

HEREBY ISSUES AN ORDER OF APPROVAL
TO CONSTRUCT, INSTALL, OR ESTABLISH

Registration No. **30022**
Date

One liquefied natural gas (LNG) processing facility and Totem Ocean Trailer Express (TOTE) Marine Vessel LNG fueling system. The LNG processing facility includes the use of the following equipment: one 66 MMBtu/hr LNG vaporizer, enclosed ground flare with four burners, one 9 MMbtu/hr water propylene glycol pretreatment heaters, one 1.6 MMbtu/hr regeneration pretreatment heaters, and one 8 Million gallon LNG storage tank.

APPLICANT

Puget Sound Energy
10885 NE 4th St
Bellevue, WA 98004

OWNER

Puget Sound Energy
10885 NE 4th St
Bellevue, WA 98004

INSTALLATION ADDRESS

Puget Sound Energy, 1001 E Alexander Ave. , Tacoma, WA 98421

THIS ORDER IS ISSUED SUBJECT TO THE FOLLOWING RESTRICTIONS AND CONDITIONS

1. Approval is hereby granted as provided in Article 6 of Regulation I of the Puget Sound Clean Air Agency to the applicant to install or establish the equipment, device or process described hereon at the **INSTALLATION ADDRESS** in accordance with the plans and specifications on file in the Engineering Division of the Puget Sound Clean Air Agency.
2. This approval does not relieve the applicant or owner of any requirement of any other governmental agency.

LNG Vaporizer

3. The LNG vaporizer approved under this order must comply with all applicable requirements established in 40 CFR Part 60, Subparts A and Dc.
 - a. The owner and/or operator shall submit notification of the date of construction and actual startup, as provided by 40 CFR 60.7. This notification shall include:
 - i. The design heat input capacity of the LNG Vaporizer and identification of fuels to be combusted.
 - b. The owner and/or operator that combusts only natural gas shall record and maintain records of the amount of natural gas combusted during each calendar month.
 - c. All records required under this section shall be maintained by the owner and/or operator of the LNG Vaporizer for a period of two years following the date of such record.
4. The LNG vaporizer shall only operate no more than 240 hours per any 12 consecutive month period.
5. The LNG vaporizer shall only use natural gas or boil-off gas as fuel for operation.
6. The LNG vaporizer shall not have a rated capacity to produce heat greater than 66 MMBtu/hr. This shall

Order of Approval for NC No. 11386

be documented in writing with manufacturer specification sheets or other agency approved method.

7. Within 60 days of commencing initial startup of the LNG vaporizer and then repeatedly once every 48 to 52 months of the previous test, the owner and/or operator shall conduct a performance test to verify compliance with the following emissions standards:
 - a. 4.0 ppmv VOC @ 3% O₂ dry - VOC testing shall be conducted in accordance with EPA Test Method 25 or 25A or an alternative method approved by the Agency. Testing to quantify exempt compounds, such as methane, shall be conducted in accordance with EPA Test Method 18 or an alternative method approved by the Agency.
 - b. 50.0 ppm CO @ 3% O₂ dry - CO testing shall be conducted in accordance with EPA Test Method 10 or an alternative method approved by the Agency.
 - c. 9.0 ppmv NO_x @ 3% O₂ dry - NOX testing shall be conducted in accordance with EPA Test Method 7E or an alternative method approved by the Agency.

The owner and/or operator shall conduct testing in accordance with Section 3.07 of Puget Sound Clean Air Agency (PSCAA) Regulation I using the following test Methods:

Sampling sites and velocity traverse points shall be selected in accordance with EPA Test Method 1 or 1A. The gas volumetric flow rate shall be measured in accordance with EPA Test Method 2, 2A, 2C, 2D, 2F, 2G or 19. The dry molecular weight shall be determined in accordance with EPA Test Method 3, 3A or 3B. The stack gas moisture shall be determined in accordance with EPA Test Method.

