217/782-2113

CONSTRUCTION PERMIT -- NESHAP SOURCE -– NSPS SOURCE –- REVISED

PERMITTEE

Air Products and Chemicals, Inc.
Attn: Scott Hartranft
7201 Hamilton Boulevard
Allentown, PA 18195-1501

Application No.: 05020063
Applicant's Designation:
Subject: Hydrogen Plant
Date Issued: July 24, 2007
Location: I-55 and Arsenal Road, Joliet

I.D. No.: 197800ACA
Date Received: May 31, 2007

Permit is hereby granted to the above-designated Permittee to CONSTRUCT emission source(s) and/or air pollution control equipment consisting of a hydrogen plant as described in the above-referenced application. This Permit is subject to standard conditions attached hereto and the following special condition(s):

Findings

1a. Air Products and Chemicals, Inc. (Air Products) is seeking a construction permit for a hydrogen plant. The plant will be designed and operated to produce hydrogen that will be sent to the adjacent ExxonMobil Refinery, along with the byproduct steam from the hydrogen production process. The hydrogen plant will provide the hydrogen needed for the refinery's Ultra Low Sulfur Diesel (uLSD) project (Application No. 03110060). The hydrogen plant would be accompanied by volatile organic material (VOM) emissions that by themselves would not be considered significant.

b. The VOM emissions from this project when combined with all other net increases in VOM emissions from the existing source (ExxonMobil - Joliet Refinery) over the calendar years 2002 through 2006 exceed 25 tons, therefore this project results in a significant net emissions increase triggering the requirements for LAER and offsets.

c. For purposes of this permit, the Hydrogen Plant is considered a support facility for the ExxonMobil Joliet Refinery that is being installed in conjunction with the Refinery's uLSD Project. Therefore, for purposes of applicability of New Source Review regulations, the Hydrogen Plant (in conjunction with the uLSD Project) is being treated as a modification to an existing major stationary source, the ExxonMobil Joliet Refinery.

2. The area in which the facility would be located is designated nonattainment for ozone and $PM_{2.5}$.

3. The overall project, hydrogen plant and uLSD project, has potential emissions, when combined with the net emission increases from other contemporaneous projects at the existing source, that are more than 25 tons/year for VOM. The project is therefore subject to 35 IAC 203: Major Stationary Sources Construction and Modification (MSSCAM).

4. After reviewing all materials submitted by Air Products, the Illinois EPA has determined that the project will use work practices that will comply with all applicable Board emissions standards and meet the Lowest Achievable Emission Rate (LAER) for VOM as required by MSSCAM. The case-by-case determination of LAER for this project is contained in the Control Requirements and the Work Practices for various units contained in Conditions 2.1.5, 2.2.5, 2.3.5, and 2.4.5 of this permit.

5. The Illinois EPA has broadly considered alternatives to this project, as required by 35 IAC 203.306. ExxonMobil's uLSD project is a federally mandated program for which hydrogen is required. As the refinery is an existing source and requires additional hydrogen for its uLSD project, the benefits of the proposed project significantly outweigh its environmental and social costs.

6. Air Products does not have any other existing major sources located in Illinois. Thus, Air Products satisfies the existing source compliance requirement of 35 IAC 203.305.

7. A copy of the application and the Illinois EPA's review of the application and a draft of this permit was forwarded to a location in the vicinity of the plant, and the public was given notice and opportunity to examine this material, to submit comments, and to request and participate in a public hearing on this matter.

1.0 PLANT-WIDE CONDITIONS FOR THE HYDROGEN PLANT

1.1 Plant-Wide Applicable Provisions and Regulations

1.1.1 Specific emission units at this plant are subject to particular regulations as set forth in Section 2 (Unit-Specific Conditions for Specific Emission Units) of this permit.

1.1.2 In addition, emission units at this plant are subject to the following regulations of general applicability:

a. No person shall cause or allow the emission of fugitive particulate matter from any process, including any material handling or storage activity, that is visible by an observer looking generally overhead at a point beyond the property line of the source unless the wind speed is greater than 40.2 kilometers per hour (25 miles per hour), pursuant to 35 IAC 212.301 and 212.314.

b. Pursuant to 35 IAC 212.123(a), no person shall cause or allow the emission of smoke or other particulate matter,

with an opacity greater than 30 percent, into the atmosphere from any emission unit other than those emission units subject to the requirements of 35 IAC 212.122, except as allowed by 35 IAC 212.123(b) and 212.124.

1.1.3 This overall project (Hydrogen Plant and uLSD Project combined) is considered a major modification for purposes of the Emission Reduction Market System (ERMS), pursuant to 35 IAC Part 205. As a major modification, the Permittee must hold allotment trading units (ATUs) for the affected components in an amount not less than 1.3 times their seasonal VOM emissions, in accordance with 35 IAC 205.150(c)(2). If requested by both Permittee and ExxonMobil, and if allowed by Illinois EPA, Permittee’s requirement to hold ATUs may be met via ATUs held in ExxonMobil’s ATU Account.

1.1.4 Emissions Offsets

a. The Permittee, either alone or coordinated with ExxonMobil Oil Corporation, shall maintain 23.0 tons of VOM emission offsets generated by other sources in the Chicago nonattainment area such that the total is 1.3 times the VOM emissions allowed from this overall project (Hydrogen Plant and uLSD Project combined).

b. These VOM emission reduction credits are provided by permanent emission reductions that occurred at the following source, as identified below. These emission reductions have been relied upon by the Illinois EPA to issue this permit and the revised ExxonMobil Joliet Refinery's uLSD Construction Permit (03110060) and cannot be used as emission reduction credits for other purposes. The reductions at the sources identified below have been made enforceable by the withdrawal of the air pollution control permits for the source.

