Marine Loading Barges and Ships of Crude Oil and Condensate

Scope:

Loading activities at marine terminals can be split into two categories: barge and ship. Expected facilities at these sites consist of:

- Fixed and/or floating roof tanks
- Loading racks
- Control equipment: flares, thermal oxidizers, VRUs
- Fugitives

Currently, marine loading is not authorized in a specific PBR and/or Standard Permit. However, the following authorizations may be claimed for these facilities:

Marine Loading:

Barge/ship loading may be authorized under Permits by Rule (PBRs) §§106.261 and/or 106.262 or by using the Oil and Gas standard permit (30 TAC 116.620).

For registrations using the PBRs:

1. Marine loading of crude oil – may be authorized under §106.261 (no speciation required); emission limits cannot exceed 6 lb/hr and 10 tpy.
2. Marine loading of condensate – may be authorized under §§106.261 and 106.262; requires speciation and meet E=L/K for each chemical (i.e. propane, butane, etc).

If claiming the Oil and Gas Standard Permit, it must be represented how the facility will meet 30 TAC 116.610(a)(1).

NOTE: Marine loading cannot be claimed under the non-rule version of the oil and gas standard permit.

Emission calculations:

- Marine loading/ unloading of live crude oil emissions are calculated by using AP-42, Section 5.2, Transportation and Marketing of Petroleum Liquids, Section 5.2 (Equations 2 and 3). The maximum vapor pressure at the maximum temperature and the maximum pumping rate should be used to calculate short-term emissions. The average vapor pressure at the average temperature and annual throughput should be used to calculate annual emissions.

- Marine loading/unloading of condensate and weathered crude oil emissions are estimated by using Equation 1 (12.46 * SPM/T) in AP-42, Section 5.2, Transportation and Marketing of Petroleum Liquids, and the Saturation Factors represented in Table 5.2-1. The maximum vapor pressure at the maximum temperature and the maximum pumping rate should be used to calculate short-term emissions. The average vapor pressure at the average temperature and annual throughput should be used to calculate annual emissions.
- TANKS 4.0 can be used to estimate working and breathing emissions from the storage tanks. Guidance to calculate short term emissions of storage tanks can be located at: www.tceq.texas.gov/permitting/air/guidance/newsourcereview/tanks/nsr_fac_tanks.html
- Equipment leak and fugitive emissions guidance can be located at: www.tceq.texas.gov/permitting/air/guidance/newsourcereview/fugitives/nsr_fac_eqfug.html

Capture / Collection techniques and efficiency:

- 65% capture/collection efficiency - if the barge is not leak-tested.
- 95% capture/collection efficiency - if the barge is leak tested based on NESHAPs Subpart BB requirements.
- 100% capture/collection efficiency - recognized only when a blower system is installed which will produce a vacuum in the barge/ship during all loading operations. The blower system should include a pressure/vacuum gauge on the suction side of the loading rack blower system adjacent to the barge/ship being loaded to verify a vacuum in that vessel. Loading shall not occur unless there is a vacuum of at least 1.5 inch water column being maintained by the vacuum-assisted vapor collection system when loading. The vacuum should be recorded every 15 minutes during loading. This information is referenced in the draft TCEQ Guidance Document entitled “Loading Operations” dated October 2000 and the previous version dated January 1995.

Control techniques and control efficiencies:

- Flares – Flares must meet 40 CFR 60.18 requirements of minimum heating value of waste gas and a maximum flare tip velocity. Flares can have a control efficiency of 98% when controlling emissions of crude oil or condensate or 99% for the following compounds: methanol, ethanol, propanol, ethylene oxide, and propylene oxide. The agency highly encourages the consideration of variable speed blowers when a control efficiency of > 98% is claimed for a steam – assisted flare to reduce over steaming of the flare which could affect the control efficiency.
- Thermal Oxidizers – must be designed for the variability of the waste gas stream and basic monitoring which consists of a thermocouple or an infrared monitor that indicates the device is working. Control efficiencies range from 90% - <99%.
- Carbon Systems – Can claim up to a 98% control efficiency. The carbon system must have an alarm system that will prevent break through.

- Vapor Recovery Units (VRU) – Refer to the VRU Control and Capture Efficiency Guidance Document to estimate emissions.
- Note: Loading cannot occur while the control system is off-line.

MSS Emissions

- No convenience landings under PBR or standard permit in accordance with the memo located at: www.tceq.texas.gov/assets/public/permitting/air/memos/tank_landing_final.pdf
- Based on the SIC Code of the site, which will determine when the planned maintenance, startup, and shutdown emissions should be submitted.

Recommendations

- If the site is part of the Air Pollutant Watch List – Please contact APD for guidance.
- Condensate shall be sampled on a monthly basis to demonstrate consistency of the API Gravity, vapor pressure, and molecular weight due to the variability of the product. An extended liquid analysis should be provided.
- Sampling must be taken from the barge loading point or equivalent.

Contact Information

Please contact the Rules Registration Section of the Air Permits Division at (512) 239-1250 or email address at mailto:airog@tceq.state.gov, if you have questions regarding this fact sheet.