The LNG vaporizer is not required to commence initial startup for the sole purpose of conducting a performance test. The owner and/or operator may wait until the unit is needed to commence initial startup.

8. At least once per quarter during operation of the LNG Vaporizer, the Permittee shall conduct visual observations of the exhaust. If any emissions are visible from the exhaust, the Permittee shall conduct a visible emissions observation by a person certified in accordance with EPA Reference Method 9 (40 CFR 60, Appendix A). Such a test shall consist of a minimum of 30 minutes of opacity observations for the LNG Vaporizer. The owner and/or operator shall ensure 0% opacity from the LNG Vaporizer as measured with the Method 9.
9. Regardless of whether or not emissions are observed pursuant to Condition #8 of this permit, the Permittee shall conduct a minimum of one visible emissions test of the LNG Vaporizer each year (within 12 months) since the last visible emissions test required under this permit condition. Such a test shall consist of a minimum of 30 minutes of opacity observations of the LNF Vaporizer and shall be performed by a person certified in accordance with EPA Reference Method 9 (40 CFR 60, Appendix A). The owner and/or operator shall ensure 0% opacity from the LNG Vaporizer as measured with the Method 9.

Enclosed Ground Flare

10. The following processes shall have their vapor waste gases routed to the enclosed ground flare before being released to the atmosphere:
 - a. Feed Gas Compressor
 - b. Amine Pretreatment Unit
 - c. Heavies Storage and fuel System
 - d. Liquefaction

Order of Approval for NC No. 11386

e. Post Load Purge

11. The flare shall be continuously operating at all times that gases are routed to it. In the event that the flare goes out of service, either due to a malfunction or maintenance, all systems being routed to the flare shall shut down until the flare can be brought back into service.

12. The owner and/or operator shall operate the enclosed ground flare as outlined below:

- a. The enclosed ground flare shall be operated with a flame present at all times during normal operation. The presence of a flare pilot flame shall be monitored using a thermocouple or any other equivalent device to detect the presence of a flame.
- b. An owner/operator has the choice of adhering to either (i) or (ii) below
 - i. Flares shall only be used meeting the heat content specifications in CFR 40 60.18 (c)(iii)(2) and the maximum tip velocity specifications in 40 CFR 60.18 (c)(4); or
 - ii. Flares shall only be used that meet the requirements of 40 CFR 60.18 (c)(3)(i).
- c. The enclosed ground flare shall be designed for and operated with an exit velocity, as determined by the methods specified in 40 CFR 60.18 (f)(4) of this section, less than 18.3 m/sec (60 ft/sec), except as provided below.
 - i. The enclosed ground flare designed for and operated with an exit velocity equal to or greater than 18.3 m/sec (60 ft/sec) but less than 122 m/sec (400 ft/sec) is allowed if the net heating value of the gas being combusted is greater than 37.3 MJ/scm (1,000 Btu/scf);
 - ii. The enclosed ground flare designed for and operated with an exit velocity less than the velocity, V_{max} (as determined by the method specified in 40 CFR 60.18 (f)(5)) and less than 122 m/sec (400 ft/sec) are allowed.
- d. The owner and/or operator shall also install a continuous operating and recording temperature device in f the flare stack combustion zone.

13. The enclosed ground flare shall have a stack height of at least 105 feet above ground level and the inside diameter shall be no more than 6 feet at the exit.

14. The maximum H₂S and total sulfur content of the natural gas processed by the facility shall be limited to 0.25 grain of H₂S per one hundred cubic feet (gr/hcf). Compliance with this condition can be met by keeping tariffs which show the maximum allowed value of H₂S in the pipeline which delivers the natural gas is 0.25 grain of H₂S per one hundred cubic feet (gr/hcf).

15. The owner and/or operator shall ensure the enclosed ground flare achieves a minimum of 99% destruction of all volatile organic compounds up to 3 carbons or less than 10 ppm NMOC by volume, dry basis as hexane @ 3% oxygen.

