks	crude vapors from tanks on legs(scf/yr)	annual gas usage (mmscf/yr)	mw crude vapors	destruction efficiency
Site 1	4	8640000	34.6	50	98%
Site 2	14	8640000	121.0	50	98%
<b>TOTAL</b>	<b>18</b>		<b>155.5</b>		

48	hr/event
6	events/yr
500	ft3/min

Annual Average (tons/yr)

	N <sub>2</sub> O	CO <sub>2</sub>	CH <sub>4</sub>
EF (kg/MMBtu)	0.0001	52.78	0.0059
TOTAL	0.016	8372.513	0.936

*Assumed a ratio of 500/1000 based on the corresponding Btu values with respect to natural gas combustion emission factors.*

Annual Average (tons/yr)

	N <sub>2</sub> O	CO <sub>2</sub>	CH <sub>4</sub>
Site 1	0.0035	1860.6	0.2
Site 2	0.012	6512.0	0.7

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Table H.2.RPA.Un.GHG.2040-22. 2040 Reduced Project Alternative VDU Average Daily Unmitigated GHG Emissions (BP).

Annual Average (tons/yr)

	<b>N<sub>2</sub>O</b>	<b>CO<sub>2</sub></b>	<b>CH<sub>4</sub></b>
Site 1	0.004	1907	0.21
Site 2	0.013	6839	0.76
<b>Total</b>	<b>0.017</b>	<b>8,746</b>	<b>0.98</b>

Daily Average (tons/day)

	<b>N<sub>2</sub>O</b>	<b>CO<sub>2</sub></b>	<b>CH<sub>4</sub></b>
Site 1	9.90E-06	5.225	5.84E-04
Site 2	3.55E-05	18.737	2.09E-03
<b>Total</b>	<b>4.54E-05</b>	<b>24</b>	<b>2.68E-03</b>

**Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR**

**Table H.2.RPA.Un.GHG.2040-23. 2040 Reduced Project Alternative BP Berth Summary.**

<b>Operation</b>	<b>N<sub>2</sub>O Emissions (tons/yr)</b>	<b>CO<sub>2</sub> Emissions (tons/yr)</b>	<b>CH<sub>4</sub> Emissions (tons/yr)</b>	<b>CO<sub>2</sub>e Emissions (tons/yr)</b>
Tanker Cruising and Manuevering	0.0080	814.68	0.1124	819.53
Tanker Hoteling	0.0132	1,490.64	0.1965	1498.86
Offloading Emissions	0.0335	3,397.73	0.4685	3417.95
Transiting Operations	0.0006	63.19	0.0087	63.57
Tug Assistance	0.0011	108.81	0.0150	109.46
Tanks	---	---	---	---
Vapor Destruction Units	0.0166	8,746.35	0.9777	8772.02
Valves, Flanges, Pumps	---	---	---	---
<b>TOTAL</b>	<b>0.0730</b>	<b>14,621.40</b>	<b>1.7789</b>	<b>14681.38</b>

<b>Operation</b>	<b>N<sub>2</sub>O Emissions (tons/day)</b>	<b>CO<sub>2</sub> Emissions (tons/day)</b>	<b>CH<sub>4</sub> Emissions (tons/day)</b>	<b>CO<sub>2</sub>e Emissions (tons/day)</b>
Tanker Cruising and Manuevering	2.20E-05	2.23	3.08E-04	2.25
Tanker Hoteling	3.62E-05	4.08	5.38E-04	4.11
Offloading Emissions	9.18E-05	9.31	1.28E-03	9.36
Transiting Operations	1.71E-06	0.17	2.39E-05	0.17
Tug Assistance	2.94E-06	0.30	4.11E-05	0.30
Tanks	---	---	---	---
Vapor Destruction Units	4.54E-05	23.96	2.68E-03	24.03
Valves, Flanges, Pumps	---	---	---	---
<b>TOTAL</b>	<b>2.00E-04</b>	<b>40.06</b>	<b>4.87E-03</b>	<b>40.22</b>

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Table H.2.RPA.Un.GHG.2040-24. 2040 Reduced Project Alternative Main Engines Average Daily Unmitigated GHG Emissions (Tesoro).

Ship	Direction	Mode	Distance (nautical miles)	Ship speed (knots)	Activity (hours)	Maximum Speed (knots)	Load Factor	MCR (kW)	Energy (kW-hr)	Shipcalls (vessels/ yr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
AFRAMAX	South In	Cruising - CW to VSR	23	12	1.92	16.1	0.414	12,477	9,902	78	0.0058	588.00	0.0811	0.0045	454.15	0.0626
		Cruising - VSR to PZ	11	12	0.92	16.1	0.414	12,477	4,736	78	0.0058	588.00	0.0811	0.0021	217.20	0.0300
		Cruising - PZ to Pilot	4.7	7	0.67	16.1	0.082	12,477	689	78	0.0058	588.00	0.0811	0.0003	31.58	0.0044
	South Out	Maneuvering - Pilot to Berth	3	3	1.00	16.1	0.006	12,477	81	78	0.0064	647.00	0.0895	0.0000	4.07	0.0006
		Maneuvering - Berth to Pilot	5	5	1.00	16.1	0.030	12,477	374	78	0.0064	647.00	0.0895	0.0002	18.86	0.0026
		Cruising - Pilot to PZ	3.5	7	0.50	16.1	0.082	12,477	513	78	0.0058	588.00	0.0811	0.0002	23.52	0.0032
		Cruising - PZ to VSR	12.5	12	1.04	16.1	0.414	12,477	5,382	78	0.0058	588.00	0.0811	0.0024	246.82	0.0340
		Cruising - VSR to CW	24.5	12	2.04	16.1	0.414	12,477	10,548	78	0.0058	588.00	0.0811	0.0048	483.76	0.0667
		<b>TOTAL</b>											<b>0</b>	<b>4,822</b>	<b>1</b>	<b>0.0146</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Un.GHG.2040-25. 2040 Reduced Project Alternative Auxiliary Generator Average Daily Unmitigated GHG Emissions (Tesoro).

Ship	Direction	Mode	Activity (hours)	MCR (kW)	Load Factor	Energy (kW-hr)	Shipcalls (vessels/yr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
AFRAMAX	South In	Cruising	3.50	3,600	0.28	3,533	78	0.0068	690.00	0.0952	0.0019	190.1353	0.0262
		Maneuvering	2.00	3,600	0.28	2,016	78	0.0068	690.00	0.0952	0.0011	108.5011	0.0150
	South Out	Maneuvering	1.5	3,600	0.28	1,512	78	0.0068	690.00	0.0952	0.0008	81.3758	0.0112
		Cruising	3.50	3,600	0.28	3,528	78	0.0068	690.00	0.0952	0.0019	189.8770	0.0262
<b>TOTAL</b>								<b>0</b>	<b>2,760</b>	<b>0</b>	<b>0.0056</b>	<b>569.89</b>	<b>0.0786</b>

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Table H.2.RPA.Un.GHG.2040-26. 2040 Reduced Project Alternative Boiler Warm-Up Average Daily Unmitigated GHG Emissions (Tesoro).

Shipcalls (vessels/yr)	Vessel Size	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	Fuel Consumption (gal/yr)	N <sub>2</sub> O Emission Factor (lb/ton)	CO <sub>2</sub> Emission Factor (lb/ton)	CH <sub>4</sub> Emission Factor (lb/ton)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
78.0	Aframax	0.20	102.17	30%	3	50,000	159,173	0.0068	690.00	0.0952	0.00157	158.99979	0.02194
TOTAL								0	690	0	0.00157	159.00	0.0219

Table H.2.RPA.Un.GHG.2040-27. 2040 Reduced Project Alternative Berth Operations Average Daily Unmitigated GHG Emissions (Tesoro).

**Auxiliary Generator Pre-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded (bbl/call)	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
78.0	Aframax	400,000	0.20	3,600	28%	2.5	0.0064	722.00	0.0952	0.00446	506.84	0.0668
<b>TOTAL</b>							<b>0.0064</b>	<b>722.00</b>	<b>0.0952</b>	<b>0.00446</b>	<b>506.84</b>	<b>0.0668</b>

**Boiler Pre-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded (bbl/call)	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	Fuel Consumption (gal/yr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
78.0	Aframax	400,000	0.20	102.17	30%	2.5	50,000	132644.14	0.0627	6,360.0	0.8770	0.01204	1,221.30	0.16841
<b>TOTAL</b>									<b>0.0627</b>	<b>6,360.00</b>	<b>0.8770</b>	<b>0.01204</b>	<b>1,221.30</b>	<b>0.1684</b>

**Auxiliary Generator Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded (bbl/call)	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
78.0	Aframax	400,000	0.20	3,600	56%	15.0	0.0064	722.00	0.0952	0.0270	3,041.0640	0.4010
<b>TOTAL</b>							<b>0.0064</b>	<b>722.00</b>	<b>0.0952</b>	<b>0.0270</b>	<b>3,041.06</b>	<b>0.4010</b>

**Boiler Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded (bbl/call)	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Inerting Fuel Consumption Savings (lb/1000 bbl offloaded)	Activity Time (hr)	Pumping Rate (bbl/hr)	Fuel Consumption (gal/yr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
78.0	Aframax	400,000	0.20	102.17	28.06	15.0	50,000	795864.85	0.0627	6,360.00	0.8770	0.0722	7,327.82	1.0105
<b>TOTAL</b>									<b>0</b>	<b>6,360</b>	<b>1</b>	<b>0.0722</b>	<b>7,327.82</b>	<b>1.0105</b>

**Auxiliary Generator Post-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded (bbl/call)	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
78.0	Aframax	400,000	0.20	3,600	28%	1.0	0.0064	722.00	0.0952	0.00180	202.73760	0.02673
<b>TOTAL</b>							<b>0.0064</b>	<b>722.00</b>	<b>0.0952</b>	<b>0.00180</b>	<b>202.74</b>	<b>0.0267</b>

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Table H.2.RPA.Un.GHG.2040-28. 2040 Reduced Project Alternative Summary of Average Daily Unmitigated Vessel GHG Emissions (Tesoro).

Mode	Equipment	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
Cruising	Main Engines	0.0144	1457.02	0.2010
Cruising	Aux Generator	0.0037	380.01	0.0524
Maneuvering	Main Engines	0.0002	22.93	0.0032
Maneuvering	Aux Generator	0.0019	189.88	0.0262
Boiler Warm-up	Boiler	0.0016	159.00	0.0219
Berth Operations	Boiler	0.0843	8549.12	1.1789
Berth Operations	Aux Generator	0.0332	3750.65	0.4945
Propulsion	TOTAL	0.0202	2049.84	0.2828
Non-Propulsion	TOTAL	0.1191	12458.76	1.6953
<b>Total Emissions</b>		<b>0.1393</b>	<b>14508.61</b>	<b>1.9781</b>

Mode	Equipment	N <sub>2</sub> O Emissions (tons/day)	CO <sub>2</sub> Emissions (tons/day)	CH <sub>4</sub> Emissions (tons/day)
Cruising	Main Engines	3.94E-05	3.99E+00	5.51E-04
Cruising	Aux Generator	1.03E-05	1.04E+00	1.44E-04
Maneuvering	Main Engines	6.21E-07	6.28E-02	8.69E-06
Maneuvering	Aux Generator	5.13E-06	5.20E-01	7.18E-05
Boiler Warm-up	Boiler	4.29E-06	4.36E-01	6.01E-05
Berth Operations	Boiler	2.31E-04	2.34E+01	3.23E-03
Berth Operations	Aux Generator	9.10E-05	1.03E+01	1.35E-03
Propulsion	TOTAL	5.54E-05	5.62E+00	7.75E-04
Non-Propulsion	TOTAL	3.26E-04	3.41E+01	4.64E-03
<b>Total Emissions</b>		<b>0.0004</b>	<b>39.75</b>	<b>0.0054</b>



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Table H.2.RPA.Un.GHG.2040-29. 2040 Reduced Project Alternative Tug Main Engines Average Daily Unmitigated GHG Emissions (Tesoro).

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Energy (kWh)	Energy (MMBtu)	Shipcalls (vessels/yr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
AFRAMAX	Maneuvering - Pilot to Berth	1.00	2	4,800	0.50	2400	8.2	78.0	0.00636	645.0	0.0890	0.0012	120.7440	0.0167
	Maneuvering - Berth to Pilot	1.00	2	4,800	0.50	2400	8.2	78.0	0.00636	645.0	0.0890	0.0012	120.7440	0.0167
<b>TOTAL</b>												<b>0.0024</b>	<b>241.4880</b>	<b>0.0333</b>

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Table H.2.RPA.Un.GHG.2040-30. 2040 Reduced Project Alternative Tug Auxiliary Generator Engines Average Daily Unmitigated GHG Emissions (Tesoro).

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Energy (kWh)	Energy (MMBtu)	Shipcalls (vessels/yr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
AFRAMAX	Maneuvering - Pilot to Berth	1.00	2	300	1.00	300	1.0	78.0	0.0068	690.0	0.0952	0.00016	16.14600	0.00223
	Maneuvering - Berth to Pilot	1.00	2	300	1.00	300	1.0	78.0	0.0068	690.0	0.0952	0.00016	16.14600	0.00223
<b>TOTAL</b>												<b>0.00032</b>	<b>32.29</b>	<b>0.00446</b>

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Table H.2.RPA.Un.GHG.2040-31. 2040 Reduced Project Alternative Summary of Tug Average Daily Unmitigated GHG Emissions (Tesoro).

Mode	Equipment	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
Tug Assist	Main Engines	0.0024	241.4880	0.0333
Tug Assist	Aux Generator	0.00032	32.29200	0.00446

**TOTAL            0.0027            273.78            0.0378**

Mode	Equipment	N <sub>2</sub> O Emissions (tons/day)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
Tug Assist	Main Engines	6.52E-06	6.62E-01	9.13E-05
Tug Assist	Aux Generator	8.72E-07	8.85E-02	1.22E-05

**TOTAL            7.40E-06            7.50E-01            1.03E-04**

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Table H.2.RPA.Un.GHG.2040-32. 2040 Reduced Project Alternative VDU Crude Average Daily Unmitigated GHG Emissions (Tesoro).

	Annual Vessel Calls	crude vapors from tanks(scf/call)	annual gas usage (mmscf/yr)	mw crude vapors	destruction efficiency
Aframax	78	224000	17.5	50	98%
TOTAL	78		17.5		

Assumed Distribution based on tank storage volume:	
Site 1	12.5%
Site 2	87.5%

Annual Average (tons/yr)

	N <sub>2</sub> O	CO <sub>2</sub>	CH <sub>4</sub>
EF (kg/MMBtu)	0.0001	52.78	0.0059
Aframax	0.0018	940.62	0.1051
TOTAL	0.0018	940.6156	0.1051

Annual Average (tons/yr)

	N <sub>2</sub> O	CO <sub>2</sub>	CH <sub>4</sub>
Site 1	0.0002	117.58	0.01
Site 2	0.0016	823.0	0.1

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Table H.2.RPA.Un.GHG.2040-33. 2040 Reduced Project Alternative VDU Legs Average Daily Unmitigated GHG Emissions (Tesoro).

	tanks	crude vapors from tanks on legs(scf/yr)	annual gas usage (mmscf/yr)	mw crude vapors	destruction efficiency
Site 1	4	8640000	34.6	50	98%
Site 2	14	8640000	121.0	50	98%
<b>TOTAL</b>	<b>18</b>		<b>155.5</b>		

48	hr/event
6	events/yr
500	ft3/min

Annual Average (tons/yr)

	N <sub>2</sub> O	CO <sub>2</sub>	CH <sub>4</sub>
EF (kg/MMBtu)	0.0001	52.78	0.0059
<b>TOTAL</b>	<b>0.016</b>	<b>8372.513</b>	<b>0.936</b>

*Assumed a ratio of 500/1000 based on the corresponding Btu values with respect to natural gas combustion emission factors.*

Annual Average (tons/yr)

	N <sub>2</sub> O	CO <sub>2</sub>	CH <sub>4</sub>
Site 1	0.0035	1860.6	0.2
Site 2	0.012	6512.0	0.7

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Table H.2.RPA.Un.GHG.2040-34. 2040 Reduced Project Alternative VDU Average Daily Unmitigated GHG Emissions (Tesoro).

Annual Average (tons/yr)

	<b>N<sub>2</sub>O</b>	<b>CO<sub>2</sub></b>	<b>CH<sub>4</sub></b>
Site 1	0.004	1978	0.22
Site 2	0.014	7335	0.82
<b>Total</b>	<b>0.018</b>	<b>9,313</b>	<b>1.04</b>

Daily Average (tons/day)

	<b>N<sub>2</sub>O</b>	<b>CO<sub>2</sub></b>	<b>CH<sub>4</sub></b>
Site 1	1.03E-05	5.420	6.06E-04
Site 2	3.81E-05	20.096	2.25E-03
<b>Total</b>	<b>4.83E-05</b>	<b>26</b>	<b>2.85E-03</b>

**Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR**

**Table H.2.RPA.Un.GHG.2040-35. 2040 Reduced Project Alternative Tesoro Berth Summary.**

<b>Operation</b>	<b>N<sub>2</sub>O Emissions (tons/yr)</b>	<b>CO<sub>2</sub> Emissions (tons/yr)</b>	<b>CH<sub>4</sub> Emissions (tons/yr)</b>	<b>CH<sub>2</sub>e Emissions (tons/yr)</b>
Tanker Cruising and Manuevering	0.0202	2,049.84	0.2828	2062.05
Tanker Hoteling	0.0332	3,750.65	0.4945	3771.33
Offloading Emissions	0.0843	8,549.12	1.1789	8600.00
Transiting Operations	0.0016	159.00	0.0219	159.95
Tug Assistance	0.0027	273.78	0.0378	275.41
Tanks	---	---	---	---
Vapor Destruction Units	0.0176	9,313.13	1.0411	9340.46
Valves, Flanges, Pumps	---	---	---	---
<b>TOTAL</b>	<b>0.1596</b>	<b>24,095.52</b>	<b>3.0570</b>	<b>24209.20</b>

<b>Operation</b>	<b>N<sub>2</sub>O Emissions (tons/day)</b>	<b>CO<sub>2</sub> Emissions (tons/day)</b>	<b>CH<sub>4</sub> Emissions (tons/day)</b>	<b>CO<sub>2</sub>e Emissions (tons/day)</b>
Tanker Cruising and Manuevering	5.54E-05	5.62	7.75E-04	5.65
Tanker Hoteling	9.10E-05	10.28	1.35E-03	10.33
Offloading Emissions	2.31E-04	23.42	3.23E-03	23.56
Transiting Operations	4.29E-06	0.44	6.01E-05	0.44
Tug Assistance	7.40E-06	0.75	1.03E-04	0.75
Tanks	---	---	---	---
Vapor Destruction Units	4.83E-05	25.52	2.85E-03	25.59
Valves, Flanges, Pumps	---	---	---	---
<b>TOTAL</b>	<b>4.37E-04</b>	<b>66.02</b>	<b>8.38E-03</b>	<b>66.33</b>

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Table H.2.RPA.Un.GHG.2040-36. 2040 Reduced Project Alternative Main Engines Average Daily Unmitigated GHG Emissions (Exxon Mobil).

Ship	Direction	Mode	Distance (nautical miles)	Ship speed (knots)	Activity (hours)	Maximum Speed (knots)	Load Factor	MCR (kW)	Energy (kW-hr)	Energy (MMBtu)	Shipcalls (vessels/ yr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
PANAMAX	South In	Cruising - CW to VSR	23	12	1.92	15.8	0.438	10,300	8,649	30	131	0.0058	588.00	0.0811	0.0066	666.20	0.0919
		Cruising - VSR to PZ	11	12	0.92	15.8	0.438	10,300	4,136	14	131	0.0058	588.00	0.0811	0.0031	318.62	0.0439
		Cruising - PZ to Pilot	4.7	7	0.67	15.8	0.087	10,300	601	2	131	0.0058	588.00	0.0811	0.0005	46.32	0.0064
		Maneuvering - Pilot to Berth		3	1.00	15.8	0.007	10,300	71	0	131	0.0064	647.00	0.0895	0.0001	5.98	0.0008
PANAMAX	South Out	Maneuvering - Berth to Pilot		5	1.00	15.8	0.032	10,300	326	1	131	0.0064	647.00	0.0895	0.0003	27.67	0.0038
		Cruising - Pilot to PZ	3.5	7	0.50	15.8	0.087	10,300	448	2	131	0.0058	588.00	0.0811	0.0003	34.50	0.0048
		Cruising - PZ to VSR	12.5	12	1.04	15.8	0.438	10,300	4,700	16	131	0.0058	588.00	0.0811	0.0036	362.07	0.0499
		Cruising - VSR to CW	24.5	12	2.04	15.8	0.438	10,300	9,213	31	131	0.0058	588.00	0.0811	0.0070	709.65	0.0979
<b>TOTAL</b>															<b>0.0214</b>	<b>2171.00</b>	<b>0.2994</b>



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Table H.2.RPA.Un.GHG.2040-37. 2040 Reduced Project Alternative Auxiliary Generator Average Daily Unmitigated GHG Emissions (Exxon Mobil).

Ship	Direction	Mode	Activity (hours)	MCR (kW)	Load Factor	Energy (kW-hr)	Energy (MMBtu)	Shipcalls (vessels/yr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
PANAMAX	South In	Cruising	3.50	3,600	0.28	3,528	12	131	0.0068	690.00	0.0952	0.0031	318.90	0.0440
		Maneuvering	2.00	3,600	0.28	2,016	7	131	0.0068	690.00	0.0952	0.0018	182.23	0.0251
PANAMAX	South Out	Maneuvering	1.5	3,600	0.28	1,512	5	131	0.0068	690.00	0.0952	0.0013	136.67	0.0189
		Cruising	3.58	3,600	0.28	3,609	12	131	0.0068	690.00	0.0952	0.0032	326.18	0.0450
<b>TOTAL</b>												<b>0.0095</b>	<b>963.98</b>	<b>0.1330</b>

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Table H.2.RPA.Un.GHG.2040-38. 2040 Reduced Project Alternative Boiler Warm-Up Average Daily Unmitigated GHG Emissions (Exxon Mobil).

Shipcalls (vessels/yr)	Vessel Size	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	Fuel Consumption (gal/yr)	N <sub>2</sub> O Emission Factor (lb/ton)	CO <sub>2</sub> Emission Factor (lb/ton)	CH <sub>4</sub> Emission Factor (lb/ton)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
131.0	Panamax	0.20	59.91	30%	3	35,000	109,729	0.0068	690.00	0.0952	0.00108	109.61	0.0151
<b>TOTAL</b>											<b>0.00108</b>	<b>109.61</b>	<b>0.0151</b>

Table H.2.RPA.Un.GHG.2040-39. 2040 Reduced Project Alternative Berth Operations Average Daily Unmitigated GHG Emissions (Exxon Mobil).

**Auxiliary Generator Pre-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	Energy (MMBtu)	Heating Value (MMBtu/1000 gal)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
131.0	Panamax	300,000	0.20	3,600	28%	2.5	8.6	150	0.0064	722.0	0.0952	0.0075	851.24	0.1122

AMP Reduction 70%  
 TOTAL 0.0022 255.3714 0.0337

**Boiler Pre-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	Fuel Consumption (gal/yr)	N <sub>2</sub> O Emission Factor (lb/ton)	CO <sub>2</sub> Emission Factor (lb/ton)	CH <sub>4</sub> Emission Factor (lb/ton)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
131.0	Panamax	300,000	0.20	59.91	30%	2.5	35,000	91,441	0.0627	6,360.0	0.8770	0.0083	841.93	0.1161

TOTAL 0.0083 841.93 0.1161

**Auxiliary Generator Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	Energy (MMBtu)	Heating Value (MMBtu/1000 gal)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
131.0	Panamax	300,000	0.20	3,600	56%	11.0	75.7	140	0.0064	722.0	0.0952	0.0332	3745.45	0.4939

AMP Reduction 70%  
 TOTAL 0.0100 1123.6342 0.1482

**Boiler Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Inerting Fuel Consumption Savings (lb/1000 bbl offloaded)	Activity Time (hr)	Pumping Rate (bbl/hr)	Fuel Consumption (gal/yr)	N <sub>2</sub> O Emission Factor (lb/ton)	CO <sub>2</sub> Emission Factor (lb/ton)	CH <sub>4</sub> Emission Factor (lb/ton)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
131.0	Panamax	300,000	0.20	59.91	28.06	11.0	35,000	402,338	0.0627	6,360.0	0.8770	0.0365	3704.47	0.5108

TOTAL 0.0365 3704.47 0.5108

**Auxiliary Generator Post-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	Energy (MMBtu)	Heating Value (MMBtu/1000 gal)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
131.0	Panamax	300,000	0.20	3,600	28%	1.0	3.4	150	0.0064	722.0	0.0952	0.0030	340.50	0.0449

AMP Reduction 70%  
 TOTAL 0.0009 102.1486 0.0135

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Un.GHG.2040-40. 2040 Reduced Project Alternative Summary of Average Daily Unmitigated Vessel GHG Emissions (Exxon Mobil).

Mode	Equipment	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
Cruising	Main Engines	2.11E-02	2137.35	2.95E-01
Cruising	Aux Generator	6.36E-03	645.08	8.90E-02
Maneuvering	Main Engines	3.32E-04	33.64	4.65E-03
Maneuvering	Aux Generator	3.14E-03	318.90	4.40E-02
Boiler Warm-up	Boiler	1.08E-03	109.61	1.51E-02
Berth Operations	Boiler	4.48E-02	4546.40	6.27E-01
Berth Operations	Aux Generator	1.31E-02	1481.15	1.95E-01
Propulsion	TOTAL	3.09E-02	3134.97	4.32E-01
Non-Propulsion	TOTAL	0.06	6137.16	0.84
<b>Total Emissions</b>		<b>8.99E-02</b>	<b>9272.14</b>	<b>1.27E+00</b>

Mode	Equipment	N <sub>2</sub> O Emissions (tons/day)	CO <sub>2</sub> Emissions (tons/day)	CH <sub>4</sub> Emissions (tons/day)
Cruising	Main Engines	5.78E-05	5.86	8.08E-04
Cruising	Aux Generator	1.74E-05	1.77	2.44E-04
Maneuvering	Main Engines	9.10E-07	0.09	1.28E-05
Maneuvering	Aux Generator	8.61E-06	0.87	1.21E-04
Boiler Warm-up	Boiler	2.96E-06	0.30	4.14E-05
Berth Operations	Boiler	1.23E-04	12.46	1.72E-03
Berth Operations	Aux Generator	3.59E-05	4.06	5.35E-04
Propulsion	TOTAL	8.47E-05	8.59	1.18E-03
Non-Propulsion	TOTAL	1.62E-04	16.81	2.29E-03
<b>Total Emissions</b>		<b>2.46E-04</b>	<b>25.40</b>	<b>3.48E-03</b>

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Table H.2.RPA.Un.GHG.2040-41. 2040 Reduced Project Alternative Tug Main Engines Average Daily Unmitigated GHG Emissions (Exxon Mobil).

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Energy (kWh)	Energy (MMBtu)	Shipcalls (vessels/yr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
PANAMAX	Maneuvering - Pilot to Berth	1.00	2	4,800	0.50	MGO	2400	8.2	131.0	0.00636	645.0	0.0890	0.0020	202.79	0.0280
	Maneuvering - Berth to Pilot	1.00	2	4,800	0.50	MGO	2400	8.2	131.0	0.00636	645.0	0.0890	0.0020	202.79	0.0280
<b>TOTAL</b>													<b>0.0040</b>	<b>405.58</b>	<b>0.0560</b>

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Table H.2.RPA.Un.GHG.2040-42. 2040 Reduced Project Alternative Tug Auxiliary Generator Engines Average Daily Unmitigated GHG Emissions (Exxon Mobil).

Ship	Mode	Activity (hours)	No. of Tugs	Average Power (kW)	Load Factor	Fuel Type	Energy (kWh)	Energy (MMBtu)	Shipcalls (vessels/yr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
PANAMAX	Maneuvering - Pilot to Berth	1.00	2	300	1.00	MGO	300	1.0	131.0	0.0068	690.0	0.0952	0.00027	27.11700	0.0037
	Maneuvering - Berth to Pilot	1.00	2	300	1.00	MGO	300	1.0	131.0	0.0068	690.0	0.0952	0.00027	27.11700	0.0037
TOTAL													0.00053	54.23	0.0075

Table H.2.RPA.Un.GHG.2040-43. 2040 Reduced Project Alternative Summary of Tug Average Daily Unmitigated GHG Emissions (Exxon Mobil).

Mode	Equipment	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
Tug Assist	Main Engines	0.0040	405.58	0.0560
Tug Assist	Aux Generator	0.00053	54.23	0.0075
<b>TOTAL</b>		<b>0.0045</b>	<b>459.81</b>	<b>0.0634</b>

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Table H.2.RPA.Un.GHG.2040-44. 2040 Reduced Project Alternative VDU Crude Average Daily Unmitigated GHG Emissions (Exxon Mobil).