Viskase, Bedford Park, I.D. No. 031012ABQ
Or
ASF Keystone, Hammond, IN

Permanent Shutdown of Facility 23.0 tons/year

c. The acquisition of VOM emission offsets shall be completed either 90 days after issuance of this Construction Permit or prior to commencement of construction of the Hydrogen Plant to support the uLSD project, whichever occurs later.

Condition 1.1.4 represents the actions identified in conjunction with this overall project to ensure that the overall project is accompanied by emission offsets and does not interfere with reasonable further progress for VOM.

Emission offsets are being required in conjunction with the issuance of the permit because USEPA has not approved provisions of the ERMS that would allow compliance with the ERMS to satisfy the offset requirements for a major modification in 35 IAC Part 203. For this purpose, the Illinois EPA has applied provisions of 35 IAC Part 203 that were applicable when a permit was originally issued for the uLSD project. This requires that offsets be provided in a ratio of 1.3 to 1.

1.2 Applicability of New Source Review Regulations

1.2.1. The Permittee, working with ExxonMobil Joliet Refinery, has addressed the applicability and compliance of 40 CFR 52.21, Prevention of Significant Deterioration (PSD) and 35 IAC Part 203, Major Stationary Sources Construction and Modification (MSSCAM). The limits established by this permit and the revised ExxonMobil Joliet Refinery's uLSD Construction Permit (03110060) are intended to ensure that the new plant addressed in this construction permit does not constitute a major modification of the refinery pursuant to these rules for NO_x, CO, SO_2, and $PM/PM_{10}/PM_{2.5}$ emissions (See also Attachment 1, 2, 3a and 3b).

For this purpose the new hydrogen plant was considered in conjunction with ExxonMobil Joliet Refinery's uLSD project, for which the hydrogen plant is a necessary element, as the two are considered a single project for purposes of PSD and MSSCAM. The net emissions increase resulting from the addition of the hydrogen plant and other activities at the ExxonMobil Joliet Refinery is described in the attachments to this permit.

1.3 Plant-Wide Recordkeeping Requirements

1.3.1 Retention and Availability of Records

a. All records and logs required by this permit shall be retained for at least five years from the date of entry (unless a longer retention period is specified by the particular recordkeeping provision herein), shall be kept at a location at the source that is readily accessible to the Illinois EPA or USEPA, and shall be made available for inspection and copying by the Illinois EPA or USEPA upon request.

b. The Permittee shall retrieve and print, on paper during normal source office hours, any records retained in an electronic format (e.g., computer) in response to an Illinois EPA or USEPA request for records during the course of a source inspection.

1.4 Plant-Wide Compliance Procedures

1.4.1 Hydrogen Plant Reformers

a. Emissions from the combustion equipment shall be determined from appropriate emission factors for the affected equipment, as developed from testing of the affected equipment or testing by the manufacturer or other similar testing.

1.4.2 Components

a. Emissions from the components, i.e., leaks from valves, pumps, fittings, etc. shall be determined from standard emission estimate methodology published by USEPA in "Protocol for Equipment Leak Emission Estimates", EPA-453/R-95-017 (November 1995) or API Publication Number 337 for components in heavy liquid service.

1.4.3 Process Vents

a. Emissions from the process vents shall be determined from appropriate emission factors for the affected equipment, as developed from testing of the affected equipment and/or process design data.

1.4.4 Individual Drain Systems

a. Emissions from the new individual drain system(s) shall be determined from appropriate emission factors for the affected equipment such as emission estimates using the Litchfield equations or emission factors developed from testing of the affected equipment.

1.5. The hydrogen plant addressed by this permit may be operated under this construction permit until a CAAPP permit is issued for the plant, provided the Permittee submits a timely and complete application for such CAAPP permit to the Illinois EPA within one year of the initial startup of the plant.

2.0 UNIT SPECIFIC CONDITIONS FOR SPECIFIC EMISSION UNITS

2.1 Unit: Hydrogen Plant Reformer Process Heaters

2.1.1 Description

The hydrogen plant will be designed to produce a maximum of 18 million cubic feet per day of hydrogen. The hydrogen plant will use suitable feed gas supplied by ExxonMobil (such as gas from the Saturate Gas Plant) and/or natural gas as the feedstock to produce the gaseous hydrogen and as fuel in the heaters. Emissions result from the heaters that supply the energy for this process.

2.1.2 List of Emission Units and Air Pollution Control Equipment

Emission Unit	Description	Emission Control Equipment
P-AP01	Reformer Process Heaters Rated at 74.5 mmBtu/hour Each	None

2.1.3 Applicable Provisions and Regulations

a. An “affected heater” for the purpose of these unit-specific conditions, is each heater as described in Conditions 2.1.1 and 2.1.2.

b. i. This permit is issued based upon the affected heaters being subject to the NSPS for Petroleum Refineries, 40 CFR 60 Subparts A and J.

ii. The Permittee shall not burn in the affected heaters any fuel gas that contains hydrogen sulfide (H_2S) in excess of 230 mg/dscm (0.10 gr/dscf) [40 CFR 60.104(a)(1)].

c. This permit is issued based upon the affected heaters being subject to National Emission Standards for Hazardous Air Pollutants For Industrial, Commercial, and Institutional Boilers and Process Heaters, 40 CFR 63, Subpart DDDDD. The Permittee shall comply with all applicable requirements of 40 CFR Part 63 Subpart DDDDD.

d. The Permittee shall not cause or allow the emissions of smoke or other particulate matter, with an opacity greater than 30 percent, into the atmosphere from each affected heater [35 IAC 212.123(a)].

e. The Permittee shall not cause or allow the emission of carbon monoxide (CO) into the atmosphere from any affected

heater to exceed 200 ppm, corrected to 50 percent excess air [35 IAC 216.121].

