

Bay Area Air Quality Management District

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**Statement of Basis
for
MAJOR FACILITY REVIEW PERMIT**

**for
Air Products and Chemicals, Inc.
Facility #B0295**

**A support facility for:
Tesoro Refining and Marketing Company
Facility #B2758 & Facility #B2759**

Facility Address:
Golden Eagle Refinery
150 Solano Way
Martinez, CA 94553

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May 2015

TABLE OF CONTENTS

A.	Background	3
B.	Facility Description	3
C.	Permit Content.....	6
	<u>I. Standard Conditions</u>	6
	<u>II. Equipment</u>	7
	<u>III. Generally Applicable Requirements</u>	7
	<u>IV. Source-Specific Applicable Requirements</u>	8
	<u>V. Schedule of Compliance</u>	21
	<u>VI. Permit Conditions</u>	21
	<u>VII. Applicable Limits and Compliance Monitoring Requirements</u>	23
	<u>VIII. Test Methods</u>	25
	<u>IX. Permit Shield:</u>	26
D.	Alternate Operating Scenarios:	26
E.	Compliance Status:.....	26
F.	Differences between the Application and the Proposed Permit:	26
	Appendices.....	27
	<u>Appendix A – Engineering Evaluations</u>	28
	Application 24173, S-1031 SMR Furnace Change of Conditions.....	29
	Application 23933, S-1031 SMR Furnace Burner Replacement Alteration.....	35
	<u>Appendix B – Glossary</u>	46

Title V Statement of Basis

This is the draft initial permit for a hydrogen gas production process unit that is a support facility for the Golden Eagle Refinery, Tesoro Refining and Marketing Company, LLC (Site No. B2758). Explained in detail in this Statement of Basis, as a support facility, this Air Products and Chemicals, Inc. Title V permit includes the applicable regulatory requirements that would otherwise apply to the No 2 Hydrogen Plant if it was included as part of the Tesoro refinery's Title V permit.

A. Background

This facility is subject to the Operating Permit requirements of Title V of the federal Clean Air Act, Part 70 of Volume 40 of the Code of Federal Regulations (CFR), and BAAQMD Regulation 2, Rule 6, Major Facility Review because it is a support facility of the Tesoro Golden Eagle Refinery, a major facility as defined by BAAQMD Regulation 2-6-212. The Tesoro refinery is a major facility because it has the “potential to emit,” as defined by BAAQMD Regulation 2-6-218, of more than 100 tons per year of a regulated air pollutant, than 10 tons per year of a hazardous air pollutant or more than 25 tons per year of a combination of hazardous air pollutants.

Major Facility Operating permits (Title V permits) must meet specifications contained in 40 CFR Part 70 as contained in BAAQMD Regulation 2, Rule 6. The permits must contain all applicable requirements (as defined in BAAQMD Regulation 2-6-202), monitoring requirements, recordkeeping requirements, and reporting requirements. The permit holders must submit reports of all monitoring at least every six months and compliance certifications at least every year.

In the Bay Area, state and District requirements are also applicable requirements and are included in the permit. These requirements can be federally enforceable or non-federally enforceable. All applicable requirements are contained in Sections I through VI of the permit.

Each facility in the Bay Area is assigned a facility number that consists of a letter and a 4-digit number. This facility number is also considered to be the identifier for the permit. The identifier for this facility is A0295.

B. Facility Description

Air Products and Chemicals, Inc., (Air Products) owns a Hydrogen Manufacturing Facility that is integrated into the overall Golden Eagle Refinery facility. Hydrocarbon based gases (including propane, natural gas and/or butane) are received from the refinery via pipeline and used as feedstock. The feedstock is then compressed and passed through a hydrotreater and desulfurizer to remove sulfur (sulfur based odorants are added to natural gas to help detect leaks). Hydrogen is manufactured by reacting hydrocarbon feedstock with steam at high temperatures. By exposing the feedstock to a catalyst in the presence of heat (approximately 1,500 degrees F.) and steam, a chemical reaction takes place that converts the feedstock into hydrogen, carbon monoxide and carbon dioxide. The reaction occurs in a fired process heater called a Steam-

Methane Reformer (SMR). The reactants are then passed through a high temperature shift reaction to improve the hydrogen recovery. The carbon monoxide and carbon dioxide are then separated from the hydrogen in the pressure swing adsorbers (PSA). The pure hydrogen is then delivered to the refinery via pipeline. The byproduct carbon monoxide and carbon dioxide waste gas is a low Btu gas used, in addition to natural gas and/or refinery fuel gas, as fuel in the SMR unit.

General Description of an Oil Refinery:

An oil refinery is an intermediary between crude oil and a refined product. It takes dirty, low-value oil originating from the ground and distills it under atmospheric pressure into its primary components: gases (light ends), gasolines, kerosene and diesels (middle distillates), heavy distillates, and heavy bottoms. The heavy bottoms go on to a vacuum distillation unit to be distilled again, this time under a vacuum, to salvage any light ends or middle distillates that did not get separated under atmospheric pressure; the heaviest bottoms continue on to a coker to obtain more components of value.

Other product components are processed by downstream units to be cleaned (hydrotreated), cracked (catalytic or hydrocracking), reformed (catalytic reforming), or alkylated (alkylation) to form gasolines and high-octane blending components, or to have sulfur or other impurities removed to make diesel fuel. Many of these downstream units rely on high purity hydrogen to function as designed. Depending on the process units in a refinery and the crude oil input, an oil refinery can produce a wide range of salable products: many different grades of gasoline and gasoline blend stocks, several grades of diesel, kerosene, jet and aviation fuel, fuel oil, bunker fuels, waxes, solvents, sulfur, coke, asphalt, or chemical plant feedstocks.

A more detailed description of petroleum refinery processes and the resulting air emissions may be found in Chapter 5 of EPA's publication AP-42, Compilation of Air Pollutant Emission Factors. This document may be found at:

<http://www.epa.gov/ttn/chief/ap42/ch05/>

The principal sources of air emissions from refineries are:

- Combustion units (furnaces, boilers, and cogeneration facilities)
- FCC (Fluidized Catalytic Cracking)
- Storage tanks
- Fugitive emissions from pipe fittings, pumps, and compressors
- Sulfur plants
- Wastewater treatment facilities

The primary source of emissions from the Air Products and Chemicals, Inc. facility is from the SMR combustion units. Combustion unit emissions are generally controlled through the use of burner technology, steam injection, or selective catalytic reduction.

The Air Products and Chemicals, Inc. facility is an integral part of the Golden Eagle Refinery (GER) owned by Tesoro Refining & Marketing Company, LLC Facility B2758-2759. The major integration is as follows:

- Hydrogen Product is delivered to the Tesoro GER process units
- Process waste gas from startup, shutdown and malfunctions is sent to the Tesoro GER flare system where it can be recovered as fuel gas or combusted in the GER main flare system.
- Process wastewater is delivered to the Tesoro GER wastewater system where it is treated in the Tesoro GER wastewater treatment facility. Emissions from process wastewater are included in the fugitive emissions.
- Electrical Power is provided, in part, by the Martinez Cogen Limited Partnership Facility No. A1820 located in the Tesoro GER.