	Annual Vessel Calls	crude vapors from tanks(scf/call)	annual gas usage (mmscf/yr)	mw crude vapors	destruction efficiency
Panamax	131	116667	15.3	50	98%
<b>TOTAL</b>	<b>131</b>		<b>15.3</b>		

Assumed Distribution based on tank storage volume:	
Site 1	12.5%
Site 2	87.5%

Annual Average (tons/yr)

	N <sub>2</sub> O	CO <sub>2</sub>	CH <sub>4</sub>
EF (kg/MMBtu)	0.0001	52.78	0.0059
Aframax	0.0016	822.79	0.0920
<b>TOTAL</b>	<b>0.0016</b>	<b>822.7898</b>	<b>0.0920</b>

Annual Average (tons/yr)

	N <sub>2</sub> O	CO <sub>2</sub>	CH <sub>4</sub>
Site 1	0.0002	102.85	0.01
Site 2	0.0014	719.9	0.1



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Table H.2.RPA.Un.GHG.2040-45. 2040 Reduced Project Alternative VDU Legs Average Daily Unmitigated GHG Emissions (Exxon Mobil).

	tanks	crude vapors from tanks on legs(scf/yr)	annual gas usage (mmscf/yr)	mw crude vapors	destruction efficiency
Site 1	4	8640000	34.6	50	98%
Site 2	14	8640000	121.0	50	98%
<b>TOTAL</b>	<b>18</b>		<b>155.5</b>		

48	hr/event
6	events/yr
500	ft3/min

Annual Average (tons/yr)

	N <sub>2</sub> O	CO <sub>2</sub>	CH <sub>4</sub>
EF (kg/MMBtu)	0.0001	52.78	0.0059
<b>TOTAL</b>	<b>0.016</b>	<b>8372.513</b>	<b>0.936</b>

*Assumed a ratio of 500/1000 based on the corresponding Btu values with respect to natural gas combustion emission factors.*

Annual Average (tons/yr)

	N <sub>2</sub> O	CO <sub>2</sub>	CH <sub>4</sub>
Site 1	0.0035	1860.6	0.2
Site 2	0.012	6512.0	0.7

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**Table H.2.RPA.Un.GHG.2040-46. 2040 Reduced Project Alternative VDU Average Daily Unmitigated GHG Emissions (Exxon Mobil).**

Annual Average (tons/yr)

	<b>N<sub>2</sub>O</b>	<b>CO<sub>2</sub></b>	<b>CH<sub>4</sub></b>
Site 1	0.004	1963	0.22
Site 2	0.014	7232	0.81
<b>Total</b>	<b>0.017</b>	<b>9,195</b>	<b>1.03</b>

Daily Average (tons/day)

	<b>N<sub>2</sub>O</b>	<b>CO<sub>2</sub></b>	<b>CH<sub>4</sub></b>
Site 1	1.02E-05	5.379	6.01E-04
Site 2	3.75E-05	19.813	2.21E-03
<b>Total</b>	<b>4.77E-05</b>	<b>25</b>	<b>2.82E-03</b>

**Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR**

**Table H.2.RPA.Un.GHG.2040-47. 2040 Reduced Project Alternative Exxon Mobil Berth Summary.**

<b>Operation</b>	<b>N<sub>2</sub>O Emissions (tons/yr)</b>	<b>CO<sub>2</sub> Emissions (tons/yr)</b>	<b>CH<sub>4</sub> Emissions (tons/yr)</b>	<b>CO<sub>2</sub>e Emissions (tons/yr)</b>
Tanker Cruising and Manuevering	0.0309	3,134.97	0.4324	3153.64
Tanker Hoteling	0.0131	1,481.15	0.1953	1489.32
Offloading Emissions	0.0448	4,546.40	0.6269	4573.46
Transiting Operations	0.0011	109.61	0.0151	110.26
Tug Assistance	0.0045	459.81	0.0634	462.55
Tanks	---	---	---	---
Vapor Destruction Units	0.0174	9,195.30	1.0279	9222.29
Valves, Flanges, Pumps	---	---	---	---
<b>TOTAL</b>	<b>0.1119</b>	<b>18,927.25</b>	<b>2.3611</b>	<b>19011.52</b>

<b>Operation</b>	<b>N<sub>2</sub>O Emissions (tons/day)</b>	<b>CO<sub>2</sub> Emissions (tons/day)</b>	<b>CH<sub>4</sub> Emissions (tons/day)</b>	<b>CO<sub>2</sub>e Emissions (tons/yr)</b>
Tanker Cruising and Manuevering	8.47E-05	8.59E+00	1.18E-03	8.64
Tanker Hoteling	3.59E-05	4.06E+00	5.35E-04	4.08
Offloading Emissions	1.23E-04	1.25E+01	1.72E-03	12.53
Transiting Operations	2.96E-06	3.00E-01	4.14E-05	0.30
Tug Assistance	1.24E-05	1.26E+00	1.74E-04	1.27
Tanks	---	---	---	---
Vapor Destruction Units	4.77E-05	2.52E+01	2.82E-03	25.27
Valves, Flanges, Pumps	---	---	---	---
<b>TOTAL</b>	<b>3.07E-04</b>	<b>5.19E+01</b>	<b>6.47E-03</b>	<b>52.09</b>

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Table H.2.RPA.Un.GHG.2040-48. 2040 Reduced Project Alternative Existing Berth Summary (BP, Tesoro and Exxon Mobil).

Operation	BP (tons/yr)	Tesoro (tons/yr)	Exxon (tons/yr)	Total (tons/yr)
<b>Tanker Cruising and Maneuvering</b>				
N <sub>2</sub> O	0.008	0.020	0.031	0.059
CO <sub>2</sub>	814.682	2049.845	3134.972	5999.499
CH <sub>4</sub>	0.112	0.283	0.432	0.828
CO <sub>2</sub> e	819.533	2062.050	3153.637	6035.219
<b>Tanker Hoteling</b>				
N <sub>2</sub> O	0.013	0.033	0.013	0.060
CO <sub>2</sub>	1490.641	3750.646	1481.154	6722.441
CH <sub>4</sub>	0.197	0.495	0.195	0.886
CO <sub>2</sub> e	1498.861	3771.327	1489.320	6759.507
<b>Offloading Emissions</b>				
N <sub>2</sub> O	0.033	0.084	0.045	0.163
CO <sub>2</sub>	3397.727	8549.119	4546.401	16493.247
CH <sub>4</sub>	0.469	1.179	0.627	2.274
CO <sub>2</sub> e	3417.950	8600.002	4573.461	16591.413
<b>Transiting Operations</b>				
N <sub>2</sub> O	0.001	0.002	0.001	0.003
CO <sub>2</sub>	63.192	159.000	109.609	331.801
CH <sub>4</sub>	0.009	0.022	0.015	0.046
CO <sub>2</sub> e	63.568	159.946	110.262	333.776
<b>Tug Assistance</b>				
N <sub>2</sub> O	0.001	0.003	0.005	0.008
CO <sub>2</sub>	108.810	273.780	459.810	842.400
CH <sub>4</sub>	0.015	0.038	0.063	0.116
CO <sub>2</sub> e	109.458	275.410	462.548	847.416
<b>Tanks</b>				
N <sub>2</sub> O	---	---	---	---
CO <sub>2</sub>	---	---	---	---
CH <sub>4</sub>	---	---	---	---
CO <sub>2</sub> e	---	---	---	---
<b>Vapor Destruction Units</b>				
N <sub>2</sub> O	0.017	0.018	0.017	0.052
CO <sub>2</sub>	8746.347	9313.128	9195.302	27254.777
CH <sub>4</sub>	0.978	1.041	1.028	3.047
CO <sub>2</sub> e	8772.016	9340.461	9222.289	27334.765
<b>Valves, Flanges, Pumps</b>				
N <sub>2</sub> O	---	---	---	---
CO <sub>2</sub>	---	---	---	---
CH <sub>4</sub>	---	---	---	---
CO <sub>2</sub> e	---	---	---	---

Table H.2.RPA.Mit.GHG.2010-1. 2010 Reduced Project Alternative Main Engines Average Daily Mitigated GHG Emissions.

Ship	Direction	Mode	Distance (nautical miles)	Ship speed (knots)	Activity (hours)	Maximum Speed (knots)	Load Factor	MCR (KW)	Energy (KW-hr)	Annual Shipcalls (vessels/yr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
VLCC	North In	Cruising - CW to VSR	22	12	1.83	16.9	0.358	25,400	16,671	26.0	0.0055	620.00	0.0818	0.0024	268.73	0.0355
		Cruising - VSR to PZ	21	12	1.75	16.9	0.358	25,400	15,913	26.0	0.0055	620.00	0.0818	0.0023	256.52	0.0338
		Cruising - PZ to Pilot	4.7	7	0.67	16.9	0.071	25,400	1,212	26.0	0.0055	620.00	0.0818	0.0002	19.54	0.0026
		Maneuvering - Pilot to Berth		3	1.00	16.9	0.006	25,400	142	26.0	0.0060	682.00	0.0902	0.0000	2.52	0.0003
		<b>TOTAL</b>								<b>0.0225</b>	<b>2542.00</b>	<b>0.3356</b>	<b>0.0049</b>	<b>547.31</b>	<b>0.0722</b>	
	North Out	Maneuvering - Berth to Pilot		5	1.00	16.9	0.026	25,400	658	26.0	0.0060	682.00	0.0902	0.0001	11.66	0.0015
		Cruising - Pilot to PZ	3.8	7	0.54	16.9	0.071	25,400	980	26.0	0.0055	620.00	0.0818	0.0001	15.79	0.0021
		Cruising - PZ to VSR	21	12	1.75	16.9	0.358	25,400	15,913	26.0	0.0055	620.00	0.0818	0.0023	256.52	0.0338
		Cruising - VSR to CW	22	12	1.83	16.9	0.358	25,400	16,671	26.0	0.0055	620.00	0.0818	0.0024	268.73	0.0355
		<b>TOTAL</b>								<b>0.0225</b>	<b>2542.00</b>	<b>0.3356</b>	<b>0.0049</b>	<b>552.71</b>	<b>0.0729</b>	
AFRAMAX	South In	Cruising - CW to VSR	23	12	1.92	16.1	0.414	12,477	9,902	32.0	0.0055	620.00	0.0818	0.0017	196.46	0.0259
		Cruising - VSR to PZ	11	12	0.92	16.1	0.414	12,477	4,736	32.0	0.0055	620.00	0.0818	0.0008	93.96	0.0124
		Cruising - PZ to Pilot	4.7	7	0.67	16.1	0.082	12,477	689	32.0	0.0055	620.00	0.0818	0.0001	13.66	0.0018
		Maneuvering - Pilot to Berth		3	1.00	16.1	0.006	12,477	81	32.0	0.0060	682.00	0.0902	0.0000	1.76	0.0002
		<b>TOTAL</b>								<b>0.0225</b>	<b>2542.00</b>	<b>0.3356</b>	<b>0.0027</b>	<b>305.83</b>	<b>0.0404</b>	
	South Out	Maneuvering - Berth to Pilot		5	1.00	16.1	0.030	12,477	374	32.0	0.0060	682.00	0.0902	0.0001	8.16	0.0011
		Cruising - Pilot to PZ	3.5	7	0.50	16.1	0.082	12,477	513	32.0	0.0055	620.00	0.0818	0.0001	10.17	0.0013
		Cruising - PZ to VSR	12.5	12	1.04	16.1	0.414	12,477	5,382	32.0	0.0055	620.00	0.0818	0.0009	106.77	0.0141
		Cruising - VSR to CW	24.5	12	2.04	16.1	0.414	12,477	10,548	32.0	0.0055	620.00	0.0818	0.0019	209.27	0.0276
		<b>TOTAL</b>								<b>0.0225</b>	<b>2542.00</b>	<b>0.3356</b>	<b>0.0030</b>	<b>334.37</b>	<b>0.0441</b>	
PANAMAX	South In	Cruising - CW to VSR	23	12	1.92	15.8	0.438	10,300	8,649	26	0.0055	620.00	0.0818	0.0012	139.42	0.0184
		Cruising - VSR to PZ	11	12	0.92	15.8	0.438	10,300	4,136	26	0.0055	620.00	0.0818	0.0006	66.68	0.0088
		Cruising - PZ to Pilot	4.7	7	0.67	15.8	0.087	10,300	601	26	0.0055	620.00	0.0818	0.0001	9.69	0.0013
		Maneuvering - Pilot to Berth		3	1.00	15.8	0.007	10,300	71	26	0.0060	682.00	0.0902	0.0000	1.25	0.0002
		<b>TOTAL</b>								<b>0.0225</b>	<b>2542.00</b>	<b>0.3356</b>	<b>0.0019</b>	<b>217.04</b>	<b>0.0286</b>	
	South Out	Maneuvering - Berth to Pilot		5	1.00	15.8	0.032	10,300	326	26	0.0060	682.00	0.0902	0.0001	5.79	0.0008
		Cruising - Pilot to PZ	3.5	7	0.50	15.8	0.087	10,300	448	26	0.0055	620.00	0.0818	0.0001	7.22	0.0010
		Cruising - PZ to VSR	12.5	12	1.04	15.8	0.438	10,300	4,700	26	0.0055	620.00	0.0818	0.0007	75.77	0.0100
		Cruising - VSR to CW	24.5	12	2.04	15.8	0.438	10,300	9,213	26	0.0055	620.00	0.0818	0.0013	148.51	0.0196
		<b>TOTAL</b>								<b>0.0225</b>	<b>2542.00</b>	<b>0.3356</b>	<b>0.0021</b>	<b>237.29</b>	<b>0.0313</b>	
SUEZMAX	North In	Cruising - CW to VSR	22	12	1.83	17	0.352	16,000	10,317	45	0.0055	620.00	0.0818	0.0026	287.85	0.0380
		Cruising - VSR to PZ	21	12	1.75	17	0.352	16,000	9,848	45	0.0055	620.00	0.0818	0.0024	274.76	0.0363
		Cruising - PZ to Pilot	4.7	7	0.67	17	0.070	16,000	750	45	0.0055	620.00	0.0818	0.0002	20.93	0.0028
		Maneuvering - Pilot to Berth		3	1.00	17	0.005	16,000	88	45	0.0060	682.00	0.0902	0.0000	2.70	0.0004
		<b>TOTAL</b>								<b>0.0225</b>	<b>2542.00</b>	<b>0.3356</b>	<b>0.0052</b>	<b>586.24</b>	<b>0.0773</b>	
	North Out	Maneuvering - Berth to Pilot		5	1.00	17	0.025	16,000	407	45	0.0060	682.00	0.0902	0.0001	12.49	0.0017
		Cruising - Pilot to PZ	3.8	7	0.54	17	0.070	16,000	606	45	0.0055	620.00	0.0818	0.0002	16.92	0.0022
		Cruising - PZ to VSR	21	12	1.75	17	0.352	16,000	9,848	45	0.0055	620.00	0.0818	0.0024	274.76	0.0363
		Cruising - VSR to CW	22	12	1.83	17	0.352	16,000	10,317	45	0.0055	620.00	0.0818	0.0026	287.85	0.0380
		<b>TOTAL</b>								<b>0.0225</b>	<b>2542.00</b>	<b>0.3356</b>	<b>0.0053</b>	<b>592.02</b>	<b>0.0781</b>	
<b>GRAND TOTAL</b>											<b>0.1800</b>	<b>20336.00</b>	<b>2.6848</b>	<b>0.0299</b>	<b>3372.81</b>	<b>0.4450</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Mit.GHG.2010-2. 2010 Reduced Project Alternative Auxiliary Generator Average Daily Mitigated GHG Emissions.

Ship	Direction	Mode	Activity (hours)	MCR (kW)	Load Factor	Energy (kW-hr)	Annual Shipcalls (vessels/yr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)	
VLCC	North In	Cruising	4.25	3,600	0.280	4,289	26.0	0.0064	722.00	0.0952	0.0007	80.51	0.0106	
		Maneuvering	2.00	3,600	0.280	2,016	26.0	0.0064	722.00	0.0952	0.0003	37.84	0.0050	
	North Out	Maneuvering	1.50	3,600	0.280	1,512	26.0	0.0068	690.00	0.0952	0.0003	27.13	0.0037	
		Cruising	4.13	3,600	0.280	4,159	26.0	0.0068	690.00	0.0952	0.0007	74.62	0.0103	
							<b>TOTAL</b>	<b>0.0128</b>	<b>1444.00</b>	<b>0.1904</b>	<b>0.0010</b>	<b>118.35</b>	<b>0.0156</b>	
AFRAMAX	South In	Cruising	3.50	3,600	0.280	3,533	32.0	0.0064	722.00	0.0952	0.0007	81.62	0.0108	
		Maneuvering	2.00	3,600	0.280	2,016	32.0	0.0064	722.00	0.0952	0.0004	46.58	0.0061	
	South Out	Maneuvering	1.50	3,600	0.278	1,501	32.0	0.0068	690.00	0.0952	0.0003	33.15	0.0046	
		Cruising	3.58	3,600	0.278	3,586	32.0	0.0068	690.00	0.0952	0.0008	79.18	0.0109	
								<b>TOTAL</b>	<b>0.0136</b>	<b>1380.00</b>	<b>0.1904</b>	<b>0.0010</b>	<b>101.74</b>	<b>0.0140</b>
								<b>TOTAL</b>	<b>0.0128</b>	<b>1444.00</b>	<b>0.1904</b>	<b>0.0011</b>	<b>128.20</b>	<b>0.0169</b>
PANAMAX	South In	Cruising	3.50	3,600	0.28	3,533	26	0.0064	722.00	0.0952	0.0006	66.32	0.0087	
		Maneuvering	2.00	3,600	0.28	2,016	26	0.0064	722.00	0.0952	0.0003	37.84	0.0050	
	South Out	Maneuvering	1.5	3,600	0.28	1,512	26	0.0068	690.00	0.0952	0.0003	27.13	0.0037	
		Cruising	3.58	3,600	0.28	3,612	26	0.0068	690.00	0.0952	0.0006	64.80	0.0089	
							<b>TOTAL</b>	<b>0.0136</b>	<b>1380.00</b>	<b>0.1904</b>	<b>0.0009</b>	<b>91.92</b>	<b>0.0127</b>	
SUEZMAX	North In	Cruising	4.25	3,600	0.28	4,289	45	0.0064	722.00	0.0952	0.0012	139.34	0.0184	
		Maneuvering	2.00	3,600	0.28	2,016	45	0.0064	722.00	0.0952	0.0006	65.50	0.0086	
	North Out	Maneuvering	1.5	3,600	0.28	1,512	45	0.0068	690.00	0.0952	0.0005	46.95	0.0065	
		Cruising	4.13	3,600	0.28	4,159	45	0.0068	690.00	0.0952	0.0013	129.14	0.0178	
							<b>TOTAL</b>	<b>0.0136</b>	<b>1380.00</b>	<b>0.1904</b>	<b>0.0017</b>	<b>176.09</b>	<b>0.0243</b>	
<b>GRAND TOTAL</b>								<b>0.1056</b>	<b>11296.00</b>	<b>1.5232</b>	<b>0.0097</b>	<b>1037.64</b>	<b>0.1398</b>	

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Mit.GHG.2010-3. 2010 Reduced Project Alternative Summary of Average Daily Mitigated Vessel GHG Emissions

Mode	Equipment	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
Cruising	Main Engines	0.0295	3326.48	0.4389
Cruising	Aux Generator	0.0067	715.53	0.0965
Maneuvering	Main Engines	0.0004	46.3312	0.0061
Maneuvering	Aux Generator	0.0030	322.11	0.0433
<b>Maneuvering</b>	<b>TOTAL</b>	<b>0.0034</b>	<b>368.44</b>	<b>0.0494</b>
<b>Propulsion</b>	<b>TOTAL</b>	<b>0.0396</b>	<b>4410.46</b>	<b>0.5848</b>

Mode	Equipment	N <sub>2</sub> O Emissions (tons/day)	CO <sub>2</sub> Emissions (tons/day)	CH <sub>4</sub> Emissions (tons/day)
Cruising	Main Engines	8.08E-05	9.11	1.20E-03
Cruising	Aux Generator	1.83E-05	1.96	2.64E-04
Maneuvering	Main Engines	1.12E-06	0.13	1.68E-05
Maneuvering	Aux Generator	8.19E-06	0.88	1.19E-04
<b>Maneuvering</b>	<b>TOTAL</b>	<b>9.30E-06</b>	<b>1.01</b>	<b>1.35E-04</b>
<b>Propulsion</b>	<b>TOTAL</b>	<b>1.08E-04</b>	<b>12.08</b>	<b>1.60E-03</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Mit.GHG.2010-4. 2010 Reduced Project Alternative Boiler Warm-Up Average Daily Mitigated GHG Emissions.

Shipcalls (vessels/yr)	Vessel Size	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	Fuel Consumpti on (gal/yr)	N <sub>2</sub> O Emission Factor (lb/ton)	CO <sub>2</sub> Emission Factor (lb/ton)	CH <sub>4</sub> Emission Factor (lb/ton)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
32.0	Aframax	MDO	0.52	102.17	30%	3	50,000	65,304	0.0627	6360.00	0.8770	0.0059	601.28	0.0829
26.0	VLCC	MDO	0.52	80.38	30%	3	90,000	75,135	0.0627	6360.00	0.8770	0.0068	691.80	0.0954
26.0	Panamax	MDO	0.52	59.91	30%	3	35,000	21,778	0.0627	6360.00	0.8770	0.0020	200.52	0.0277
45.0	Suezmax	MDO	0.52	82.85	30%	3	70,000	104,252	0.0627	6360.00	0.8770	0.0095	959.89	0.1324
<b>TOTAL</b>									<b>0</b>	<b>25,440</b>	<b>4</b>	<b>0.0242</b>	<b>2453.49</b>	<b>0.3383</b>



Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Mit.GHG.2010-5. 2010 Reduced Project Alternative Summary of Boiler Warm-Up Average Daily Mitigated GHG Emissions.

<b>Mode</b>	<b>Equipment</b>	<b>N<sub>2</sub>O Emissions (tons/yr)</b>	<b>CO<sub>2</sub> Emissions (tons/yr)</b>	<b>CH<sub>4</sub> Emissions (tons/yr)</b>
Boiler Warm-up	Boiler	0.0242	2,453.49	0.3383

Table H.2.RPA.Mit.GHG.2010-6. 2010 Reduced Project Alternative Berth Operations Average Daily Mitigated GHG Emissions.

**Auxiliary Generator Pre-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	Energy (MMBtu)	Heating Value (MMBtu/1000 gal)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
32.0	Aframax	700,000	Dist at 0.2%S	0.20	3,600	28%	2.5	8.6	140.0	0.0068	690.0	0.0952	0.0020	198.7200	0.0274
26.0	VLCC	2,000,000	Dist at 0.2%S	0.20	3,600	28%	2.5	8.6	140.0	0.0068	690.0	0.0952	0.0016	161.4600	0.0223
26.0	Panamax	350,000	Dist at 0.2%S	0.20	3,600	28%	2.5	8.6	140.0	0.0068	690.0	0.0952	0.0016	161.4600	0.0223
45.0	Suezmax	1,000,000	Dist at 0.2%S	0.20	3,600	28%	2.5	8.6	140.0	0.0068	690.0	0.0952	0.0028	279.4500	0.0386
<b>TOTAL</b>													<b>0.0079</b>	<b>801.0900</b>	<b>0.1105</b>

**Boiler Pre-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	Fuel Consumption (gal/yr)	N <sub>2</sub> O Emission Factor (lb/ton)	CO <sub>2</sub> Emission Factor (lb/ton)	CH <sub>4</sub> Emission Factor (lb/ton)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
32.0	Aframax	700,000	Dist at 0.2%S	0.20	102.17	30%	2.5	50,000	54,420.2	0.0627	6,360.00	0.8770	0.0049	501.0669	0.0691
26.0	VLCC	2,000,000	Dist at 0.2%S	0.20	80.38	30%	2.5	90,000	62,612.9	0.0627	6,360.00	0.8770	0.0057	576.4998	0.0795
26.0	Panamax	350,000	Dist at 0.2%S	0.20	59.91	30%	2.5	35,000	18,148.5	0.0627	6,360.00	0.8770	0.0016	167.0998	0.0230
45.0	Suezmax	1,000,000	Dist at 0.2%S	0.20	82.85	30%	2.5	70,000	86,876.7	0.0627	6,360.00	0.8770	0.0079	799.9050	0.1103
<b>TOTAL</b>													<b>0.0202</b>	<b>2,044.5715</b>	<b>0.2819</b>

**Auxiliary Generator Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	Energy (MMBtu)	Heating Value (MMBtu/1000 gal)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
32.0	Aframax	700,000	Dist at 0.2%S	0.20	3,600	56%	15.0	102.4	140.0	0.0068	690.0	0.0952	0.0118	1,192.3200	0.1645
26.0	VLCC	2,000,000	Dist at 0.2%S	0.20	3,600	56%	23.2	158.4	140.0	0.0068	690.0	0.0952	0.0148	1,498.3488	0.2067
26.0	Panamax	350,000	Dist at 0.2%S	0.20	3,600	56%	11.0	75.7	140.0	0.0068	690.0	0.0952	0.0070	710.4240	0.0980
45.0	Suezmax	1,000,000	Dist at 0.2%S	0.20	3,600	56%	15.3	105.2	140.0	0.0068	690.0	0.0952	0.0169	1,710.2340	0.2360
<b>TOTAL</b>													<b>0.0504</b>	<b>5,111.3268</b>	<b>0.7052</b>

**Boiler Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Inerting Fuel Consumption Savings (lb/1000 bbl offloaded)	Activity Time (hr)	Pumping Rate (bbl/hr)	Fuel Consumption (gal/yr)	N <sub>2</sub> O Emission Factor (lb/ton)	CO <sub>2</sub> Emission Factor (lb/ton)	CH <sub>4</sub> Emission Factor (lb/ton)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
32.0	Aframax	700,000	Dist at 0.2%S	0.20	102.17	28.06	15.0	50,000	326,521.4	0.0627	6,360.00	0.8770	0.0296	3,006.4013	0.4146
26.0	VLCC	2,000,000	Dist at 0.2%S	0.20	80.38	28.06	23.2	90,000	581,047.9	0.0627	6,360.00	0.8770	0.0527	5,349.9184	0.7377
26.0	Panamax	350,000	Dist at 0.2%S	0.20	59.91	28.06	11.0	35,000	79,853.4	0.0627	6,360.00	0.8770	0.0072	735.2393	0.1014
45.0	Suezmax	1,000,000	Dist at 0.2%S	0.20	82.85	28.06	15.3	70,000	531,685.2	0.0627	6,360.00	0.8770	0.0483	4,895.4184	0.6750
<b>TOTAL</b>													<b>0.1379</b>	<b>13,986.9775</b>	<b>1.9287</b>

**Auxiliary Generator Post-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	Energy (MMBtu)	Heating Value (MMBtu/1000 gal)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
32.0	Aframax	700,000	Dist at 0.2%S	0.20	3,600	28%	1.0	3.4	140.0	0.0068	690.0	0.0952	0.0008	79.4880	0.0110
26.0	VLCC	2,000,000	Dist at 0.2%S	0.20	3,600	28%	1.0	3.4	140.0	0.0068	690.0	0.0952	0.0006	64.5840	0.0089
26.0	Panamax	350,000	Dist at 0.2%S	0.20	3,600	28%	1.0	3.4	140.0	0.0068	690.0	0.0952	0.0006	64.5840	0.0089
45.0	Suezmax	1,000,000	Dist at 0.2%S	0.20	3,600	28%	1.0	3.4	140.0	0.0068	690.0	0.0952	0.0011	111.7800	0.0154
<b>TOTAL</b>													<b>0.0032</b>	<b>320.4360</b>	<b>0.0442</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Mit.GHG.2010-7. 2010 Reduced Project Alternative Summary of Berth Operations Average Daily Mitigated GHG Emissions.

Year 2010 (No AMP)

Mode	Equipment	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
Berth Operations	Boiler	0.1580	16031.55	2.2106
Berth Operations	Aux Generator	0.0614	6232.85	0.8600

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Mit.GHG.2015-1. 2015 Reduced Project Alternative Main Engines Average Daily Mitigated GHG Emissions.

