



GHG Review in Recent and Future Marine Terminal Lease Renewals and Permits

California State Lands Commission
Prevention First 2010

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Greenhouse Gas (GHG) Regulations – Current and Future

- **California AB32 Reporting**

- ◆ Facilities with emissions >25,000 MTpy CO₂e – June 2009.

- **USEPA Mandatory Reporting Rule**

- ◆ Subparts address specific industries – first reports due March 2011.
- ◆ Other facilities with emissions >25,000 MTpy CO₂e

- **California Environmental Quality Act (CEQA) Guidelines**

- ◆ As of 18 March 2010 EIRs must address GHG emissions

- **USEPA Tailoring Rule**

- ◆ Two-phase implementation in 2011 for new and modified sources
- ◆ BACT review for GHG emissions increases at major sources



New Permitting Implications for Marine Terminals

- **Modifications and other projects requiring EIRs must now include GHG emissions calculations. Evaluate whether the project:**
 - ◆ *Generates greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment*
 - ◆ *Conflicts with any applicable plan, policy or regulation of an agency adopted for the purpose of reducing the emissions of greenhouse gases*
- **The Tailoring Rule phase-in may subject large sources to PSD permitting**



Emissions of GHG at Marine Terminals

- **By Activity**

- ◆ On-shore power use, vapor destruction units, minor fugitive losses
 - ◆ Ocean-Going Vessel (OGV) Main Engine
 - » Maneuvering
 - ◆ Ocean-Going Vessel (OGV) Auxiliary Engine
 - » Hoteling
 - » Pumping cargo
 - ◆ Ocean-Going Vessel (OGV) Auxiliary Boiler
 - » Pumping cargo
 - ◆ Tug and Barge Main Engines
- ◆ Scope may or may not include transit

- **By Chemical**

- ◆ CO₂
- ◆ CH₄
- ◆ N₂O
- ◆ Refrigerants



Emission Factor Types

- **Fuel-Based**

- ◆ Units equivalent to lbs GHG/gallon fuel
- ◆ Do not need specific data about equipment or combustion processes

- **Power-Based**

- ◆ Units equivalent to g GHG/kW-hr
- ◆ Requires specific data including
 - » Types of combustion activity
 - » Equipment ratings
 - » Duration of each combustion activity
 - » Emission factors for each activity



Emission Factor Sources

- **Governmental**

- ◆ US EPA
 - » AP-42
 - » *Analysis of Commercial Marine Vessels Emissions and Fuel Consumption Data*
- ◆ California Air Resources Board
 - » *Initial Statement of Reasons for Proposed Rulemaking: Fuel Sulfur and Other Operational Requirements for Ocean-Going Vessels within California Waters and 24 Nautical Miles of the California Baseline, Appendix D*

- **Intergovernmental**

- ◆ Intergovernmental Panel on Climate Change (IPCC)

- **Other**

- ◆ California Climate Action Registry (CCAR) General Reporting Protocol
- ◆ World Ports Climate Initiative (WPCI)
- ◆ Reports such as those by IVL, Entec, and ICF

Fuel-Based Emission Factor Comparison

CO₂ Emission Factor (lb/gal)			
Fuel	AP-42	IPCC	CCAR
Distillate Fuel Oil (#2)	22.3	23.9	22.4
Residual Fuel Oil (#6)	24.4	26.9	26.0
Liquefied Petroleum Gas (LPG)	12.5	13.4	12.8

CH₄ Emission Factor (lb/gal)			
Fuel	AP-42	IPCC	CCAR
Distillate Fuel Oil (#2)	0.000052	0.0032	0.0016
Residual Fuel Oil (#6)	0.00100	0.0035	0.0019
Liquefied Petroleum Gas (LPG)	0.0002	0.0011	0.00020

N₂O Emission Factor (lb/gal)			
Fuel	AP-42	IPCC	CCAR
Distillate Fuel Oil (#2)	0.00026	0.0002	0.00057
Residual Fuel Oil (#6)	0.00053	0.0002	0.00066
Liquefied Petroleum Gas (LPG)	0.0009	0.00002	0.00002

Current Marine Terminal EIRs with GHG Emissions

Project	GHG Emitting Activities	GHG Emission Factor Units	Emission Factor Source
Chevron El Segundo Marine Terminal Lease Renewal	Tanker Main and Auxiliary Engines and Auxiliary Boilers; Tugs	g/kW-hr	IVL Methodology for Calculating Emissions from Ships: Update on Emission Factors
Shore Marine Oil Terminal Lease Renewal (Selby)	Tankers and Articulated Tug-Barges	g/kW-hr	CARB Initial Statement of Reasons for Proposed Rulemaking: Fuel Sulfur and Other Operational Requirements for Ocean-Going Vessels within California Waters and 24 Nautical Miles of the California Baseline
Shell Martinez Marine Oil Terminal Lease Renewal	Tanker Transit, Pumping, and Hoteling; Tugs	[unconfirmed]	USEPA AP-42 Emission Factors for Liquefied Petroleum Gas External Combustion
			USEPA Analysis of Commercial Marine Vessels Emissions and Fuel Consumption Data
			CCAR General Reporting Protocol, Version 3
Venocol Ellwood Marine Terminal Lease Renewal	Tugs, Barges	[unconfirmed]	[unconfirmed]
Pacific L.A. Marine Terminal LLC, Pier 400, Berth 408 Project	Ships, Tugs, Tanks, Vapor Destruction Units, Valves, Flanges, and Pumps, Electricity Consumption	g/kW-hr lb/ton cargo pumped	CCAR General Reporting Protocol, Version 2.2