Emissions for the facility are shown in the following table.

Description	Potential to Emit, Tons/yr				
	Organic	NOx	CO	PM	SO2
Hydrogen Plant S-1030 Fugitive Emissions	13.35	0	0	0	0
SMR Furnace S-1031 Emissions	3.87	16.13	21.93	12.90	4.46
Total Direct Emissions	17.22	16.13	21.93	12.90	4.46
Electrical Power	0.60	3.10	3.7	0.70	1.60
Flare Emissions	0.03	0.01	0.04	0	0
Total Indirect Emissions	0.63	3.11	3.74	0.7	1.6
Total Facility Emissions	17.85	19.24	25.67	13.6	6.06

Hazardous Air Pollutants are shown in the following table and are solely based on combustion emissions. Emission factors are the highest found in the California Air Toxics Emission Factor (CATEF) database, Boilers and Heaters firing Refinery Gas abated with an SCR. Emissions are based on a maximum firing rate of 294MMBtu/hr, 8760 hours per year, and a 1020 Btu/SCF heating value for the refinery fuel gas. These emissions are conservative since fuel gas is typically recycled PSA gas supplemented by natural gas.

HAP	Emission Factor	Potential to Emit	
	Lb/MMSCF	Lb/hour	Tons/year
Acetaldehyde	1.77E-01	5.10E-02	2.23E-01
Antimony Compounds	8.51E-04	2.45E-04	1.07E-03
Arsenic Compounds	1.69E-03	4.87E-04	2.13E-03
Benzene	1.40E+00	4.04E-01	1.77E+00
Beryllium Compounds	2.95E-04	8.50E-05	3.72E-04
Cadmium Compounds	3.13E-03	9.02E-04	3.95E-03
Carbon Tetrachloride	1.68E-02	4.84E-03	2.12E-02

HAP	Emission Factor		Potential to Emit	
	Lb/MMSCF	Lb/hour	Tons/year	
Carbonyl Sulfide	2.43E+00	7.00E-01	3.07E+00	
Chloroform	5.19E-02	1.50E-02	6.55E-02	
Chromium Compounds	3.08E-02	8.88E-03	3.89E-02	
Cobalt Compounds	2.60E-04	7.49E-05	3.28E-04	
Cyanide Compounds	1.42E-02	4.09E-03	1.79E-02	
Ethylbenzene	9.50E-02	2.74E-02	1.20E-01	
Formaldehyde	3.80E+00	1.10E+00	4.80E+00	
Hydrochloric Acid	1.15E+00	3.31E-01	1.45E+00	
Lead Compounds	8.43E-03	2.43E-03	1.06E-02	
Manganese Compounds	1.37E-02	3.95E-03	1.73E-02	
Mercury Compounds	1.01E-03	2.91E-04	1.28E-03	
Naphthalene	1.87E-02	5.39E-03	2.36E-02	
Nickel Compounds	2.88E-02	8.30E-03	3.64E-02	
Polycyclic Organic Matter	1.00E-04	2.88E-05	1.26E-04	
Phenol	6.99E-02	2.01E-02	8.82E-02	
Selenium Compounds	4.24E-02	1.22E-02	5.35E-02	
Toluene	5.00E+00	1.44E+00	6.31E+00	
Trichloroethane	5.80E-02	1.67E-02	7.32E-02	
Trichloroethylene	5.13E-02	1.48E-02	6.48E-02	
Xylene (Total)	2.36E-01	6.80E-02	2.98E-01	
Xylene (o)	1.01E-01	2.91E-02	1.28E-01	
Total HAP			1.87E+01	
Maximum HAP (Toluene)			6.31E+00	

Combustion greenhouse gases (GHG) are shown in the following table. Emissions are based on a maximum firing rate of 294MMBtu/hr, 8760 hours per year, and a 1020 Btu/SCF heating value for the refinery fuel gas. These emissions are conservative since fuel gas is typically recycled PSA gas supplemented by natural gas.

GHG	Emission Factor		Potential to Emit		
	Kg/MMBtu	Lb/MMbtu	Lb/hour	Tons/year	MT/year
Carbon Dioxide	66.72	147	43,218	189,295	171,725

C. Permit Content

The legal and factual basis for the permit follows. The permit sections are described in the order that they are presented in the permit.

I. Standard Conditions

This section contains administrative requirements and conditions that apply to all facilities. If the Title IV (Acid Rain) requirements for certain fossil-fuel fired electrical generating facilities or the accidental release (40 CFR § 68) programs apply, the section will contain a standard condition pertaining to these programs. Many of these conditions derive from 40 CFR § 70.6, Permit Content, which dictates certain standard conditions that must be placed in the permit. The language that the District has developed for many of these requirements has been adopted into the BAAQMD Manual of Procedures, Volume II, Part 3, Section 4, and therefore must appear in the permit.

The standard conditions also contain references to BAAQMD Regulation 1 and Regulation 2. These are the District's General Provisions and Permitting rules.

II. Equipment

This section of the permit lists all permitted or significant sources. Each source is identified by an S and a number (e.g., S24 or S-24).

Permitted sources are those sources that require a BAAQMD operating permit pursuant to BAAQMD Rule 2-1-302.

Significant sources are those sources that have a potential to emit of more than 2 tons of a "regulated air pollutant," as defined in BAAQMD Rule 2-6-222, per year or 400 pounds of a "hazardous air pollutant," as defined in BAAQMD Rule 2-6-210, per year.

All abatement (control) devices that control permitted or significant sources are listed. Each abatement device whose primary function is to reduce emissions is identified by an A and a number (e.g., A-24). If a source is also an abatement device, such as when an engine controls VOC emissions, it will be listed in this table but will have an "S" number. An abatement device that is also a source (such as a thermal oxidizer that burns fuel) will have an "A" number.

The equipment section is considered to be part of the facility description. It contains information that is necessary for applicability determinations, such as fuel types, contents or sizes of tanks, etc. This information is part of the factual basis of the permit.

Each of the permitted sources has previously been issued a permit to operate pursuant to the requirements of BAAQMD Regulation 2, Permits. These permits are issued in accordance with state law and the District's regulations. The capacities in this table are the maximum allowable capacities for each source, pursuant to Standard Condition I.J and Regulation 2-1-403.

III. Generally Applicable Requirements

This section of the permit lists requirements that generally apply to all sources at a facility including insignificant sources and portable equipment that may not require a District permit. If a generally applicable requirement applies specifically to a source that is permitted or significant, the standard will also appear in Section IV and the monitoring for that requirement will appear in

Sections IV and VII of the permit. Parts of this section apply to all facilities (e.g., particulate, architectural coating, odorous substance, and sandblasting standards). In addition, standards that apply to insignificant or unpermitted sources at a facility (e.g., refrigeration units that use more than 50 pounds of an ozone-depleting compound), are placed in this section.

Unpermitted sources are exempt from normal District permits pursuant to an exemption in BAAQMD Regulation 2, Rule 1. They may, however, be specifically described in a Title V permit if they are considered a significant source pursuant to the definition in BAAQMD Rule 2-6-239.