16. The enclosed ground flare may not discharge total sulfur dioxide (SO₂) into the atmosphere in excess of 165 lbs of SO₂ per MMScf. In lieu of conducting a performance test on SO₂ at the outlet of the flare, the Permittee may test the inlet concentration to the flare from the Amine pretreatment unit annually (Once every 12 months) for all sulfur containing compounds and then assume all sulfur converts to SO₂ in the stack.

- a. If the owner and/or operator decides to comply with this condition using the inlet SO₂ concentration, the Inlet flare gas sulfur testing shall be at least once every 12 months (annually). The test sample should be a composite grab using an appropriate ASTM test method as specified in 40 CFR 75 Appendix D Section 2.3.3.1, or an alternative method approved by the agency. If, after two years of annual testing, the sulfur content is found to be

Order of Approval for NC No. 11386

consistently less than the 165 lbs of SO₂ per MMScf, the periodic sampling rate can be changed to once every 5 years.

- b. If the owner and/or operator decides to test the SO₂ at the outlet of the flare stack, the testing shall be done at least once every 12 months (annually). SO₂ testing shall be conducted in accordance with EPA Test Method 6C, or an alternative method approved by the agency. If, after two years of annual testing, the SO₂ emission rate is found to be consistently less than the 165 lbs of SO₂ per MMScf, the testing frequency can be changed to once every 5 years.
- 17. The enclosed ground flare may not discharge nitrogen oxides (NO_x) into the atmosphere in excess of the following limits: 0.066 lbs/MMBtu whenever the small warm burner (Burner 3) is operating, 0.060 lbs/MMBtu whenever the small cold burner (Burner 2) is operating, and 0.023 lbs/MMBtu whenever exclusively one or both of the large burners (Large Warm Burner 1 and Large Cold Burner 4) are operating.
- 18. The enclosed ground flare may not discharge carbon monoxide (CO) into the atmosphere in excess of the following limits: 0.196 lbs/MMBtu whenever the small warm burner (Burner 3) is operating, 0.180 lbs/MMBtu whenever the small cold burner (Burner 2) is operating, and 0.075 lbs/MMBtu whenever exclusively one or both of the large burners (Large Warm Burner 1 and Large Cold Burner 4) are operating.
- 19. There shall be no visible emissions from the enclosed ground flare, except for periods not to exceed 5 min in any 2 consecutive hours, as determined by EPA Method 22 in Appendix A in 40 CFR Part 60. The observation period shall be 2 hours and shall be used according to Method 22.
- 20. The owner and/or operator may not discharge Particulate Matter (PM) greater than 0.0075 lbs/MMbtu.
- 21. Initial compliance with the minimum destruction efficiency in Condition #15 must be demonstrated by testing the enclosed ground flare within 60 days of starting up the flare in accordance with Section 3.07 of Puget Sound Clean Air Agency (PSCAA) Regulation I using EPA reference methods 1, 2, 3C, 4 and 25C from Appendix A of 40 CFR Part 60. Inlet and outlet NMOC concentrations must be converted to ppmv of hexane. Compliance testing must be conducted while gas streams are being vented to the flare at a flowrate of at least 600 scfm or other flow rate that represents the worst case operating scenario and must consist of at least three separate 30-min test runs. The owner and/or operator may conduct additional testing in order to adjust the operating flare temperature required by Condition #29.
- 22. Initial compliance with the NO_x limit in Condition #17 must be demonstrated by testing the enclosed ground flare within 60 days of starting-up the unit in accordance with Section 3.07 of PSCAA Regulation I using EPA reference methods 1, 2, 3A, 4 and 7E from Appendix A of 40 CFR Part 60. Compliance testing must be conducted while gas streams are being vented to the flare at a flowrate of at least 600 scfm or other flow rate that represents the worst case operating scenario must consist of at least three separate 30-min test runs.
- 23. Initial compliance with the CO limit in Condition #18 must be demonstrated by testing the enclosed ground flare within 60 days of starting-up the unit in accordance with Section 3.07 of PSCAA Regulation I using EPA reference methods 1, 2, 3A, 4 and 10 from Appendix A of 40 CFR Part 60. Compliance testing must be conducted while gas streams are being vented to the flare at a flowrate of at least 600 scfm or other flow rate that represents the worst case operating scenario must consist of at least three separate 30-min test runs.
- 24. Compliance with the visible emissions limit in Condition #19 must at a minimum be demonstrated by inspecting the enclosed ground flare stack for visible emissions once a week. These inspections must be