2.1.4 Non-Applicability of Regulations of Concern

a. This permit is issued based on the affected heaters not being subject to 40 CFR 60 Subpart Dc, NSPS for Small Industrial-Commercial-Institutional Steam Generating Units because the affected heaters are process heaters as defined in Subpart Dc.

2.1.5 Control Requirements and Work Practices

a. Natural gas, PSA (Pressure Swing Adsorption) vent gas, syngas, or a combination of such fuels shall be the only fuels fired in the affected heaters.

b. The affected heaters shall be maintained and operated with good combustion practices to control emissions of VOM, which shall include routine operating practices, maintenance and repair practices, and other periodic assessments of the combustion performance of the affected heaters to reasonably minimize emission of VOM.

c. Pursuant to 40 CFR 63.7505(b), the Permittee shall always operate and maintain the affected heaters, including air pollution control and monitoring equipment, according to the provisions in 40 CFR 63.6(e)(1)(i).

d. Pursuant to 40 CFR 63.7505(e), the Permittee shall develop and implement a written startup, shutdown, and malfunction plan (SSMP) according to the provisions in 40 CFR 63.6(e)(3).

Note: Conditions 2.1.5(a) and (b) represent the Lowest Achievable Emissions Rate (LAER) for emissions of VOM from the affected heaters, pursuant to 35 IAC 203.301.

2.1.6 Production and Emission Limitations

a. The aggregate design firing rate of the affected heaters shall not exceed 150 mmBtu/hour.

b. Emissions from the affected heaters (both heaters combined), including emissions during startup and shutdown of the hydrogen plant, shall not exceed the following limits:

	Emissions	
Pollutant	(Tons/Month)	(Tons/Year)
PM/PM_{10}	0.5	5.00

Pollutant	Emissions (Tons/Month)	Emissions (Tons/Year)
VOM	0.4	3.60
SO_2	0.1	0.55
NO_x	4.1	41.14
CO	2.7	26.72

c. Compliance with annual limits shall be determined on a monthly basis from the sum of the data for the current month plus the preceding 11 months (running 12 month total).

d. Pursuant to 40 CFR 63.7500(a)(1) and 63.7505(a), CO emissions from the affected heaters shall not exceed 400 ppm by volume on a dry basis corrected to 3 percent oxygen (3-run average), except during periods of startup, shutdown, and malfunction.

2.1.7 Testing Requirements

a. Nitrogen Oxides Testing

i. Within 60 days after achieving the maximum production rate at which the affected heaters will be operated, but not later than 180 days after initial startup, the nitrogen oxide (NO_x) emissions of the affected heaters shall be measured during conditions which are representative of maximum emissions.

ii. The following methods and procedures shall be used for testing of emissions, unless another method is approved by the Illinois EPA: Refer to 40 CFR 60, Appendix A, and 40 CFR 61, Appendix B, for USEPA test methods.

Location of Sample Points	USEPA Method 1
Gas Flow and Velocity	USEPA Method 2
Flue Gas Weight	USEPA Method 3
Moisture	USEPA Method 4
Nitrogen Oxides	USEPA Method 7e

b. Carbon Monoxide Testing

i. Pursuant to 40 CFR 63.7510(g), the Permittee shall demonstrate initial compliance with the CO emission limits no later than 180 days after startup of the affected heaters.

A. The Permittee shall use the applicable performance tests and procedures specified by 40 CFR 63.7520 and 63.7530.

B. Pursuant to 40 CFR 63.7510(c), the initial compliance demonstration is conducting a performance test for carbon monoxide according to Table 5 of 40 CFR 63 Subpart DDDDD.

ii. Pursuant to 40 CFR 63.7515(e), the Permittee shall conduct all applicable performance tests according to 40 CFR 63.7520 on an annual basis. Annual performance tests must be completed between 10 and 12 months after the previous performance test.

c. Hydrogen Sulfide Testing

In accordance with 40 CFR 60.8, within 60 days after achieving the maximum production rate at which the affected heaters will be operated, but not later than 180 days after initial startup of the affected heaters and at such other times as may be required by the Illinois EPA, the Permittee shall conduct performance test(s) in accordance with 40 CFR 60.106(e) and furnish the Illinois EPA a written report of the results of such performance test(s).