IV. Source-Specific Applicable Requirements

This section of the permit lists the applicable requirements that apply to permitted or significant sources. These applicable requirements are contained in tables that pertain to one or more sources that have the same requirements. The order of the requirements is:

- District Rules
- SIP Rules (if any) listed following the corresponding District Rules. SIP rules are District rules that have been approved by EPA into the California State Implementation Plan. SIP rules are “federally enforceable” and a “Y” (yes) indication will appear in the “Federally Enforceable” column. If the SIP rule is the current District rule, separate citation of the SIP rule is not necessary and the “Federally Enforceable” column will have a “Y” for “yes”. If the SIP rule is not the current District rule, the SIP rule or the necessary portions of the SIP rule are cited separately after the District rule. The SIP portions will be federally enforceable; the non-SIP versions will not be federally enforceable, unless EPA has approved them through another program.
- Other District requirements, such as the Manual of Procedures, as appropriate.
- Federal requirements (other than SIP provisions)
- BAAQMD permit conditions. The text of BAAQMD permit conditions is found in Section VI of the permit.
- Federal permit conditions. The text of Federal permit conditions, if any, is found in Section VI of the permit.

Section IV of the permit contains citations to all of the applicable requirements. The text of the requirements is found in the regulations, which are readily available on the District’s or EPA’s websites, or in the permit conditions, which are found in Section VI of the permit. All monitoring requirements are cited in Section IV. Section VII is a cross-reference between the limits and monitoring requirements. A discussion of monitoring is included in Section C.VII of this permit evaluation/statement of basis.

Complex Applicability Determinations:

This facility has had a complex permitting history. This permitting history results in complex applicability determinations.

The equipment and sources owned by Air Products were initially permitted by former Golden Eagle Refinery (then referred to as the Avon Refinery) owner Tosco Corporation (Tosco). The

initial Authority to Construct for a 25MMSCFD hydrogen plant was granted via 1989 NSR Application 3318 Refinery Modernization and Energy Conservation Project (RMEC). NSR emission increases were addressed by the Tosco Refinery Emissions Cap (aka "Bubble", established by the Tosco No 3 HDS Project Application 27769 in the early 1980's) and were offset by emission control measures added to other sources in the Bubble. The facility was built by Air Products under contract with Tosco at a location formerly occupied by another Tosco processing unit. Commercial hydrogen production commenced December 11, 1993. A second Authority to Construct was granted January 27, 1995 to new refinery owner Ultramar, Inc. via 1993 Application 10912 Clean Fuels Project (CFP) for a 50MMSCFD hydrogen plant. The original Tosco Authority to Construct was cancelled June 23, 1995. Facility Ownership was formally transferred to Air Products via 1995 Application 14929. A Permit to Operate was first granted to Air Products on May 5, 1995 for a 25MMSCFD hydrogen plant including a 222MMBtu/hr SMR furnace. Modifications were made to the facility in 1996 to fully utilize pre-invested capacity. In 2002, via Application 5222, a permit to operate was granted to Air Products for a peak hydrogen production capacity of 38MMSCFD including a 294MMBtu/hr SMR furnace.

Since the facility emissions were subject to and included in the (current refinery owner) Tesoro Refinery Emissions Cap, Air Products was subject to Permit Condition 8077, which details the limits and requirements of the Tesoro Bubble. In 2012, with Tesoro concurrence, Air Products requested and the District granted a revision where the Air Products facility emissions were "carved out" of the Tesoro Bubble, and transferred to and subsequently owned by Air Products. To accomplish this, the NSR emissions increases, initially calculated and permitted through the 1989 Tosco RMEC Project, were transferred to Air Products and codified in Permit Condition 25199. The Tesoro Bubble will be reduced by the identical emissions quantities.

The Air District has determined that Air Products' No. 2 Hydrogen Plant qualifies as part of the same facility as the Tesoro Petroleum Refinery Facility pursuant to the definition of "Facility" in Regulation 2-6-206. In order to be considered the same facility, or one major source for the purposes of District Regulation 2-6, Title V and federal permitting purposes, sources must be:

1. located on contiguous or adjacent property
2. under common control, and
3. belonging to the same "industrial grouping" (or one is a support facility for the other).

In the case of the Air Products No. 2 Hydrogen Plant, factors one and three are clearly met. First, the facility is located in the "Process Block" of the Tesoro Golden Eagle Refinery; it serves as a process unit of the refinery. In addition, the hydrogen plant is a support facility for the refinery. All hydrogen product gas is delivered to the Tesoro Petroleum Refinery for use in the petroleum processing equipment of the petroleum refinery; the hydrogen plant supports the operation of the refinery. The Air District has also determined that the hydrogen plant and refinery are under "common control." The Air Products facility was initially permitted by Tosco Corporation, previous owner of the petroleum refinery, and after initial operation, was again permitted by Ultramar, Inc., the subsequent owner of the petroleum refinery. The No 2 Hydrogen Plant is integrated in the Tesoro petroleum refinery by connecting and using Tesoro supporting utilities (e.g. cooling water, wastewater, flare). When the Air Products facility was originally permitted by the petroleum refinery, the requirements of District Regulation 2, Rule 2

New Source Review were addressed, in part, by including the No 2 Hydrogen Plant emissions in the Tosco Refinery Emissions Cap (aka "Bubble") where emissions were offset by installing controls on other sources included in the Bubble.

The fact that there are no shared personnel or administrative functions between Tesoro and Air Products weigh against a finding for common control. However, the contract for services (hydrogen gas) between Tesoro and Air Products is controlled by Tesoro. If Tesoro refinery operation does not require all of the hydrogen production Air Products can produce, Air Products must curtail operations. In addition, 100% of the Air Products hydrogen product is and will be used by Tesoro. Therefore, the District has determined that the Air Products No. 2 Hydrogen Plant should be treated as part of the same "facility" as the Tesoro Petroleum Refinery.

Because it has been determined that the Air Products hydrogen plant is part of the Tesoro refinery Title V facility, Air Products must obtain a Title V permit. While Air Products may obtain its own permit (rather than be included in Tesoro's Title V permit), as it has chosen, the applicable requirements that would otherwise be required under a single permit for the sources must be included in Air Products' individual permit as "a major source may not be divided in a way that changes how it would be subject to or comply with applicable requirements compared with what would otherwise occur if a single title V permit were issued to that major source." *See Memorandum from John S. Seitz, EPA, Major Source Determinations for Military Installations under the Air Toxics, New Source Review, and Title V Operating Permit Programs of the Clean Air Act, August 2, 1996.* For these reasons, the District has determined that the Air Products No. 2 Hydrogen Plant's Title V permit must include the regulatory requirements that would otherwise apply to the No. 2 Hydrogen Plant if it was included as part of Tesoro refinery's Title V permit.

The determination to permit the No 2 Hydrogen Plant as part of the Tesoro petroleum refinery "facility" within which it is located and for which it serves as a process unit, is consistent with the permitting of the Tesoro owned No 1 Hydrogen Plant and with the permitting of other independently owned hydrogen plants located in the Bay Area, including the Air Products Hydrogen Manufacturing facility located at the Shell Martinez Refinery.