Ship	Direction	Mode	Distance (nautical miles)	Ship speed (knots)	Activity (hours)	Maximum Speed (knots)	Load Factor	MCR (kW)	Energy (kW-hr)	Annual Shipcalls (vessels/yr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
VLCC	North In	Cruising - CW to VSR	22	12	1.83	16.9	0.358	25,400	16,671	46.0	0.0058	588.00	0.0811	0.0044	450.91	0.0622
		Cruising - VSR to PZ	21	12	1.75	16.9	0.358	25,400	15,913	46.0	0.0058	588.00	0.0811	0.0042	430.42	0.0594
		Cruising - PZ to Pilot	4.7	7	0.67	16.9	0.071	25,400	1,212	46.0	0.0058	588.00	0.0811	0.0003	32.78	0.0045
		Maneuvering - Pilot to Berth		3	1.00	16.9	0.006	25,400	142	46.0	0.0064	647.00	0.0895	0.0000	4.23	0.0006
		<b>TOTAL</b>								<b>0.0238</b>	<b>2411.00</b>	<b>0.3328</b>	<b>0.0091</b>	<b>918.34</b>	<b>0.1267</b>	
	North Out	Maneuvering - Berth to Pilot		5	1.00	16.9	0.026	25,400	658	46.0	0.0064	647.00	0.0895	0.0002	19.58	0.0027
		Cruising - Pilot to PZ	3.8	7	0.54	16.9	0.071	25,400	980	46.0	0.0058	588.00	0.0811	0.0003	26.50	0.0037
		Cruising - PZ to VSR	21	12	1.75	16.9	0.358	25,400	15,913	46.0	0.0058	588.00	0.0811	0.0042	430.42	0.0594
		Cruising - VSR to CW	22	12	1.83	16.9	0.358	25,400	16,671	46.0	0.0058	588.00	0.0811	0.0044	450.91	0.0622
		<b>TOTAL</b>								<b>0.0238</b>	<b>2411.00</b>	<b>0.3328</b>	<b>0.0091</b>	<b>927.41</b>	<b>0.1279</b>	
AFRAMAX	South In	Cruising - CW to VSR	23	12	1.92	16.1	0.414	12,477	9,902	24.0	0.0058	588.00	0.0811	0.0014	139.74	0.0193
		Cruising - VSR to PZ	11	12	0.92	16.1	0.414	12,477	4,736	24.0	0.0058	588.00	0.0811	0.0007	66.83	0.0092
		Cruising - PZ to Pilot	4.7	7	0.67	16.1	0.082	12,477	689	24.0	0.0058	588.00	0.0811	0.0001	9.72	0.0013
		Maneuvering - Pilot to Berth		3	1.00	16.1	0.006	12,477	81	24.0	0.0064	647.00	0.0895	0.0000	1.25	0.0002
		<b>TOTAL</b>								<b>0.0238</b>	<b>2411.00</b>	<b>0.3328</b>	<b>0.0021</b>	<b>217.54</b>	<b>0.0300</b>	
	South Out	Maneuvering - Berth to Pilot		5	1.00	16.1	0.030	12,477	374	24.0	0.0064	647.00	0.0895	0.0001	5.80	0.0008
		Cruising - Pilot to PZ	3.5	7	0.50	16.1	0.082	12,477	513	24.0	0.0058	588.00	0.0811	0.0001	7.24	0.0010
		Cruising - PZ to VSR	12.5	12	1.04	16.1	0.414	12,477	5,382	24.0	0.0058	588.00	0.0811	0.0007	75.94	0.0105
		Cruising - VSR to CW	24.5	12	2.04	16.1	0.414	12,477	10,548	24.0	0.0058	588.00	0.0811	0.0015	148.85	0.0205
		<b>TOTAL</b>								<b>0.0238</b>	<b>2411.00</b>	<b>0.3328</b>	<b>0.0023</b>	<b>237.83</b>	<b>0.0328</b>	
PANAMAX	South In	Cruising - CW to VSR	23	12	1.92	15.8	0.438	10,300	8,649	10	0.0058	588.00	0.0811	0.0005	50.85	0.0070
		Cruising - VSR to PZ	11	12	0.92	15.8	0.438	10,300	4,136	10	0.0058	588.00	0.0811	0.0002	24.32	0.0034
		Cruising - PZ to Pilot	4.7	7	0.67	15.8	0.087	10,300	601	10	0.0058	588.00	0.0811	0.0000	3.54	0.0005
		Maneuvering - Pilot to Berth		3	1.00	15.8	0.007	10,300	71	10	0.0064	647.00	0.0895	0.0000	0.46	0.0001
		<b>TOTAL</b>								<b>0.0238</b>	<b>2411.00</b>	<b>0.3328</b>	<b>0.0008</b>	<b>79.17</b>	<b>0.0109</b>	
	South Out	Maneuvering - Berth to Pilot		5	1.00	15.8	0.032	10,300	326	10	0.0064	647.00	0.0895	0.0000	2.11	0.0003
		Cruising - Pilot to PZ	3.5	7	0.50	15.8	0.087	10,300	448	10	0.0058	588.00	0.0811	0.0000	2.63	0.0004
		Cruising - PZ to VSR	12.5	12	1.04	15.8	0.438	10,300	4,700	10	0.0058	588.00	0.0811	0.0003	27.64	0.0038
		Cruising - VSR to CW	24.5	12	2.04	15.8	0.438	10,300	9,213	10	0.0058	588.00	0.0811	0.0005	54.17	0.0075
		<b>TOTAL</b>								<b>0.0238</b>	<b>2411.00</b>	<b>0.3328</b>	<b>0.0009</b>	<b>86.56</b>	<b>0.0119</b>	
SUEZMAX	North In	Cruising - CW to VSR	22	12	1.83	17	0.352	16,000	10,317	52	0.0058	588.00	0.0811	0.0031	315.46	0.0435
		Cruising - VSR to PZ	21	12	1.75	17	0.352	16,000	9,848	52	0.0058	588.00	0.0811	0.0030	301.12	0.0415
		Cruising - PZ to Pilot	4.7	7	0.67	17	0.070	16,000	750	52	0.0058	588.00	0.0811	0.0002	22.93	0.0032
		Maneuvering - Pilot to Berth		3	1.00	17	0.005	16,000	88	52	0.0064	647.00	0.0895	0.0000	2.96	0.0004
		<b>TOTAL</b>								<b>0.0238</b>	<b>2411.00</b>	<b>0.3328</b>	<b>0.0063</b>	<b>642.46</b>	<b>0.0886</b>	
	North Out	Maneuvering - Berth to Pilot		5	1.00	17	0.025	16,000	407	52	0.0064	647.00	0.0895	0.0001	13.70	0.0019
		Cruising - Pilot to PZ	3.8	7	0.54	17	0.070	16,000	606	52	0.0058	588.00	0.0811	0.0002	18.54	0.0026
		Cruising - PZ to VSR	21	12	1.75	17	0.352	16,000	9,848	52	0.0058	588.00	0.0811	0.0030	301.12	0.0415
		Cruising - VSR to CW	22	12	1.83	17	0.352	16,000	10,317	52	0.0058	588.00	0.0811	0.0031	315.46	0.0435
		<b>TOTAL</b>								<b>0.0238</b>	<b>2411.00</b>	<b>0.3328</b>	<b>0.0064</b>	<b>648.81</b>	<b>0.0895</b>	
<b>GRAND</b>																
<b>TOTAL</b>											<b>0.1904</b>	<b>19288.00</b>	<b>2.6624</b>	<b>0.0371</b>	<b>3758.12</b>	<b>0.5184</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Mit.GHG.2015-2. 2015 Reduced Project Alternative Auxiliary Generator Average Daily Mitigated GHG Emissions

Ship	Direction	Mode	Activity (hours)	MCR (kW)	Load Factor	Energy (kW-hr)	Annual Shipcalls (vessels/yr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
VLCC	North In	Cruising	4.25	3,600	0.280	4,289	46.0	0.0068	690.00	0.0952	0.0013	136.13	0.0188
		Maneuvering	2.00	3,600	0.280	2,016	46.0	0.0068	690.00	0.0952	0.0006	63.99	0.0088
	North Out	Maneuvering	1.50	3,600	0.280	1,512	46.0	0.0068	690.00	0.0952	0.0005	47.99	0.0066
		Cruising	4.13	3,600	0.280	4,159	46.0	0.0068	690.00	0.0952	0.0013	132.01	0.0182
<b>TOTAL</b>							<b>0.0136</b>	<b>1380.00</b>	<b>0.1904</b>	<b>0.0018</b>	<b>180.00</b>	<b>0.0248</b>	
AFRAMAX	South In	Cruising	3.50	3,600	0.280	3,533	24.0	0.0068	690.00	0.0952	0.0006	58.50	0.0081
		Maneuvering	2.00	3,600	0.280	2,016	24.0	0.0068	690.00	0.0952	0.0003	33.38	0.0046
	South Out	Maneuvering	1.50	3,600	0.278	1,501	24.0	0.0068	690.00	0.0952	0.0002	24.86	0.0034
		Cruising	3.58	3,600	0.278	3,586	24.0	0.0068	690.00	0.0952	0.0006	59.39	0.0082
<b>TOTAL</b>							<b>0.0136</b>	<b>1380.00</b>	<b>0.1904</b>	<b>0.0008</b>	<b>84.25</b>	<b>0.0116</b>	
PANAMAX	South In	Cruising	3.50	3,600	0.28	3,533	10	0.0068	690.00	0.0952	0.0002	24.38	0.0034
		Maneuvering	2.00	3,600	0.28	2,016	10	0.0068	690.00	0.0952	0.0001	13.91	0.0019
	South Out	Maneuvering	1.5	3,600	0.28	1,512	10	0.0068	690.00	0.0952	0.0001	10.43	0.0014
		Cruising	3.58	3,600	0.28	3,612	10	0.0068	690.00	0.0952	0.0002	24.92	0.0034
<b>TOTAL</b>							<b>0.0136</b>	<b>1380.00</b>	<b>0.1904</b>	<b>0.0003</b>	<b>35.36</b>	<b>0.0049</b>	
SUEZMAX	North In	Cruising	4.25	3,600	0.28	4,289	52	0.0068	690.00	0.0952	0.0015	153.88	0.0212
		Maneuvering	2.00	3,600	0.28	2,016	52	0.0068	690.00	0.0952	0.0007	72.33	0.0100
	North Out	Maneuvering	1.5	3,600	0.28	1,512	52	0.0068	690.00	0.0952	0.0005	54.25	0.0075
		Cruising	4.13	3,600	0.28	4,159	52	0.0068	690.00	0.0952	0.0015	149.23	0.0206
<b>TOTAL</b>							<b>0.0136</b>	<b>1380.00</b>	<b>0.1904</b>	<b>0.0020</b>	<b>203.48</b>	<b>0.0281</b>	
<b>GRAND TOTAL</b>								<b>0.1088</b>	<b>11040.00</b>	<b>1.5232</b>	<b>0.0104</b>	<b>1059.59</b>	<b>0.1462</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Mit.GHG.2015-3. 2015 Reduced Project Alternative Summary of Average Daily Mitigated Vessel GHG Emissions.

Mode	Equipment	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
Cruising	Main Engines	0.0366	3,708	0.5114
Cruising	Aux Generator	0.0073	738	0.1019
Maneuvering	Main Engines	0.0005	50	0.0069
Maneuvering	Aux Generator	0.0032	321	0.0443
<b>Maneuvering</b>	<b>TOTAL</b>	<b>0.0037</b>	<b>371</b>	<b>0.0512</b>
<b>Propulsion</b>				
	<b>TOTAL</b>	<b>0.0475</b>	<b>4,818</b>	<b>0.6646</b>

Mode	Equipment	N <sub>2</sub> O Emissions (tons/day)	CO <sub>2</sub> Emissions (tons/day)	CH <sub>4</sub> Emissions (tons/day)
Cruising	Main Engines	0.0001	10	0.0014
Cruising	Aux Generator	0.0000	2	0.0003
Maneuvering	Main Engines	0.0000	0	0.0000
Maneuvering	Aux Generator	0.0000	1	0.0001
<b>Maneuvering</b>	<b>TOTAL</b>	<b>0.0000</b>	<b>1</b>	<b>0.0001</b>
<b>Propulsion</b>				
	<b>TOTAL</b>	<b>0.0001</b>	<b>13</b>	<b>0.0018</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Mit.GHG.2015-4. 2015 Reduced Project Alternative Boiler Warm-Up Average Daily Mitigated GHG Emissions.

Shipcalls (vessels/yr)	Vessel Size	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	Fuel Consumption (gal/yr)	N <sub>2</sub> O Emission Factor (lb/ton)	CO <sub>2</sub> Emission Factor (lb/ton)	CH <sub>4</sub> Emission Factor (lb/ton)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
24.0	Aframax	0.20	102.17	30%	3	50,000	48,978	0.0068	690.00	0.0952	0.0005	48.92	0.0068
46.0	VLCC	0.20	80.38	30%	3	90,000	132,932	0.0068	690.00	0.0952	0.0013	132.79	0.0183
10	Panamax	0.20	59.91	30%	3	35,000	6,980	0.0068	690.00	0.0952	0.0001	6.97	0.0010
52	Suezmax	0.20	82.85	30%	3	70,000	100,391	0.0068	690.00	0.0952	0.0010	100.28	0.0138
<b>TOTAL</b>								<b>0.0272</b>	<b>2,760.00</b>	<b>0.3808</b>	<b>0.0028</b>	<b>288.97</b>	<b>0.0399</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Mit.GHG.2015-5. 2015 Reduced Project Alternative Summary of Boiler Warm-Up Average Daily Mitigated GHG Emissions.

<b>Mode</b>	<b>Equipment</b>	<b>N<sub>2</sub>O Emissions (tons/yr)</b>	<b>CO<sub>2</sub> Emissions (tons/yr)</b>	<b>CH<sub>4</sub> Emissions (tons/yr)</b>
Boiler Warm-up	Boiler	0.0028	288.97	0.0399



Table H.2.RPA.Mit.GHG.2015-6. 2015 Reduced Project Alternative Berth Operations Average Daily Mitigated GHG Emissions.

**Auxiliary Generator Pre-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded (bbl/call)	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	Energy (MMBtu)	Heating Value (MMBtu/1000 gal)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
24.0	Aframax	700,000	Dist at 0.2	0.20	3,600	28%	2.5	8.5	150	0.0064	722.0	0.0952	0.0014	155.95	0.0206
46.0	VLCC	2,000,000	Dist at 0.2	0.20	3,600	28%	2.5	8.5	150	0.0064	722.0	0.0952	0.0026	298.91	0.0394
10.0	Panamax	350,000	Dist at 0.2	0.20	3,600	28%	2.5	8.6	150	0.0064	722.0	0.0952	0.0006	64.98	0.0086
52.0	Suezmax	1,000,000	Dist at 0.2	0.20	3,600	28%	2.5	8.6	150	0.0064	722.0	0.0952	0.0030	337.90	0.0446
<b>TOTAL</b>													<b>0.0075</b>	<b>857.74</b>	<b>0.1131</b>

**Auxiliary Generator Usage per Ship Visit**

Shipcalls (vessels/yr)	Vessel Type	Auxiliary kW per Vessel	Load Factor	Hours/visit	kW-Hrs/Visit	AMP Reduction	AMPed kW-Hr per year
24.0	Aframax	3,600	28%	2.5	9,000	0.15	183,600
46.0	VLCC	3,600	28%	2.5	9,000	0.15	351,900
10.0	Panamax	3,600	28%	2.5	9,000	0.15	76,500
52.0	Suezmax	3,600	28%	2.5	9,000	0.15	397,800

**TOTAL**  
AMPed kW-Hr per year **1,009,800**

**Boiler Pre-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded (bbl/call)	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	Fuel Consumption (gal/yr)	N <sub>2</sub> O Emission Factor (lb/ton)	CO <sub>2</sub> Emission Factor (lb/ton)	CH <sub>4</sub> Emission Factor (lb/ton)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
24.0	Aframax	700,000	Dist at 0.2	0.20	102.17	30%	2.5	50,000	40,815	0.0627	6,360.0	0.8770	0.0037	375.80	0.0518
46.0	VLCC	2,000,000	Dist at 0.2	0.20	80.38	30%	2.5	90,000	110,777	0.0627	6,360.0	0.8770	0.0101	1019.96	0.1406
10.0	Panamax	350,000	Dist at 0.2	0.20	59.91	30%	2.5	35,000	6,980	0.0627	6,360.0	0.8770	0.0006	64.27	0.0089
52.0	Suezmax	1,000,000	Dist at 0.2	0.20	82.85	30%	2.5	70,000	100,391	0.0627	6,360.0	0.8770	0.0091	924.33	0.1275
<b>TOTAL</b>													<b>0.0235</b>	<b>2384.37</b>	<b>0.3288</b>

**Auxiliary Generator Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded (bbl/call)	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	Energy (MMBtu)	Heating Value (MMBtu/1000 gal)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
24.0	Aframax	700,000	Dist at 0.2	0.20	3,600	56%	15.0	102.4	140	0.0064	722.0	0.0952	0.0082	936.71	0.1234
46.0	VLCC	2,000,000	Dist at 0.2	0.20	3,600	56%	23.2	158.4	140	0.0064	722.0	0.0952	0.0246	2773.87	0.3658
10.0	Panamax	350,000	Dist at 0.2	0.20	3,600	56%	11.0	75.7	140	0.0064	722.0	0.0952	0.0025	285.91	0.0377
52.0	Suezmax	1,000,000	Dist at 0.2	0.20	3,600	56%	15.3	105.2	140	0.0064	722.0	0.0952	0.0183	2067.92	0.2727
<b>TOTAL</b>													<b>0.0537</b>	<b>6063.41</b>	<b>0.7995</b>

**Auxiliary Generator Usage per Ship Visit**

Shipcalls (vessels/yr)	Vessel Type	Auxiliary kW per Vessel	Load Factor	Hours/visit	kW-Hrs/Visit	AMP Reduction	AMPed kW-Hr per year
24.0	Aframax	3,600	56%	15.0	54,000	0.15	1,101,600
46.0	VLCC	3,600	56%	23.2	83,520	0.15	3,265,632
10.0	Panamax	3,600	56%	11.0	39,600	0.15	306,600
52.0	Suezmax	3,600	56%	15.3	55,080	0.15	2,434,536

**TOTAL**  
AMPed kW-Hr per year **7,138,368**

**Boiler Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded (bbl/call)	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Inerting Fuel Savings (lb/1000 bbl offloaded)	Activity Time (hr)	Pumping Rate (bbl/hr)	Fuel Consumption (gal/yr)	N <sub>2</sub> O Emission Factor (lb/ton)	CO <sub>2</sub> Emission Factor (lb/ton)	CH <sub>4</sub> Emission Factor (lb/ton)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
24.0	Aframax	700,000	Dist at 0.2	0.20	102.17	28.06	15.0	50,000	244,891	0.0627	6,360.0	0.8770	0.0222	2254.80	0.3109
46.0	VLCC	2,000,000	Dist at 0.2	0.20	80.38	28.06	23.2	90,000	1,028,008	0.0627	6,360.0	0.8770	0.0333	9465.24	1.3052
10.0	Panamax	350,000	Dist at 0.2	0.20	59.91	28.06	11.0	35,000	30,713	0.0627	6,360.0	0.8770	0.0028	282.78	0.0390
52.0	Suezmax	1,000,000	Dist at 0.2	0.20	82.85	28.06	15.3	70,000	614,392	0.0627	6,360.0	0.8770	0.0558	5656.93	0.7801
<b>TOTAL</b>													<b>0.1741</b>	<b>17659.75</b>	<b>2.4352</b>

**Auxiliary Generator Post-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded (bbl/call)	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	Energy (MMBtu)	Heating Value (MMBtu/1000 gal)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
24.0	Aframax	700,000	Dist at 0.2	0.20	3,600	28%	1.0	3.4	150	0.0064	722.0	0.0952	0.0005	62.38	0.0082
46.0	VLCC	2,000,000	Dist at 0.2	0.20	3,600	28%	1.0	3.4	150	0.0064	722.0	0.0952	0.0011	119.56	0.0158
10.0	Panamax	350,000	Dist at 0.2	2.70	3,600	28%	1.0	3.4	150	0.0064	722.0	0.0952	0.0002	25.99	0.0034
52.0	Suezmax	1,000,000	Dist at 0.2	2.70	3,600	28%	1.0	3.4	150	0.0064	722.0	0.0952	0.0012	135.16	0.0178
<b>TOTAL</b>													<b>0.0030</b>	<b>343.09</b>	<b>0.0452</b>

**Auxiliary Generator Usage per Ship Visit**

Shipcalls (vessels/yr)	Vessel Type	Auxiliary kW per Vessel	Load Factor	Hours/visit	kW-Hrs/Visit	AMP Reduction	AMPed kW-Hr per year
24.0	Aframax	3,600	28%	1.0	3,600	0.15	73,440
46.0	VLCC	3,600	28%	1.0	3,600	0.15	140,760
10.0	Panamax	3,600	28%	1.0	3,600	0.15	30,600
52.0	Suezmax	3,600	28%	1.0	3,600	0.15	159,120

**TOTAL**  
AMPed kW-Hr per year **403,920**

Total AMPed kW-Hr per year **8,552,088**

GHG Emissions from AMPed Electricity	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O
	Emission Factors		
Lb/MW-Hrs	804.54	0.0037	0.01
Project Year	Pounds Per Year		
2010	6,880,497	32	57

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Mit.GHG.2015-7. 2015 Reduced Project Alternative Summary of Berth Operations Average Daily Mitigated GHG Emissions.

No AMP

Mode	Equipment	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
Berth Operations	Boiler	0.1976	20044.12	2.7639
Berth Operations	Aux Generator	0.0643	7264.2442	0.9578

Mitigated Emissions with AMP - Year 2015

AMP Reduction 15%

Berth Operations	Boiler	0.1976	20044.12	2.7639
Berth Operations	Aux Generator	0.0546	6174.61	0.8142

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Mit.GHG.2025-1. 2025 Reduced Project Alternative Main Engines Average Daily Mitigated GHG Emissions.

Ship	Direction	Mode	Distance (nautical miles)	Ship speed (knots)	Activity (hours)	Maximum Speed (knots)	Load Factor	MCR (kW)	Energy (kW-hr)	Annual Shipcalls (vessels/yr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
VLCC	North In	Cruising - CW to VSR	22	12	1.83	16.9	0.358	25,400	16,671	46.0	0.0058	588.00	0.0811	0.0044	450.91	0.0622
		Cruising - VSR to PZ	21	12	1.75	16.9	0.358	25,400	15,913	46.0	0.0058	588.00	0.0811	0.0042	430.42	0.0594
		Cruising - PZ to Pilot	4.7	7	0.67	16.9	0.071	25,400	1,212	46.0	0.0058	588.00	0.0811	0.0003	32.78	0.0045
		Maneuvering - Pilot to Berth		3	1.00	16.9	0.006	25,400	142	46.0	0.0064	647.00	0.0895	0.0000	4.23	0.0006
		<b>TOTAL</b>								<b>0.0238</b>	<b>2411.00</b>	<b>0.3328</b>	<b>0.0091</b>	<b>918.34</b>	<b>0.1267</b>	
	North Out	Maneuvering - Berth to Pilot		5	1.00	16.9	0.026	25,400	658	46.0	0.0064	647.00	0.0895	0.0002	19.58	0.0027
		Cruising - Pilot to PZ	3.8	7	0.54	16.9	0.071	25,400	980	46.0	0.0058	588.00	0.0811	0.0003	26.50	0.0037
		Cruising - PZ to VSR	21	12	1.75	16.9	0.358	25,400	15,913	46.0	0.0058	588.00	0.0811	0.0042	430.42	0.0594
		Cruising - VSR to CW	22	12	1.83	16.9	0.358	25,400	16,671	46.0	0.0058	588.00	0.0811	0.0044	450.91	0.0622
		<b>TOTAL</b>								<b>0.0238</b>	<b>2411.00</b>	<b>0.3328</b>	<b>0.0091</b>	<b>927.41</b>	<b>0.1279</b>	
AFRAMAX	South In	Cruising - CW to VSR	23	12	1.92	16.1	0.414	12,477	9,902	24.0	0.0058	588.00	0.0811	0.0014	139.74	0.0193
		Cruising - VSR to PZ	11	12	0.92	16.1	0.414	12,477	4,736	24.0	0.0058	588.00	0.0811	0.0007	66.83	0.0092
		Cruising - PZ to Pilot	4.7	7	0.67	16.1	0.082	12,477	689	24.0	0.0058	588.00	0.0811	0.0001	9.72	0.0013
		Maneuvering - Pilot to Berth		3	1.00	16.1	0.006	12,477	81	24.0	0.0064	647.00	0.0895	0.0000	1.25	0.0002
		<b>TOTAL</b>								<b>0.0238</b>	<b>2411.00</b>	<b>0.3328</b>	<b>0.0021</b>	<b>217.54</b>	<b>0.0300</b>	
	South Out	Maneuvering - Berth to Pilot		5	1.00	16.1	0.030	12,477	374	24.0	0.0064	647.00	0.0895	0.0001	5.80	0.0008
		Cruising - Pilot to PZ	3.5	7	0.50	16.1	0.082	12,477	513	24.0	0.0058	588.00	0.0811	0.0001	7.24	0.0010
		Cruising - PZ to VSR	12.5	12	1.04	16.1	0.414	12,477	5,382	24.0	0.0058	588.00	0.0811	0.0007	75.94	0.0105
		Cruising - VSR to CW	24.5	12	2.04	16.1	0.414	12,477	10,548	24.0	0.0058	588.00	0.0811	0.0015	148.85	0.0205
		<b>TOTAL</b>								<b>0.0238</b>	<b>2411.00</b>	<b>0.3328</b>	<b>0.0023</b>	<b>237.83</b>	<b>0.0328</b>	
PANAMAX	South In	Cruising - CW to VSR	23	12	1.92	15.8	0.438	10,300	8,649	10	0.0058	588.00	0.0811	0.0005	50.85	0.0070
		Cruising - VSR to PZ	11	12	0.92	15.8	0.438	10,300	4,136	10	0.0058	588.00	0.0811	0.0002	24.32	0.0034
		Cruising - PZ to Pilot	4.7	7	0.67	15.8	0.087	10,300	601	10	0.0058	588.00	0.0811	0.0000	3.54	0.0005
		Maneuvering - Pilot to Berth		3	1.00	15.8	0.007	10,300	71	10	0.0064	647.00	0.0895	0.0000	0.46	0.0001
		<b>TOTAL</b>								<b>0.0238</b>	<b>2411.00</b>	<b>0.3328</b>	<b>0.0008</b>	<b>79.17</b>	<b>0.0109</b>	
	South Out	Maneuvering - Berth to Pilot		5	1.00	15.8	0.032	10,300	326	10	0.0064	647.00	0.0895	0.0000	2.11	0.0003
		Cruising - Pilot to PZ	3.5	7	0.50	15.8	0.087	10,300	448	10	0.0058	588.00	0.0811	0.0000	2.63	0.0004
		Cruising - PZ to VSR	12.5	12	1.04	15.8	0.438	10,300	4,700	10	0.0058	588.00	0.0811	0.0003	27.64	0.0038
		Cruising - VSR to CW	24.5	12	2.04	15.8	0.438	10,300	9,213	10	0.0058	588.00	0.0811	0.0005	54.17	0.0075
		<b>TOTAL</b>								<b>0.0238</b>	<b>2411.00</b>	<b>0.3328</b>	<b>0.0009</b>	<b>86.56</b>	<b>0.0119</b>	
SUEZMAX	North In	Cruising - CW to VSR	22	12	1.83	17	0.352	16,000	10,317	52	0.0058	588.00	0.0811	0.0031	315.46	0.0435
		Cruising - VSR to PZ	21	12	1.75	17	0.352	16,000	9,848	52	0.0058	588.00	0.0811	0.0030	301.12	0.0415
		Cruising - PZ to Pilot	4.7	7	0.67	17	0.070	16,000	750	52	0.0058	588.00	0.0811	0.0002	22.93	0.0032
		Maneuvering - Pilot to Berth		3	1.00	17	0.005	16,000	88	52	0.0064	647.00	0.0895	0.0000	2.96	0.0004
		<b>TOTAL</b>								<b>0.0238</b>	<b>2411.00</b>	<b>0.3328</b>	<b>0.0063</b>	<b>642.46</b>	<b>0.0886</b>	
	North Out	Maneuvering - Berth to Pilot		5	1.00	17	0.025	16,000	407	52	0.0064	647.00	0.0895	0.0001	13.70	0.0019
		Cruising - Pilot to PZ	3.8	7	0.54	17	0.070	16,000	606	52	0.0058	588.00	0.0811	0.0002	18.54	0.0026
		Cruising - PZ to VSR	21	12	1.75	17	0.352	16,000	9,848	52	0.0058	588.00	0.0811	0.0030	301.12	0.0415
		Cruising - VSR to CW	22	12	1.83	17	0.352	16,000	10,317	52	0.0058	588.00	0.0811	0.0031	315.46	0.0435
		<b>TOTAL</b>								<b>0.0238</b>	<b>2411.00</b>	<b>0.3328</b>	<b>0.0064</b>	<b>648.81</b>	<b>0.0895</b>	
<b>GRAND</b>																
<b>TOTAL</b>											<b>0.1904</b>	<b>19288.00</b>	<b>2.6624</b>	<b>0.0371</b>	<b>3758.12</b>	<b>0.5184</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Mit.GHG.2025-2. 2025 Reduced Project Alternative Auxiliary Generator Average Daily Mitigated GHG Emissions

Ship	Direction	Mode	Activity (hours)	MCR (kW)	Load Factor	Energy (kW-hr)	Annual Shipcalls (vessels/yr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)	
VLCC	North In	Cruising	4.25	3,600	0.280	4,289	46.0	0.0068	690.00	0.0952	0.0013	136.13	0.0188	
		Maneuvering	2.00	3,600	0.280	2,016	46.0	0.0068	690.00	0.0952	0.0006	63.99	0.0088	
	North Out	Maneuvering	1.50	3,600	0.280	1,512	46.0	0.0068	690.00	0.0952	0.0005	47.99	0.0066	
		Cruising	4.13	3,600	0.280	4,159	46.0	0.0068	690.00	0.0952	0.0013	132.01	0.0182	
							<b>TOTAL</b>	<b>0.0136</b>	<b>1380.00</b>	<b>0.1904</b>	<b>0.0020</b>	<b>200.11</b>	<b>0.0276</b>	
AFRAMAX	South In	Cruising	3.50	3,600	0.280	3,533	24.0	0.0068	690.00	0.0952	0.0006	58.50	0.0081	
		Maneuvering	2.00	3,600	0.280	2,016	24.0	0.0068	690.00	0.0952	0.0003	33.38	0.0046	
	South Out	Maneuvering	1.50	3,600	0.278	1,501	24.0	0.0068	690.00	0.0952	0.0002	24.86	0.0034	
		Cruising	3.58	3,600	0.278	3,586	24.0	0.0068	690.00	0.0952	0.0006	59.39	0.0082	
								<b>TOTAL</b>	<b>0.0136</b>	<b>1380.00</b>	<b>0.1904</b>	<b>0.0018</b>	<b>180.00</b>	<b>0.0248</b>
								<b>TOTAL</b>	<b>0.0136</b>	<b>1380.00</b>	<b>0.1904</b>	<b>0.0009</b>	<b>91.89</b>	<b>0.0127</b>
PANAMAX	South In	Cruising	3.50	3,600	0.28	3,533	10	0.0068	690.00	0.0952	0.0002	24.38	0.0034	
		Maneuvering	2.00	3,600	0.28	2,016	10	0.0068	690.00	0.0952	0.0001	13.91	0.0019	
	South Out	Maneuvering	1.5	3,600	0.28	1,512	10	0.0068	690.00	0.0952	0.0001	10.43	0.0014	
		Cruising	3.58	3,600	0.28	3,612	10	0.0068	690.00	0.0952	0.0002	24.92	0.0034	
								<b>TOTAL</b>	<b>0.0136</b>	<b>1380.00</b>	<b>0.1904</b>	<b>0.0004</b>	<b>38.29</b>	<b>0.0053</b>
								<b>TOTAL</b>	<b>0.0136</b>	<b>1380.00</b>	<b>0.1904</b>	<b>0.0003</b>	<b>35.36</b>	<b>0.0049</b>
SUEZMAX	North In	Cruising	4.25	3,600	0.28	4,289	52	0.0068	690.00	0.0952	0.0015	153.88	0.0212	
		Maneuvering	2.00	3,600	0.28	2,016	52	0.0068	690.00	0.0952	0.0007	72.33	0.0100	
	North Out	Maneuvering	1.5	3,600	0.28	1,512	52	0.0068	690.00	0.0952	0.0005	54.25	0.0075	
		Cruising	4.13	3,600	0.28	4,159	52	0.0068	690.00	0.0952	0.0015	149.23	0.0206	
								<b>TOTAL</b>	<b>0.0136</b>	<b>1380.00</b>	<b>0.1904</b>	<b>0.0022</b>	<b>226.22</b>	<b>0.0312</b>
								<b>TOTAL</b>	<b>0.0136</b>	<b>1380.00</b>	<b>0.1904</b>	<b>0.0015</b>	<b>149.23</b>	<b>0.0206</b>
<b>TOTAL</b>								<b>0.0136</b>	<b>1380.00</b>	<b>0.1904</b>	<b>0.0020</b>	<b>203.48</b>	<b>0.0281</b>	
<b>GRAND TOTAL</b>								<b>0.1088</b>	<b>11040.00</b>	<b>1.5232</b>	<b>0.0104</b>	<b>1059.59</b>	<b>0.1462</b>	

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Mit.GHG.2025-3. 2025 Reduced Project Alternative Summary of Average Daily Mitigated Vessel GHG Emissions.