Note: The hydrogen sulfide testing requirement is not necessary if the H_2S content of the fuel gas to the affected heaters is monitored by an existing CEM

2.1.8 Monitoring Requirements

a. Pursuant to 40 CFR 63.7505(d), the Permittee shall develop a site-specific monitoring plan according to the requirements in 40 CFR 63.7505(d)(1) through (4).

b. i. The Permittee shall comply with the monitoring requirements specified in 40 CFR 60.105 by installing, calibrating, maintaining and operating an instrument for continuously monitoring and recording the concentration (dry basis) of H_2S in fuel gases before being burned in the affected heaters.

ii. Notwithstanding the above, pursuant to 40 CFR 60.13(i), after receipt and consideration of written application, the USEPA may approve alternatives to the above monitoring procedures.

c. The Permittee shall determine compliance with the H_2S standard in 40 CFR 60.104(a)(1) as follows: Method 11, 15, 15A, or 16 shall be used to determine the H_2S concentration in the fuel gas. The gases entering the sampling train should be at about atmospheric pressure. If the pressure in the refinery fuel gas lines is relatively high, a flow control valve may be used to reduce the pressure. If the

line pressure is high enough to operate the sampling train without a vacuum pump, the pump may be eliminated from the sampling train. The sample shall be drawn from a point near the centroid of the fuel gas line [40 CFR 60.106(e)(1)].

d. The Permittee shall maintain records of the concentration (dry basis) of H_2S in fuel gases before being burned in the affected heaters to demonstrate compliance with Condition 2.1.3(a)(i)(B).

2.1.9 Recordkeeping Requirements

The Permittee shall maintain records of the following items for each affected heater:

a. The Permittee shall comply with the applicable recordkeeping requirements specified by 40 CFR 63.7555.

b. i. A file showing documentation of the maximum rated firing rate of each affected heater (mmBtu/hour).

ii. A file showing the potential emissions from the affected heaters with supporting calculations and documentation (tons/year).

c. The Permittee shall maintain records of the following items relating to the startup, shutdown or malfunction of the hydrogen plant. Note: this recordkeeping requirements applies to all emission units at the hydrogen plant.

i. Maximum emission rate of each pollutant emitted during each event (lb/hour);

ii. Duration of each event; and

iii. NO_x, CO, VOM, SO_2, and PM/PM_{10} emitted during each event (tons).

2.1.10 Reporting Requirements

a. The Permittee shall promptly notify the Illinois EPA, Air Compliance Unit, of deviations of an affected heater with the permit requirements. Reports shall describe the probable cause of such deviations, and any corrective actions or preventive measures taken.

b. Pursuant to 40 CFR 63.7515(g), the Permittee shall report the results of performance tests within 60 days after the completion of the performance tests. This report should also verify that the operating limits for affected heaters have not changed or provide documentation of revised

operating parameters established according to 40 CFR 63.7530 and Table 7 to 40 CFR Part 63 Subpart DDDDD, as applicable. The reports for all subsequent performance tests should include all applicable information required in 40 CFR 63.7550.

c. The Permittee shall comply with the applicable notification and recordkeeping requirements specified by 40 CFR 63.7545 and 63.7550, respectively.

2.2 Unit: Components

2.2.1 Description

As part of the piping and pumping equipment associated with the hydrogen plant, leaks may occur from components such as valves, flanges and compressor seals.

2.2.2 List of Emission Units and Air Pollution Control Equipment

Emission Unit	Description	Emission Control Equipment
Components	Components (compressors, open-ended lines, valves, connectors) within the Hydrogen Plant battery limits and components associated with tying into the existing refinery	None

2.2.3 Applicable Provisions and Regulations

a. An “affected component” for the purpose of these unit-specific conditions, is a new component installed as part of the Hydrogen Plant Project as described in Conditions 2.2.1 and 2.2.2, and any subsequent replacement of such new component.

b. This permit is issued based upon the affected components being subject to National Emission Standards for Hazardous Air Pollutants From Petroleum Refineries, 40 CFR 63, Subparts A and CC. The Illinois EPA administers the NESHAP for subject sources in Illinois pursuant to a delegation agreement with the USEPA. The Permittee shall comply with all applicable requirements of 40 CFR 63, Subparts A and CC.

   Note: The ExxonMobil Joliet Refinery has indicated that it generally complies with the equipment leak requirements specified in 40 CFR 63, Subpart CC by complying with the Standards of Performance for Equipment Leaks of VOC in the Synthetic Organic Chemicals Manufacturing Industry 40 CFR 60, Subpart VV. However, for affected components the Permittee (Air Products) will comply with applicable provisions of 40 CFR Part 63, Subpart H (See Condition 2.2.5(a)).

2.2.4 Non-Applicability of Regulations of Concern

a. Pursuant to 40 CFR 63.640(p), components that would be also subject to the provisions of 40 CFR Parts 60 and 61 are

required only to comply with the provisions of 40 CFR Part 63 Subpart CC, rather than Parts 60 and 61.

b. Notwithstanding the fact that the affected components are subject to 35 IAC 218.445 through 218.452, which require a leak monitoring and repair program, the source is not required to address the provisions of these state rules. This condition is based on the Illinois EPA's finding, following review of the various requirements of these state rules and the federal rules at 40 CFR Part 63, Subpart H, that compliance with these federal rules, as is required by this permit, will assure compliance with these state rules. (Refer to 40 CFR 63.640(q)).

2.2.5 Control Requirements and Work Practices

a. Affected components shall comply with the applicable standards in 40 CFR 63, Subpart H for components in gas/vapor service and light liquid service, including:

i. Affected compressors shall comply with the standards for compressors in 40 CFR 63.164.

ii. Affected open-ended lines (gas service) shall comply with the standards for open-ended valves or lines in 40 CFR 63.167.

iii. Affected valves (gas service and liquid service) shall comply with the standards for valves in gas/vapor service and in light liquid service in 40 CFR 63.168.

iv. Affected connectors (gas service and light liquid service) shall comply with the standards for connectors in gas/vapor service and in light liquid service in 40 CFR 63.174.

b. For affected compressors, open-ended lines, valves and connectors, the Permittee shall monitor the component to detect leaks by the method specified in 40 CFR 63.180(b), except that a more stringent definition of a leak shall apply, i.e., an instrument reading of 500 parts per million or greater from components shall be considered a leak.