Regulation 8, Rule 2, Miscellaneous Operations

S-1030 No 2 Hydrogen Plant is subject to Regulation 8, Rule 2, Miscellaneous Operations because the plant includes equipment that emits precursor organic compounds and is not limited by other Rules in Regulation 8, Regulation 10 or Regulation 12, Rule 12. Regulation 8-2-301 limits any discharge into the atmosphere to 15 lb/day and to a concentration of 300 ppm total carbon on a dry basis.

Regulation 8, Rule 8 -- Wastewater Collection and Separation Systems

The Air Products No 2 Hydrogen Plant is located in the process unit section of the Tesoro Golden Eagle Refinery. This process section includes a refinery wastewater collection system. Air Products uses this refinery wastewater system. Wastewater from other refinery units does not enter the Air Products site. Air Products wastewater is collected on site and added to the

refinery wastewater system off-plot. There is no comingled refinery wastewater on the Air Products site. Because the Air Products No. 2 Hydrogen Plant exclusively serves the Tesoro Golden Eagle Refinery and uses the Golden Eagle Refinery's wastewater collection system, the No. 2 Hydrogen Plant is subject to the requirements of Regulation 8, Rule 8 that apply to wastewater collection system components at petroleum refineries, including Regulations 8-8-312, 8-8-313, 8-8-314, 8-8-402, 8-8-403, 8-8-404 and 8-8-505, as enumerated below. Although Air Products No. 2 Hydrogen Plant is therefore subject to the enumerated requirements for wastewater collection systems at petroleum refineries, that does not necessarily mean that the No. 2 Hydrogen Plant constitutes a "petroleum refinery" in all instances, as that term may be defined by other laws and regulations (including other District regulations), the applicability of which must each be evaluated in accordance with its own terms.

S-1030 No 2 Hydrogen Plant is subject to Regulation 8, Rule 8 Wastewater Collection and Separation Systems as described in Regulation 8-8-101, Description:

8-8-101 Description: The purpose of this Rule is to limit the emissions of organic compounds from wastewater collection and separation systems that handle liquid organic compounds from industrial processes.

Wastewater components are defined in Regulation 8-8-200 Definitions. The wastewater components located at the No. 2 Hydrogen Plant and the reference definitions are as follows:

- Junction Box, Regulation 8-8-217
- Manholes, Regulation 8-8-222
- Process Drains, Regulation 8-8-225
- Reaches, Regulation 8-8-226
- Vent Pipes, Regulation 8-8-229

The Regulation 8, Rule 8 emissions standards, administrative requirements and recordkeeping requirements that are applicable to the listed components are as follows:

- Regulation 8-8-308, Junction Box
- Regulation 8-8-312, Controlled Wastewater Collection System Components at Petroleum Refineries
- Regulation 8-8-313, Uncontrolled Wastewater Collection System Components at Petroleum Refineries
- Regulation 8-8-314, New Wastewater Collection System Components at Petroleum Refineries
- Regulation 8-8-402, Wastewater Inspection and Maintenance Plan at Petroleum Refineries
- Regulation 8-8-403, Petroleum Refinery Compliance Schedule
- Regulation 8-8-404, Uncontrolled Wastewater Collection System Components Election
- Regulation 8-8-505, Records for Wastewater Collection System Components at Petroleum Refineries

Regulation 8, Rule 18 -- Equipment Leaks

The Air Products No. 2 Hydrogen Plant is subject to Regulation 8, Rule 18, Equipment Leaks, which limits emissions of organic compounds and methane from leaking equipment at petroleum refineries, chemical plants, bulk plants and bulk terminals. The type of equipment covered in this regulation are valves, connectors, pumps, compressors, pressure relief devices, diaphragms, hatches, sight-glasses, fittings, sampling ports, meters, pipes, and vessels. The specific reference definitions are as follows:

- Regulation 8-18-204, Connection
- Regulation 8-18-214, Pressure Relief Device
- Regulation 8-18-221, Valve

However, all Pressure Relief Devices in organic service are vented to the No. 2 Hydrogen Plant flare header, which in turn is connected to the Tesoro flare header. Under normal operation, any gas from the Pressure Relief Valves are recovered by the Tesoro Flare Gas Recovery Compressors and used in the Tesoro fuel gas system(s). Therefore, according to Regulation 8-18-110, the Air Products Pressure Relief Devices are exempt from Regulation 8, Rule 18. The emission standards and exemptions that are applicable to the Air Products No. 2 Hydrogen Plant are as follows:

- Regulation 8-18-110, Exemption, Controlled Seal Systems and Pressure Relief Devices
- Regulation 8-18-301, General
- Regulation 8-18-302, Valves
- Regulation 8-18-303, Pumps and Compressors
- Regulation 8-18-304, Connections
- Regulation 8-18-305, Pressure Relief Devices (exempt per 8-18-110)

In addition, the administrative, monitoring, recordkeeping and procedure requirements are as follows:

- Regulation 8-18-401, Inspection
- Regulation 8-18-402, Identification
- Regulation 8-18-403, Visual Inspection Schedule
- Regulation 8-18-404, Alternate Inspection Schedule
- Regulation 8-18-502, Records
- Regulation 8-18-503, Reports
- Regulation 8-18-603, Determination of Control Efficiency

Regulation 8, Rule 28 -- Episodic Releases from Pressure Relief Devices at Petroleum Refineries and Chemical Plants

The Air Products No 2 Hydrogen Plant is subject to Regulation 8, Rule 28, which prevents episodic emissions of organic compounds from pressure relief devices. However, all of the Air Products pressure relief devices discharge to a vapor recovery system, which normally is

recovered and used at Tesoro for fuel gas. Therefore, there are no "Release Events" as defined in Regulation 8-28-214.

The following Regulation 8-28 emission standards are applicable to the No. 2 Hydrogen Plant .

- Regulation 8-28-302, Pressure Relief Devices at New or Modified Sources at Petroleum Refineries. The modification that triggers this standard was completed in 1996. However, it was 2002 Application 5222 that permitted the modification and included the required BACT determination.
- Regulation 8-28-303 Existing Pressure Relief Devices at Petroleum Refineries

The administrative, monitoring and recordkeeping requirements applicable to the No. 2 Hydrogen Plant are as follows:

- Regulation 8-28-404, Identification
- Regulation 8-28-502.2, Records

All of the other administrative, monitoring and recordkeeping requirements in Regulation 8, Rule 28 are only applicable to "release events" or discharges to atmosphere.

Regulation 9, Rule 1 -- Sulfur Dioxide

Normally the Air Products No. 2 Hydrogen Plant S-1031 SMR furnace fires natural gas and recycled PSA off-gas, both of which are low in sulfur content. However, the S-1031 SMR furnace is permitted to fire refinery fuel gas that can have H₂S content as high as the 163 ppm limit of NSPS 40 CFR 60 Subpart J. Therefore, the No. 2 Hydrogen Plant has a potential to emit sulfur dioxide and is subject to the requirements of Regulation 9, Rule 1. The emission standards that are applicable to the No 2 Hydrogen Plant are as follows:

- Regulation 9-1-301, Limitations on Ground Level Concentrations
- Regulation 9-1-302, General Emission Limitation

The administrative, monitoring and recordkeeping requirements applicable to the No. 2 Hydrogen Plant are only Regulation 9-1-501, Area Monitoring Requirements, upon request of the APCO.