Mode	Equipment	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
Cruising	Main Engines	0.0366	3708.04	0.5114
Cruising	Aux Generator	0.0073	738.44	0.1019
Maneuvering	Main Engines	0.0005	50.08	0.0069
Maneuvering	Aux Generator	0.0032	321.15	0.0443
<b>Maneuvering</b>	<b>TOTAL</b>	<b>0.0037</b>	<b>371.24</b>	<b>0.0512</b>
<b>Propulsion</b>				
	<b>TOTAL</b>	<b>0.0475</b>	<b>4,817.72</b>	<b>0.6646</b>

Mode	Equipment	N <sub>2</sub> O Emissions (tons/day)	CO <sub>2</sub> Emissions (tons/day)	CH <sub>4</sub> Emissions (tons/day)
Cruising	Main Engines	1.00E-04	10.16	1.40E-03
Cruising	Aux Generator	1.99E-05	2.02	2.79E-04
Maneuvering	Main Engines	1.36E-06	0.14	1.90E-05
Maneuvering	Aux Generator	8.67E-06	0.88	1.21E-04
<b>Maneuvering</b>	<b>TOTAL</b>	<b>1.00E-05</b>	<b>1.02</b>	<b>1.40E-04</b>
<b>Propulsion</b>				
	<b>TOTAL</b>	<b>1.30E-04</b>	<b>13.20</b>	<b>1.82E-03</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Mit.GHG.2025-4. 2025 Reduced Project Alternative Boiler Warm-Up Average Daily Mitigated GHG Emissions.

Shipcalls (vessels/year)	Vessel Size	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	Fuel Consumption (gal/yr)	N <sub>2</sub> O Emission Factor (lb/ton)	CO <sub>2</sub> Emission Factor (lb/ton)	CH <sub>4</sub> Emission Factor (lb/ton)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
24.0	Aframax	0.20	102.17	30%	3	50,000	48,978	0.0068	690.00	0.0952	0.0005	48.92	0.0068
46.0	VLCC	0.20	80.38	30%	3	90,000	132,932	0.0068	690.00	0.0952	0.0013	132.79	0.0183
10	Panamax	0.20	59.91	30%	3	35,000	6,980	0.0068	690.00	0.0952	0.0001	6.97	0.0010
52	Suezmax	0.20	82.85	30%	3	70,000	100,391	0.0068	690.00	0.0952	0.0010	100.28	0.0138
<b>TOTAL</b>								<b>0.0272</b>	<b>2,760.00</b>	<b>0.3808</b>	<b>0.0028</b>	<b>288.97</b>	<b>0.0399</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Mit.GHG.2025-5. 2025 Reduced Project Alternative Summary of Boiler Warm-Up Average Daily Mitigated GHG Emissions.

<b>Mode</b>	<b>Equipment</b>	<b>N<sub>2</sub>O Emissions (tons/yr)</b>	<b>CO<sub>2</sub> Emissions (tons/yr)</b>	<b>CH<sub>4</sub> Emissions (tons/yr)</b>
Boiler Warm-up	Boiler	0.0028	288.97	0.0399

Table H.2.RPA.Mit.GHG.2025-6. 2025 Reduced Project Alternative Berth Operations Average Daily Mitigated GHG Emissions.

**Auxiliary Generator Pre-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	Energy (MMBtu)	Heating Value (MMBtu/1000 gal)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
24.0	Aframax	700,000	0.20	3,600	28%	2.5	8.5	150	0.0064	722.0	0.0952	0.0014	155.95	0.0206
46.0	VLCC	2,000,000	0.20	3,600	28%	2.5	8.5	150	0.0064	722.0	0.0952	0.0026	298.91	0.0394
10.0	Panamax	350,000	0.20	3,600	28%	2.5	8.6	150	0.0064	722.0	0.0952	0.0006	64.98	0.0086
52.0	Suezmax	1,000,000	0.20	3,600	28%	2.5	8.6	150	0.0064	722.0	0.0952	0.0030	337.90	0.0446
<b>TOTAL</b>												<b>0.0075</b>	<b>857.74</b>	<b>0.1131</b>

**Boiler Pre-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	Fuel Consumption (gal/yr)	N <sub>2</sub> O Emission Factor (lb/ton)	CO <sub>2</sub> Emission Factor (lb/ton)	CH <sub>4</sub> Emission Factor (lb/ton)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
24.0	Aframax	700,000	0.20	102.17	30%	2.5	50,000	40,815	0.0627	6,360.0	0.8770	0.0037	375.80	0.0518
46.0	VLCC	2,000,000	0.20	80.38	30%	2.5	90,000	110,777	0.0627	6,360.0	0.8770	0.0101	1019.96	0.1406
10.0	Panamax	350,000	0.20	59.91	30%	2.5	35,000	6,980	0.0627	6,360.0	0.8770	0.0006	64.27	0.0089
52.0	Suezmax	1,000,000	0.20	82.85	30%	2.5	70,000	100,391	0.0627	6,360.0	0.8770	0.0091	924.33	0.1275
<b>TOTAL</b>												<b>0.0235</b>	<b>2384.37</b>	<b>0.3288</b>

**Auxiliary Generator Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	Energy (MMBtu)	Heating Value (MMBtu/1000 gal)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
24.0	Aframax	700,000	0.20	3,600	56%	15.0	102.4	140	0.0064	722.0	0.0952	0.0082	935.71	0.1234
46.0	VLCC	2,000,000	0.20	3,600	56%	23.2	158.4	140	0.0064	722.0	0.0952	0.0246	2773.87	0.3658
10.0	Panamax	350,000	0.20	3,600	56%	11.0	75.7	140	0.0064	722.0	0.0952	0.0025	285.91	0.0377
52.0	Suezmax	1,000,000	0.20	3,600	56%	15.3	105.2	140	0.0064	722.0	0.0952	0.0183	2067.92	0.2727
<b>TOTAL</b>												<b>0.0537</b>	<b>6063.41</b>	<b>0.7995</b>

**Boiler Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Inerting Fuel Consumption Savings (lb/1000 bbl offloaded)	Activity Time (hr)	Pumping Rate (bbl/hr)	Fuel Consumption (gal/yr)	N <sub>2</sub> O Emission Factor (lb/ton)	CO <sub>2</sub> Emission Factor (lb/ton)	CH <sub>4</sub> Emission Factor (lb/ton)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
24.0	Aframax	700,000	0.20	102.17	28.06	15.0	50,000	244,891	0.0627	6,360.0	0.8770	0.0222	2254.80	0.3109
46.0	VLCC	2,000,000	0.20	80.38	28.06	23.2	90,000	1,028,008	0.0627	6,360.0	0.8770	0.0933	9465.24	1.3052
10.0	Panamax	350,000	0.20	59.91	28.06	11.0	35,000	30,713	0.0627	6,360.0	0.8770	0.0028	282.78	0.0390
52.0	Suezmax	1,000,000	0.20	82.85	28.06	15.3	70,000	614,392	0.0627	6,360.0	0.8770	0.0558	5656.93	0.7801
<b>TOTAL</b>												<b>0.1741</b>	<b>17659.75</b>	<b>2.4352</b>

**Auxiliary Generator Post-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	Energy (MMBtu)	Heating Value (MMBtu/1000 gal)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
24.0	Aframax	700,000	0.20	3,600	28%	1.0	3.4	150	0.0064	722.0	0.0952	0.0005	62.38	0.0082
46.0	VLCC	2,000,000	0.20	3,600	28%	1.0	3.4	150	0.0064	722.0	0.0952	0.0011	119.56	0.0158
10.0	Panamax	350,000	2.70	3,600	28%	1.0	3.4	150	0.0064	722.0	0.0952	0.0002	25.99	0.0034
52.0	Suezmax	1,000,000	2.70	3,600	28%	1.0	3.4	150	0.0064	722.0	0.0952	0.0012	135.16	0.0178
<b>TOTAL</b>												<b>0.0030</b>	<b>343.09</b>	<b>0.0452</b>



**Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR**

**Table H.2.RPA.Mit.GHG.2025-7. 2025 Reduced Project Alternative Summary of Berth Operations Average Daily Mitigated GHG Emissions.**

**No AMP**

<b>Mode</b>	<b>Equipment</b>	<b>N<sub>2</sub>O Emissions (tons/yr)</b>	<b>CO<sub>2</sub> Emissions (tons/yr)</b>	<b>CH<sub>4</sub> Emissions (tons/yr)</b>
Berth Operations	Boiler	0.1976	20044.12	2.7639
Berth Operations	Aux Generator	0.0643	7264.2442	0.9578

**Mitigated Emissions with AMP - Year 2025**

AMP Reduction            40%

Berth Operations	Boiler	0.1976	20044.12	2.7639
Berth Operations	Aux Generator	0.0386	4358.55	0.5747

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Mit.GHG.2040-1. 2040 Reduced Project Alternative Main Engines Average Daily Mitigated GHG Emissions.

Ship	Direction	Mode	Distance (nautical miles)	Ship speed (knots)	Activity (hours)	Maximum Speed (knots)	Load Factor	MCR (kW)	Energy (kW-hr)	Annual Shipcalls (vessels/yr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
VLCC	North In	Cruising - CW to VSR	22	12	1.83	16.9	0.358	25,400	16,671	46.0	0.0058	588.00	0.0811	0.0044	450.91	0.0622
		Cruising - VSR to PZ	21	12	1.75	16.9	0.358	25,400	15,913	46.0	0.0058	588.00	0.0811	0.0042	430.42	0.0594
		Cruising - PZ to Pilot	4.7	7	0.67	16.9	0.071	25,400	1,212	46.0	0.0058	588.00	0.0811	0.0003	32.78	0.0045
		Maneuvering - Pilot to Berth		3	1.00	16.9	0.006	25,400	142	46.0	0.0064	647.00	0.0895	0.0000	4.23	0.0006
		<b>TOTAL</b>								<b>0.0238</b>	<b>2411.00</b>	<b>0.3328</b>	<b>0.0091</b>	<b>918.34</b>	<b>0.1267</b>	
	North Out	Maneuvering - Berth to Pilot		5	1.00	16.9	0.026	25,400	658	46.0	0.0064	647.00	0.0895	0.0002	19.58	0.0027
		Cruising - Pilot to PZ	3.8	7	0.54	16.9	0.071	25,400	980	46.0	0.0058	588.00	0.0811	0.0003	26.50	0.0037
		Cruising - PZ to VSR	21	12	1.75	16.9	0.358	25,400	15,913	46.0	0.0058	588.00	0.0811	0.0042	430.42	0.0594
		Cruising - VSR to CW	22	12	1.83	16.9	0.358	25,400	16,671	46.0	0.0058	588.00	0.0811	0.0044	450.91	0.0622
		<b>TOTAL</b>								<b>0.0238</b>	<b>2411.00</b>	<b>0.3328</b>	<b>0.0091</b>	<b>927.41</b>	<b>0.1279</b>	
AFRAMAX	South In	Cruising - CW to VSR	23	12	1.92	16.1	0.414	12,477	9,902	24.0	0.0058	588.00	0.0811	0.0014	139.74	0.0193
		Cruising - VSR to PZ	11	12	0.92	16.1	0.414	12,477	4,736	24.0	0.0058	588.00	0.0811	0.0007	66.83	0.0092
		Cruising - PZ to Pilot	4.7	7	0.67	16.1	0.082	12,477	689	24.0	0.0058	588.00	0.0811	0.0001	9.72	0.0013
		Maneuvering - Pilot to Berth		3	1.00	16.1	0.006	12,477	81	24.0	0.0064	647.00	0.0895	0.0000	1.25	0.0002
		<b>TOTAL</b>								<b>0.0238</b>	<b>2411.00</b>	<b>0.3328</b>	<b>0.0021</b>	<b>217.54</b>	<b>0.0300</b>	
	South Out	Maneuvering - Berth to Pilot		5	1.00	16.1	0.030	12,477	374	24.0	0.0064	647.00	0.0895	0.0001	5.80	0.0008
		Cruising - Pilot to PZ	3.5	7	0.50	16.1	0.082	12,477	513	24.0	0.0058	588.00	0.0811	0.0001	7.24	0.0010
		Cruising - PZ to VSR	12.5	12	1.04	16.1	0.414	12,477	5,382	24.0	0.0058	588.00	0.0811	0.0007	75.94	0.0105
		Cruising - VSR to CW	24.5	12	2.04	16.1	0.414	12,477	10,548	24.0	0.0058	588.00	0.0811	0.0015	148.85	0.0205
		<b>TOTAL</b>								<b>0.0238</b>	<b>2411.00</b>	<b>0.3328</b>	<b>0.0023</b>	<b>237.83</b>	<b>0.0328</b>	
PANAMAX	South In	Cruising - CW to VSR	23	12	1.92	15.8	0.438	10,300	8,649	10	0.0058	588.00	0.0811	0.0005	50.85	0.0070
		Cruising - VSR to PZ	11	12	0.92	15.8	0.438	10,300	4,136	10	0.0058	588.00	0.0811	0.0002	24.32	0.0034
		Cruising - PZ to Pilot	4.7	7	0.67	15.8	0.087	10,300	601	10	0.0058	588.00	0.0811	0.0000	3.54	0.0005
		Maneuvering - Pilot to Berth		3	1.00	15.8	0.007	10,300	71	10	0.0064	647.00	0.0895	0.0000	0.46	0.0001
		<b>TOTAL</b>								<b>0.0238</b>	<b>2411.00</b>	<b>0.3328</b>	<b>0.0008</b>	<b>79.17</b>	<b>0.0109</b>	
	South Out	Maneuvering - Berth to Pilot		5	1.00	15.8	0.032	10,300	326	10	0.0064	647.00	0.0895	0.0000	2.11	0.0003
		Cruising - Pilot to PZ	3.5	7	0.50	15.8	0.087	10,300	448	10	0.0058	588.00	0.0811	0.0000	2.63	0.0004
		Cruising - PZ to VSR	12.5	12	1.04	15.8	0.438	10,300	4,700	10	0.0058	588.00	0.0811	0.0003	27.64	0.0038
		Cruising - VSR to CW	24.5	12	2.04	15.8	0.438	10,300	9,213	10	0.0058	588.00	0.0811	0.0005	54.17	0.0075
		<b>TOTAL</b>								<b>0.0238</b>	<b>2411.00</b>	<b>0.3328</b>	<b>0.0009</b>	<b>86.56</b>	<b>0.0119</b>	
SUEZMAX	North In	Cruising - CW to VSR	22	12	1.83	17	0.352	16,000	10,317	52	0.0058	588.00	0.0811	0.0031	315.46	0.0435
		Cruising - VSR to PZ	21	12	1.75	17	0.352	16,000	9,848	52	0.0058	588.00	0.0811	0.0030	301.12	0.0415
		Cruising - PZ to Pilot	4.7	7	0.67	17	0.070	16,000	750	52	0.0058	588.00	0.0811	0.0002	22.93	0.0032
		Maneuvering - Pilot to Berth		3	1.00	17	0.005	16,000	88	52	0.0064	647.00	0.0895	0.0000	2.96	0.0004
		<b>TOTAL</b>								<b>0.0238</b>	<b>2411.00</b>	<b>0.3328</b>	<b>0.0063</b>	<b>642.46</b>	<b>0.0886</b>	
	North Out	Maneuvering - Berth to Pilot		5	1.00	17	0.025	16,000	407	52	0.0064	647.00	0.0895	0.0001	13.70	0.0019
		Cruising - Pilot to PZ	3.8	7	0.54	17	0.070	16,000	606	52	0.0058	588.00	0.0811	0.0002	18.54	0.0026
		Cruising - PZ to VSR	21	12	1.75	17	0.352	16,000	9,848	52	0.0058	588.00	0.0811	0.0030	301.12	0.0415
		Cruising - VSR to CW	22	12	1.83	17	0.352	16,000	10,317	52	0.0058	588.00	0.0811	0.0031	315.46	0.0435
		<b>TOTAL</b>								<b>0.0238</b>	<b>2411.00</b>	<b>0.3328</b>	<b>0.0064</b>	<b>648.81</b>	<b>0.0895</b>	
<b>GRAND</b>																
<b>TOTAL</b>											<b>0.1904</b>	<b>19288.00</b>	<b>2.6624</b>	<b>0.0371</b>	<b>3758.12</b>	<b>0.5184</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Mit.GHG.2040-2. 2040 Reduced Project Alternative Auxiliary Generator Average Daily Mitigated GHG Emissions

Ship	Direction	Mode	Activity (hours)	MCR (kW)	Load Factor	Energy (kW-hr)	Annual Shipcalls (vessels/yr)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)	
VLCC	North In	Cruising	4.25	3,600	0.280	4,289	46.0	0.0068	690.00	0.0952	0.0013	136.13	0.0188	
		Maneuvering	2.00	3,600	0.280	2,016	46.0	0.0068	690.00	0.0952	0.0006	63.99	0.0088	
	North Out	Maneuvering	1.50	3,600	0.280	1,512	46.0	0.0068	690.00	0.0952	0.0005	47.99	0.0066	
		Cruising	4.13	3,600	0.280	4,159	46.0	0.0068	690.00	0.0952	0.0013	132.01	0.0182	
							<b>TOTAL</b>	<b>0.0136</b>	<b>1380.00</b>	<b>0.1904</b>	<b>0.0020</b>	<b>200.11</b>	<b>0.0276</b>	
AFRAMAX	South In	Cruising	3.50	3,600	0.280	3,533	24.0	0.0068	690.00	0.0952	0.0006	58.50	0.0081	
		Maneuvering	2.00	3,600	0.280	2,016	24.0	0.0068	690.00	0.0952	0.0003	33.38	0.0046	
	South Out	Maneuvering	1.50	3,600	0.278	1,501	24.0	0.0068	690.00	0.0952	0.0002	24.86	0.0034	
		Cruising	3.58	3,600	0.278	3,586	24.0	0.0068	690.00	0.0952	0.0006	59.39	0.0082	
								<b>TOTAL</b>	<b>0.0136</b>	<b>1380.00</b>	<b>0.1904</b>	<b>0.0018</b>	<b>180.00</b>	<b>0.0248</b>
								<b>TOTAL</b>	<b>0.0136</b>	<b>1380.00</b>	<b>0.1904</b>	<b>0.0009</b>	<b>91.89</b>	<b>0.0127</b>
PANAMAX	South In	Cruising	3.50	3,600	0.28	3,533	10	0.0068	690.00	0.0952	0.0002	24.38	0.0034	
		Maneuvering	2.00	3,600	0.28	2,016	10	0.0068	690.00	0.0952	0.0001	13.91	0.0019	
	South Out	Maneuvering	1.5	3,600	0.28	1,512	10	0.0068	690.00	0.0952	0.0001	10.43	0.0014	
		Cruising	3.58	3,600	0.28	3,612	10	0.0068	690.00	0.0952	0.0002	24.92	0.0034	
								<b>TOTAL</b>	<b>0.0136</b>	<b>1380.00</b>	<b>0.1904</b>	<b>0.0004</b>	<b>38.29</b>	<b>0.0053</b>
								<b>TOTAL</b>	<b>0.0136</b>	<b>1380.00</b>	<b>0.1904</b>	<b>0.0003</b>	<b>35.36</b>	<b>0.0049</b>
SUEZMAX	North In	Cruising	4.25	3,600	0.28	4,289	52	0.0068	690.00	0.0952	0.0015	153.88	0.0212	
		Maneuvering	2.00	3,600	0.28	2,016	52	0.0068	690.00	0.0952	0.0007	72.33	0.0100	
	North Out	Maneuvering	1.5	3,600	0.28	1,512	52	0.0068	690.00	0.0952	0.0005	54.25	0.0075	
		Cruising	4.13	3,600	0.28	4,159	52	0.0068	690.00	0.0952	0.0015	149.23	0.0206	
								<b>TOTAL</b>	<b>0.0136</b>	<b>1380.00</b>	<b>0.1904</b>	<b>0.0022</b>	<b>226.22</b>	<b>0.0312</b>
								<b>TOTAL</b>	<b>0.0136</b>	<b>1380.00</b>	<b>0.1904</b>	<b>0.0015</b>	<b>149.23</b>	<b>0.0206</b>
<b>TOTAL</b>								<b>0.0136</b>	<b>1380.00</b>	<b>0.1904</b>	<b>0.0020</b>	<b>203.48</b>	<b>0.0281</b>	
<b>GRAND TOTAL</b>								<b>0.1088</b>	<b>11040.00</b>	<b>1.5232</b>	<b>0.0104</b>	<b>1059.59</b>	<b>0.1462</b>	

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Mit.GHG.2040-3. 2040 Reduced Project Alternative Summary of Average Daily Mitigated Vessel GHG Emissions.

Mode	Equipment	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
Cruising	Main Engines	0.0366	3708.04	0.5114
Cruising	Aux Generator	0.0073	738.44	0.1019
Maneuvering	Main Engines	0.0005	50.08	0.0069
Maneuvering	Aux Generator	0.0032	321.15	0.0443
<b>Maneuvering</b>	<b>TOTAL</b>	<b>0.0037</b>	<b>371.24</b>	<b>0.0512</b>
<b>Propulsion</b>	<b>TOTAL</b>	<b>0.0475</b>	<b>4817.72</b>	<b>0.6646</b>

Mode	Equipment	N <sub>2</sub> O Emissions (tons/day)	CO <sub>2</sub> Emissions (tons/day)	CH <sub>4</sub> Emissions (tons/day)
Cruising	Main Engines	1.00E-04	10.16	1.40E-03
Cruising	Aux Generator	1.99E-05	2.02	2.79E-04
Maneuvering	Main Engines	1.36E-06	0.14	1.90E-05
Maneuvering	Aux Generator	8.67E-06	0.88	1.21E-04
<b>Maneuvering</b>	<b>TOTAL</b>	<b>1.00E-05</b>	<b>1.02</b>	<b>1.40E-04</b>
<b>Propulsion</b>	<b>TOTAL</b>	<b>1.30E-04</b>	<b>13.20</b>	<b>1.82E-03</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Mit.GHG.2040-4. 2040 Reduced Project Alternative Boiler Warm-Up Average Daily Mitigated GHG Emissions.

Shipcalls (vessels/ yr)	Vessel Size	Sulfur Content (%)	Fuel Consump tion (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	Fuel Consump tion (gal/yr)	N <sub>2</sub> O Emission Factor (lb/ton)	CO <sub>2</sub> Emission Factor (lb/ton)	CH <sub>4</sub> Emission Factor (lb/ton)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
24.0	Aframax	0.20	102.17	30%	3	50,000	48,978	0.0068	690.00	0.0952	0.0005	48.92	0.0068
46.0	VLCC	0.20	80.38	30%	3	90,000	132,932	0.0068	690.00	0.0952	0.0013	132.79	0.0183
10	Panamax	0.20	59.91	30%	3	35,000	6,980	0.0068	690.00	0.0952	0.0001	6.97	0.0010
52	Suezmax	0.20	82.85	30%	3	70,000	100,391	0.0068	690.00	0.0952	0.0010	100.28	0.0138
<b>TOTAL</b>								<b>0.0272</b>	<b>2,760.00</b>	<b>0.3808</b>	<b>0.0028</b>	<b>288.97</b>	<b>0.0399</b>

**Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR**

**Table H.2.RPA.Mit.GHG.2040-5. 2040 Reduced Project Alternative Summary of Boiler Warm-Up Average Daily Mitigated GHG Emissions.**

<b>Mode</b>	<b>Equipment</b>	<b>N<sub>2</sub>O Emissions (tons/yr)</b>	<b>CO<sub>2</sub> Emissions (tons/yr)</b>	<b>CH<sub>4</sub> Emissions (tons/yr)</b>
Boiler Warm-up	Boiler	0.0028	288.97	0.0399

Table H.2.RPA.Mit.GHG.2040-6. 2040 Reduced Project Alternative Berth Operations Average Daily Mitigated GHG Emissions.