Order of Approval for NC No. 11386

performed during daylight hours when the flare system is in operation. If during the scheduled inspection or at any other time, visible emissions other than uncombined water are observed, the owner or operator must submit a report to the Agency within 30 calendar days of the end of the month in which the violation occurred. The report must include the time and duration of the visible emissions and a description of actions taken to correct the violation.

25. Compliance with the PM emission standard in Condition #20 shall be tested within 60 days of starting-up the unit in accordance with Section 3.07 of PSCAA regulation I using PSCAA method 5 (Board Resolution 540) or other agency approved method.
26. A testing notification must be submitted to the PSCAA in accordance with Section 3.07 of Regulation I, twenty one days before any compliance test required by this Order of Approval is conducted. The facility must submit a test plan with the notification that includes what operating scenario is being vented to the flare for each test and all specific flare and process equipment operating data that will be collected during the test as well as the methods that will be used to collect the data.
27. The enclosed ground flare is not required to be started up solely for the purposes of a compliance test within 60 days; the owner and/or operator may wait up to 180 days to conduct a performance test of this section.
28. The owner and/or operator shall operate the enclosed ground flare burners at or above the average temperature range recorded during the most recent source test which shows compliance with Condition #15. The burner set point temperature of the flare, used to control the temperature within the flare, shall be set such that the temperature of the flare does not drop below the most recent source test temperature. The flare operating temperature requirement does not apply to periods of start-ups, shutdowns and/or malfunctions provided that these events are not actively processing waste gases and do not last for more than 1-hour.
29. The owner and/or operator shall report to the agency no later than 30 days after the violation is discovered all instances when either:
 - a. The flare temperature readings were below the allowable temperature required under Condition #28.
 - b. Startup, shutdown or malfunction events lasted longer than an hour and the enclosed ground flare was actively receiving waste gases.
30. The owner/or operator shall develop and maintain an Operation and Maintenance (O&M) plan for the enclosed ground flare. The O&M plan shall be developed and implemented per Agency's Regulation I. The following shall be included in the O&M plan at a minimum:
 - a. Calibration, maintenance, repair and replacement procedures of monitoring, burner and ignition system equipment for the enclosed ground flare.
 - b. Opacity inspection procedures.
 - c. Written start-up, shutdown, and malfunction plan according to the provisions of 40 CFR 63.6(e)(3).

Fugitive Emissions (Leaks)

31. All valves, flanges, seals, joints and compressors shall be reasonably accessible for fugitive emissions monitoring during normal plant operation.

Order of Approval for NC No. 11386

32. The owner and/or operator shall develop and maintain a Leak Detection and Repair Plan (LDAR) plan for fugitive emissions as outlined below. The LDAR plan shall be implemented and submitted to the agency for approval as soon as the facility is started up. If there are changes made after start-up or if the Agency has required changes to the LDAR as a result of the submittal, the owner and/or operator shall submit and implement the updated LDAR within 30 days of the changes. The LDAR plan shall be implemented using the provisions of 40 CFR 60 Subpart H, as outlined below:

- a. 40 CFR 63.160 Definitions
- b. General requirements under 40 CFR 63.162(a), (c), (d), (f), (g), and (h)
- c. Monitoring provisions for equipment gas/vapor and light liquid service under 40 CFR 63.163 to 174, using the 500-ppm leak rate definition immediately upon startup
- d. Method 21 test methods and procedures (40 CFR part 60, Appendix A)
- e. Delay of repair provisions under 40 CFR 63.171
- f. The alternative quality improvement program for equipment described in 40 CFR 63.175 and 176, in lieu of related 40 CFR 63.168 and 163 requirements.
- g. Recordkeeping provisions for equipment in VOC service under 40 CFR 63.181