Typical Marine Terminal GHG Emissions

Project	Baseline Year(s)	Baseline GHG Emissions (tpy CO₂e)
Chevron El Segundo Marine Terminal Lease Renewal	2006	41,123 ¹
Shore Marine Oil Terminal Lease Renewal	2003	1,903
Shell Martinez Marine Oil Terminal Lease Renewal	2007	3,980
Venoco Ellwood Marine Terminal Lease Renewal	2001-2003	280
Pacific L.A. Marine Terminal LLC, Pier 400, Berth 408 Project	Proposed Project Year 2010	46,044

¹Total for the South Coast Air Basin.

CEQA Thresholds

CEQA Significance Thresholds for Selected Coastal Air Districts	
Bay Area Air Quality Management District	10,000 MTpy CO ₂ e for stationary sources
South Coast Air Quality Management District	10,000 MTpy CO ₂ e interim threshold
Sacramento Metropolitan Air Quality Management District	Recommended GHG threshold related to AB32 reduction goals
San Diego Air Pollution Control District	None
Santa Barbara County Air Pollution Control District	None
Ventura County Air Pollution Control District	None



So What if GHG Emissions Are Over a Threshold?

- **If the project emissions are above the CEQA significance thresholds, you will need to mitigate GHG emissions to below the threshold.**
- **Mitigation can include:**
 - » GHG emissions reductions at the site
 - » Energy efficiency projects
 - » Electrification of operations
 - » Funding of supplemental GHG reduction projects
- **If the project emissions are above the major source threshold (>100,000 tpy GHG), you will need a federal Title V permit (if the facility does not already have one).**
 - ♦ GHGs to be added to Title V permits when due for next renewal (no applicable requirements yet).
- **If the project emissions of a major source are above the PSD significance threshold (>75,000 tpy)**
 - ♦ Subject to Best Available Control Technology (BACT) review for GHG

GHG Emissions vs. Criteria Pollutant Emissions

- **NOx is often the first pollutant to trigger PSD permitting from combustion sources**
- **GHG and NOx emissions were compared for external combustion of Residual Fuel Oil**

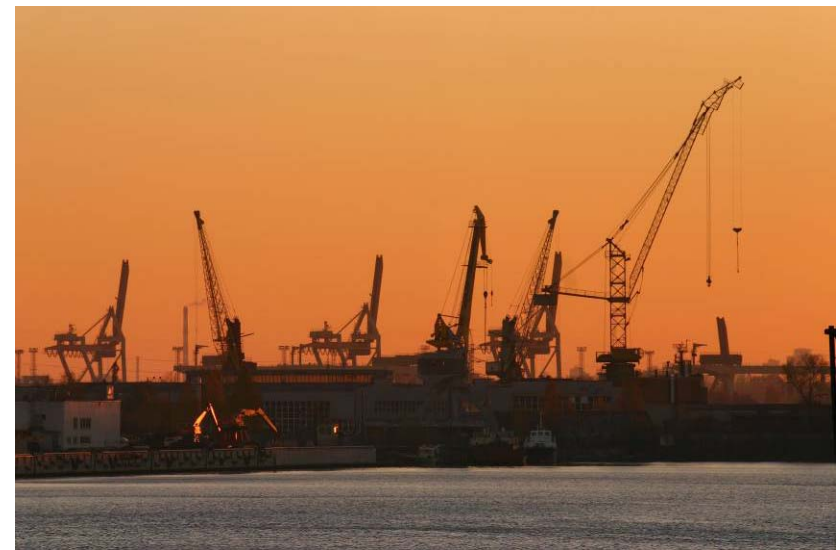
	GHG	NOx
Emission Factor	24.5 lb CO ₂ e/gal	55 lb NOx/gal
PSD Major Source Threshold	100,000 tpy	100 or 250 tpy
PSD Permitting Threshold Major Modification	75,000 tpy	40 tpy

USEPA Tailoring Rule Phase-In

Date	Action	
2 January 2011	<p>New and modified major sources already subject to PSD must account for GHG emissions</p> <p>If over 75,000 tpy increase in GHG, BACT evaluation is required</p>	
1 July 2011	<p>New sources with GHG emissions >100,000 tpy can trigger PSD (on GHG alone). Will require Title V permit.</p>	
	<p>Major modified sources with increases in GHG emissions > 75,000 tpy will trigger PSD permitting and BACT evaluation</p>	

Conclusions

- **GHG emissions will have to be calculated at marine terminals**
 - ◆ For CEQA impacts
 - ◆ For PSD applicability
 - ◆ For Title V purposes
- **GHG calculation methodologies vary**
 - ◆ By what activities are included
 - ◆ By what emission factors to use
- **Marine terminals may have to provide mitigations if GHG emission increases exceed the CEQA significance thresholds**
- **Marine terminal GHG emissions are not likely to trigger PSD permitting on their own**



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