**Auxiliary Generator Pre-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	Energy (MMBtu)	Heating Value (MMBtu/1000 gal)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
24.0	Aframax	700,000	Dist at 0.2	0.20	3,600	28%	2.5	8.5	150	0.0064	722.0	0.0952	0.0014	155.95	0.0206
46.0	VLCC	2,000,000	Dist at 0.2	0.20	3,600	28%	2.5	8.5	150	0.0064	722.0	0.0952	0.0026	298.91	0.0394
10.0	Panamax	350,000	Dist at 0.2	0.20	3,600	28%	2.5	8.6	150	0.0064	722.0	0.0952	0.0006	64.98	0.0086
52	Suezmax	1,000,000	Dist at 0.2	0.20	3,600	28%	2.5	8.6	150	0.0064	722.0	0.0952	0.0030	337.90	0.0446
<b>TOTAL</b>													<b>0.0075</b>	<b>857.74</b>	<b>0.1131</b>

**Boiler Pre-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	Fuel Consumption (gal/yr)	N <sub>2</sub> O Emission Factor (lb/ton)	CO <sub>2</sub> Emission Factor (lb/ton)	CH <sub>4</sub> Emission Factor (lb/ton)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
24.0	Aframax	700,000	Dist at 0.2	0.20	102.17	30%	2.5	50,000	40,815	0.0627	6,360.0	0.8770	0.0037	375.80	0.0518
46.0	VLCC	2,000,000	Dist at 0.2	0.20	80.38	30%	2.5	90,000	110,777	0.0627	6,360.0	0.8770	0.0101	1019.96	0.1406
10.0	Panamax	350,000	Dist at 0.2	0.20	59.91	30%	2.5	35,000	6,980	0.0627	6,360.0	0.8770	0.0006	64.27	0.0089
52.0	Suezmax	1,000,000	Dist at 0.2	0.20	82.85	30%	2.5	70,000	100,391	0.0627	6,360.0	0.8770	0.0091	924.33	0.1275
<b>TOTAL</b>													<b>0.0235</b>	<b>2384.37</b>	<b>0.3288</b>

**Auxiliary Generator Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	Energy (MMBtu)	Heating Value (MMBtu/1000 gal)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
24.0	Aframax	700,000	Dist at 0.2	0.20	3,600	56%	15.0	102.4	140	0.0064	722.0	0.0952	0.0082	935.71	0.1234
46.0	VLCC	2,000,000	Dist at 0.2	0.20	3,600	56%	23.2	158.4	140	0.0064	722.0	0.0952	0.0246	2773.87	0.3658
10.0	Panamax	350,000	Dist at 0.2	0.20	3,600	56%	11.0	75.7	140	0.0064	722.0	0.0952	0.0025	285.91	0.0377
52.0	Suezmax	1,000,000	Dist at 0.2	0.20	3,600	56%	15.3	105.2	140	0.0064	722.0	0.0952	0.0183	2067.92	0.2727
<b>TOTAL</b>													<b>0.0537</b>	<b>6063.41</b>	<b>0.7995</b>

**Boiler Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Inerting Fuel Consumption Savings (lb/1000 bbl offloaded)	Activity Time (hr)	Pumping Rate (bbl/hr)	Fuel Consumption (gal/yr)	N <sub>2</sub> O Emission Factor (lb/ton)	CO <sub>2</sub> Emission Factor (lb/ton)	CH <sub>4</sub> Emission Factor (lb/ton)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
24.0	Aframax	700,000	Dist at 0.2	0.20	102.17	28.06	15.0	50,000	244,891	0.0627	6,360.0	0.8770	0.0222	2254.80	0.3109
46.0	VLCC	2,000,000	Dist at 0.2	0.20	80.38	28.06	23.2	90,000	1,028,008	0.0627	6,360.0	0.8770	0.0933	9465.24	1.3052
10.0	Panamax	350,000	Dist at 0.2	0.20	59.91	28.06	11.0	35,000	30,713	0.0627	6,360.0	0.8770	0.0028	282.78	0.0390
52.0	Suezmax	1,000,000	Dist at 0.2	0.20	82.85	28.06	15.3	70,000	614,392	0.0627	6,360.0	0.8770	0.0558	5656.93	0.7801
<b>TOTAL</b>													<b>0.1741</b>	<b>17659.75</b>	<b>2.4352</b>

**Auxiliary Generator Post-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	Energy (MMBtu)	Heating Value (MMBtu/1000 gal)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
24.0	Aframax	700,000	Dist at 0.2	0.20	3,600	28%	1.0	3.4	150	0.0064	722.0	0.0952	0.0005	62.38	0.0082
46.0	VLCC	2,000,000	Dist at 0.2	0.20	3,600	28%	1.0	3.4	150	0.0064	722.0	0.0952	0.0011	119.56	0.0158
10.0	Panamax	350,000	Dist at 0.2	2.70	3,600	28%	1.0	3.4	150	0.0064	722.0	0.0952	0.0002	25.99	0.0034
52.0	Suezmax	1,000,000	Dist at 0.2	2.70	3,600	28%	1.0	3.4	150	0.0064	722.0	0.0952	0.0012	135.16	0.0178
<b>TOTAL</b>													<b>0.0030</b>	<b>343.09</b>	<b>0.0452</b>

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.Mit.GHG.2040-7. 2040 Reduced Project Alternative Summary of Berth Operations Average Daily Mitigated GHG Emissions.

No AMP

Mode	Equipment	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
Berth Operations	Boiler	0.1976	20044.12	2.7639
Berth Operations	Aux Generator	0.0643	7264.2442	0.9578

Mitigated Emissions with AMP - Year 2040

AMP Reduction 70%

Berth Operations	Boiler	0.1976	20044.12	2.7639
Berth Operations	Aux Generator	0.0193	2179.27	0.2874



**APPENDIX H.2 - SECTION 3.2**  
**GHG EMISSIONS FROM AMP ELECTRICITY**  
**CONSUMPTION**

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Table H.2.PP.Mit.AMP.GHG.2010-1. 2010 Proposed Project Berth Operations Average Daily Mitigated GHG Emissions by AMP Electricity Consumption.

**Auxiliary Generator Pre-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	Energy (MMBtu)	Heating Value (MMBtu/1000 gal)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
32.0	Aframax	700,000	Dist at 0.2%S	0.20	3,600	28%	2.5	8.6	140.0	0.0068	690.0	0.0952	0.0020	198.7200	0.0274
26.0	VLCC	2,000,000	Dist at 0.2%S	0.20	3,600	28%	2.5	8.6	140.0	0.0068	690.0	0.0952	0.0016	161.4600	0.0223
26.0	Panamax	350,000	Dist at 0.2%S	0.20	3,600	28%	2.5	8.6	140.0	0.0068	690.0	0.0952	0.0016	161.4600	0.0223
45.0	Suezmax	1,000,000	Dist at 0.2%S	0.20	3,600	28%	2.5	8.6	140.0	0.0068	690.0	0.0952	0.0028	279.4500	0.0386
<b>TOTAL</b>													<b>0.0079</b>	<b>801.0900</b>	<b>0.1105</b>

**Auxiliary Generator Usage per Ship Visit**

Shipcalls (vessels/yr)	Vessel Type	Auxiliary kW per Vessel	Load Factor	Hours/visit	kW-Hrs/Visit	AMP Reduction	AMPed kW-Hr per year	
32.0	Aframax	3,600	28%	2.5	9,000	---	---	
26.0	VLCC	3,600	28%	2.5	9,000	---	---	
26.0	Panamax	3,600	28%	2.5	9,000	---	---	
45.0	Suezmax	3,600	28%	2.5	9,000	---	---	
<b>TOTAL</b>							<b>AMPed kW-Hr per year</b>	<b>---</b>

**Boiler Pre-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	Fuel Consumption (gal/yr)	N <sub>2</sub> O Emission Factor (lb/ton)	CO <sub>2</sub> Emission Factor (lb/ton)	CH <sub>4</sub> Emission Factor (lb/ton)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
32.0	Aframax	700,000	Dist at 0.2%S	0.20	102.17	30%	2.5	50,000	54,420.2	0.0627	6,360.00	0.8770	0.0049	501.0669	0.0691
26.0	VLCC	2,000,000	Dist at 0.2%S	0.20	80.38	30%	2.5	90,000	62,612.9	0.0627	6,360.00	0.8770	0.0057	576.4998	0.0795
26.0	Panamax	350,000	Dist at 0.2%S	0.20	59.91	30%	2.5	35,000	18,148.5	0.0627	6,360.00	0.8770	0.0016	167.0998	0.0230
45.0	Suezmax	1,000,000	Dist at 0.2%S	0.20	82.85	30%	2.5	70,000	86,876.7	0.0627	6,360.00	0.8770	0.0079	799.9050	0.1103
<b>TOTAL</b>													<b>0.0202</b>	<b>2,044.5715</b>	<b>0.2819</b>

**Auxiliary Generator Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	Energy (MMBtu)	Heating Value (MMBtu/1000 gal)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
32.0	Aframax	700,000	Dist at 0.2%S	0.20	3,600	56%	15.0	102.4	140.0	0.0068	690.0	0.0952	0.0118	1,192.3200	0.1645
26.0	VLCC	2,000,000	Dist at 0.2%S	0.20	3,600	56%	23.2	158.4	140.0	0.0068	690.0	0.0952	0.0148	1,498.3488	0.2067
26.0	Panamax	350,000	Dist at 0.2%S	0.20	3,600	56%	11.0	75.7	140.0	0.0068	690.0	0.0952	0.0070	710.4240	0.0980
45.0	Suezmax	1,000,000	Dist at 0.2%S	0.20	3,600	56%	15.3	105.2	140.0	0.0068	690.0	0.0952	0.0169	1,710.2340	0.2360
<b>TOTAL</b>													<b>0.0504</b>	<b>5,111.3268</b>	<b>0.7052</b>

**Auxiliary Generator Usage per Ship Visit**

Shipcalls (vessels/yr)	Vessel Type	Auxiliary kW per Vessel	Load Factor	Hours/visit	kW-Hrs/Visit	AMP Reduction	AMPed kW-Hr per year	
32.0	Aframax	3,600	56%	15.0	54,000	---	---	
26.0	VLCC	3,600	56%	23.2	83,520	---	---	
26.0	Panamax	3,600	56%	11.0	39,600	---	---	
45.0	Suezmax	3,600	56%	15.3	55,080	---	---	
<b>TOTAL</b>							<b>AMPed kW-Hr per year</b>	<b>---</b>

**Boiler Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Inerting Fuel Consumption Savings (lb/1000 bbl offloaded)	Activity Time (hr)	Pumping Rate (bbl/hr)	Fuel Consumption (gal/yr)	N <sub>2</sub> O Emission Factor (lb/ton)	CO <sub>2</sub> Emission Factor (lb/ton)	CH <sub>4</sub> Emission Factor (lb/ton)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
32.0	Aframax	700,000	Dist at 0.2%S	0.20	102.17	28.06	15.0	50,000	326,521.4	0.0627	6,360.00	0.8770	0.0296	3,006.4013	0.4146
26.0	VLCC	2,000,000	Dist at 0.2%S	0.20	80.38	28.06	23.2	90,000	581,047.9	0.0627	6,360.00	0.8770	0.0527	5,349.9184	0.7377
26.0	Panamax	350,000	Dist at 0.2%S	0.20	59.91	28.06	11.0	35,000	79,853.4	0.0627	6,360.00	0.8770	0.0072	735.2393	0.1014
45.0	Suezmax	1,000,000	Dist at 0.2%S	0.20	82.85	28.06	15.3	70,000	531,685.2	0.0627	6,360.00	0.8770	0.0483	4,895.4184	0.6750
<b>TOTAL</b>													<b>0.1379</b>	<b>13,986.9775</b>	<b>1.9287</b>

**Auxiliary Generator Post-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	Energy (MMBtu)	Heating Value (MMBtu/1000 gal)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
32.0	Aframax	700,000	Dist at 0.2%S	0.20	3,600	28%	1.0	3.4	140.0	0.0068	690.0	0.0952	0.0008	79.4880	0.0110
26.0	VLCC	2,000,000	Dist at 0.2%S	0.20	3,600	28%	1.0	3.4	140.0	0.0068	690.0	0.0952	0.0006	64.5840	0.0089
26.0	Panamax	350,000	Dist at 0.2%S	0.20	3,600	28%	1.0	3.4	140.0	0.0068	690.0	0.0952	0.0006	64.5840	0.0089
45.0	Suezmax	1,000,000	Dist at 0.2%S	0.20	3,600	28%	1.0	3.4	140.0	0.0068	690.0	0.0952	0.0011	111.7900	0.0154
<b>TOTAL</b>													<b>0.0032</b>	<b>320.4360</b>	<b>0.0442</b>

**Auxiliary Generator Usage per Ship Visit**

Shipcalls (vessels/yr)	Vessel Type	Auxiliary kW per Vessel	Load Factor	Hours/visit	kW-Hrs/Visit	AMP Reduction	AMPed kW-Hr per year	
32.0	Aframax	3,600	28%	1.0	3,600	---	---	
26.0	VLCC	3,600	28%	1.0	3,600	---	---	
26.0	Panamax	3,600	28%	1.0	3,600	---	---	
45.0	Suezmax	3,600	28%	1.0	3,600	---	---	
<b>TOTAL</b>							<b>AMPed kW-Hr per year</b>	<b>---</b>
<b>TOTAL</b>							<b>AMPed kW-Hr per year</b>	<b>---</b>

**GHG Emissions from AMPed Electricity**

	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O
	<i>Emission Factors</i>		
Lb/MW-Hrs	804.54	0.0037	0.01
Project Year	<i>Tons Per Year</i>		
2010	---	---	---

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Mit.AMP.GHG.2010-2. 2010 Proposed Project Summary of Berth Operations Average Daily Mitigated GHG Emissions by AMP Electricity Consumption.

Year 2010 (No AMP)

Mode	Equipment	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
Berth Operations	Boiler	0.1580	16031.55	2.2106
Berth Operations	Aux Generator	0.0614	6232.85	0.8600

Table H.2.PP.Mit.AMP.GHG.2015-3. 2015 Proposed Project Berth Operations Average Daily Mitigated GHG Emissions by AMP Electricity Consumption.

**Auxiliary Generator Pre-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	Energy (MMBtu)	Heating Value (MMBtu/1000 gal)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
24.0	Aframax	700,000	Dist at 0.2	0.20	3,600	28%	2.5	8.5	150	0.0064	722.0	0.0952	0.0014	155.95	0.0206
51.0	VLCC	2,000,000	Dist at 0.2	0.20	3,600	28%	2.5	8.5	150	0.0064	722.0	0.0952	0.0023	331.40	0.0437
12.0	Panamax	350,000	Dist at 0.2	0.20	3,600	28%	2.5	8.6	150	0.0064	722.0	0.0952	0.0007	77.98	0.0103
60.0	Suezmax	1,000,000	Dist at 0.2	0.20	3,600	28%	2.5	8.6	150	0.0064	722.0	0.0952	0.0034	389.88	0.0514

TOTAL

0.0084 955.21 0.1259

**Auxiliary Generator Usage per Ship Visit**

Shipcalls (vessels/yr)	Vessel Type	Auxiliary kW per Vessel	Load Factor	Hours/Visit	kW-Hrs/Visit	AMP Reduction	AMPed kW-Hr per year
24.0	Aframax	3,600	28%	2.5	9,000	0.15	183,600
51.0	VLCC	3,600	28%	2.5	9,000	0.15	390,150
12.0	Panamax	3,600	28%	2.5	9,000	0.15	91,800
60.0	Suezmax	3,600	28%	2.5	9,000	0.15	459,000

TOTAL  
AMPed kW-Hr per year 1,124,550

**Boiler Pre-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bb/hr)	Fuel Consumption (gal/yr)	N <sub>2</sub> O Emission Factor (lb/ton)	CO <sub>2</sub> Emission Factor (lb/ton)	CH <sub>4</sub> Emission Factor (lb/ton)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
24.0	Aframax	700,000	Dist at 0.2	0.20	102.17	30%	2.5	50,000	40,815	0.0627	6,360.0	0.8770	0.0037	375.80	0.0518
51.0	VLCC	2,000,000	Dist at 0.2	0.20	80.38	30%	2.5	90,000	122,818	0.0627	6,360.0	0.8770	0.0111	1,130.83	0.1559
12.0	Panamax	350,000	Dist at 0.2	0.20	59.91	30%	2.5	35,000	8,376	0.0627	6,360.0	0.8770	0.0008	77.12	0.0106
60.0	Suezmax	1,000,000	Dist at 0.2	0.20	82.85	30%	2.5	70,000	115,836	0.0627	6,360.0	0.8770	0.0105	1,066.54	0.1471

TOTAL

0.0261 2650.29 0.3655

**Auxiliary Generator Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	Energy (MMBtu)	Heating Value (MMBtu/1000 gal)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
24.0	Aframax	700,000	Dist at 0.2	0.20	3,600	56%	15.0	102.4	140	0.0064	722.0	0.0952	0.0082	935.71	0.1234
51.0	VLCC	2,000,000	Dist at 0.2	0.20	3,600	56%	23.2	158.4	140	0.0064	722.0	0.0952	0.0273	3,075.37	0.4055
12.0	Panamax	350,000	Dist at 0.2	0.20	3,600	56%	11.0	75.7	140	0.0064	722.0	0.0952	0.0030	343.09	0.0452
60.0	Suezmax	1,000,000	Dist at 0.2	0.20	3,600	56%	15.3	105.2	140	0.0064	722.0	0.0952	0.0212	2,386.07	0.3146

TOTAL

0.0597 6740.25 0.8887

**Auxiliary Generator Usage per Ship Visit**

Shipcalls (vessels/yr)	Vessel Type	Auxiliary kW per Vessel	Load Factor	Hours/Visit	kW-Hrs/Visit	AMP Reduction	AMPed kW-Hr per year
24.0	Aframax	3,600	56%	15.0	54,000	0.15	1,101,600
51.0	VLCC	3,600	56%	23.2	83,520	0.15	3,620,592
12.0	Panamax	3,600	56%	11.0	39,600	0.15	403,920
60.0	Suezmax	3,600	56%	15.3	55,080	0.15	2,809,080

TOTAL  
AMPed kW-Hr per year 7,935,192

**Boiler Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Inerting Fuel Consumption Savings (lb/1000 bbl offloaded)	Activity Time (hr)	Pumping Rate (bb/hr)	Fuel Consumption (gal/yr)	N <sub>2</sub> O Emission Factor (lb/ton)	CO <sub>2</sub> Emission Factor (lb/ton)	CH <sub>4</sub> Emission Factor (lb/ton)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
24.0	Aframax	700,000	Dist at 0.2	0.20	102.17	28.06	15.0	50,000	244,891	0.0627	6,360.0	0.8770	0.0222	2,254.80	0.3109
51.0	VLCC	2,000,000	Dist at 0.2	0.20	80.38	28.06	23.2	90,000	1,139,748	0.0627	6,360.0	0.8770	0.1035	10,494.07	1.4471
12.0	Panamax	350,000	Dist at 0.2	0.20	59.91	28.06	11.0	35,000	36,855	0.0627	6,360.0	0.8770	0.0033	339.34	0.0468
60.0	Suezmax	1,000,000	Dist at 0.2	0.20	82.85	28.06	15.3	70,000	708,914	0.0627	6,360.0	0.8770	0.0643	6,527.22	0.9001

TOTAL

0.1934 19615.44 2.7048

**Auxiliary Generator Post-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	Energy (MMBtu)	Heating Value (MMBtu/1000 gal)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
24.0	Aframax	700,000	Dist at 0.2	0.20	3,600	28%	1.0	3.4	150	0.0064	722.0	0.0952	0.0005	62.38	0.0082
51.0	VLCC	2,000,000	Dist at 0.2	0.20	3,600	28%	1.0	3.4	150	0.0064	722.0	0.0952	0.0012	132.56	0.0175
12.0	Panamax	350,000	Dist at 0.2	2.70	3,600	28%	1.0	3.4	150	0.0064	722.0	0.0952	0.0003	31.19	0.0041
60.0	Suezmax	1,000,000	Dist at 0.2	2.70	3,600	28%	1.0	3.4	150	0.0064	722.0	0.0952	0.0014	155.95	0.0206

TOTAL

0.0034 382.08 0.0504

**Auxiliary Generator Usage per Ship Visit**

Shipcalls (vessels/yr)	Vessel Type	Auxiliary kW per Vessel	Load Factor	Hours/Visit	kW-Hrs/Visit	AMP Reduction	AMPed kW-Hr per year
24.0	Aframax	3,600	28%	1.0	3,600	0.15	73,440
51.0	VLCC	3,600	28%	1.0	3,600	0.15	156,060
12.0	Panamax	3,600	28%	1.0	3,600	0.15	36,720
60.0	Suezmax	3,600	28%	1.0	3,600	0.15	183,600

TOTAL  
AMPed kW-Hr per year 449,820

Total AMPed kW-Hr per year 9,509,562

**GHG Emissions from AMPed Electricity**

	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O
<i>Emission Factors</i>			
Lb/MW-Hrs	804.54	0.0037	0.01
<i>Tons Per Year</i>			
2015	3,825	0.018	0.032

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Mit.AMP.GHG.2015-4. 2015 Proposed Project Summary of Berth Operations Average Daily Mitigated GHG Emissions by AMP Electricity Consumption.

**No AMP**

Mode	Equipment	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
Berth Operations	Boiler	0.2195	22265.73	3.0703
Berth Operations	Aux Generator	0.0715	8077.5338	1.0651

**Mitigated Emissions with AMP - Year 2015**

AMP Reduction 15%

Berth Operations	Boiler	0.2195	22265.73	3.0703
Berth Operations	Aux Generator	0.0607	6865.90	0.9053

Table H.2.PP.Mit.AMP.GHG.2025-5. 2025 Proposed Project Berth Operations Average Daily Mitigated GHG Emissions by AMP Electricity Consumption.

Auxiliary Generator Pre-Pumping															
Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	Energy (MMBtu)	Heating Value (MMBtu/1000 gal)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
36.0	Aframax	700,000	Dist at 0.2	0.20	3,600	28%	2.5	8.5	150	0.0064	722.0	0.0952	0.0021	233.93	0.0308
69.0	VLCC	2,000,000	Dist at 0.2	0.20	3,600	28%	2.5	8.5	150	0.0064	722.0	0.0952	0.0039	448.36	0.0591
18.0	Panamax	350,000	Dist at 0.2	0.20	3,600	28%	2.5	8.6	150	0.0064	722.0	0.0952	0.0010	116.96	0.0154
78.0	Suezmax	1,000,000	Dist at 0.2	0.20	3,600	28%	2.5	8.6	150	0.0064	722.0	0.0952	0.0045	506.84	0.0668
<b>TOTAL</b>												<b>0.0115</b>	<b>1306.10</b>	<b>0.1722</b>	

Auxiliary Generator Usage per Ship Visit

Shipcalls (vessels/yr)	Vessel Type	Auxiliary kW per Vessel	Load Factor	Hours/visit	kW-Hrs/Visit	AMP Reduction	AMPed kW-Hr per year
36.0	Aframax	3,600	28%	2.5	9,000	0.4	194,400
69.0	VLCC	3,600	28%	2.5	9,000	0.4	372,600
18.0	Panamax	3,600	28%	2.5	9,000	0.4	97,200
78.0	Suezmax	3,600	28%	2.5	9,000	0.4	421,200
<b>TOTAL</b>							<b>AMPed kW-Hr per year 1,085,400</b>

Boiler Pre-Pumping

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	Fuel Consumption (gal/yr)	N <sub>2</sub> O Emission Factor (lb/ton)	CO <sub>2</sub> Emission Factor (lb/ton)	CH <sub>4</sub> Emission Factor (lb/ton)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
36.0	Aframax	700,000	Dist at 0.2	0.20	102.17	30%	2.5	50,000	61,223	0.0627	6,360.0	0.8770	0.0056	563.70	0.0777
69.0	VLCC	2,000,000	Dist at 0.2	0.20	80.38	30%	2.5	90,000	168,165	0.0627	6,360.0	0.8770	0.0151	1529.94	0.2110
18.0	Panamax	350,000	Dist at 0.2	0.20	59.91	30%	2.5	35,000	12,564	0.0627	6,360.0	0.8770	0.0011	115.68	0.0160
78.0	Suezmax	1,000,000	Dist at 0.2	0.20	82.85	30%	2.5	70,000	150,586	0.0627	6,360.0	0.8770	0.0137	1386.50	0.1912
<b>TOTAL</b>												<b>0.0354</b>	<b>3595.83</b>	<b>0.4958</b>	

Auxiliary Generator Pumping

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	Energy (MMBtu)	Heating Value (MMBtu/1000 gal)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
36.0	Aframax	700,000	Dist at 0.2	0.20	3,600	56%	15.0	102.4	140	0.0064	722.0	0.0952	0.0123	1403.57	0.1851
69.0	VLCC	2,000,000	Dist at 0.2	0.20	3,600	56%	23.2	158.4	140	0.0064	722.0	0.0952	0.0369	4160.80	0.5486
18.0	Panamax	350,000	Dist at 0.2	0.20	3,600	56%	11.0	75.7	140	0.0064	722.0	0.0952	0.0046	514.64	0.0679
78.0	Suezmax	1,000,000	Dist at 0.2	0.20	3,600	56%	15.3	105.2	140	0.0064	722.0	0.0952	0.0275	3101.89	0.4090
<b>TOTAL</b>												<b>0.0813</b>	<b>9180.89</b>	<b>1.2106</b>	

Auxiliary Generator Usage per Ship Visit

Shipcalls (vessels/yr)	Vessel Type	Auxiliary kW per Vessel	Load Factor	Hours/visit	kW-Hrs/Visit	AMP Reduction	AMPed kW-Hr per year
36.0	Aframax	3,600	56%	15.0	54,000	0.4	1,166,400
69.0	VLCC	3,600	56%	23.2	83,520	0.4	3,457,728
18.0	Panamax	3,600	56%	11.0	39,600	0.4	427,680
78.0	Suezmax	3,600	56%	15.3	55,080	0.4	2,577,744
<b>TOTAL</b>							<b>AMPed kW-Hr per year 7,629,552</b>

Boiler Pumping

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Inerting Fuel Consumption Savings (lb/1000 bbl offloaded)	Activity Time (hr)	Pumping Rate (bbl/hr)	Fuel Consumption (gal/yr)	N <sub>2</sub> O Emission Factor (lb/ton)	CO <sub>2</sub> Emission Factor (lb/ton)	CH <sub>4</sub> Emission Factor (lb/ton)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
36.0	Aframax	700,000	Dist at 0.2	0.20	102.17	28.06	15.0	50,000	367,337	0.0627	6,360.0	0.8770	0.0333	3382.20	0.4664
69.0	VLCC	2,000,000	Dist at 0.2	0.20	80.38	28.06	23.2	90,000	1,542,012	0.0627	6,360.0	0.8770	0.1400	14197.86	1.9578
18.0	Panamax	350,000	Dist at 0.2	0.20	59.91	28.06	11.0	35,000	55,283	0.0627	6,360.0	0.8770	0.0050	509.01	0.0702
78.0	Suezmax	1,000,000	Dist at 0.2	0.20	82.85	28.06	15.3	70,000	921,588	0.0627	6,360.0	0.8770	0.0837	8485.39	1.1701
<b>TOTAL</b>												<b>0.2620</b>	<b>26574.47</b>	<b>3.6644</b>	

Auxiliary Generator Post-Pumping

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	Energy (MMBtu)	Heating Value (MMBtu/1000 gal)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
36.0	Aframax	700,000	Dist at 0.2	0.20	3,600	28%	1.0	3.4	150	0.0064	722.0	0.0952	0.0008	93.57	0.0123
69.0	VLCC	2,000,000	Dist at 0.2	0.20	3,600	28%	1.0	3.4	150	0.0064	722.0	0.0952	0.0016	179.34	0.0236
18.0	Panamax	350,000	Dist at 0.2	0.20	3,600	28%	1.0	3.4	150	0.0064	722.0	0.0952	0.0004	46.79	0.0062
78.0	Suezmax	1,000,000	Dist at 0.2	0.20	3,600	28%	1.0	3.4	150	0.0064	722.0	0.0952	0.0018	202.74	0.0267
<b>TOTAL</b>												<b>0.0046</b>	<b>522.44</b>	<b>0.0689</b>	

Auxiliary Generator Usage per Ship Visit

Shipcalls (vessels/yr)	Vessel Type	Auxiliary kW per Vessel	Load Factor	Hours/visit	kW-Hrs/Visit	AMP Reduction	AMPed kW-Hr per year
36.0	Aframax	3,600	28%	1.0	3,600	0.4	77,760
69.0	VLCC	3,600	28%	1.0	3,600	0.4	149,040
18.0	Panamax	3,600	28%	1.0	3,600	0.4	38,880
78.0	Suezmax	3,600	28%	1.0	3,600	0.4	168,480
<b>TOTAL</b>							<b>AMPed kW-Hr per year 434,160</b>
<b>Total AMPed kW-Hr per year</b>							<b>9,149,112</b>

GHG Emissions from AMPed Electricity			
	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O
Emission Factors			
Lb/MW-Hrs	804.54	0.0037	0.01
Project Year	Tons Per Year		
2025	3,680	0.017	0.031

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Mit.AMP.GHG.2025-6. 2025 Proposed Project Summary of Berth Operations Average Daily Mitigated GHG Emissions by AMP Electricity Consumption.

No AMP

Mode	Equipment	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
Berth Operations	Boiler	0.2974	30170.29	4.1603
Berth Operations	Aux Generator	0.0974	11009.4314	1.4517

Mitigated Emissions with AMP - Year 2025

AMP Reduction 40%

Berth Operations	Boiler	0.2974	30170.29	4.1603
Berth Operations	Aux Generator	0.0584	6605.66	0.8710



Table H.2.PP.Mit.AMP.GHG.2040-7. 2040 Proposed Project Berth Operations Average Daily Mitigated GHG Emissions by AMP Electricity Consumption.

