Northwest Air Pollution Authority hereby issues
Order of Approval to Construct (OAC) #813a

Project Summary: Construct and operate a steam methane reformer (SMR) located within the boundaries of the Shell Puget Sound Refinery to supply up to 7.7 million standard cubic feet of hydrogen gas per day to the refinery's hydrogen system. Products of combustion will be emitted from the SMR reactor and from the flare. Maximum heat input to the SMR reactor in the form of natural gas and pressure swing adsorption (PSA) off-gas is 80.2 MMBtu/hour. This hydrogen plant is being constructed in association with the refinery's Hydrocracker #3 to produce low sulfur gasoline. The project will not result in any debottlenecking of pre-existing processing capacity at the refinery.

APPLICANT
Rich Deal
Air Liquide Americas
2700 Post Oak Blvd, Suite 1800
Houston, Texas 77056

OWNER
Air Liquide America
2700 Post Oak Blvd, Suite 1800
Houston, Texas 77056

FACILITY LOCATION:
8551 South Texas Road, Anacortes, Washington
NWAPA Registration #: 828-EM02-S

Best Available Control Technology (BACT) for the SMR reactor has been determined to be:
- For nitrogen oxide (NOx) is low NOx burners.
- For fine particulate (PM-10), sulfur dioxide (SOx) and carbon monoxide (CO) is the selection of natural gas and PSA off-gas for fuel and the use of good combustion practices.

As authorized by the Northwest Air Pollution Authority Regulation Section 300, this order is issued subject to the following restrictions and conditions:

1. The flare pilot system shall use only pipeline grade natural gas and the sweep for the flare shall be nitrogen.

2. The SMR shall not exceed a firing rate of 80.2 MMBtu/hour and shall combust only pipeline grade natural gas and PSA off-gas.
3. The following parameters shall be recorded and records kept for a period of no less than three years.

a) The quantity of natural gas and PSA off-gas combusted in the SMR,

b) The valve position data used to calculate flow(s) to the flare during flaring events, and

c) An explanation as to the cause of each flaring event.

4. The flare shall be operated with a pilot flame which shall be continuously monitored using a thermocouple or other equivalent device.

5. Visible emissions from the SMR stack or flare shall not exceed five percent (5%) opacity for more than six minutes in any one hour as determined by EPA Method 9. Compliance with this condition will be determined by the NWAPA, or by an independent party under contract to the facility, if required by the NWAPA.

6. Nitrogen oxide emissions from the SMR stack shall not exceed 0.035 pounds/MMBtu heat input (higher heating value) or 2.8 pound/hour based on a 3-hour rolling average.

7. Carbon monoxide emissions from the SMR stack shall not exceed 0.122 pounds/MMBtu heat input (higher heating value) or 1.7 pounds/hour based on a 3-hour rolling average.

8. Compliance with conditions 6 and 7 shall be determined by an initial performance test conducted at the SMR’s maximum allowable firing rate and under normal operations. The test shall be conducted within 90 days of initial startup and shall use the following test methods.

$$\text{NO}_x: \quad 40 \text{ CFR 60 Appendix A, EPA Method 7E}$$

$$\text{CO:} \quad 40 \text{ CFR 60 Appendix A, EPA Method 10}$$

A performance test plan shall be submitted to NWAPA at least 30 days prior to testing and shall include the scheduled test date and test methods to be used. Test results shall be submitted to the NWAPA no later than 45 days following completion of testing.

9. Emissions from the project shall not cause an exceedance of acceptable source impact levels specified in WAC 173-466-150 and -160 as determined by methods specified in WAC 173-460-080. Compliance with this condition shall be demonstrated upon request by the NWAPA.

10. NOx emissions from the flaring of process gasses shall not exceed 0.50 (5.0 x 10^-3) tons per calendar year (not including emissions from the flare pilot). This emission limit shall include periods of plant startup, shutdown, malfunction and during periods of load discrepancies. An emission factor of 0.0641 lb/MMBtu low hearing value (TNRCC Document RG-109, October 2000 draft) shall be used to calculate emissions. This calculation may be revised if a more accurate emission factor becomes available. Any change in the emission factor shall be mutually agreed upon by Air Liquide and the NWAPA and incorporated into this OAC with a corresponding change in the mass emission limit. The plant shall keep monthly records on the
calculated NOx emissions from the flare. These monthly records shall include the pounds of NOx emitted during the month and the calendar year total to date. These records shall be kept on-site for a period of at least three years and shall be readily available for review by the NWAPA.

Dan Mahar, PE
Permitting Engineer

Anne Neilsen, PE
Reviewing Engineer

James Randles
Director

Revision A: Reformat. Clarify conditions 1, 3, 4 and 5. Add condition 3b. Change condition 10 by removing the requirement to notify NWAPA of initial startup as it was received on October 14, 2003 and at the request of Air Liquide add an annual NOx limit for the flare with associated recordkeeping.