Regulation 9, Rule 2 -- Hydrogen Sulfide

Normally the Air Products No 2 Hydrogen Plant S-1031 SMR furnace fires natural gas and recycled PSA waste gas, both of which are low in sulfur content. However, the S-1031 SMR furnace is permitted to fire refinery fuel gas that can have H₂S content as high as the 163 ppm limit of NSPS 40 CFR 60 Subpart J. In addition, all process feed gas is treated to remove sulfur compounds and while there is a theoretical potential for this treatment process to release small amounts of hydrogen sulfide into the process gas, this event is very unlikely since it would result in poisoning of the SMR catalyst and an eventual plant shutdown, and in any event would not

result in a direct H₂S release to the atmosphere. Therefore, the No. 2 Hydrogen Plant has a potential to emit hydrogen sulfide only when it is firing refinery fuel gas as fuel and is subject to the requirements of Regulation 9, Rule 2. The emission standard that is applicable to the No. 2 Hydrogen Plant is as follows:

- Regulation 9-2-301, Limitations on Hydrogen Sulfide

The APCO may require Air Products to comply with the administrative, monitoring and recordkeeping requirements applicable of Regulation 9-2-501, Area Monitoring Requirements.

Regulation 9, Rule 3 Nitrogen Oxides from Heat Transfer Operations.

The Air Products S-1031 SMR furnace is subject to Regulation 9, Rule 3 that limits the emissions of nitrogen oxides from existing, new or modified heat transfer operations. S-1031 is a new heat transfer operation as defined in Regulation 9-3-201 since the Authority to Construct was granted after April 19, 1975. The emission standard applicable to S-1031 is as follows:

- Regulation 9-3-303, New or Modified Heat Transfer Operation Limits

There are no administrative, monitoring or recordkeeping requirements for S-1031 in Regulation 9, Rule 3.

Regulation 9, Rule 7 Nitrogen Oxides and Carbon Monoxide from Industrial, Institutional and Commercial Boilers, Steam Generators and Process Heaters

Air Products S-1031 SMR Furnace is potentially subject to the requirements of Regulation 9, Rule 7. However, S-1031 is exempt from Regulation 9, Rule 7 pursuant to Regulation 9-7-110.3:

9-7-110 Exemptions: The requirements of this rule shall not apply to the following:
110.3 Boilers, steam generators and process heaters that are used in petroleum refineries;

Regulation 9, Rule 10 -- NO_x and CO from Boilers, Steam Generators, and Process Heaters in Petroleum Refineries

Air Products S-1031 SMR Furnace is potentially subject to the requirements of Regulation 9, Rule 10. However, S-1031 SMR furnace was granted an Authority to Construct on 10/22/2002 via Application 5222 when it was modified to a capacity of 294 MMBtu/hr. In Application 5222, S-1031 was subject to a NO_x BACT determination. Therefore, S-1031 is exempt from Regulation 9, Rule 10 pursuant to Regulation 9-10-110.6:

9-10-110 Exemptions: The requirements of this rule shall not apply to the following:
110.6 Boilers, steam generators and process heaters, including CO boilers, that receive an Authority to Construct subject to BACT requirements for NO_x on or after January 5, 1994.

Regulation 12, Rule 11 -- Flare Monitoring at Petroleum Refineries

The Air Products No 2 Hydrogen Plant contains control valves, manual vents and pressure safety valves that discharge waste gas into the Tesoro flare header. Similar to all refinery waste gas, Air Products waste gas that is routinely discharged into the flare header is normally recovered by the Tesoro Flare Gas Recycle Compressors CP-539 and CP-540, sent to the No. 5 Gas Plant, and treated for use as refinery fuel gas. Also similar to all refinery waste gas, when the compressors are unable to recycle all of the Air Products waste gas along with the refinery waste gas, then the combined excess waste gas is combusted in the Tesoro Main Flare System (S-854, S-944, S-945, S-992, S-1012, S-1517, a six flare staged system).

The purpose of Regulation 12, Rule 11 is to require monitoring and recording of emissions data for flares at petroleum refineries. While Regulation 12, Rule 11 contains monitoring and reporting requirements, these requirements are only applicable to the owner or operator of the flare device itself. Since Air Products does not own or operate a flare, the requirements of Regulation 12, Rule 11 are not applicable to Air Products. Indeed, Tesoro Marketing and Refining, LLC, the owner and operator of the flares, is subject to, and in compliance with, the requirements of Regulation 12, Rule 11.

Regulation 12, Rule 12 -- Flares at Petroleum Refineries

The No. 2 Hydrogen Plant can produce vent gas that is directed to the flare gas recovery system at the Tesoro Refinery. Tesoro owns and operates the flare gas recovery system that includes six flares subject to Regulation 12, Rule 12. The current practice is that Air Products provides the necessary information to Tesoro and Tesoro is responsible for complying with the administrative requirements of Regulation 12, Rule 12. Tesoro is responsible for maintaining a Flare Management Plan approved by the District. A permit condition that clarifies Air Products' obligations to minimize flaring events and effectuate Tesoro's compliance with Regulation 12, Rule 12, Permit Condition 25995, has been added to the permit via Application No. 27043.

40 CFR 60 Subpart J -- NSPS for Petroleum Refineries

The Air Products S-1031 SMR Furnace is potentially subject to 40 CFR 60, Subpart J because it is a "fuel gas combustion device" as defined in 40 CFR 60.101(g), constructed between June 11, 1973 and May 14, 2007, and located in a petroleum refinery..

S-1031 normally combusts natural gas and PSA off-gas. However, S-1031 is permitted to combust "fuel gas" as defined in 40 CFR 60.101(d). The 40 CFR 60.102 Standard for particulate matter and 40 CFR 60.103 Standard for carbon monoxide do not apply to fuel gas combustion devices. Only 40 CFR 60.104 Standards for sulfur oxides are applicable to S-1031. Monitoring requirements are detailed in 40 CFR 60.105. However, under normal operation where only natural gas and PSA off-gas are used for combustion, and in cases where propane or butane meeting LPG product specifications are combusted, Air Products is exempt from the monitoring requirements pursuant to 40 CFR 60.105(a)(4)(iv)(B) and 60.105(a)(4)(iv)(C). During the

operation where S-1031 is combusting refinery fuel gas, Air Products must comply with the monitoring requirements, either 40 CFR 60.105(a)(3) or 60.105(a)(4).

