

**PSE Tacoma LNG Facility NOC Application  
Response to PSCAA Request for Additional Information About  
Ambient Air Quality Assessment Scenarios**

**September 27, 2017**

The following document summarizes the different operating scenarios that were modeled as part of the ambient air quality assessment.

Facility Operating Scenarios:

- 1) Liquefying (all five waste gas cases)
- 2) Vaporizing (flare in holding mode)
- 3) Liquefying (all five waste gas cases) and truck and/or ship loading (all three waste gas cases)
- 4) Vaporizing (flare in holding mode) and truck and/or ship loading (all three waste gas cases)
- 5) Flare in holding mode, no other operations (e.g. maintenance shut down)
- 6) Flare in holding mode and truck and/or ship loading (all three waste gas cases).

Under Scenario 1, the facility's liquefaction process is operating and natural gas is pretreated, chilled, and sent to the LNG storage tank. Under Scenario 2, the LNG is being vaporized; liquefaction is not occurring and the flare is in holding mode. Scenario 2 (vaporizing) is not expected to occur more than 10 days per year whereas Scenario 1 (liquefying) could occur all hours of the year when not vaporizing.

Blow down and purge gas from the truck and ship loading operation may be flared during all operation scenarios (liquefying, vaporizing, or maintenance shutdown).

The vaporizer is running during Scenarios 2 and 4 and air quality modeling combines predicted concentrations from the vaporizer to predicted concentrations from the flare to give a total concentration for that facility operating scenario.

Several waste gas stream composition cases listed and described below are considered for the flare's two warm burners (5 liquefying cases based on different feed gas composition and flare holding) and small cold burner (truck and/or ship loading). Each operating scenario's waste gas stream was modeled to determine which combination produces the highest predicted ambient concentration. As you may recall, there is a fourth burner, large cold gas low-NO<sub>x</sub> burner in the flare, which is only used for cryogenic gas during plant upset conditions which do not represent a normal or anticipated operating scenario. As such, it is not included in the emissions inventory or dispersion modeling scenarios.

Large Warm Burner Cases:

- **Liquefying Case 1:** Base Design / Low Btu; Design Composition (2% CO<sub>2</sub>)
- **Liquefying Case 3:** "Normal" Operation; Alternative Heavy Composition (~0.2% CO<sub>2</sub>)
- **Liquefying Case 4:** Maximum Hydraulic Flare Case; Alternative Heavy Composition (2% CO<sub>2</sub>)
- **Liquefying Case 5:** High Specific Btu to Flare; Alternative Heavy Composition (~0.2% CO<sub>2</sub>)

Small Warm Burner Cases:

- **Liquefying Case 2:** Facility Turndown; Average Composition (~0.5% CO<sub>2</sub>)
- **Holding:** Facility Holding, No Liquefaction

Small Cold Burner Cases:

- **LNG Transfer Case A1:** Ship bunkering and truck loading at the same time
- **LNG Transfer Case A2:** Ship bunkering or truck loading, not both
- **LNG Transfer Case B:** Ship bunkering lean gas purge after initial rich gas purge

Table 1 summarizes the flare modeling scenarios and references the corresponding facility operating scenario described above. We've indicated with an 'X' which burner(s) within the flare assembly would be firing during each scenario.

**Table 1: Flare Emission Scenarios for Air Quality Modeling**

| Operating Scenario Number | Scenario Description                         | Modeling Source ID | Large Warm Gas Low-NO <sub>x</sub> Burner | Small Warm Gas Standard Burner | Small Cold Gas Standard Burner |
|---------------------------|--|--------------------|---|--------------------------------|--------------------------------|
| 1                         | Liquefying Case 1                            | LW1                | X   |                                |                                |
| 1                         | Liquefying Case 2                            | SW2                |   | X                              |                                |
| 1                         | Liquefying Case 3                            | LW3                | X   |                                |                                |
| 1                         | Liquefying Case 4                            | LW4                | X   |                                |                                |
| 1                         | Liquefying Case 5                            | LW5                | X   |                                |                                |
| 3                         | Liquefying Case 1, Truck and Ship Loading A1 | LWSC1A1            | X   |                                | X                              |
| 3                         | Liquefying Case 2, Truck and Ship Loading A1 | SWSC2A1            |   | X                              | X                              |
| 3                         | Liquefying Case 3, Truck and Ship Loading A1 | LWSC3A1            | X   |                                | X                              |
| 3                         | Liquefying Case 4, Truck and Ship Loading A1 | LWSC4A1            | X   |                                | X                              |
| 3                         | Liquefying Case 5, Truck and Ship Loading A1 | LWSC5A1            | X   |                                | X                              |
| 3                         | Liquefying Case 1, Truck or Ship Loading A2  | LWSC1A2            | X   |                                | X                              |
| 3                         | Liquefying Case 2, Truck or Ship Loading A2  | SWSC2A2            |   |                                | X                              |
| 3                         | Liquefying Case 3, Truck or Ship Loading A2  | LWSC3A2            | X   |                                | X                              |
| 3                         | Liquefying Case 4, Truck or Ship Loading A2  | LWSC4A2            | X   |                                | X                              |
| 3                         | Liquefying Case 5, Truck or Ship Loading A2  | LWSC5A2            | X   |                                | X                              |
| 3                         | Liquefying Case 1, Blow Down and Purge B     | LWSC1B             | X   |                                | X                              |
| 3                         | Liquefying Case 2, Blow Down and Purge B     | SWSC2B             |   | X                              | X                              |
| 3                         | Liquefying Case 3, Blow Down and Purge B     | LWSC3B             | X   |                                | X                              |
| 3                         | Liquefying Case 4, Blow Down and Purge B     | LWSC4B             | X   |                                | X                              |
| 3                         | Liquefying Case 5, Blow Down and Purge B     | LWSC5B             | X   |                                | X                              |

|      |  |         |  |   |   |
|------|--|---------|--|---|---|
| 2, 5 | Flare Holding                            | FLAREH  |  | X |   |
| 6    | Flare Holding, Truck and Ship Loading A1 | SWSCHA1 |  | X | X |
| 6    | Flare Holding, Truck or Ship Loading A2  | SWSCHA2 |  | X | X |
| 6    | Flare Holding, Blow Down and Purge B     | SWSCHB  |  | X | X |