Note: Condition 2.2.5 represents the Lowest Achievable Emissions Rate (LAER) for emissions of VOM as applied affected components, pursuant to 35 IAC 203.301.

2.2.6 Production and Emission Limitations

a. Emissions of volatile organic material (VOM) from the affected components, which includes the components

associated with tying into the existing refinery (i.e., valves, flanges, etc.) shall not exceed 2.89 tons per year.

b. Emissions of carbon monoxide from the affected components (i.e., connectors, open-ended lines) shall not exceed 2.77 tons per year.

2.2.7 Testing Requirements

Testing requirements are not set for the affected components.

2.2.8 Monitoring Requirements

a. The Permittee shall comply with monitoring requirements identified in 40 CFR 63.168 and 63.174. For this purpose, the Permittee shall utilize the test methods and procedures identified in 40 CFR 63.180.

b. Monitoring of components associated with tie in to the refinery and outside the hydrogen plant fence line shall be performed by Air Products unless these components are monitored by the ExxonMobil Joliet Refinery.

2.2.9 Recordkeeping Requirements

a. The Permittee shall comply with the recordkeeping requirements identified in 40 CFR 63.181. In these records, the Permittee shall include such other information as is needed to assure that the repair requirements in this permit are met.

b. The Permittee shall maintain records of the following items for affected components:

i. Number of components by unit or location and type.

ii. Calculated VOM emissions including supporting calculations, attributable to these components determined in accordance with Condition 2.2.12 (tons/year).

c. The Permittee shall maintain a file that contains the following information for affected components. This file may be kept in either paper or electronic copy:

i. The applicable identification number for each component;

ii. Results from initial leak monitoring of the affected component;

iii. Leak definition for each affected component; and

iv. Monitoring frequency (i.e., when monitoring is due).

2.2.10 Reporting Requirements

a. The Permittee shall promptly notify the Illinois EPA, Air Compliance Unit, of deviations of an affected component with the permit requirements. Reports shall describe the probable cause of such deviations, and any corrective actions or preventable measures taken. As the operation of affected components is addressed by reporting requirements under applicable rules, this requirement may be satisfied with the reporting required by such regulations.

b. The Permittee shall comply with the reporting provisions identified in 40 CFR 63.182. Specifically, the Permittee shall submit the following reports:

i. An Initial Notification described in 40 CFR 63.182(b),

ii. A Notification of Compliance Status described in 40 CFR 63.182(c) submitted no later than 90 days after initial startup of the hydrogen plant, and

iii. Periodic Reports described in 40 CFR 63.182(d).

c. With the initial compliance report required by Condition 2.2.10(b)(ii), the Permittee shall submit:

i. Records of the number and type of affected components, and;

ii. Calculated VOM emissions for affected components using the predicted leak rate and emission factors provided in the permit application.

Note: This information will be used to evaluate variation between predicted and as-built component counts, which may have an impact on projected emissions (i.e., emission limits and required offsets.

2.3 Unit: Process Vents

2.3.1 Description

During the steam generation process, residual by-products of reaction (methanol and ammonia) will be stripped and vented through the deaerator vent and the blowdown flash vent to the atmosphere. Process gases associated with the startup/shutdown of the reformer, the multi-service compressor, the desulfurization beds, and the PSA unit, will be routed through a closed-vent system to the ExxonMobil Joliet Refinery flare. Product hydrogen will also be routed to the flare during variation in customer hydrogen demand.

2.3.2 List of Emission Units and Air Pollution Control Equipment

Emission Unit	Description	Emission Control Equipment
Deaerator Vent and Blowdown Flash Vent	Deaerator Vent and Blowdown Flash Vent	None
Other Vents	Startup and Shutdown Events associated with the Hydrogen Plant	Flare

2.3.3 Applicable Provisions and Regulations

a. An “affected process vent” for the purpose of these unit-specific conditions, are the vents described in Conditions 2.3.1 and 2.3.2.

b. The deaerator vent and blowdown vent are subject to 35 IAC Part 218, Subpart R: Petroleum Refining and Related Industries. Pursuant to 35 IAC 218.441(c)(1), no person shall cause or allow the discharge of more than 8 lbs/hour of organic material into the atmosphere from the affected process vents.

2.3.4 Non-Applicability of Regulations of Concern

The affected process vents are not subject to NESHAP, 40 CFR 63, Subpart CC because deaerator vents are specifically excluded from the definition of miscellaneous process vent, pursuant to 40 CFR 63.641.

2.3.5 Control Requirements and Work Practices

a. The affected process vents and associated flare shall be maintained and operated with good operating practices to minimize the formation and loss of VOM containing materials. These practices shall include routine operating

practices, maintenance and repair practices, and other periodic assessments of the combustion performance of the affected units to reasonably minimize emission of VOM.

b. i. The hydrogen plant shall be served by a flare system for control of VOM emissions as follows:

A. Process gases generated during periods of startup/shutdown of the reformer, the multi-service compressor, the desulfurization beds, the H2 membrane, and the PSA unit, will be routed to the flare.