General Plant Requirements:

33. The owner and/or operator shall document that the Liquefied Natural Gas storage tank capacity does not exceed 8 million gallons. The documentation shall be made readily available upon request from the Agency.
34. The owner and/or operator shall document and ensure that the LNG storage tank is cooled to at least -260 Degree F while storing natural gas. The documentation shall be made readily available upon request from the Agency.
35. The propane, isopentane, ethylene, and heavies storage tanks shall not be more than 20,000 gallons. The owner and/or operator shall document the tank capacities and the documentation shall be made readily available upon request from the Agency.
36. The refrigerant compressor shall be equipped with a seal leak recovery system capable of at least 90% recovery. This condition can be verified with testing or with manufacturer data information showing the system is capable of meeting 90% recovery on the refrigerant. The documentation to verify compliance with this condition shall be made readily available upon request from the Agency.
37. The owner and/or operator shall install a mercury removal system, capable of removing elemental mercury from the natural gas coming into the facility. The owner and/or operator shall include periodic inspection and maintenance of the mercury removal system in the operation and maintenance plan, accordingly.
38. The owner and/or operator shall document that the underground marine loading piping is vacuum jacketed and a fiber optic leak detection system is installed below the LNG lines to ensure there are no leaks while loading operations occur. The documentation showing compliance with this condition shall be made readily available upon request from the Agency.
39. The owner and/or operator shall keep documentation showing that the cooling water system is a closed loop system, and the water/propylene glycol mixture does not come into direct contact with any liquefaction equipment process liquid during operation. The documentation showing compliance with this

Order of Approval for NC No. 11386

condition shall be made readily available upon request from the Agency.

40. Pursuant to the State Environmental Policy Act, RCW 43.21C.060, WAC 197-11-660, and Puget Sound Clean Air Agency Regulation I, Section 2.12:

The owner and/or operator shall ensure that the sole source of natural gas supply used in all operations at the Tacoma LNG facility comes from British Columbia or Alberta, Canada. Compliance with this condition shall be verified by the owner and/or operator maintaining the following records:

- a. Monthly records documenting the purchase of natural gas from seller(s) at the Huntingdon, B.C. Pool (trading hub) showing delivery point of the Huntingdon/Sumas interconnect with Northwest Pipeline and the corresponding monthly volume purchased.
- b. Monthly records of nominations on Northwest Pipeline contracts showing receipt point of Sumas, delivery point of Frederickson and monthly volume of natural gas delivered.
- c. Monthly records of nominations on the PSE system showing receipt point of Frederickson, delivery point of Tacoma LNG facility and monthly volume of natural gas delivered.
- d. Monthly records documenting the volume of natural gas received at the Tacoma LNG facility
- e. Monthly records indicating that the flow of Natural Gas from Canada was from north to south passed the Frederickson Gate Station.
- f. In the event that the natural gas pipeline supplying the Tacoma LNG facility ceases to transport gas from north to south passed the Frederickson Gate Station, the owner and/or operator shall immediately cease accepting natural gas from the pipeline.
 - i. If the event described in Condition #40(f) of this order occurs, the owner and/or operator shall submit a report to the Agency no later than 15 days after original discovery outlining all of the following:
 1. Date and Time of incident.
 2. Owner and/or operators response to the incident.
 3. If the natural gas continued to be accepted during the event, provide reason(s) operations continued pulling natural gas from the pipeline.
 4. Measures taken to minimize the amount of natural gas taken from the pipeline during this time.
 5. Quantity of natural gas processed during the event.
- g. The owner and/or operator shall submit semiannual data reports to the Agency compiling and summarizing the data recorded in Conditions #40 (a) – (f) of this order. These semiannual reports shall be submitted no later than January 31 and July 31 for each proceeding six month calendar period. If the issuance of this permit causes one of these reporting periods to be shorter than 6 months, the owner and/or operator shall submit data for the number of months it was operating before January 31 or July 31.