40 CFR 60 Subpart GGG -- NSPS for Equipment Leaks in Petroleum Refineries

40 CFR 60 Subpart VV -- NSPS SOCOMI Equipment Leaks

The Air Products No. 2 Hydrogen Plant is subject to 40 CFR 60 Subpart GGG because the facility is located within a of “Petroleum Refinery that was constructed after January 4, 1983, and on or before November 7, 2006. Additionally, the No. 2 Hydrogen Plant is not directly subject to Subpart VV because it does not produce one or more of the chemicals listed in Section 60.489 per the definition of “synthetic organic chemical manufacturing industry” in Section 60.481. The Standards of Subpart GGG per Section 60.592 nonetheless require compliance with Subpart VV §§ 60.482-1 to 60.482-10. These standards are as follows:

- § 60.482-1 Standards: General.
- § 60.482-2 Standards: Pumps in light liquid service.
- § 60.482-3 Standards: Compressors.
- § 60.482-4 Standards: Pressure relief devices in gas/vapor service.
- § 60.482-5 Standards: Sampling connection systems.
- § 60.482-6 Standards: Open-ended valves or lines.
- § 60.482-7 Standards: Valves in gas/vapor service and in light liquid service.
- § 60.482-8 Standards: Pumps and valves in heavy liquid service, pressure relief devices in light liquid or heavy liquid service, and connectors.
- § 60.482-9 Standards: Delay of repair.
- § 60.482-10 Standards: Closed vent systems and control devices.

40 CFR 60 Subpart QQQ -- NSPS Petroleum Refinery Wastewater Systems

The Air Products No 2 Hydrogen Plant is located in the process unit section of the Tesoro Golden Eagle Refinery. This process section includes a refinery wastewater collection system. Air Products uses this refinery wastewater system. Wastewater from Tesoro refinery units does not enter the Air Products site, Air Products wastewater is collected on site and added to the Tesoro refinery wastewater off-plot. There is no comingled refinery wastewater on the Air Products site.

The Air Products No 2 Hydrogen Plant is subject to 40 CFR 60 Subpart QQQ because the facility has a wastewater system (as defined in 40 CFR 60.691) located in a petroleum refinery modified after May 4, 1987. The wastewater system components, as defined in 40 CFR 60.691, that are in the No 2 Hydrogen Plant are the following:

- Catch Basin
- Individual Drain System
- Junction Box
- Sewer Line
- Stormwater Sewer System

- Wastewater System
- Water Seal Controls

However, Section 60.692-1(d)(1) exempts stormwater sewer systems and 60.692-1(d)(2) exempts ancillary equipment “which is physically separate from the wastewater system and does not come in contact with or store oily wastewater” from the requirements of Subpart QQQ. The Standards of 40 CFR 60.692 that are applicable are as follows:

- § 60.692-1 Standards: General.
- § 60.692-2 Standards: Individual drain systems
- § 60.692-6 Standards: Delay of repair
- § 60.693-1 Alternative standards for individual drain systems.

40 CFR 61 Subpart J -- NESHAPS Benzene Equipment Leaks

40 CFR 61 Subpart J applies to fugitive emissions from equipment “in benzene service.” “In Benzene Service,” as defined in 40 CFR 61.111, includes equipment that contains or contacts a fluid that is at least 10% benzene by weight. The only potential source of benzene in the Air Products No. 2 Hydrogen Plant is the refinery fuel gas when it is used for a fuel. However, the refinery fuel gas will never contain benzene in quantities of 10% or higher, therefore the requirements of 40 CFR 61 Subpart J are not applicable.

40 CFR 61 Subpart V -- NESHAPS Equipment Leaks

40 CFR 61 Subpart V applies to equipment in “volatile hazardous air pollutant (VHAP) service.” “In VHAP service,” as defined in 40 CFR 61.241, includes equipment that contains or contacts a fluid that is at least 10% VHAP by weight. VHAP is defined as in 40 CFR 60.241 as any substance regulated by Part 61. The list of pollutants designed as hazardous air pollutants are listed in 40 CFR 61.01. The only potential source of VHAPs in the Air Products No. 2 Hydrogen Plant is the refinery fuel gas when it is used for a fuel. However, the refinery fuel gas will never contain VHAPs in quantities of 10% or higher, therefore the requirements of 40 CFR 61 Subpart V are not applicable.

40 CFR 61 Subpart FF -- NESHAPS Benzene Waste Operations

The Air Products No 2 Hydrogen Plant is potentially subject to 40 CFR 61 Subpart FF because the facility sends wastewater to a petroleum refinery that is subject to 40 CFR 61 Subpart FF. The Tesoro petroleum refinery complies with 40 CFR 61 Subpart FF through the "6BQ" option in 40 CFR 61.342(e). This option allows management of the waste streams subject to the 6 Mg/year limit.

However, it is unlikely that the Air Products No. 2 Hydrogen Plant would ever generate waste streams with benzene content. The only potential source of benzene is the refinery fuel gas when it is used for fuel. Fuel is combusted, the flue gas abated with an SCR, and discharged to

atmosphere. There is no contact with a waste stream that could generate benzene waste. Refinery fuel gas is not used for feedstock.

Therefore, Air Products is not subject to the requirements of 40 CFR 61 Subpart FF.

40 CFR 63 Subpart CC -- Refinery MACT

The Air Products No 2 Hydrogen Plant is potentially subject to 40 CFR 63 Subpart CC because it is a “petroleum refinery process unit” located at a “plant site” that is a major source per the definitions in Section 63.641 and the applicability provisions in Section 63.640 of Subpart CC:

§ 63.640 Applicability and designation of affected source.

(a) This subpart applies to petroleum refining process units . . . that are located at a plant site and that meet the criteria in paragraphs (a)(1) and (2) of this section:

- (1) Are located at a plant site that is a major source as defined in section 112(a) of the Clean Air Act; and
- (2) Emit or have equipment containing or contacting one or more of the hazardous air pollutants listed in table 1 of this subpart.

§ 63.641 Definitions.

Petroleum refining process unit means a process unit used in an establishment primarily engaged in petroleum refining as defined in the Standard Industrial Classification code for petroleum refining (2911), and used primarily for the following:

- . . .
- (4) Examples of such units include, but are not limited to . . . hydrogen production, isomerization, polymerization, thermal processes, and blending, sweetening, and treating processes. . . .

Plant site means all contiguous or adjoining property that is under common control including properties that are separated only by a road or other public right-of-way. . . .

The “affected source” comprises the emission points listed in 40 CFR 63.640(c) including the following:

1. All miscellaneous process vents from petroleum refining process units that contain or contact HAPs;
2. All storage vessels associated with petroleum refining process units that contain or contact HAPs;
3. All wastewater streams and treatment operations associated with petroleum refining process units that contain or contact HAPs; and
4. All equipment leaks from petroleum refining process units that are in organic HAP service;
5. All gasoline loading racks classified under Standard Industrial Classification code 2911;
6. All marine vessel loading operations located at a petroleum refinery;
7. All storage vessels and equipment leaks associated with a bulk gasoline terminal or pipeline breakout station; and

8. All heat exchange systems in organic HAP service, as defined in this subpart.

Air Products does not have emission points described in #5, #6 and #7. Therefore, the standards and monitoring requirements that are potentially applicable to Air Products are the following:

- § 63.642 General standards.
- § 63.643 Miscellaneous process vent provisions
- § 63.644 Monitoring provisions for miscellaneous process vents.
- § 63.646 Storage vessel provisions.
- § 63.647 Wastewater provisions.
- § 63.648 Equipment leak standards.
- § 63.654 Heat exchange systems.