B. Vent gases associated with safety relief valves, test instruments and monitors.

C. Excess process off-gases including SGP feed gas, syngas, PSA purge gas, and hydrogen.

D. Vent gases resulting from the depressurization of vessels or equipment in preparation for turnaround or maintenance.

ii. This requirement may be satisfied by ducting such discharges to the ExxonMobil Joliet Refinery Flare System as proposed.

Note: Condition 2.3.5 represents the Lowest Achievable Emissions Rate (LAER) for emissions of VOM as applied to affected process vents, pursuant to 35 IAC 203.301.

2.3.6 Production and Emission Limitations

a. Emissions from the affected process vents, including emissions during startup and shutdown of the hydrogen plant, shall not exceed the following limits. Compliance with the annual limit shall be determined from a running total of 12 months of data.

Pollutant	Emissions (Tons/Year)
NO_x	1.47
CO	3.68
SO_2	0.02
VOM	2.08

b. Combined VOM emissions from the Deaerator Vent and Blowdown Flash Vent shall not exceed 0.5 lb/mmscf hydrogen produced, annual average.

2.3.7 Testing Requirements

Testing requirements are not set for the affected process vents.

2.3.8 Monitoring Requirements

Monitoring requirements are not set for the affected process vents.

2.3.9 Recordkeeping Requirements

The Permittee shall maintain records of the following items for the affected process vents:

a. A file containing calculations showing the maximum emissions which could occur from the affected process vents with supporting calculations and documentation.

2.3.10 Reporting Requirements

a. The Permittee shall promptly notify the Illinois EPA, Air Compliance Unit, of deviations of an affected process vent with the permit requirements. Reports shall describe the probable cause of such deviations, and any corrective actions or preventive measures taken.

2.4 Unit: Individual Drain Systems

2.4.1 Description

As part of the hydrogen plant project, individual drain systems will be installed that will drain to the ExxonMobil's existing wastewater treatment facility. The new drain systems at the hydrogen plant, along with the individual drain system(s) (IDS) being installed or modified as part of ExxonMobil's uLSD project will be controlled by the design and operation of these systems. In addition, the ExxonMobil Joliet Refinery will re-route tank water draws from existing storage tanks 221, 222, 223, 224, and 225 to the closed light slop system to allow for recovery, instead of directly to the oil-water separation portions of the Refinery's wastewater treatment plant. Therefore, there will be a net decrease in emissions from the aggregate facility. The new affected individual drain system(s) is classified as a Group 2 wastewater stream as defined in 40 CFR 63.641.

2.4.2 List of Emission Units and Air Pollution Control Equipment

Emission Unit	Description	Emission Control Equipment
IDS	IDS within the Hydrogen Plant Battery Limits	None

2.4.3 Applicable Provisions and Regulations

a. An "affected individual drain system" associated with the Hydrogen Plant for the purpose of these unit-specific conditions, is an IDS within the Hydrogen Plant battery Limits as described in Conditions 2.4.1 and 2.4.2. Requirements for any new or modified IDS installed as part of ExxonMobil's uLSD Project are included in ExxonMobil's uLSD Construction Permit (Application 03110060).

b. This permit is issued based upon the affected individual drain system associated with the Hydrogen Plant being subject to the NSPS for Standards of Performance for VOC Emissions From Petroleum Refinery Wastewater Systems, 40 CFR 60 Subparts A and QQQ. The Illinois EPA administers the NSPS for subject sources in Illinois pursuant to a delegation agreement with the USEPA. The Permittee shall comply with all applicable requirements of 40 CFR 60, Subparts A and QQQ.

c. This permit is issued based upon certain IDS also being subject to the National Emission Standards for Hazardous Air Pollutants From Petroleum Refineries, 40 CFR 63 Subparts A and CC. For the affected individual drain system associated with the Hydrogen Plant, the Permittee

shall comply with all applicable requirements of 40 CFR 63, Subparts A and CC.

Note: If the affected individual drain system associated with the Hydrogen Plant meets the criteria for Group 2 wastewater streams as defined in 40 CFR 63.641, as planned by the Permittee, there would be no control requirements under 40 CFR 63, Subpart CC.

2.4.4 Non-Applicability of Regulations of Concern

Non-applicability of regulations of concern are not set for the affected individual drain system associated with the Hydrogen Plant.

2.4.5 Control Requirements and Work Practices

a. i. Each drain shall be equipped with water seal controls [40 CFR 60.692-2(a)(1)].

ii. Each drain in active service shall be checked by visual or physical inspection initially and monthly thereafter for indications of low water levels or other conditions that would reduce the effectiveness of the water seal controls [40 CFR 60.692-2(a)(2)].

iii. Except as provided in 40 CFR 60.692-2(a)(4), each drain out of active service shall be checked by visual or physical inspection initially and weekly thereafter for indications of low water levels or other problems that could result in VOC emissions [40 CFR 60.692-2(a)(3)].

iv. As an alternative to the requirements in 40 CFR 60.692-2(a)(3), if an owner or operator elects to install a tightly sealed cap or plug over a drain that is out of service, inspections shall be conducted initially and semiannually to ensure caps or plugs are in place and properly installed [40 CFR 60.692-2(a)(4)].

v. Whenever low water levels or missing or improperly installed caps or plugs are identified, water shall be added or first efforts at repair shall be made as soon as practicable, but not later than 24 hours after detection, except as provided in 40 CFR 60.692-6 [40 CFR 60.692-2(a)(5)].