Auxiliary Generator Pre-Pumping															
Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded (bb/call)	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	Energy (MMBtu)	Heating Value (MMBtu/1000 gal)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
36.0	Aframax	700,000	Dist at 0.2	0.20	3,600	28%	2.5	8.5	150	0.0064	722.0	0.0952	0.0021	233.93	0.0308
69.0	VLCC	2,000,000	Dist at 0.2	0.20	3,600	28%	2.5	8.5	150	0.0064	722.0	0.0952	0.0039	448.36	0.0591
18.0	Panamax	350,000	Dist at 0.2	0.20	3,600	28%	2.5	8.6	150	0.0064	722.0	0.0952	0.0010	116.96	0.0154
78.0	Suezmax	1,000,000	Dist at 0.2	0.20	3,600	28%	2.5	8.6	150	0.0064	722.0	0.0952	0.0045	506.84	0.0668
<b>TOTAL</b>													<b>0.0115</b>	<b>1306.10</b>	<b>0.1722</b>

Auxiliary Generator Usage per Ship Visit

Shipcalls (vessels/yr)	Vessel Type	Auxiliary kW per Vessel	Load Factor	Hours/Visit	kW-Hrs/Visit	AMP Reduction	AMPed kW-Hr per year
36.0	Aframax	3,600	28%	2.5	9,000	0.7	97,200
69.0	VLCC	3,600	28%	2.5	9,000	0.7	186,300
18.0	Panamax	3,600	28%	2.5	9,000	0.7	48,600
78.0	Suezmax	3,600	28%	2.5	9,000	0.7	210,600
<b>TOTAL</b>							<b>542,700</b>

Boiler Pre-Pumping

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded (bb/call)	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bb/hr)	Fuel Consumption (gal/yr)	N <sub>2</sub> O Emission Factor (lb/ton)	CO <sub>2</sub> Emission Factor (lb/ton)	CH <sub>4</sub> Emission Factor (lb/ton)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
36.0	Aframax	700,000	Dist at 0.2	0.20	102.17	30%	2.5	50,000	61,223	0.0627	6,360.0	0.8770	0.0056	563.70	0.0777
69.0	VLCC	2,000,000	Dist at 0.2	0.20	80.38	30%	2.5	90,000	166,165	0.0627	6,360.0	0.8770	0.0151	1529.94	0.2110
18.0	Panamax	350,000	Dist at 0.2	0.20	59.91	30%	2.5	35,000	12,564	0.0627	6,360.0	0.8770	0.0011	115.68	0.0160
78.0	Suezmax	1,000,000	Dist at 0.2	0.20	82.85	30%	2.5	70,000	150,586	0.0627	6,360.0	0.8770	0.0137	1386.50	0.1912
<b>TOTAL</b>													<b>0.0354</b>	<b>3595.83</b>	<b>0.4958</b>

Auxiliary Generator Pumping

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded (bb/call)	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	Energy (MMBtu)	Heating Value (MMBtu/1000 gal)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
36.0	Aframax	700,000	Dist at 0.2	0.20	3,600	56%	15.0	102.4	140	0.0064	722.0	0.0952	0.0123	1403.57	0.1851
69.0	VLCC	2,000,000	Dist at 0.2	0.20	3,600	56%	23.2	158.4	140	0.0064	722.0	0.0952	0.0369	4160.80	0.5486
18.0	Panamax	350,000	Dist at 0.2	0.20	3,600	56%	11.0	75.7	140	0.0064	722.0	0.0952	0.0046	514.64	0.0679
78.0	Suezmax	1,000,000	Dist at 0.2	0.20	3,600	56%	15.3	105.2	140	0.0064	722.0	0.0952	0.0275	3101.89	0.4090
<b>TOTAL</b>													<b>0.0813</b>	<b>9180.89</b>	<b>1.2106</b>

Auxiliary Generator Usage per Ship Visit

Shipcalls (vessels/yr)	Vessel Type	Auxiliary kW per Vessel	Load Factor	Hours/Visit	kW-Hrs/Visit	AMP Reduction	AMPed kW-Hr per year
36.0	Aframax	3,600	56%	15.0	54,000	0.7	583,200
69.0	VLCC	3,600	56%	23.2	83,520	0.7	1,728,864
18.0	Panamax	3,600	56%	11.0	39,600	0.7	213,840
78.0	Suezmax	3,600	56%	15.3	55,080	0.7	1,288,872
<b>TOTAL</b>							<b>3,814,776</b>

Boiler Pumping

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded (bb/call)	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Inerting Fuel Consumption Savings (lb/1000 bbl offloaded)	Activity Time (hr)	Pumping Rate (bb/hr)	Fuel Consumption (gal/yr)	N <sub>2</sub> O Emission Factor (lb/ton)	CO <sub>2</sub> Emission Factor (lb/ton)	CH <sub>4</sub> Emission Factor (lb/ton)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
36.0	Aframax	700,000	Dist at 0.2	0.20	102.17	28.06	15.0	50,000	367,337	0.0627	6,360.0	0.8770	0.0333	3382.20	0.4664
69.0	VLCC	2,000,000	Dist at 0.2	0.20	80.38	28.06	23.2	90,000	1,542,012	0.0627	6,360.0	0.8770	0.1400	14197.86	1.9578
18.0	Panamax	350,000	Dist at 0.2	0.20	59.91	28.06	11.0	35,000	55,283	0.0627	6,360.0	0.8770	0.0050	509.01	0.0702
78.0	Suezmax	1,000,000	Dist at 0.2	0.20	82.85	28.06	15.3	70,000	921,588	0.0627	6,360.0	0.8770	0.0837	8485.39	1.1701
<b>TOTAL</b>													<b>0.2620</b>	<b>26574.47</b>	<b>3.6644</b>

Auxiliary Generator Post-Pumping

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded (bb/call)	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	Energy (MMBtu)	Heating Value (MMBtu/1000 gal)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
36.0	Aframax	700,000	Dist at 0.2	0.20	3,600	28%	1.0	3.4	150	0.0064	722.0	0.0952	0.0008	93.57	0.0123
69.0	VLCC	2,000,000	Dist at 0.2	0.20	3,600	28%	1.0	3.4	150	0.0064	722.0	0.0952	0.0016	179.34	0.0236
18.0	Panamax	350,000	Dist at 0.2	2.70	3,600	28%	1.0	3.4	150	0.0064	722.0	0.0952	0.0004	46.79	0.0062
78.0	Suezmax	1,000,000	Dist at 0.2	2.70	3,600	28%	1.0	3.4	150	0.0064	722.0	0.0952	0.0018	202.74	0.0267
<b>TOTAL</b>													<b>0.0046</b>	<b>522.44</b>	<b>0.0689</b>

Auxiliary Generator Usage per Ship Visit

Shipcalls (vessels/yr)	Vessel Type	Auxiliary kW per Vessel	Load Factor	Hours/Visit	kW-Hrs/Visit	AMP Reduction	AMPed kW-Hr per year
36.0	Aframax	3,600	28%	1.0	3,600	0.7	38,880
69.0	VLCC	3,600	28%	1.0	3,600	0.7	74,520
18.0	Panamax	3,600	28%	1.0	3,600	0.7	19,440
78.0	Suezmax	3,600	28%	1.0	3,600	0.7	84,240
<b>TOTAL</b>							<b>217,080</b>
<b>Total AMPed kW-Hr per year</b>							<b>4,574,556</b>

GHG Emissions from AMPed Electricity

	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O
	Emission Factors		
Lb/MW-Hrs	804.54	0.0037	0.01
Project Year	Tons Per Year		
2040	1,840	0.008	0.015

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.PP.Mit.AMP.GHG.2040-8. 2040 Proposed Project Summary of Berth Operations Average Daily Mitigated GHG Emissions by AMP Electricity Consumption.

No AMP

Mode	Equipment	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
Berth Operations	Boiler	0.2974	30170.29	4.1603
Berth Operations	Aux Generator	0.0974	11009.4314	1.4517

Mitigated Emissions with AMP - Year 2040

AMP Reduction 70%

Berth Operations	Boiler	0.2974	30170.29	4.1603
Berth Operations	Aux Generator	0.0292	3302.83	0.4355

Table H.2.NFA/NPA.AMP.GHG.2015-1.  
2015 No Federal Action/No Project Alternative Berth Operations Average Daily GHG Emissions by AMP Electricity Consumption (Exxon Mobil).

**Auxiliary Generator Pre-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	Energy (MMBtu)	Heating Value (MMBtu/1000 gal)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)		
146.0	Panamax	300,000	0.20	3,600	28%	2.5	8.6	150	0.0064	722.0	0.0952	0.0083	948.71	0.1251		
AMP Reduction 15%												<b>TOTAL</b>		0.0071	806.40	0.1063

**Auxiliary Generator Usage per Ship Visit**

Shipcalls (vessels/yr)	Vessel Type	Auxiliary kW per Vessel	Hours/visit	kW-Hrs/Visit	AMP Reduction	AMPed kW-Hr per year
146.0	Panamax	3,600	2.5	9,000	0.15	1,116,900
<b>TOTAL</b>						AMPed kW-Hr per year 1,116,900

**Boiler Pre-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	Fuel Consumption (gal/yr)	N <sub>2</sub> O Emission Factor (lb/ton)	CO <sub>2</sub> Emission Factor (lb/ton)	CH <sub>4</sub> Emission Factor (lb/ton)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
146.0	Panamax	300,000	0.20	59.91	30%	2.5	35,000	101,911	0.0627	6,360.0	0.8770	0.0093	938.33	0.1294
<b>TOTAL</b>												0.0093	938.33	0.1294

**Auxiliary Generator Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	Energy (MMBtu)	Heating Value (MMBtu/1000 gal)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)		
146.0	Panamax	300,000	0.20	3,600	56%	11.0	75.7	140	0.0064	722.0	0.0952	0.0370	4174.32	0.5504		
AMP Reduction 15%												<b>TOTAL</b>		0.0315	3548.17	0.4678

**Auxiliary Generator Usage per Ship Visit**

Shipcalls (vessels/yr)	Vessel Type	Auxiliary kW per Vessel	Hours/visit	kW-Hrs/Visit	AMP Reduction	AMPed kW-Hr per year
146.0	Panamax	3,600	11.0	39,600	0.15	4,914,360
<b>TOTAL</b>						AMPed kW-Hr per year 4,914,360

**Boiler Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Inerting Fuel Consumption Savings (lb/1000 bbl offloaded)	Activity Time (hr)	Pumping Rate (bbl/hr)	Fuel Consumption (gal/yr)	N <sub>2</sub> O Emission Factor (lb/ton)	CO <sub>2</sub> Emission Factor (lb/ton)	CH <sub>4</sub> Emission Factor (lb/ton)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
146.0	Panamax	300,000	0.20	59.91	28.06	11.0	35,000	448,408	0.0627	6,360.0	0.8770	0.0407	4128.65	0.5693
<b>TOTAL</b>												0.0407	4128.65	0.5693

**Auxiliary Generator Post-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	Energy (MMBtu)	Heating Value (MMBtu/1000 gal)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)		
146.0	Panamax	300,000	0.20	3,600	28%	1.0	3.4	150	0.0064	722.0	0.0952	0.0034	379.48	0.0500		
AMP Reduction 15%												<b>TOTAL</b>		0.0029	322.56	0.0425

**Auxiliary Generator Usage per Ship Visit**

Shipcalls (vessels/yr)	Vessel Type	Auxiliary kW per Vessel	Hours/visit	kW-Hrs/Visit	AMP Reduction	AMPed kW-Hr per year
146.0	Panamax	3,600	1.0	3,600	0.15	446,760
<b>TOTAL</b>						AMPed kW-Hr per year 446,760
<b>Total AMPed kW-Hr per year</b>						6,478,020

**GHG Emissions from AMPed Electricity**

	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O	CO <sub>2</sub> e
<i>Emission Factors</i>				
Lb/MW-Hrs	804.54	0.0037	0.01	- - -
<i>Tons Per Year</i>				
Project Year 2015	2,606	0.012	0.03	2616.21

**Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR**

**Table H.2.NFA/NPA.AMP.GHG.2015-2.**

**2015 No Federal Action/No Project Alternative Summary Berth Operations Average Daily GHG Emissions by AMP Electricity Consumption (Exxon Mobil).**

**No AMP**

<b>Mode</b>	<b>Equipment</b>	<b>N<sub>2</sub>O Emissions (tons/yr)</b>	<b>CO<sub>2</sub> Emissions (tons/yr)</b>	<b>CH<sub>4</sub> Emissions (tons/yr)</b>
Berth Operations	Boiler	0.05	5066.98	0.70
Berth Operations	Aux Generator	0.049	5502.506	0.726

**Mitigated Emissions with AMP - Year 2015**

AMP Reduction 15%

Berth Operations	Boiler	0.0500	5066.98	0.6987
Berth Operations	Aux Generator	0.0414	4677.1304	0.6167

Table H.2.NFA/NPA.AMP.GHG.2025-3.  
2025 No Federal Action/No Project Alternative Berth Operations Average Daily GHG Emissions by AMP Electricity Consumption (Exxon Mobil)

**Auxiliary Generator Pre-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	Energy (MMBtu)	Heating Value (MMBtu/1000 gal)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
146.0	Panamax	300,000	0.20	3,600	28%	2.5	8.6	150	0.0064	722.0	0.0952	0.0083	948.71	0.1251

AMP Reduction 70% **TOTAL** 0.0025 284.61 0.0375

**Auxiliary Generator Usage per Ship Visit**

Shipcalls (vessels/yr)	Vessel Type	Auxiliary kW per Vessel	Hours/visit	kW-Hrs/Visit	AMP Reduction	AMPed kW-Hr per year
146.0	Panamax	3,600	2.5	9,000	0.7	394,200
<b>TOTAL</b>						394,200

**Boiler Pre-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	Fuel Consumption (gal/yr)	N <sub>2</sub> O Emission Factor (lb/ton)	CO <sub>2</sub> Emission Factor (lb/ton)	CH <sub>4</sub> Emission Factor (lb/ton)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
146.0	Panamax	300,000	0.20	59.91	30%	2.5	35,000	101,911	0.0627	6,360.0	0.8770	0.0093	938.33	0.1294

**TOTAL** 0.0093 938.33 0.1294

**Auxiliary Generator Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	Energy (MMBtu)	Heating Value (MMBtu/1000 gal)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
146.0	Panamax	300,000	0.20	3,600	56%	11.0	75.7	140	0.0064	722.0	0.0952	0.0370	4174.32	0.5504

AMP Reduction 70% **TOTAL** 0.0111 1252.29 0.1651

**Auxiliary Generator Usage per Ship Visit**

Shipcalls (vessels/yr)	Vessel Type	Auxiliary kW per Vessel	Hours/visit	kW-Hrs/Visit	AMP Reduction	AMPed kW-Hr per year
146.0	Panamax	3,600	11.0	39,600	0.7	1,734,480
<b>TOTAL</b>						1,734,480

**Boiler Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Inerting Fuel Consumption Savings (lb/1000 bbl offloaded)	Activity Time (hr)	Pumping Rate (bbl/hr)	Fuel Consumption (gal/yr)	N <sub>2</sub> O Emission Factor (lb/ton)	CO <sub>2</sub> Emission Factor (lb/ton)	CH <sub>4</sub> Emission Factor (lb/ton)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
146.0	Panamax	300,000	0.20	59.91	28.06	11.0	35,000	448,408	0.0627	6,360.0	0.8770	0.0407	4128.65	0.5693

**TOTAL** 0.0407 4128.65 0.5693

**Auxiliary Generator Post-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	Energy (MMBtu)	Heating Value (MMBtu/1000 gal)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
146.0	Panamax	300,000	0.20	3,600	28%	1.0	3.4	150	0.0064	722.0	0.0952	0.0034	379.48	0.0500

AMP Reduction 70% **TOTAL** 0.0010 113.84 0.0150

**Auxiliary Generator Usage per Ship Visit**

Shipcalls (vessels/yr)	Vessel Type	Auxiliary kW per Vessel	Hours/visit	kW-Hrs/Visit	AMP Reduction	AMPed kW-Hr per year
146.0	Panamax	3,600	1.0	3,600	0.7	157,680
<b>TOTAL</b>						157,680
<b>Total AMPed kW-Hr per year</b>						2,286,360

**GHG Emissions from AMPed Electricity**

	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O	CO <sub>2</sub> e
<i>Emission Factors</i>				
Lb/MW-Hrs	804.54	0.0037	0.01	---
<i>Tons Per Year</i>				
Project Year	920	0.004	0.01	923.37

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.NFA/NPA.AMP.GHG.2025-4.

2025 No Federal Action/No Project Alternative Summary Berth Operations Average Daily GHG Emissions by AMP Electricity Consumption (Exxon Mobil).

No AMP

Mode	Equipment	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
Berth Operations	Boiler	0.050	5066.98	0.70
Berth Operations	Aux Generator	0.0487	5502.5064	0.7255

Mitigated Emissions with AMP - Year 2025

AMP Reduction 70%

Berth Operations	Boiler	0.0500	5066.98	0.6987
Berth Operations	Aux Generator	0.0146	1650.7519	0.2177

Table H.2.NFA/NPA.AMP.GHG.2040-5.  
2040 No Federal Action/No Project Alternative Berth Operations Average Daily GHG Emissions by AMP Electricity Consumption (Exxon Mobil)

**Auxiliary Generator Pre-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	Energy (MMBtu)	Heating Value (MMBtu/1000 gal)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
146.0	Panamax	300,000	0.20	3,600	28%	2.5	8.6	150	0.0064	722.0	0.0952	0.0083	948.71	0.1251

AMP Reduction 70% **TOTAL** 0.0025 284.61 0.0375

**Auxiliary Generator Usage per Ship Visit**

Shipcalls (vessels/yr)	Vessel Type	Auxiliary kW per Vessel	Hours/visit	kW-Hrs/Visit	AMP Reduction	AMPed kW-Hr per year
146.0	Panamax	3,600	2.5	9,000	0.7	394,200
<b>TOTAL</b>						394,200

**Boiler Pre-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	Fuel Consumption (gal/yr)	N <sub>2</sub> O Emission Factor (lb/ton)	CO <sub>2</sub> Emission Factor (lb/ton)	CH <sub>4</sub> Emission Factor (lb/ton)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
146.0	Panamax	300,000	0.20	59.91	30%	2.5	35,000	101,911	0.0627	6,360.0	0.8770	0.0093	938.33	0.1294

**TOTAL** 0.0093 938.33 0.1294

**Auxiliary Generator Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	Energy (MMBtu)	Heating Value (MMBtu/1000 gal)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
146.0	Panamax	300,000	0.20	3,600	56%	11.0	75.7	140	0.0064	722.0	0.0952	0.0370	4174.32	0.5504

AMP Reduction 70% **TOTAL** 0.0111 1252.29 0.1651

**Auxiliary Generator Usage per Ship Visit**

Shipcalls (vessels/yr)	Vessel Type	Auxiliary kW per Vessel	Hours/visit	kW-Hrs/Visit	AMP Reduction	AMPed kW-Hr per year
146.0	Panamax	3,600	11.0	39,600	0.7	1,734,480
<b>TOTAL</b>						1,734,480

**Boiler Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Inerting Fuel Consumption Savings (lb/1000 bbl offloaded)	Activity Time (hr)	Pumping Rate (bbl/hr)	Fuel Consumption (gal/yr)	N <sub>2</sub> O Emission Factor (lb/ton)	CO <sub>2</sub> Emission Factor (lb/ton)	CH <sub>4</sub> Emission Factor (lb/ton)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
146.0	Panamax	300,000	0.20	59.91	28.06	11.0	35,000	448,408	0.0627	6,360.0	0.8770	0.0407	4128.65	0.5693

**TOTAL** 0.0407 4128.65 0.5693

**Auxiliary Generator Post-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	Energy (MMBtu)	Heating Value (MMBtu/1000 gal)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
146.0	Panamax	300,000	0.20	3,600	28%	1.0	3.4	150	0.0064	722.0	0.0952	0.0034	379.48	0.0500

AMP Reduction 70% **TOTAL** 0.0010 113.84 0.0150

**Auxiliary Generator Usage per Ship Visit**

Shipcalls (vessels/yr)	Vessel Type	Auxiliary kW per Vessel	Hours/visit	kW-Hrs/Visit	AMP Reduction	AMPed kW-Hr per year
146.0	Panamax	3,600	1.0	3,600	0.7	157,680
<b>TOTAL</b>						157,680
Total AMPed kW-Hr per year						2,286,360

**GHG Emissions from AMPed Electricity**

	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O	CO <sub>2</sub> e
<i>Emission Factors</i>				
Lb/MW-Hrs	804.54	0.0037	0.01	---
<i>Tons Per Year</i>				
Project Year	920	0.004	0.01	923.37

**Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR**

**Table H.2.NFA/NPA.AMP.GHG.2040-6.**

**2040 No Federal Action/No Project Alternative Summary Berth Operations Average Daily GHG Emissions by AMP Electricity Consumption (Exxon Mobil).**

**No AMP**

<b>Mode</b>	<b>Equipment</b>	<b>N<sub>2</sub>O Emissions (tons/yr)</b>	<b>CO<sub>2</sub> Emissions (tons/yr)</b>	<b>CH<sub>4</sub> Emissions (tons/yr)</b>
Berth Operations	Boiler	0.050	5066.98	0.70
Berth Operations	Aux Generator	0.0487	5502.5064	0.7255

**Mitigated Emissions with AMP - Year 2040**

AMP Reduction 70%

Berth Operations	Boiler	0.0500	5066.98	0.6987
Berth Operations	Aux Generator	0.0146	1650.7519	0.2177



Table H.2.RPA.AMP.GHG.2010-1. 2010 Reduced Project Alternative Berth Operations Average Daily Mitigated GHG Emissions by AMP Electricity Consumption.

**Auxiliary Generator Pre-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	Energy (MMBtu)	Heating Value (MMBtu/1000 gal)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
32.0	Aframax	700,000	Dist at 0.2%S	0.20	3,600	28%	2.5	8.6	140.0	0.0068	690.0	0.0952	0.0020	198.7200	0.0274
26.0	VLCC	2,000,000	Dist at 0.2%S	0.20	3,600	28%	2.5	8.6	140.0	0.0068	690.0	0.0952	0.0016	161.4600	0.0223
26.0	Panamax	350,000	Dist at 0.2%S	0.20	3,600	28%	2.5	8.6	140.0	0.0068	690.0	0.0952	0.0016	161.4600	0.0223
45.0	Suezmax	1,000,000	Dist at 0.2%S	0.20	3,600	28%	2.5	8.6	140.0	0.0068	690.0	0.0952	0.0028	279.4500	0.0386
<b>TOTAL</b>													<b>0.0079</b>	<b>801.0900</b>	<b>0.1105</b>

**Auxiliary Generator Usage per Ship Visit**

Shipcalls (vessels/yr)	Vessel Type	Auxiliary kW per Vessel	Load Factor	Hours/Visit	kW-Hrs/Visit	AMP Reduction	AMPed kW-Hr per year	
32.0	Aframax	3,600	28%	2.5	9,000	---	---	
26.0	VLCC	3,600	28%	2.5	9,000	---	---	
26.0	Panamax	3,600	28%	2.5	9,000	---	---	
45.0	Suezmax	3,600	28%	2.5	9,000	---	---	
<b>TOTAL</b>							<b>AMPed kW-Hr per year</b>	<b>---</b>

**Boiler Pre-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	Fuel Consumption (gal/yr)	N <sub>2</sub> O Emission Factor (lb/ton)	CO <sub>2</sub> Emission Factor (lb/ton)	CH <sub>4</sub> Emission Factor (lb/ton)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
32.0	Aframax	700,000	Dist at 0.2%S	0.20	102.17	30%	2.5	50,000	54,420.2	0.0627	6,360.00	0.8770	0.0049	501.0669	0.0691
26.0	VLCC	2,000,000	Dist at 0.2%S	0.20	80.38	30%	2.5	90,000	62,612.9	0.0627	6,360.00	0.8770	0.0057	576.4998	0.0795
26.0	Panamax	350,000	Dist at 0.2%S	0.20	59.91	30%	2.5	35,000	18,148.5	0.0627	6,360.00	0.8770	0.0016	167.0998	0.0230
45.0	Suezmax	1,000,000	Dist at 0.2%S	0.20	82.85	30%	2.5	70,000	86,876.7	0.0627	6,360.00	0.8770	0.0079	799.9050	0.1103
<b>TOTAL</b>													<b>0.0202</b>	<b>2,044.5715</b>	<b>0.2819</b>

**Auxiliary Generator Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	Energy (MMBtu)	Heating Value (MMBtu/1000 gal)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
32.0	Aframax	700,000	Dist at 0.2%S	0.20	3,600	56%	15.0	102.4	140.0	0.0068	690.0	0.0952	0.0118	1,192.3200	0.1645
26.0	VLCC	2,000,000	Dist at 0.2%S	0.20	3,600	56%	23.2	158.4	140.0	0.0068	690.0	0.0952	0.0148	1,498.3488	0.2067
26.0	Panamax	350,000	Dist at 0.2%S	0.20	3,600	56%	11.0	75.7	140.0	0.0068	690.0	0.0952	0.0070	710.4240	0.0980
45.0	Suezmax	1,000,000	Dist at 0.2%S	0.20	3,600	56%	15.3	105.2	140.0	0.0068	690.0	0.0952	0.0169	1,710.2340	0.2360
<b>TOTAL</b>													<b>0.0504</b>	<b>5,111.3268</b>	<b>0.7052</b>

**Auxiliary Generator Usage per Ship Visit**

Shipcalls (vessels/yr)	Vessel Type	Auxiliary kW per Vessel	Load Factor	Hours/Visit	kW-Hrs/Visit	AMP Reduction	AMPed kW-Hr per year	
32.0	Aframax	3,600	56%	15.0	54,000	---	---	
26.0	VLCC	3,600	56%	23.2	83,520	---	---	
26.0	Panamax	3,600	56%	11.0	39,600	---	---	
45.0	Suezmax	3,600	56%	15.3	55,080	---	---	
<b>TOTAL</b>							<b>AMPed kW-Hr per year</b>	<b>---</b>

**Boiler Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Inerting Fuel Savings (lb/1000 bbl offloaded)	Activity Time (hr)	Pumping Rate (bbl/hr)	Fuel Consumption (gal/yr)	N <sub>2</sub> O Emission Factor (lb/ton)	CO <sub>2</sub> Emission Factor (lb/ton)	CH <sub>4</sub> Emission Factor (lb/ton)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
32.0	Aframax	700,000	Dist at 0.2%S	0.20	102.17	28.06	15.0	50,000	326,521.4	0.0627	6,360.00	0.8770	0.0296	3,006.4013	0.4146
26.0	VLCC	2,000,000	Dist at 0.2%S	0.20	80.38	28.06	23.2	90,000	581,047.9	0.0627	6,360.00	0.8770	0.0527	5,349.9184	0.7377
26.0	Panamax	350,000	Dist at 0.2%S	0.20	59.91	28.06	11.0	35,000	79,853.4	0.0627	6,360.00	0.8770	0.0072	735.2393	0.1014
45.0	Suezmax	1,000,000	Dist at 0.2%S	0.20	82.85	28.06	15.3	70,000	531,685.2	0.0627	6,360.00	0.8770	0.0483	4,895.4184	0.6750
<b>TOTAL</b>													<b>0.1379</b>	<b>13,986.9775</b>	<b>1.9287</b>

**Auxiliary Generator Post-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	Energy (MMBtu)	Heating Value (MMBtu/1000 gal)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
32.0	Aframax	700,000	Dist at 0.2%S	0.20	3,600	28%	1.0	3.4	140.0	0.0068	690.0	0.0952	0.0008	79.4880	0.0110
26.0	VLCC	2,000,000	Dist at 0.2%S	0.20	3,600	28%	1.0	3.4	140.0	0.0068	690.0	0.0952	0.0006	64.5840	0.0089
26.0	Panamax	350,000	Dist at 0.2%S	0.20	3,600	28%	1.0	3.4	140.0	0.0068	690.0	0.0952	0.0006	64.5840	0.0089
45.0	Suezmax	1,000,000	Dist at 0.2%S	0.20	3,600	28%	1.0	3.4	140.0	0.0068	690.0	0.0952	0.0011	111.7800	0.0154
<b>TOTAL</b>													<b>0.0032</b>	<b>320.4360</b>	<b>0.0442</b>

**Auxiliary Generator Usage per Ship Visit**

Shipcalls (vessels/yr)	Vessel Type	Auxiliary kW per Vessel	Load Factor	Hours/Visit	kW-Hrs/Visit	AMP Reduction	AMPed kW-Hr per year	
32.0	Aframax	3,600	28%	1.0	3,600	---	---	
26.0	VLCC	3,600	28%	1.0	3,600	---	---	
26.0	Panamax	3,600	28%	1.0	3,600	---	---	
45.0	Suezmax	3,600	28%	1.0	3,600	---	---	
<b>TOTAL</b>							<b>AMPed kW-Hr per year</b>	<b>---</b>
<b>Total AMPed</b>							<b>kW-Hr per year</b>	<b>---</b>

**GHG Emissions from AMPed Electricity**

	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O
<i>Emission Factors</i>			
Lb/MW-Hrs	804.54	0.0037	0.01
<i>Tons Per Year</i>			
2010	---	---	---

Table H.2.RPA.AMP.GHG.2010-2. 2010 Reduced Project Alternative Summary of Berth Operations Average Daily Mitigated GHG Emissions by AMP Electricity Consumption.