The definition of “miscellaneous process vent” in Section 63.641 excludes hydrogen plant deaerator vents as follows:

Miscellaneous process vent means a gas stream containing greater than 20 parts per million by volume organic HAP that is continuously or periodically discharged during normal operation of a petroleum refining process unit meeting the criteria specified in § 63.640(a). . . . Miscellaneous process vents do not include:

-
- (14) Hydrogen production plant vents through which carbon dioxide is removed from process streams or through which steam condensate produced or treated within the hydrogen plant is degassed or deaerated.

Therefore, the No. 2 Hydrogen Plant is not subject to the Subpart CC requirements for miscellaneous process vents.

The No. 2 Hydrogen Plant does not include vessels used to store organic liquids that contain or contact HAPs (not including pressure vessels and vessels smaller than 40 cubic meters [10,500 gallons]) as defined in Section 63.641. The only storage vessel in the No 2 Hydrogen Plant stores ammonia for the SCR abatement device. Since ammonia is not a material listed in Table 1 of Subpart CC and is not an “organic liquid,” the storage vessel is not subject to Subpart CC.

The Air Products No 2 Hydrogen Plant contributes wastewater to the Tesoro Petroleum Refinery wastewater system. However, the No.2 Hydrogen Plant does not include wastewater streams and treatment operations that contain or contact HAPs. Furthermore, any Air Products wastewater will not have a benzene concentration of 10 ppm or greater. Thus, any wastewater potentially subject to Subpart CC is therefore a Group 2 Wastewater Stream as defined in 40 CFR 63.641. There are no standards in 40 CFR 63.647 for Group 2 Wastewater Streams.

The requirements of 40 CFR 63.648 Equipment Leak Standards require compliance with the provisions of 40 CFR 60 Subpart VV. However, the Air Products No 2 Hydrogen Plant does not have equipment that is “in organic HAP service” as defined in 40 CFR 63.641 (equipment containing or contacting a fluid that is at least 5% by weight of total organic HAP). Therefore, according to 40 CFR 63.648(a)(1), there are no equipment leak standards applicable. As

discussed previously, Air Products is already subject to the requirements of 40 CFR 60 Subpart VV through 40 CFR 60 Subpart GGG.

Air Products operates heat exchangers in cooling water service. However, none of these heat exchangers cool fluids that contain at least 5% by weight of organic HAP. Therefore, none of the Air Products heat exchangers are “in organic HAP service” as defined in 40 CFR 63.641. Thus, the requirements of 40 CFR 63.654 do not apply because the Air Products heat exchangers are not Heat Exchange Systems as defined in 40 CFR 63.641.

In conclusion, the Air Products No 2 Hydrogen Plant is subject to the following standards for 40 CFR 63 Subpart CC:

§ 63.642 General standards.

However, the only applicable general standard in Section 63.642 is the requirement to apply for a part 70 or 771 operating permit from the appropriate permitting authority.

40 CFR 64 -- Compliance Assurance Monitoring (CAM)

The Air Products S-1031 SMR Furnace is potentially subject to 40 CFR 64 Compliance Assurance Monitoring. General applicability is detailed in 40 CFR 64.2(a). S-1031 is subject to CAM because of the following:

- (1) The unit is required to obtain a part 70 or 71 permit;
- (2) The furnace is subject to a NO_x emission limitation of 10 ppm @ 3% O₂ in Permit Condition 21087;
- (3) The furnace is abated with a SCR control device to achieve compliance with the emissions limit; and
- (4) The furnace has pre-control device potential to emit over 100 tons of NO_x annually.

Exemptions to 40 CFR 64 that may apply to S-1031 are detailed in 40 CFR 64.2(b). 40 CFR 64.2(b)(1) lists the exempt emission limitations or standards. The NO_x emissions limit is not an exempt limitation because:

- 64.2(b)(1)(i) -- The NO_x emissions limitation is not a federal requirement proposed by the [EPA] Administrator after November 15, 1990.
- 64.2(b)(1)(ii) -- The NO_x emissions limitation is not part of the stratospheric ozone protection requirements of Title VI.
- 64.2(b)(1)(iii) -- The NO_x emissions limitation is not an Acid Rain Program requirement.
- 64.2(b)(1)(iv) -- The NO_x emissions limitation is not part of an emissions trading program.
- 64.2(b)(1)(v) -- The NO_x emissions limitation is not part of an emissions cap that meets the requirements of 40 CFR 70.4(b)(12) or 71.6(a)(13)(iii).
- 64.2(b)(1)(vi) -- The NO_x emissions limitation is not currently contained in a part 70 or 71 permit that specifies a continuous compliance determination method. Permit Condition 21087, Part 6, does impose a District Approved NO_x CEM, but this requirement is currently part of the District Permit to Operate, not a part 70 or 71 permit. Air Products will not have a part 70 permit until after this initial Title V permit is issued.

District permit applications included in this proposed permit

Since Air Products submitted the application for a Title V permit, the following NSR applications have been submitted and are included in the proposed permit.

Application #	Project Description
24173	S-1031 SMR Furnace Change of Conditions
23933	SMR Furnace Burner Replacement Alteration

V. Schedule of Compliance

Because the District has not determined that the facility is out of compliance with an applicable requirement, the schedule of compliance for this permit only contains elements 2-6-409.10.1 and 2-6-409.10.2.

VI. Permit Conditions

During the Title V permit development, the District has reviewed the existing permit conditions, deleted the obsolete conditions, and as appropriate, revised the conditions for clarity and enforceability. Some conditions may have been deleted because they reiterate an applicable requirement that is now contained in Section IV, Source-Specific Applicable Requirements. Each permit condition is identified with a unique numerical identifier, up to five digits.

Where necessary to meet Title V requirements, additional monitoring, recordkeeping, or reporting has been added to the permit.

All changes to existing permit conditions are clearly shown in “strike-out/underline” format in the proposed permit. When the permit is issued, all “strike-out” language will be deleted; all “underline” language will be retained, subject to consideration of comments received.

The existing permit conditions are generally derived from previously issued District Authorities to Construct (A/C) or Permits to Operate (P/O). It is also possible for permit conditions to be imposed or revised as part of the annual review of the facility by the District pursuant to California Health and Safety Code (H&SC) § 42301(e), through a variance pursuant to H&SC § 42350 *et seq.*, an order of abatement pursuant to H&SC § 42450 *et seq.*, or as an administrative revision initiated by District staff. After issuance of the Title V permit, permit conditions will be revised using the procedures in Regulation 2, Rule 6, Major Facility Review.

The District has reviewed and, where appropriate, revised or added new annual and daily throughput limits on sources so as to help ensure compliance with District rules addressing preconstruction review. The applicability of preconstruction review depends on whether there is

a “modified source” as defined in District Rule 2-1-234. Whether there is a modified source depends in part on whether there has been an “increase” in “emission level.” 2-1-234 defines what will be considered an emissions level increase, and takes a somewhat different approach depending on whether a source has previously permitted by the District.