b. i. Junction boxes shall be equipped with a cover and may have an open vent pipe. The vent pipe shall be at least 90 cm (3 ft) in length and shall not exceed 10.2 cm (4 in) in diameter [40 CFR 60.692-2(b)(1)].

ii. Junction box covers shall have a tight seal around the edge and shall be kept in place at all times, except during inspection and maintenance [40 CFR 60.692-2(b)(2)].

iii. Junction boxes shall be visually inspected initially and semiannually thereafter to ensure that the cover is in place and to ensure that the cover has a tight seal around the edge [40 CFR 60.692-2(b)(3)].

iv. If a broken seal or gap is identified, first effort at repair shall be made as soon as practicable, but not later than 15 calendar days after the broken seal or gap is identified, except as provided in 40 CFR 60.692-6 [40 CFR 60.692-2(b)(4)].

c. i. Sewer lines shall not be open to the atmosphere and shall be covered or enclosed in a manner so as to have no visual gaps or cracks in joints, seals, or other emission interfaces [40 CFR 60.692-2(c)(1)].

ii. The portion of each unburied sewer line shall be visually inspected initially and semiannually thereafter for indication of cracks, gaps, or other problems that could result in VOC emissions [40 CFR 60.692-2(c)(2)].

iii. Whenever cracks, gaps, or other problems are detected, repairs shall be made as soon as practicable, but not later than 15 calendar days after identification, except as provided in 40 CFR 60.692-6 [40 CFR 60.692-2(c)(3)].

d. Except as provided in 40 CFR 60.692-2(e), each modified or reconstructed individual drain system that has a catch basin in the existing configuration prior to May 4, 1987 shall be exempt from the provisions of 40 CFR 60.692-2 [40 CFR 60.692-2(d)].

e. Refinery wastewater routed through new process drains and a new first common downstream junction box, either as part of a new individual drain system or an existing individual drain system, shall not be routed through a downstream catch basin [40 CFR 60.692-2(e)].

Note: Condition 2.4.5 represents the Lowest Achievable Emissions Rate (LAER) for emissions of VOM as applied to affected individual drain systems, pursuant to 35 IAC 203.301.

2.4.6 Emission Limitations

a. VOM emissions from the affected individual drain system associated with the Hydrogen Plant shall not exceed 0.12 tons per year.

2.4.7 Testing Requirements

a. Before using any equipment installed in compliance with the requirements of 40 CFR 60.692-2, the owner or operator shall inspect such equipment for indications of potential emissions, defects, or other problems that may cause the requirements of 40 CFR Part 60 Subpart QQQ not to be met. Points of inspection shall include, but are not limited to, seals, flanges, joints, gaskets, hatches, caps, and plugs [40 CFR 60.696(a)].

2.4.8 Monitoring Requirements

Monitoring requirements are not set for the affected individual drain system associated with the Hydrogen Plant.

2.4.9 Recordkeeping Requirements

a. The Permittee shall comply with the applicable recordkeeping requirements of 40 CFR 60.697.

2.4.10 Reporting Requirements

a. The Permittee shall promptly notify the Illinois EPA, Air Compliance Unit, of deviations of an affected individual drain system associated with the Hydrogen Plant with the permit requirements. Reports shall describe the probable cause of such deviations, and any corrective actions or preventive measures taken.

b. The Permittee shall comply with the applicable reporting requirements of 40 CFR 60.698.

It should be noted that this permit has been revised to alter the monitoring procedures for components associated with the tie-ins to the refinery and which are outside the hydrogen plant fence line. In addition, the permitted VOM emissions from affected components have been decreased as the actual component count was less than originally planned. It should also be noted that this permit has been revised to increase the emission rates from process vents attributable to the increase in catalyst change outs. Finally, the reformer startup/shutdown events have been altered resulting in a slight increase in combustion emissions. The overall result of these changes is a net decrease in emissions.

If you have any questions on this permit, please contact Jason Schnepp at 217/782-2113.

Edwin C. Bakowski, P.E. Date Issued: _____
Acting Manager, Permit Section
Division of Air Pollution Control

ECB:JMS:psj

cc: Region 1
Lotus Notes
CES
Brad Kohlmeyer, ExxonMobil

Attachment 1

Emissions Associated With This Project

Unit	NO_x[a]	NO_x[b]	CO	SO_2	VOM	PM	PM_{10}[c]
Reformer Process Heaters	41.14	41.14	26.72	0.55	3.60	5.00	5.00
Components	---	---	2.77	---	2.89	---	---
Misc. Process Equipment	1.47	1.47	3.68	0.02	2.08	---	---
Wastewater Operations	---	---	---	---	0.12	---	---
uLSD Project	16.45	78.48	14.74	238.87	6.69	1.08	1.08
PSD/NAA Significance Level	40.00	40.00	100.00	40.00	40/25	25.00	15.00
Totals:	59.06	121.09	47.91	239.44	15.38	6.08	6.08
Netting Required?	Yes	Yes	No	Yes	No/LAER	No	No

[a] NO_x as an attainment pollutant (See also Attachment 3a).

[b] NO_x as a precursor to ozone for the 8-hour standard (See also Attachment 3b).

[c] PM_{10} is also used as a surrogate for $PM_{2.5}$ in accordance with USEPA guidance.