Year 2010 (No AMP)

Mode	Equipment	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
Berth Operations	Boiler	0.1580	16031.55	2.2106
Berth Operations	Aux Generator	0.0614	6232.85	0.8600

Table H.2.RPA.AMP.GHG.2015-3. 2015 Reduced Project Alternative Berth Operations Average Daily Mitigated GHG Emissions by AMP Electricity Consumption.

**Auxiliary Generator Pre-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	Energy (MMBtu)	Heating Value (MMBtu/1000 gal)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
24.0	Aframax	700,000	Dist at 0.2	0.20	3,600	28%	2.5	8.5	150	0.0064	722.0	0.0952	0.0014	155.95	0.0206
46.0	VLCC	2,000,000	Dist at 0.2	0.20	3,600	28%	2.5	8.5	150	0.0064	722.0	0.0952	0.0026	298.91	0.0394
10.0	Panamax	350,000	Dist at 0.2	0.20	3,600	28%	2.5	8.6	150	0.0064	722.0	0.0952	0.0006	64.98	0.0086
52.0	Suezmax	1,000,000	Dist at 0.2	0.20	3,600	28%	2.5	8.6	150	0.0064	722.0	0.0952	0.0030	337.90	0.0446
<b>TOTAL</b>													<b>0.0075</b>	<b>857.74</b>	<b>0.1131</b>

**Auxiliary Generator Usage per Ship Visit**

Shipcalls (vessels/yr)	Vessel Type	Auxiliary kW per Vessel	Load Factor	Hours/visit	kW-Hrs/Visit	AMP Reduction	AMPed kW-Hr per year
24.0	Aframax	3,600	28%	2.5	9,000	0.15	183,600
46.0	VLCC	3,600	28%	2.5	9,000	0.15	351,900
10.0	Panamax	3,600	28%	2.5	9,000	0.15	76,500
52.0	Suezmax	3,600	28%	2.5	9,000	0.15	397,800
<b>TOTAL</b>							<b>1,009,800</b>

**Boiler Pre-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	Fuel Consumption (gal/yr)	N <sub>2</sub> O Emission Factor (lb/ton)	CO <sub>2</sub> Emission Factor (lb/ton)	CH <sub>4</sub> Emission Factor (lb/ton)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
24.0	Aframax	700,000	Dist at 0.2	0.20	102.17	30%	2.5	50,000	40,815	0.0627	6,360.0	0.8770	0.0037	375.80	0.0518
46.0	VLCC	2,000,000	Dist at 0.2	0.20	80.38	30%	2.5	90,000	110,777	0.0627	6,360.0	0.8770	0.0101	1019.96	0.1406
10.0	Panamax	350,000	Dist at 0.2	0.20	59.91	30%	2.5	35,000	6,980	0.0627	6,360.0	0.8770	0.0006	64.27	0.0089
52.0	Suezmax	1,000,000	Dist at 0.2	0.20	82.85	30%	2.5	70,000	100,391	0.0627	6,360.0	0.8770	0.0091	924.33	0.1275
<b>TOTAL</b>													<b>0.0235</b>	<b>2384.37</b>	<b>0.3288</b>

**Auxiliary Generator Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	Energy (MMBtu)	Heating Value (MMBtu/1000 gal)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
24.0	Aframax	700,000	Dist at 0.2	0.20	3,600	56%	15.0	102.4	140	0.0064	722.0	0.0952	0.0082	935.71	0.1234
46.0	VLCC	2,000,000	Dist at 0.2	0.20	3,600	56%	23.2	158.4	140	0.0064	722.0	0.0952	0.0246	2773.87	0.3658
10.0	Panamax	350,000	Dist at 0.2	0.20	3,600	56%	11.0	75.7	140	0.0064	722.0	0.0952	0.0025	285.91	0.0377
52.0	Suezmax	1,000,000	Dist at 0.2	0.20	3,600	56%	15.3	105.2	140	0.0064	722.0	0.0952	0.0183	2067.92	0.2727
<b>TOTAL</b>													<b>0.0537</b>	<b>6063.41</b>	<b>0.7995</b>

**Auxiliary Generator Usage per Ship Visit**

Shipcalls (vessels/yr)	Vessel Type	Auxiliary kW per Vessel	Load Factor	Hours/visit	kW-Hrs/Visit	AMP Reduction	AMPed kW-Hr per year
24.0	Aframax	3,600	56%	15.0	54,000	0.15	1,101,600
46.0	VLCC	3,600	56%	23.2	83,520	0.15	3,265,632
10.0	Panamax	3,600	56%	11.0	39,600	0.15	336,600
52.0	Suezmax	3,600	56%	15.3	55,080	0.15	2,434,536
<b>TOTAL</b>							<b>7,138,368</b>

**Boiler Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Inerting Fuel Consumption Savings (lb/1000 bbl offloaded)	Activity Time (hr)	Pumping Rate (bbl/hr)	Fuel Consumption (gal/yr)	N <sub>2</sub> O Emission Factor (lb/ton)	CO <sub>2</sub> Emission Factor (lb/ton)	CH <sub>4</sub> Emission Factor (lb/ton)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
24.0	Aframax	700,000	Dist at 0.2	0.20	102.17	28.06	15.0	50,000	244,891	0.0627	6,360.0	0.8770	0.0222	2254.80	0.3109
46.0	VLCC	2,000,000	Dist at 0.2	0.20	80.38	28.06	23.2	90,000	1,028,008	0.0627	6,360.0	0.8770	0.0933	9465.24	1.3052
10.0	Panamax	350,000	Dist at 0.2	0.20	59.91	28.06	11.0	35,000	30,713	0.0627	6,360.0	0.8770	0.0028	282.78	0.0390
52.0	Suezmax	1,000,000	Dist at 0.2	0.20	82.85	28.06	15.3	70,000	614,392	0.0627	6,360.0	0.8770	0.0558	5656.93	0.7801
<b>TOTAL</b>													<b>0.1741</b>	<b>17659.75</b>	<b>2.4352</b>

**Auxiliary Generator Post-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	Energy (MMBtu)	Heating Value (MMBtu/1000 gal)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
24.0	Aframax	700,000	Dist at 0.2	0.20	3,600	28%	1.0	3.4	150	0.0064	722.0	0.0952	0.0005	62.38	0.0082
46.0	VLCC	2,000,000	Dist at 0.2	0.20	3,600	28%	1.0	3.4	150	0.0064	722.0	0.0952	0.0011	119.56	0.0158
10.0	Panamax	350,000	Dist at 0.2	2.70	3,600	28%	1.0	3.4	150	0.0064	722.0	0.0952	0.0002	25.99	0.0034
52.0	Suezmax	1,000,000	Dist at 0.2	2.70	3,600	28%	1.0	3.4	150	0.0064	722.0	0.0952	0.0012	135.16	0.0178
<b>TOTAL</b>													<b>0.0030</b>	<b>343.09</b>	<b>0.0452</b>

**Auxiliary Generator Usage per Ship Visit**

Shipcalls (vessels/yr)	Vessel Type	Auxiliary kW per Vessel	Load Factor	Hours/visit	kW-Hrs/Visit	AMP Reduction	AMPed kW-Hr per year
24.0	Aframax	3,600	28%	1.0	3,600	0.15	73,440
46.0	VLCC	3,600	28%	1.0	3,600	0.15	140,760
10.0	Panamax	3,600	28%	1.0	3,600	0.15	30,600
52.0	Suezmax	3,600	28%	1.0	3,600	0.15	159,120
<b>TOTAL</b>							<b>403,920</b>
<b>Total AMPed kW-Hr per year</b>							<b>8,552,088</b>

**GHG Emissions from AMPed Electricity**

	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O
Lb/MW-Hrs	804.54	0.0037	0.01
Project Year	Tons Per Year		
2015	3,440	0.016	0.029

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.AMP.GHG.2015-4. 2015 Reduced Project Alternative Summary of Berth Operations Average Daily Mitigated GHG Emissions by AMP Electricity Consumption.

No AMP

Mode	Equipment	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
Berth Operations	Boiler	0.1976	20044.12	2.7639
Berth Operations	Aux Generator	0.0643	7264.2442	0.9578

Mitigated Emissions with AMP - Year 2015

AMP Reduction 15%

Berth Operations	Boiler	0.1976	20044.1188	2.7639
Berth Operations	Aux Generator	0.0546	6174.61	0.8142

Table H.2.RPA.AMP.GHG.2025-5. 2025 Reduced Project Alternative Berth Operations Average Daily Mitigated GHG Emissions by AMP Electricity Consumption.

**Auxiliary Generator Pre-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	Energy (MMBtu)	Heating Value (MMBtu/1000 gal)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
24.0	Aframax	700,000	Dist at 0.2	0.20	3,600	28%	2.5	8.6	150	0.0064	722.0	0.0952	0.0014	155.95	0.0206
46.0	VLCC	2,000,000	Dist at 0.2	0.20	3,600	28%	2.5	8.6	150	0.0064	722.0	0.0952	0.0026	298.91	0.0394
10.0	Panamax	350,000	Dist at 0.2	0.20	3,600	28%	2.5	8.6	150	0.0064	722.0	0.0952	0.0006	64.98	0.0086
52.0	Suezmax	1,000,000	Dist at 0.2	0.20	3,600	28%	2.5	8.6	150	0.0064	722.0	0.0952	0.0030	337.90	0.0446
<b>TOTAL</b>													<b>0.0075</b>	<b>857.74</b>	<b>0.1131</b>

**Auxiliary Generator Usage per Ship Visit**

Shipcalls (vessels/yr)	Vessel Type	Auxiliary kW per Vessel	Load Factor	Hours/Visit	kW-Hrs/Visit	AMP Reduction	AMPed kW Hr per year
24.0	Aframax	3,600	28%	2.5	9,000	0.4	129,600
46.0	VLCC	3,600	28%	2.5	9,000	0.4	248,400
10.0	Panamax	3,600	28%	2.5	9,000	0.4	54,000
52.0	Suezmax	3,600	28%	2.5	9,000	0.4	280,800
<b>TOTAL</b>							<b>712,800</b>

**Boiler Pre-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bb/hr)	Fuel Consumption (gal/yr)	N <sub>2</sub> O Emission Factor (lb/ton)	CO <sub>2</sub> Emission Factor (lb/ton)	CH <sub>4</sub> Emission Factor (lb/ton)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
24.0	Aframax	700,000	Dist at 0.2	0.20	102.17	30%	2.5	50,000	40,815	0.0627	6,360.0	0.8770	0.0037	375.80	0.0518
46.0	VLCC	2,000,000	Dist at 0.2	0.20	80.38	30%	2.5	90,000	110,777	0.0627	6,360.0	0.8770	0.0101	1019.96	0.1406
10.0	Panamax	350,000	Dist at 0.2	0.20	59.91	30%	2.5	35,000	6,980	0.0627	6,360.0	0.8770	0.0006	64.27	0.0089
52.0	Suezmax	1,000,000	Dist at 0.2	0.20	82.85	30%	2.5	70,000	100,391	0.0627	6,360.0	0.8770	0.0091	924.33	0.1275
<b>TOTAL</b>													<b>0.0235</b>	<b>2384.37</b>	<b>0.3288</b>

**Auxiliary Generator Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	Energy (MMBtu)	Heating Value (MMBtu/1000 gal)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
24.0	Aframax	700,000	Dist at 0.2	0.20	3,600	56%	15.0	102.4	140	0.0064	722.0	0.0952	0.0082	935.71	0.1234
46.0	VLCC	2,000,000	Dist at 0.2	0.20	3,600	56%	23.2	158.4	140	0.0064	722.0	0.0952	0.0246	2773.87	0.3658
10.0	Panamax	350,000	Dist at 0.2	0.20	3,600	56%	11.0	75.7	140	0.0064	722.0	0.0952	0.0025	285.91	0.0377
52.0	Suezmax	1,000,000	Dist at 0.2	0.20	3,600	56%	15.3	105.2	140	0.0064	722.0	0.0952	0.0183	2067.92	0.2727
<b>TOTAL</b>													<b>0.0537</b>	<b>6063.41</b>	<b>0.7995</b>

**Auxiliary Generator Usage per Ship Visit**

Shipcalls (vessels/yr)	Vessel Type	Auxiliary kW per Vessel	Load Factor	Hours/Visit	kW-Hrs/Visit	AMP Reduction	AMPed kW Hr per year
24.0	Aframax	3,600	56%	15.0	54,000	0.4	777,600
46.0	VLCC	3,600	56%	23.2	83,520	0.4	2,305,152
10.0	Panamax	3,600	56%	11.0	39,600	0.4	237,600
52.0	Suezmax	3,600	56%	15.3	55,080	0.4	1,718,496
<b>TOTAL</b>							<b>5,038,848</b>

**Boiler Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Inerting Fuel Consumption Savings (lb/1000 bbl offloaded)	Activity Time (hr)	Pumping Rate (bb/hr)	Fuel Consumption (gal/yr)	N <sub>2</sub> O Emission Factor (lb/ton)	CO <sub>2</sub> Emission Factor (lb/ton)	CH <sub>4</sub> Emission Factor (lb/ton)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
24.0	Aframax	700,000	Dist at 0.2	0.20	102.17	28.06	15.0	50,000	244,891	0.0627	6,360.0	0.8770	0.0222	2254.80	0.3109
46.0	VLCC	2,000,000	Dist at 0.2	0.20	80.38	28.06	23.2	90,000	1,028,008	0.0627	6,360.0	0.8770	0.0933	9465.24	1.3052
10.0	Panamax	350,000	Dist at 0.2	0.20	59.91	28.06	11.0	35,000	30,713	0.0627	6,360.0	0.8770	0.0028	282.78	0.0390
52.0	Suezmax	1,000,000	Dist at 0.2	0.20	82.85	28.06	15.3	70,000	614,392	0.0627	6,360.0	0.8770	0.0558	5656.93	0.7801
<b>TOTAL</b>													<b>0.1741</b>	<b>17659.75</b>	<b>2.4352</b>

**Auxiliary Generator Post-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	Energy (MMBtu)	Heating Value (MMBtu/1000 gal)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
24.0	Aframax	700,000	Dist at 0.2	0.20	3,600	28%	1.0	3.4	150	0.0064	722.0	0.0952	0.0005	62.38	0.0082
46.0	VLCC	2,000,000	Dist at 0.2	0.20	3,600	28%	1.0	3.4	150	0.0064	722.0	0.0952	0.0011	119.56	0.0158
10.0	Panamax	350,000	Dist at 0.2	0.20	3,600	28%	1.0	3.4	150	0.0064	722.0	0.0952	0.0002	25.99	0.0034
52.0	Suezmax	1,000,000	Dist at 0.2	0.20	3,600	28%	1.0	3.4	150	0.0064	722.0	0.0952	0.0012	135.16	0.0178
<b>TOTAL</b>													<b>0.0030</b>	<b>343.09</b>	<b>0.0452</b>

**Auxiliary Generator Usage per Ship Visit**

Shipcalls (vessels/yr)	Vessel Type	Auxiliary kW per Vessel	Load Factor	Hours/Visit	kW-Hrs/Visit	AMP Reduction	AMPed kW Hr per year
24.0	Aframax	3,600	28%	1.0	3,600	0.4	51,840
46.0	VLCC	3,600	28%	1.0	3,600	0.4	99,360
10.0	Panamax	3,600	28%	1.0	3,600	0.4	21,600
52.0	Suezmax	3,600	28%	1.0	3,600	0.4	112,320
<b>TOTAL</b>							<b>285,120</b>
<b>Total AMPed kW-Hr per year</b>							<b>6,036,768</b>

**GHG Emissions from AMPed Electricity**

	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O
Lb/MW-Hrs	804.54	0.0037	0.01
Project Year	Tons Per Year		
2025	5,692	0.026	0.047

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.AMP.GHG.2025-6. 2025 Reduced Project Alternative Summary of Berth Operations Average Daily Mitigated GHG Emissions by AMP Electricity Consumption.

No AMP

Mode	Equipment	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
Berth Operations	Boiler	0.20	20044.12	2.76
Berth Operations	Aux Generator	0.06	7264.24	0.96

Mitigated Emissions with AMP - Year 2025

AMP Reduction 40%

Berth Operations	Boiler	0.20	20044.12	2.76
Berth Operations	Aux Generator	0.04	4358.55	0.57

Table H.2.RPA.AMP.GHG.2025-7. 2025 Reduced Project Alternative Berth Operations Average Daily Mitigated GHG Emissions by AMP Electricity Consumption (BP).

**Auxiliary Generator Pre-Pumping**

Shippcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	Energy (MMBtu)	Heating Value (MMBtu/1000 gal)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
27.0	Aframax	400,000	Dist at 0.2	0.20	3,600	28%	2.5	8.6	150	0.0064	722.0	0.0952	0.0015	175.45	0.0231
TOTAL													0.0015	175.45	0.0231

**Auxiliary Generator Usage per Ship Visi**

Shippcalls (vessels/yr)	Vessel Type	Auxiliary kW per Vessel	Load Factor	Hours/visit	kW-Hrs/Visit	AMP Reduction	AMPed kW-Hr per year
27.0	Aframax	3,600	28%	2.5	9,000	0%	243,000
TOTAL							243,000

**Boiler Pre-Pumping**

Shippcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bb/hr)	Fuel Consumption (gal/yr)	N <sub>2</sub> O Emission Factor (lb/ton)	CO <sub>2</sub> Emission Factor (lb/ton)	CH <sub>4</sub> Emission Factor (lb/ton)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
27.0	Aframax	400,000	Dist at 0.2	0.20	102.17	30%	2.5	50,000	45,917	0.0627	6,360.0	0.8770	0.0042	422.78	0.0583
TOTAL													0.0042	422.78	0.0583

**Auxiliary Generator Pumping**

Shippcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	Energy (MMBtu)	Heating Value (MMBtu/1000 gal)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
27.0	Aframax	400,000	Dist at 0.2	0.20	3,600	56%	15.0	102.4	140	0.0064	722.0	0.0952	0.0093	1052.68	0.1388
TOTAL													0.0093	1052.68	0.1388

**Auxiliary Generator Usage per Ship Visi**

Shippcalls (vessels/yr)	Vessel Type	Auxiliary kW per Vessel	Load Factor	Hours/visit	kW-Hrs/Visit	AMP Reduction	AMPed kW-Hr per year
27.0	Aframax	3,600	56%	15.0	54,000	0%	1,458,000
TOTAL							1,458,000

**Boiler Pumping**

Shippcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Inerting Fuel Consumption Savings (lb/1000 bbl offloaded)	Activity Time (hr)	Pumping Rate (bb/hr)	Fuel Consumption (gal/yr)	N <sub>2</sub> O Emission Factor (lb/ton)	CO <sub>2</sub> Emission Factor (lb/ton)	CH <sub>4</sub> Emission Factor (lb/ton)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
27.0	Aframax	400,000	Dist at 0.2	0.20	102.17	28.06	15.0	50,000	275,502	0.0627	6,360.0	0.8770	0.0250	2536.65	0.3498
TOTAL													0.0250	2536.65	0.3498

**Auxiliary Generator Post-Pumping**

Shippcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	Energy (MMBtu)	Heating Value (MMBtu/1000 gal)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
27.0	Aframax	400,000	Dist at 0.2	0.20	3,600	28%	1.0	3.4	150	0.0064	722.0	0.0952	0.0006	70.18	0.0093
TOTAL													0.0006	70.18	0.0093

**Auxiliary Generator Usage per Ship Visi**

Shippcalls (vessels/yr)	Vessel Type	Auxiliary kW per Vessel	Load Factor	Hours/visit	kW-Hrs/Visit	AMP Reduction	AMPed kW-Hr per year
27.0	Aframax	3,600	28%	1.0	3,600	0%	97,200
TOTAL							97,200
AMPed kW-Hr per year							97,200
Total AMPed kW-Hr per year							1,798,200

**GHG Emissions from AMPed Electricity**

	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O
	Emission Factors		
Lb/MW-Hrs	804.54	0.0037	0.01
Project Year	Tons Per Year		
2025	723	0.003	0.006

Table H.2.RPA.AMP.GHG.2025-8. 2025 Reduced Project Alternative Berth Operations Average Daily Mitigated GHG Emissions by AMP Electricity Consumption (Tesoro).

**Auxiliary Generator Pre-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	Energy (MMBtu)	Heating Value (MMBtu/1000 gal)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
68.0	Aframax	400,000	Dist at 0.2	0.20	3,600	28%	2.5	8.6	150	0.0064	722.0	0.0952	0.0039	441.86	0.0583
<b>TOTAL</b>													<b>0.0039</b>	<b>441.86</b>	<b>0.0583</b>

**Auxiliary Generator Usage per Ship Visit**

Shipcalls (vessels/yr)	Vessel Type	Auxiliary kW per Vessel	Load Factor	Hours/visit	kW-Hrs/Visit	AMP Reduction	AMPed kW-Hr per year
68.0	Aframax	3,600	28%	2.5	3,000	0%	612,000
<b>TOTAL</b>							<b>612,000</b>
<b>AMPed kW-Hr per year</b>							<b>612,000</b>

**Boiler Pre-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bb/hr)	Fuel Consumption (gal/yr)	N <sub>2</sub> O Emission Factor (lb/ton)	CO <sub>2</sub> Emission Factor (lb/ton)	CH <sub>4</sub> Emission Factor (lb/ton)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
68.0	Aframax	400,000	Dist at 0.2	0.20	102.17	30%	2.5	50,000	115,643	0.0627	6,360.0	0.8770	0.0105	1064.77	0.1468
<b>TOTAL</b>													<b>0.0105</b>	<b>1064.77</b>	<b>0.1468</b>

**Auxiliary Generator Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	Energy (MMBtu)	Heating Value (MMBtu/1000 gal)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
68.0	Aframax	400,000	Dist at 0.2	0.20	3,600	56%	15.0	102.4	140	0.0064	722.0	0.0952	0.0233	2651.18	0.3496
<b>TOTAL</b>													<b>0.0233</b>	<b>2651.18</b>	<b>0.3496</b>

**Auxiliary Generator Usage per Ship Visit**

Shipcalls (vessels/yr)	Vessel Type	Auxiliary kW per Vessel	Load Factor	Hours/visit	kW-Hrs/Visit	AMP Reduction	AMPed kW-Hr per year
68.0	Aframax	3,600	56%	15.0	54,000	0%	3,672,000
<b>TOTAL</b>							<b>3,672,000</b>
<b>AMPed kW-Hr per year</b>							<b>3,672,000</b>

**Boiler Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Inerting Fuel Consumption Savings (lb/1000 bbl offloaded)	Activity Time (hr)	Pumping Rate (bb/hr)	Fuel Consumption (gal/yr)	N <sub>2</sub> O Emission Factor (lb/ton)	CO <sub>2</sub> Emission Factor (lb/ton)	CH <sub>4</sub> Emission Factor (lb/ton)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
68.0	Aframax	400,000	Dist at 0.2	0.20	102.17	28.06	15.0	50,000	693,858	0.0627	6,360.0	0.8770	0.0630	6388.60	0.8809
<b>TOTAL</b>													<b>0.0630</b>	<b>6388.60</b>	<b>0.8809</b>

**Auxiliary Generator Post-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	Energy (MMBtu)	Heating Value (MMBtu/1000 gal)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
68.0	Aframax	400,000	Dist at 0.2	0.20	3,600	28%	1.0	3.4	150	0.0064	722.0	0.0952	0.0016	176.75	0.0233
<b>TOTAL</b>													<b>0.0016</b>	<b>176.75</b>	<b>0.0233</b>

**Auxiliary Generator Usage per Ship Visit**

Shipcalls (vessels/yr)	Vessel Type	Auxiliary kW per Vessel	Load Factor	Hours/visit	kW-Hrs/Visit	AMP Reduction	AMPed kW-Hr per year
68.0	Aframax	3,600	28%	1.0	3,600	0%	244,800
<b>TOTAL</b>							<b>244,800</b>
<b>AMPed kW-Hr per year</b>							<b>244,800</b>
<b>Total AMPed kW-Hr per year</b>							<b>4,528,800</b>

**GHG Emissions from AMPed Electricity**

	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O
	Emission Factors		
Lb/MMW-Hrs	804.54	0.0037	0.07
Project Year	Tons Per Year		
2025	1,822	0.008	0.015



Table H.2.RPA.AMP.GHG.2025-9. 2025 Reduced Project Alternative Berth Operations Average Daily Mitigated GHG Emissions by AMP Electricity Consumption (Exxon Mobil).

**Auxiliary Generator Pre-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded (bbl/call)	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	Energy (MMBtu)	Heating Value (MMBtu/1000 gal)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
114.0	Panamax	300,000	Dist at 0.2	0.20	3,600	28%	2.5	8.6	150	0.0064	722.0	0.0952	0.0065	740.77	0.0977

TOTAL

0.0065 740.77 0.0977

**Auxiliary Generator Usage per Ship Visit**

Shipcalls (vessels/yr)	Vessel Type	Auxiliary kW per Vessel	Load Factor	Hours/visit	kW-Hrs/Visit	AMP Reduction	AMPed kW-Hr per year
114.0	Panamax	3,600	28%	2.5	9,000	0.7	307,800

TOTAL  
AMPed kW-Hr per year 307,800

**Boiler Pre-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded (bbl/call)	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	Fuel Consumption (gal/yr)	N <sub>2</sub> O Emission Factor (lb/ton)	CO <sub>2</sub> Emission Factor (lb/ton)	CH <sub>4</sub> Emission Factor (lb/ton)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
114.0	Panamax	300,000	Dist at 0.2	0.20	59.91	30%	2.5	35,000	79,574	0.0627	6,360.0	0.8770	0.0072	732.67	0.1010

TOTAL

0.0072 732.67 0.1010

**Auxiliary Generator Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded (bbl/call)	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	Energy (MMBtu)	Heating Value (MMBtu/1000 gal)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
114.0	Panamax	300,000	Dist at 0.2	0.20	3,600	56%	11.0	75.7	140	0.0064	722.0	0.0952	0.0289	3259.40	0.4298

TOTAL

0.0289 3259.40 0.4298

**Auxiliary Generator Usage per Ship Visit**

Shipcalls (vessels/yr)	Vessel Type	Auxiliary kW per Vessel	Load Factor	Hours/visit	kW-Hrs/Visit	AMP Reduction	AMPed kW-Hr per year
114.0	Panamax	3,600	56%	11.0	39,600	0.7	1,354,320

TOTAL  
AMPed kW-Hr per year 1,354,320

**Boiler Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded (bbl/call)	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Inerting Fuel Consumption Savings (lb/1000 bbl offloaded)	Activity Time (hr)	Pumping Rate (bbl/hr)	Fuel Consumption (gal/yr)	N <sub>2</sub> O Emission Factor (lb/ton)	CO <sub>2</sub> Emission Factor (lb/ton)	CH <sub>4</sub> Emission Factor (lb/ton)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
114.0	Panamax	300,000	Dist at 0.2	0.20	59.91	28.06	11.0	35,000	350,126	0.0627	6,360.0	0.8770	0.0318	3223.74	0.4445

TOTAL

0.0318 3223.74 0.4445

**Auxiliary Generator Post-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded (bbl/call)	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	Energy (MMBtu)	Heating Value (MMBtu/1000 gal)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
114.0	Panamax	300,000	Dist at 0.2	0.20	3,600	28%	1.0	3.4	150	0.0064	722.0	0.0952	0.0026	296.31	0.0391

TOTAL

0.0026 296.31 0.0391

**Auxiliary Generator Usage per Ship Visit**

Shipcalls (vessels/yr)	Vessel Type	Auxiliary kW per Vessel	Load Factor	Hours/visit	kW-Hrs/Visit	AMP Reduction	AMPed kW-Hr per year
114.0	Panamax	3,600	28%	1.0	3,600	0.7	123,120

TOTAL  
AMPed kW-Hr per year 123,120

Total AMPed kW-Hr per year 1,785,240

**GHG Emissions from AMPed Electricity**

	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O
Emission Factors			
Lb/MW-Hrs	804.54	0.0037	0.01
Tons Per Year			
2025	718	0.003	0.006

Table H.2.RPA.AMP.GHG.2040-10. 2040 Reduced Project Alternative Berth Operations Average Daily Mitigated GHG Emissions by AMP Electricity Consumption.