41. Odor Compliance

The owner and/or operator shall develop an odor response plan and odor complaint log with the following elements:

- a. Instances where the odor gas injection system (methyl mercaptan) caused odors and any corrective action taken.
- b. Initiate an investigation of all odor complaints received from the public as soon as possible, but no later than 12 hours after receipt of the complaint.
- c. Take corrective action to eliminate odors beyond the property line as soon as possible, but within 24 hours after receipt of the complaint. If the odors cannot be eliminated within 24 hours after receipt of the complaint, the owner and/or operator shall explain the reasoning in the odor compliant log and the date that it was corrected.
- d. Develop a report for every odor complaint and investigation. The odor complaint and

Order of Approval for NC No. 11386

investigation report must include the following:

- i. The date and time of when the complaint was received.
- ii. The date and time of when the investigation was initiated.
- iii. Location of complaint and investigation.
- iv. Weather conditions during the complaint and investigation.
- v. Description of complaint and investigation.
- vi. Actions taken in response to the complaint.
- vii. The date and time odors are no longer detected.

42. The owner and/or operator shall not perform truck loading for more than 360 hours per any 12 consecutive month period.

Recordkeeping and Reporting Requirements

43. All records required by this Order of Approval must be maintained onsite and available for inspection by agency personnel for at least two years from the date of generation.

44. The following records shall be kept onsite and up-to-date, and be made readily available to Agency personnel upon request at all times:

- a. Compliance test reports.
- b. Certified opacity readings for the LNG vaporizer and enclosed ground flare.
- c. Amount of hours of operation for the LNG vaporizer.
- d. Annual Sulfur sample readings and the dates the samples were taken.
- e. LDAR records outlined in the following sections of 40 CFR 63.181
 - i. A list of all equipment subject to the LDAR program.
 - ii. Maintain records of visual and Method 21 inspections of LDAR parts.
 - iii. Maintain records when leak first detected, repair date, and reason for delay if not repaired within 15 days.
 - iv. Maintain a list of equipment in organic service less than 300 hours per year
 - v. Maintain records when leak first detected, repair date, and reason for delay if not repaired within 15 days.
- f. A copy of the odor complaint log and odor response plan.
- g. A log of the monthly and 12-month rolling total hours of truck loading operations.
- h. A written log showing corrective actions taken to maintain compliance with this Order of Approval. Each log entry must include date, time and description of the action.
- i. A written log showing any instance waste gases bypass the enclosed ground flare and are released to the atmosphere unabated. Each log entry must include date, time, duration and the estimated amount of waste gases (including all speciated data) released to the atmosphere.
- j. The Operation and Maintenance (O&M) plan.

45. The following records shall be kept onsite, updated within 30 days at the end of each month for at least two years from the date of generation, and be made readily available to Agency personnel upon request:

- a. Enclosed ground flare: Written or electronic copies of the 3-hour average readings for the flare operating temperature.
- b. Results of opacity inspections to determine compliance with the requirements in Condition #24.

46. The Agency shall be notified, in writing, within 30 days of the end of the month in which an exceedance of any emissions limitation and standard identified in these permit conditions is discovered.

Order of Approval for NC No. 11386

APPEAL RIGHTS

Pursuant to Puget Sound Clean Air Agency's Regulation I, Section 3.17 and RCW 43.21B.310, this Order may be appealed to the Pollution Control Hearings Board (PCHB). To appeal to the PCHB, a written notice of appeal must be filed with the PCHB and a copy served upon Puget Sound Clean Air Agency within 30 days of the date the applicant receives this Order.

Ralph Munoz
Reviewing Engineer

Carole Cenci
Compliance Manager

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