Attachment 2

PSD Applicability – SO_2 Netting Analysis

Contemporaneous Time Period: January 1999 Through April 2006

Table I – Emissions Increases and Decreases Associated With The Proposed Modification

Item of Equipment	Emissions (Tons/Year)
Hydrogen Plant	0.57
uLSD	238.87
	239.44

Table II – Source-Wide Creditable Contemporaneous Emission Increases

Item of Equipment	Date	Emissions Increase (Tons/Year)	Permit Number
FCC Jumpover Line	5/2002	32.23	02030040
Repl. FCC Expander Turbine	10/2003	2.36	02040013
Coker B/D Tank	3/2004	7.02	03060085
Temporary Coker Diesel Pump	12/2004	0.28	04100043
	Total:	41.89	

Table III – Source-Wide Creditable Contemporaneous Emission Decreases

Item of Equipment	Date	Emissions Decrease (Tons/Year)	Permit Number
Low Sulfur Mogas	10/2003	576.83	01030070
Coker B/D Recovery	9/2004	2,593.00	03060091
	Total:	3,169.83	

Table IV – Net Emissions Change

	(Tons/Year)
Increases and Decreases Associated With Proposed Modification	239.44
Creditable Contemporaneous Emission Increases	41.89
Creditable Contemporaneous Emission Decreases	-3,169.83
	-2,888.50

Attachment 3a

PSD Applicability - NO_x Netting Analysis

Contemporaneous Time Period: January 1999 Through April 2006

Table I – Emissions Increases and Decreases Associated With The Proposed Modification

Item of Equipment		Emission Change (Tons/Year)
uLSD		16.45
Hydrogen Plant		42.61
	Total:	59.06

Table II – Source-Wide Creditable Contemporaneous Emission Increases

Item of Equipment	Date	Emissions Increase (Tons/Year)	Permit Number
FCC Jumpover Line	5/2002	8.19	02030040
Low Sulfur Mogas	10/2003	39.04	01030070
FCC Expander Turbine	10/2003	12.26	02040013
Coker Blowdown Tank	3/2004	3.21	03060085
Temporary Coker Diesel Pump	12/2004	4.19	04100043
	Total:	66.89	

Table III – Source-Wide Creditable Contemporaneous Emission Decreases

Item of Equipment	Date	Emissions Decrease (Tons/Year)	Permit Number
Coker B/D Recovery	11/2004	219.00	03060091

Table IV – Net Emissions Change

	(Tons/Year)
Increases and Decreases Associated With Proposed Modification	59.06
Creditable Contemporaneous Emission Increases	66.89
Creditable Contemporaneous Emission Decreases	-219.00
	-93.05

Attachment 3b

Non-attainment NSR Applicability - NO_x Netting Analysis (8-hour Ozone)

Contemporaneous Time Period: November 1998 through April 2006

Table I – Emissions Increases and Decreases Associated With The Proposed Modification

Item of Equipment	Emission Change (Tons/Year)
uLSD	78.48
Hydrogen Plant	42.61
Total:	121.09

Table II – Source-Wide Creditable Contemporaneous Emission Increases

Item of Equipment	Date	Emissions Increase (Tons/Year)	Permit Number
FCC Jumpover Line	5/2002	8.19	02030040
Low Sulfur Mogas	10/2003	39.04	01030070
FCC Expander Turbine	10/2003	12.26	02040013
Coker Blowdown Tank	3/2004	3.21	03060085
Temporary Coker Diesel Pump	12/2004	4.19	04100043
	Total:	66.89	

Table III – Source-Wide Creditable Contemporaneous Emission Decreases

Item of Equipment	Date	Emissions Decrease (Tons/Year)	Permit Number
Coker B/D Recovery	11/2004	219.00	03060091

Table IV – Net Emissions Change

	(Tons/Year)
Increases and Decreases Associated With Proposed Modification	121.09
Creditable Contemporaneous Emission Increases	66.89
Creditable Contemporaneous Emission Decreases	-219.00
	-31.02

Attachment 4

Non-attainment NSR Applicability - VOM Netting Analysis (1-hour Ozone)

Contemporaneous Time Period: 2001 through 2006

Table I – Emissions Increases and Decreases Associated With The Proposed Modification

Item of Equipment	Emission Change (Tons/Year)
uLSD	6.69
Hydrogen Plant	8.69
Total:	15.38

Table II – Source-Wide Creditable Contemporaneous Emission Increases

Item of Equipment	Date	Emissions Increase (Tons/Year)	Permit Number
FCC Jumpover Line	5/2002	0.22	02030040
Low Sulfur Mogas	10/2003	17.28	01030070
FCC Expander Turbine	10/2003	0.25	02040013
Coker Blowdown Tank	3/2004	0.00	03060085
Temporary Coker Diesel Pump	12/2004	0.34	04100043
Asphalt Railcar Loading	12/2004	4.09	04090004
Sludge/Emulsion Treatment	3/2005	1.33	04110073
	Total:	23.51	

Table III – Source-Wide Creditable Contemporaneous Emission Decreases

Item of Equipment	Date	Emissions Decrease (Tons/Year)	Permit Number
Coker B/D Recovery	11/2004	5.90	03060091

Table IV – Net Emissions Change

	(Tons/Year)
Increases and Decreases Associated With Proposed Modification	15.38
Creditable Contemporaneous Emission Increases	23.51
Creditable Contemporaneous Emission Decreases	-5.90
	32.99

JMS:psj