**Auxiliary Generator Pre-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	Energy (MMBtu)	Heating Value (MMBtu/1000 gal)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
24.0	Aframax	700,000	Dist at 0.2	0.20	3,600	28%	2.5	8.5	150	0.0064	722.0	0.0952	0.0014	155.95	0.0206
46.0	VLCC	2,000,000	Dist at 0.2	0.20	3,600	28%	2.5	8.5	150	0.0064	722.0	0.0952	0.0026	298.91	0.0394
10.0	Panamax	350,000	Dist at 0.2	0.20	3,600	28%	2.5	8.6	150	0.0064	722.0	0.0952	0.0006	64.98	0.0086
52.0	Suezmax	1,000,000	Dist at 0.2	0.20	3,600	28%	2.5	8.6	150	0.0064	722.0	0.0952	0.0030	337.90	0.0446
<b>TOTAL</b>													<b>0.0075</b>	<b>857.74</b>	<b>0.1131</b>

**Auxiliary Generator Usage per Ship Visit**

Shipcalls (vessels/yr)	Vessel Type	Auxiliary kW per Vessel	Load Factor	Hours/visit	kW-Hrs/Visit	AMP Reduction	AMPed kW Hr per year
24.0	Aframax	3,600	28%	2.5	9,000	0.7	64,800
46.0	VLCC	3,600	28%	2.5	9,000	0.7	124,200
10.0	Panamax	3,600	28%	2.5	9,000	0.7	27,000
52.0	Suezmax	3,600	28%	2.5	9,000	0.7	140,400
<b>TOTAL</b>							<b>356,400</b>

**Boiler Pre-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	Fuel Consumption (gal/yr)	N <sub>2</sub> O Emission Factor (lb/ton)	CO <sub>2</sub> Emission Factor (lb/ton)	CH <sub>4</sub> Emission Factor (lb/ton)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
24.0	Aframax	700,000	Dist at 0.2	0.20	102.17	30%	2.5	50,000	40,815	0.0627	6,360.0	0.8770	0.0037	375.80	0.0518
46.0	VLCC	2,000,000	Dist at 0.2	0.20	80.38	30%	2.5	90,000	110,777	0.0627	6,360.0	0.8770	0.0101	1019.96	0.1406
10.0	Panamax	350,000	Dist at 0.2	0.20	59.91	30%	2.5	35,000	6,980	0.0627	6,360.0	0.8770	0.0006	64.27	0.0089
52.0	Suezmax	1,000,000	Dist at 0.2	0.20	82.85	30%	2.5	70,000	100,391	0.0627	6,360.0	0.8770	0.0091	924.33	0.1275
<b>TOTAL</b>													<b>0.0235</b>	<b>2384.37</b>	<b>0.3288</b>

**Auxiliary Generator Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	Energy (MMBtu)	Heating Value (MMBtu/1000 gal)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
24.0	Aframax	700,000	Dist at 0.2	0.20	3,600	56%	15.0	102.4	140	0.0064	722.0	0.0952	0.0082	935.71	0.1234
46.0	VLCC	2,000,000	Dist at 0.2	0.20	3,600	56%	23.2	158.4	140	0.0064	722.0	0.0952	0.0246	2773.87	0.3658
10.0	Panamax	350,000	Dist at 0.2	0.20	3,600	56%	11.0	75.7	140	0.0064	722.0	0.0952	0.0025	285.91	0.0377
52.0	Suezmax	1,000,000	Dist at 0.2	0.20	3,600	56%	15.3	105.2	140	0.0064	722.0	0.0952	0.0183	2067.92	0.2727
<b>TOTAL</b>													<b>0.0537</b>	<b>6063.41</b>	<b>0.7995</b>

**Auxiliary Generator Usage per Ship Visit**

Shipcalls (vessels/yr)	Vessel Type	Auxiliary kW per Vessel	Load Factor	Hours/visit	kW-Hrs/Visit	AMP Reduction	AMPed kW Hr per year
24.0	Aframax	3,600	56%	15.0	54,000	0.7	388,800
46.0	VLCC	3,600	56%	23.2	83,520	0.7	1,152,576
10.0	Panamax	3,600	56%	11.0	39,600	0.7	118,800
52.0	Suezmax	3,600	56%	15.3	55,080	0.7	859,248
<b>TOTAL</b>							<b>2,519,424</b>

**Boiler Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Inerting Fuel Consumption Savings (lb/1000 bbl offloaded)	Activity Time (hr)	Pumping Rate (bbl/hr)	Fuel Consumption (gal/yr)	N <sub>2</sub> O Emission Factor (lb/ton)	CO <sub>2</sub> Emission Factor (lb/ton)	CH <sub>4</sub> Emission Factor (lb/ton)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
24.0	Aframax	700,000	Dist at 0.2	0.20	102.17	28.06	15.0	50,000	244,891	0.0627	6,360.0	0.8770	0.0222	2254.80	0.3109
46.0	VLCC	2,000,000	Dist at 0.2	0.20	80.38	28.06	23.2	90,000	1,028,008	0.0627	6,360.0	0.8770	0.0933	9465.24	1.3052
10.0	Panamax	350,000	Dist at 0.2	0.20	59.91	28.06	11.0	35,000	30,713	0.0627	6,360.0	0.8770	0.0028	282.78	0.0390
52.0	Suezmax	1,000,000	Dist at 0.2	0.20	82.85	28.06	15.3	70,000	614,392	0.0627	6,360.0	0.8770	0.0558	5656.93	0.7801
<b>TOTAL</b>													<b>0.1741</b>	<b>17659.75</b>	<b>2.4352</b>

**Auxiliary Generator Post-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	Energy (MMBtu)	Heating Value (MMBtu/1000 gal)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
24.0	Aframax	700,000	Dist at 0.2	0.20	3,600	28%	1.0	3.4	150	0.0064	722.0	0.0952	0.0005	62.38	0.0082
46.0	VLCC	2,000,000	Dist at 0.2	0.20	3,600	28%	1.0	3.4	150	0.0064	722.0	0.0952	0.0011	119.56	0.0158
10.0	Panamax	350,000	Dist at 0.2	2.70	3,600	28%	1.0	3.4	150	0.0064	722.0	0.0952	0.0002	25.99	0.0034
52.0	Suezmax	1,000,000	Dist at 0.2	2.70	3,600	28%	1.0	3.4	150	0.0064	722.0	0.0952	0.0012	135.16	0.0178
<b>TOTAL</b>													<b>0.0030</b>	<b>343.09</b>	<b>0.0452</b>

**Auxiliary Generator Usage per Ship Visit**

Shipcalls (vessels/yr)	Vessel Type	Auxiliary kW per Vessel	Load Factor	Hours/visit	kW-Hrs/Visit	AMP Reduction	AMPed kW Hr per year
24.0	Aframax	3,600	28%	1.0	3,600	0.7	25,920
46.0	VLCC	3,600	28%	1.0	3,600	0.7	49,680
10.0	Panamax	3,600	28%	1.0	3,600	0.7	10,800
52.0	Suezmax	3,600	28%	1.0	3,600	0.7	56,160
<b>TOTAL</b>							<b>142,560</b>
<b>Total AMPed kW-Hr per year</b>							<b>3,018,384</b>

**GHG Emissions from AMPed Electricity**

	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O
<i>Emission Factors</i>			
Lb/MW-Hrs	804.54	0.0037	0.01
<i>Tons Per Year</i>			
2040	4,156	0.019	0.035

Pacific L.A. Marine Terminal LLC Crude Oil Terminal Draft SEIS/SEIR

Table H.2.RPA.AMP.GHG.2040-11. 2040 Reduced Project Alternative Summary of Berth Operations Average Daily Mitigated GHG Emissions by AMP Electricity Consumption.

No AMP

Mode	Equipment	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
Berth Operations	Boiler	0.1976	20044.12	2.7639
Berth Operations	Aux Generator	0.0643	7264.2442	0.9578

Mitigated Emissions with AMP - Year 2040

AMP Reduction 70%

Berth Operations	Boiler	0.1976	20044.1188	2.7639
Berth Operations	Aux Generator	0.0193	2179.27	0.2874

Table H.2.RPA.AMP.GHG.2040-12. 2040 Reduced Project Alternative Berth Operations Average Daily Mitigated GHG Emissions by AMP Electricity Consumption (BP).

**Auxiliary Generator Pre-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	Energy (MMBtu)	Heating Value (MMBtu/1000 gal)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
31.0	Aframax	400,000	Dist at 0.2	0.20	3,600	28%	2.5	8.5	150	0.0064	722.0	0.0952	0.0018	201.44	0.0266
TOTAL													0.0018	201.44	0.0266

**Auxiliary Generator Usage per Ship Visit**

Shipcalls (vessels/yr)	Vessel Type	Auxiliary kW per Vessel	Load Factor	Hours/visit	kW-Hrs/Visit	AMP Reduction	AMPed kW-Hr per year
31.0	Aframax	3,600	28%	2.5	9,000	0	279,000
TOTAL							279,000

**Boiler Pre-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	Fuel Consumption (gal/yr)	N <sub>2</sub> O Emission Factor (lb/ton)	CO <sub>2</sub> Emission Factor (lb/ton)	CH <sub>4</sub> Emission Factor (lb/ton)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
31.0	Aframax	400,000	Dist at 0.2	0.20	102.17	30%	2.5	50,000	52,720	0.0627	6,360.0	0.8770	0.0048	485.41	0.0669
TOTAL													0.0048	485.41	0.0669

**Auxiliary Generator Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	Energy (MMBtu)	Heating Value (MMBtu/1000 gal)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
31.0	Aframax	400,000	Dist at 0.2	0.20	3,600	56%	15.0	102.4	140	0.0064	722.0	0.0952	0.0106	1208.63	0.1594
TOTAL													0.0106	1208.63	0.1594

**Auxiliary Generator Usage per Ship Visit**

Shipcalls (vessels/yr)	Vessel Type	Auxiliary kW per Vessel	Load Factor	Hours/visit	kW-Hrs/Visit	AMP Reduction	AMPed kW-Hr per year
31.0	Aframax	3,600	56%	15.0	54,000	0	1,674,000
TOTAL							1,674,000

**Boiler Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Inerting Fuel Consumption Savings (lb/1000 bbl offloaded)	Activity Time (hr)	Pumping Rate (bbl/hr)	Fuel Consumption (gal/yr)	N <sub>2</sub> O Emission Factor (lb/ton)	CO <sub>2</sub> Emission Factor (lb/ton)	CH <sub>4</sub> Emission Factor (lb/ton)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
31.0	Aframax	400,000	Dist at 0.2	0.20	102.17	28.06	15.0	50,000	316,318	0.0627	6,360.0	0.8770	0.0287	2912.45	0.4016
TOTAL													0.0287	2912.45	0.4016

**Auxiliary Generator Post-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	Energy (MMBtu)	Heating Value (MMBtu/1000 gal)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
31.0	Aframax	400,000	Dist at 0.2	0.20	3,600	28%	1.0	3.4	150	0.0064	722.0	0.0952	0.0007	80.58	0.0106
TOTAL													0.0007	80.58	0.0106

**Auxiliary Generator Usage per Ship Visit**

Shipcalls (vessels/yr)	Vessel Type	Auxiliary kW per Vessel	Load Factor	Hours/visit	kW-Hrs/Visit	AMP Reduction	AMPed kW-Hr per year
31.0	Aframax	3,600	28%	1.0	3,600	0	111,600
TOTAL							111,600
Total AMPed kW-Hr per year							2,064,600

**GHG Emissions from AMPed Electricity**

	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O
<i>Emission Factors</i>			
Lb/MW-Hrs	804.54	0.0037	0.01
<i>Tons Per Year</i>			
2040	831	0.004	0.007

Table H.2.RPA.AMP.GHG.2040-13. 2040 Reduced Project Alternative Berth Operations Average Daily Mitigated GHG Emissions by AMP Electricity Consumption (Tesoro).

**Auxiliary Generator Pre-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	Energy (MMBtu)	Heating Value (MMBtu/1000 gal)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
48.0	Aframax	400,000	Dist at 0.2	0.20	3,600	28%	2.5	8.5	150	0.0064	722.0	0.0952	0.0027	311.90	0.0411
<b>TOTAL</b>													<b>0.0027</b>	<b>311.90</b>	<b>0.0411</b>

**Auxiliary Generator Usage per Ship Visit**

Shipcalls (vessels/yr)	Vessel Type	Auxiliary kW per Vessel	Load Factor	Hours/visit	kW-Hrs/Visit	AMP Reduction	AMPed kW-Hr per year
48.0	Aframax	3,600	28%	2.5	9,000	0	432,000
<b>TOTAL</b>							<b>432,000</b>

**Boiler Pre-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bbl/hr)	Fuel Consumption (gal/yr)	N <sub>2</sub> O Emission Factor (lb/ton)	CO <sub>2</sub> Emission Factor (lb/ton)	CH <sub>4</sub> Emission Factor (lb/ton)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
48.0	Aframax	400,000	Dist at 0.2	0.20	102.17	30%	2.5	50,000	81,630	0.0627	6,360.0	0.8770	0.0074	751.60	0.1036
<b>TOTAL</b>													<b>0.0074</b>	<b>751.60</b>	<b>0.1036</b>

**Auxiliary Generator Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	Energy (MMBtu)	Heating Value (MMBtu/1000 gal)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
48.0	Aframax	400,000	Dist at 0.2	0.20	3,600	56%	15.0	102.4	140	0.0064	722.0	0.0952	0.0165	1871.42	0.2468
<b>TOTAL</b>													<b>0.0165</b>	<b>1871.42</b>	<b>0.2468</b>

**Auxiliary Generator Usage per Ship Visit**

Shipcalls (vessels/yr)	Vessel Type	Auxiliary kW per Vessel	Load Factor	Hours/visit	kW-Hrs/Visit	AMP Reduction	AMPed kW-Hr per year
48.0	Aframax	3,600	56%	15.0	54,000	0	2,592,000
<b>TOTAL</b>							<b>2,592,000</b>

**Boiler Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Inerting Fuel Consumption Savings (lb/1000 bbl offloaded)	Activity Time (hr)	Pumping Rate (bbl/hr)	Fuel Consumption (gal/yr)	N <sub>2</sub> O Emission Factor (lb/ton)	CO <sub>2</sub> Emission Factor (lb/ton)	CH <sub>4</sub> Emission Factor (lb/ton)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
48.0	Aframax	400,000	Dist at 0.2	0.20	102.17	28.06	15.0	50,000	489,782	0.0627	6,360.0	0.8770	0.0445	4509.60	0.6218
<b>TOTAL</b>													<b>0.0445</b>	<b>4509.60</b>	<b>0.6218</b>

**Auxiliary Generator Post-Pumping**

Shipcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	Energy (MMBtu)	Heating Value (MMBtu/1000 gal)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
48.0	Aframax	400,000	Dist at 0.2	0.20	3,600	28%	1.0	3.4	150	0.0064	722.0	0.0952	0.0011	124.76	0.0165
<b>TOTAL</b>													<b>0.0011</b>	<b>124.76</b>	<b>0.0165</b>

**Auxiliary Generator Usage per Ship Visit**

Shipcalls (vessels/yr)	Vessel Type	Auxiliary kW per Vessel	Load Factor	Hours/visit	kW-Hrs/Visit	AMP Reduction	AMPed kW-Hr per year
48.0	Aframax	3,600	28%	1.0	3,600	0	172,800
<b>TOTAL</b>							<b>172,800</b>
<b>Total AMPed kW-Hr per year</b>							<b>3,196,800</b>

**GHG Emissions from AMPed Electricity**

	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O
	<i>Emission Factors</i>		
Lb/MW-Hrs	804.54	0.0037	0.01
Project Year	<i>Tons Per Year</i>		
2040	1,286	0.006	0.011

Table H.2.RPA.AMP.GHG.2040-14. 2040 Reduced Project Alternative Berth Operations Average Daily Mitigated GHG Emissions by AMP Electricity Consumption (Exxon Mobil).

**Auxiliary Generator Pre-Pumping**

Shippcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	Energy (MMBtu)	Heating Value (MMBtu/1000 gal)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
131.0	Panamax	300,000	Dist at 0.2	0.20	3,600	28%	2.5	8.6	150	0.0064	722.0	0.0952	0.0075	851.24	0.1122
<b>TOTAL</b>													<b>0.0075</b>	<b>851.24</b>	<b>0.1122</b>

**Auxiliary Generator Usage per Ship Visit**

Shippcalls (vessels/yr)	Vessel Type	Auxiliary kW per Vessel	Load Factor	Hours/visit	kW-Hrs/Visit	AMP Reduction	AMPed kW-Hr per year
131.0	Panamax	3,600	28%	2.5	9,000	0.7	353,700
<b>TOTAL</b>							<b>AMPed kW-Hr per year</b>
							<b>353,700</b>

**Boiler Pre-Pumping**

Shippcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Load Factor	Activity Time (hr)	Pumping Rate (bb/hr)	Fuel Consumption (gal/yr)	N <sub>2</sub> O Emission Factor (lb/ton)	CO <sub>2</sub> Emission Factor (lb/ton)	CH <sub>4</sub> Emission Factor (lb/ton)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
131.0	Panamax	300,000	Dist at 0.2	0.20	59.91	30%	2.5	35,000	91,441	0.0627	6,360.0	0.8770	0.0083	841.93	0.1161
<b>TOTAL</b>													<b>0.0083</b>	<b>841.93</b>	<b>0.1161</b>

**Auxiliary Generator Pumping**

Shippcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	Energy (MMBtu)	Heating Value (MMBtu/1000 gal)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
131.0	Panamax	300,000	Dist at 0.2	0.20	3,600	56%	11.0	75.7	140	0.0064	722.0	0.0952	0.0332	3745.45	0.4939
<b>TOTAL</b>													<b>0.0332</b>	<b>3745.45</b>	<b>0.4939</b>

**Auxiliary Generator Usage per Ship Visit**

Shippcalls (vessels/yr)	Vessel Type	Auxiliary kW per Vessel	Load Factor	Hours/visit	kW-Hrs/Visit	AMP Reduction	AMPed kW-Hr per year
131.0	Panamax	3,600	56%	11.0	39,600	0.7	1,556,280
<b>TOTAL</b>							<b>AMPed kW-Hr per year</b>
							<b>1,556,280</b>

**Boiler Pumping**

Shippcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	Fuel Consumption (lb/1000 bbl offloaded)	Inerting Fuel Consumption Savings (lb/1000 bbl offloaded)	Activity Time (hr)	Pumping Rate (bb/hr)	Fuel Consumption (gal/yr)	N <sub>2</sub> O Emission Factor (lb/ton)	CO <sub>2</sub> Emission Factor (lb/ton)	CH <sub>4</sub> Emission Factor (lb/ton)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
131.0	Panamax	300,000	Dist at 0.2	0.20	59.91	28.06	11.0	35,000	402,338	0.0627	6,360.0	0.8770	0.0365	3704.47	0.5108
<b>TOTAL</b>													<b>0.0365</b>	<b>3704.47</b>	<b>0.5108</b>

**Auxiliary Generator Post-Pumping**

Shippcalls (vessels/yr)	Vessel Size	Crude Offloaded bbl/call	Fuel Type	Sulfur Content (%)	MCR (kW)	Load Factor	Activity Time (hr)	Energy (MMBtu)	Heating Value (MMBtu/1000 gal)	N <sub>2</sub> O Emission Factor (g/kWh)	CO <sub>2</sub> Emission Factor (g/kWh)	CH <sub>4</sub> Emission Factor (g/kWh)	N <sub>2</sub> O Emissions (tons/yr)	CO <sub>2</sub> Emissions (tons/yr)	CH <sub>4</sub> Emissions (tons/yr)
131.0	Panamax	300,000	Dist at 0.2	2.70	3,600	28%	1.0	3.4	150	0.0064	722.0	0.0952	0.0030	340.50	0.0449
<b>TOTAL</b>													<b>0.0030</b>	<b>340.50</b>	<b>0.0449</b>

**Auxiliary Generator Usage per Ship Visit**

Shippcalls (vessels/yr)	Vessel Type	Auxiliary kW per Vessel	Load Factor	Hours/visit	kW-Hrs/Visit	AMP Reduction	AMPed kW-Hr per year
131.0	Panamax	3,600	28%	1.0	3,600	0.7	141,480
<b>TOTAL</b>							<b>AMPed kW-Hr per year</b>
							<b>141,480</b>
<b>Total AMPed kW-Hr per year</b>							<b>2,051,460</b>

**GHG Emissions from AMPed Electricity**

	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O
<i>Emission Factors</i>			
Lb/MW-Hrs	804.54	0.0037	0.01
<i>Tons Per Year</i>			
2040	825	0.004	0.007

**APPENDIX H.2 – SECTION 4**  
**FUGITIVE AND STORAGE TANK EMISSIONS**

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**Table H.2.Em-1. Summary of Fugitive Emissions.**

New Source Unit with BACT	Service	Number of Sources	<10,000 ppmv THC Emission Factor (lb/hr/source)	Total Emissions (lb/yr)	Maximum Daily Emissions (lb/day)
Valves	Light Liquid	1125	3.3E-05	325.22	0.89
Pumps	Light Liquid	40	5.3E-04	185.71	0.51
Others (Compressors and others)	Light Liquid	960	5.3E-05	445.71	1.22
Fittings (Connectors and Flanges)	Light Liquid	1650	1.6E-05	231.26	0.63
<b>TOTALS</b>		<b>3775</b>	<b>6.32E-04</b>	<b>1187.90</b>	<b>3.25</b>

Emission Factors from Table IV-2b (Method 3) of Guidelines for Fugitive Emissions Calculations, SCAQMD, June 2003.

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Table H.2.Em-2. Summary of Storage Tank Emissions.

Tank Farm	Number of Tanks	Size of Tank (bbls)	Annual VOC Emissions for One Tank (lb/yr)	Annual VOC Emissions for All Tanks - 250,000 bbl/day throughput (lb/yr)	Annual VOC Emissions for All Tanks - 350,000 bbl/day throughput (lb/day)	Annual VOC Emissions for All Tanks - 450,000 bbl/day throughput (lb/day)	Annual VOC Emissions for All Tanks - 500,000 bbl/day throughput (lb/day)	Annual VOC Emissions for All Tanks - 677,000 bbl/day throughput (lb/day)	Annual VOC Emissions for All Tanks - 2,160,000 bbl/day peak throughput (lb/day)
Site 1	2	250k short	13,142	26,283	36,796	47,310	52,566	71,175	227,086
	1	50k surge	6,012	6,012	8,417	10,822	12,025	16,281	51,946
	1	15k fueling	180	180	251	323	359	486	1,552
Site 2	14	250k tall	10,648	149,068	208,696	268,323	298,137	403,677	1,287,951
<b>Total (without VDU)</b>			<b>29,981</b>	<b>181,543</b>	<b>254,161</b>	<b>326,778</b>	<b>363,087</b>	<b>491,619</b>	<b>1,568,534</b>
<b>Total (with VDU - 98% Destruction Efficiency)</b>			<b>600</b>	<b>3,631</b>	<b>5,083</b>	<b>6,536</b>	<b>7,262</b>	<b>9,832</b>	<b>31,371</b>

**APPENDIX H.2 – SECTION 5**  
**EMISSION FACTORS**

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Table H.2.EF-1. Tug Emission Factors and Fuel Use Factors.

**Project Year 2010**

Tug Operation	Fuel Type	Emission Factors (g/kW-hr)					Fuel Consumption
		NO <sub>x</sub>	SO <sub>2</sub> (2)	CO	ROG	PM <sub>10</sub>	
Main Engines	MGO	11.75	0.006	1.87	0.37	0.48	210
Auxiliary Generator	MGO	9.64	0.004	1.67	0.27	0.45	210

(1) Composite EFs for category 1/2 diesel engines (Starcrest 2006). Average sulfur (S) content = 0.19% (PEI Section 3.2.2) in year 2003 and 15 ppm in year 2007+

**Project Year 2015**

Tug Operation	Fuel Type	Emission Factors (g/kW-hr)					Fuel Consumption
		NO <sub>x</sub>	SO <sub>2</sub> (2)	CO	ROG	PM <sub>10</sub>	
Main Engines	MGO	10.04	0.006	1.87	0.36	0.43	210
Auxiliary Generator	MGO	8.91	0.004	1.67	0.27	0.40	210

(1) Composite EFs for category 1/2 diesel engines (Starcrest 2006). Average sulfur (S) content = 0.19% (PEI Section 3.2.2) in year 2003 and 15 ppm in year 2007+

**Project Year 2025**

Tug Operation	Fuel Type	Emission Factors (g/kW-hr)					Fuel Consumption
		NO <sub>x</sub>	SO <sub>2</sub> (2)	CO	ROG	PM <sub>10</sub>	
Main Engines	MGO	8.33	0.006	1.87	0.35	0.36	210
Auxiliary Generator	MGO	7.5	0.004	1.67	0.27	0.32	210

(1) Composite EFs for category 1/2 diesel engines (Starcrest 2006). Average sulfur (S) content = 0.19% (PEI Section 3.2.2) in year 2003 and 15 ppm in year 2007+

**Project Year 2040**

Tug Operation	Fuel Type	Emission Factors (g/kW-hr)					Fuel Consumption
		NO <sub>x</sub>	SO <sub>2</sub> (2)	CO	ROG	PM <sub>10</sub>	
Main Engines	MGO	7.47	0.006	1.87	0.35	0.33	210
Auxiliary Generator	MGO	6.8	0.004	1.67	0.27	0.28	210

(1) Composite EFs for category 1/2 diesel engines (Starcrest 2006). Average sulfur (S) content = 0.19% (PEI Section 3.2.2) in year 2003 and 15 ppm in year 2007+

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**Table H.2.EF-2. OGV Emission Factors and Fuel Use Factors.**

**Emission Factors and Fuel Use Factors - Proposed Project**

Ship Operation	Fuel Type	Emission Factors (1) (g/kW-hr)							Fuel Consumption
		NO <sub>x</sub>	SO <sub>2</sub> (2)	CO	ROG	PM	PM <sub>10</sub>	PM <sub>2.5</sub>	
Main Engines	Dist at 0.2%S	17.0	% S	1.4	0.6	0.29	0.29	0.27	185
	MDO	17.0	% S	1.4	0.6	0.39	0.39	0.36	185
	HFO	18.1	10.5	1.4	0.6	1.56	1.56	1.44	195
Auxiliary Generator	Dist at 0.2%S	13.9	% S	1.1	0.4	0.28	0.27	0.21	217
	MDO	13.9	% S	1.1	0.4	0.3	0.29	0.23	217
	HFO	14.7	12.3	1.1	0.4	1.5	1.44	1.15	227

Sulfur 10.5 Main Engine  
Sulfur 12.3 Auxiliary Generator

(1) PM, PM<sub>10</sub> and PM<sub>2.5</sub> emission factors are derived from ICF Methodology for Port Inventories with 92% of PM=PM<sub>10</sub> for both HFO and distillate. EFs for NO<sub>x</sub>, SO<sub>2</sub>, CO, and ROG are from Entec (2002). The auxiliary generator HFO PM EF = 1.5 g/kW-hr, per CARB's *Draft Emission Estimation Methodology for Ocean-Going Vessels* (2005).

(2) The POLA (2004c) and Entec (2002) Reports use 10.5 g/kW-hr for SO<sub>2</sub> from the main engines operating on HFO and 12.3 g/kW-hr for SO<sub>2</sub> from the auxiliary generators operating on HFO, calculated on a mass balance basis using the sulfur content of the fuel (2.7%) and assuming full conversion to oxides of sulfur. For other fuel types, this emission factor was adjusted by (%S)/(2.7), where %S is the corresponding percent sulfur by weight for each fuel type.

Ship Operation	Fuel Type	Emission Factors (1) (kg/tonne)						
		NO <sub>x</sub>	SO <sub>2</sub> (2)	CO	ROG	PM	PM <sub>10</sub>	PM <sub>2.5</sub>
Boilers less than 100 MMBtu	Dist at 0.2%S	2.8	20 x %S	0.7	0.04	0.47	0.33	0.22
	MDO	2.8	20 x %S	0.7	0.04	0.47	0.33	0.22
	HFO	7.0	20 x %S	0.6	0.16	1.46	1.26	0.82
Boilers greater than 100 MMBtu	Dist at 0.2%S	3.4	20 x %S	0.7	0.15	0.47	0.33	0.22
	MDO	3.4	20 x %S	0.7	0.15	0.47	0.33	0.22
	HFO	6.0	20 x %S	0.6	0.13	3.75	3.22	2.10

Sulfur 20.0

MGO and MDO Blend assumed to have the same properties as MDO.

(1) EFs are from AP-42 with 70% of PM=PM10 for distillate and 86% of PM=PM10 for HFO.

(2) The mass (kg) of SO<sub>2</sub> potentially emitted per tonne (metric ton) of fuel consumed was calculated as equal to 20.0 times the percent by weight of sulfur in the fuel, assuming full conversion of all fuel-bound sulfur to oxides of sulfur. The emission factors in this table multiplies the sulfur content of each fuel type by 20.0.

**Fuel Characteristics:**

Fuel	Density	Sulfur Content (%)	VLCC	Aframax	Panamax	Suezmax
			Boiler Fuel Consumption (lb/1000 bbl offloaded)	Boiler Fuel Consumption (lb/1000 bbl offloaded)	Boiler Fuel Consumption (lb/1000 bbl offloaded)	Boiler Fuel Consumption (lb/1000 bbl offloaded)
Dist at 0.2	7.3	0.20	80.38	102.17	59.91	82.85
MDO	7.5	0.52	80.38	102.17	59.91	82.85
HFO	8.1	2.70	84.93	107.96	63.3	87.54
Inerting Boiler Fuel Consumption Savings (lb/1000 bbl offloaded)			28.06	28.06		

Inert gas consumption (Herbert Engineering Corporation, 2005)

449 lb exhaust gas/1000 bbl offloaded

16 lb exhaust gas/lb fuel

28.06 lb fuel/1000 bbl offloaded