Sources that were modified or constructed since the District began issuing new source review permits will have permits that contain throughput limits, and these limits are reflected in the Title V permit. These limits have previously undergone District review, and are considered to be the legally binding “emission level” for purposes of 2-234.1 and 2-1-234.2. All sources at this facility were issued permits under the new source review program. By contrast, for older sources that have never been through preconstruction review (commonly referred to as “grandfathered” sources), an “increase” in “emission level” is addressed in 2-1-234.3. A grandfathered source is not subject to preconstruction review unless its emission level increases above the highest of either: 1) the design capacity of the source, 3) the capacity listed in a permit to operate, or 3) highest capacity demonstrated prior to March 2000. However, if the throughput capacity of a grandfathered source is limited by upstream or downstream equipment (i.e., is “bottlenecked”), then the relaxing of that limitation (“debottlenecking”) is considered a modification.

Air Products does not have any "grandfathered" sources.

Conditions that are obsolete or that have no regulatory basis have been deleted from this permit.

Conditions have also been deleted due to the following:

- Redundancy in record-keeping requirements.
- Redundancy in other conditions, regulations and rules.
- The condition has been superseded by other regulations and rules.
- The equipment has been taken out of service or is exempt.
- The event has already occurred (i.e. initial or start-up source tests).

The regulatory basis has been referenced following each condition. The regulatory basis may be a rule or regulation. The District is also using the following codes for regulatory basis:

- BACT: This code is used for a condition imposed by the Air Pollution Control Officer (APCO) to ensure compliance with the Best Available Control Technology in Regulation 2-2-301.
- Cumulative Increase: This code is used for a condition imposed by the APCO which limits a source’s operation to the operation described in the permit application pursuant to BAAQMD Regulation 2-1-403.
- Offsets: This code is used for a condition imposed by the APCO to ensure compliance with the use of offsets for the permitting of a source or with the banking of emissions from a source pursuant to Regulation 2, Rules 2 and 4.
- PSD: This code is used for a condition imposed by the APCO to ensure compliance with a Prevention of Significant Deterioration permit issued pursuant to Regulation 2, Rule 2.
- TRMP: This code is used for a condition imposed by the APCO to ensure compliance with limits that arise from the District’s Toxic Risk Management Policy.

Abatement device operating parameter monitoring has been added for each abatement device.

Additional monitoring has been added, where appropriate, to assure compliance with the applicable requirements.

VII. Applicable Limits and Compliance Monitoring Requirements

This section of the permit is a summary of numerical limits and related monitoring requirements that apply to each source. The summary includes a citation for each monitoring requirement, frequency, and type. The applicable requirements for monitoring are completely contained in Sections IV, Source-Specific Applicable Requirements, and VI, Permit Conditions, of the permit.

The tables below contain only the limits for which there is no monitoring or inadequate monitoring in the applicable requirements. The District has examined the monitoring for other limits and has determined that monitoring is adequate to provide a reasonable assurance of compliance. Calculations for potential to emit will be provided when no monitoring is proposed due to the size of a source. In all other cases, the column will have “N/A”, meaning “Not applicable”.

Monitoring decisions are typically the result of a balancing of several different factors including: 1) the likelihood of a violation given the characteristics of normal operation, 2) degree of variability in the operation and in the control device, if there is one, 3) the potential severity of impact of an undetected violation, 4) the technical feasibility and probative value of indicator monitoring, 5) the economic feasibility of indicator monitoring, and 6) whether there is some other factor, such as a different regulatory restriction applicable to the same operation, that also provides some assurance of compliance with the limit in question.

These factors are the same as those historically applied by the District in developing monitoring for applicable requirements. It follows that, although Title V calls for a re-examination of all monitoring, there is a presumption that these factors have been appropriately balanced and incorporated in the District’s prior rule development and/or permit issuance. It is possible that, where a rule or permit requirement has historically had no monitoring associated with it, no monitoring may still be appropriate in the Title V permit if, for instance, there is little likelihood of a violation. Compliance behavior and associated costs of compliance are determined in part by the frequency and nature of associated monitoring requirements. As a result, the District will generally revise the nature or frequency of monitoring only when it can support a conclusion that existing monitoring is inadequate.

A summary of all monitoring is contained in Section VII, Applicable Limits and Compliance Monitoring Requirements, of the permit. The summary includes a citation for each monitoring requirement, frequency, and type. The applicable requirements for monitoring are completely contained in Sections IV, Source-Specific Applicable Requirements, and VI, Permit Conditions, of the permit.

<u>NOX Sources</u>

S# & Description	Federally Enforceable Limit Citation	Federally Enforceable Limit	Monitoring
none			

NOx Discussion:

The source at the facility that is subject to a NOx limit is also subject to NOx monitoring. This monitoring requirement comes from existing permit conditions. For more detailed information on this matter, see Table VII-C.

<u>CO Sources</u>			
S# & Description	Federally Enforceable Limit Citation	Federally Enforceable Limit	Monitoring
none			

CO Discussion:

The source at the facility that is subject to a CO limit is also subject to CO monitoring. This monitoring requirement come from existing permit conditions. For more detailed information on this matter, see Table VII-C.

<u>SO₂ Sources</u>			
S# & Description	Federally Enforceable Limit Citation	Federally Enforceable Limit	Monitoring
Facility	BAAQMD 9-1-301	GLC of 0.5 ppm for 3 min. or 0.25 ppm for 60 min. or 0.05 ppm for 24 hours	Area Monitoring (Note 1)
Facility	BAAQMD 9-1-302	General emission standard: < 300 ppm SO ₂ (applies only to gas-fired equipment when GLMs are not functioning)	None (Note 2)

Note 1: All facility combustion sources are subject to the SO₂ emission limitations in District Regulation 9, Rule 1 (ground-level concentration and emission point concentration). Area monitoring to demonstrate compliance with the ground level SO₂ concentration requirements of Regulation 9-1-301 has been required by the APCO (per BAAQMD Regulation 9-1-501) for the refinery, but not specifically to Air products. The APCO has not required monitoring by Air Products because it is located in the refinery "process block" and has a low likelihood of emitting SO₂ since fuel gas is typically natural gas and sulfur free PSA gas.

Note 2: All facility combustion sources are subject to the SO2 emission limitations in District Regulation 9, Rule 1 (ground-level concentration and emission point concentration). In EPA's June 24, 1999 agreement with CAPCOA and ARB, "Periodic Monitoring Recommendations for Generally Applicable Requirements in SIP", EPA has agreed that gaseous-fueled combustion sources do not need additional monitoring to verify compliance with Regulation 9, Rule 1, since violations of the regulation are unlikely. Therefore, no monitoring is necessary for this requirement.

<u>PM Sources</u>			
S# & Description	Federally Enforceable Limit Citation	Federally Enforceable Limit	Monitoring
S1031	BAAQMD 6-1-310.3 SIP 6-310.3	0.15 grain/dscf @ 6% O2	No monitoring is proposed because emissions are expected to be negligible

<u>POC Sources</u>			
S# & Description	Federally Enforceable Limit Citation	Federally Enforceable Limit	Monitoring
S-1030	BAAQMD 8-2-301 SIP 8-2-301	15 lb/day and 300 ppm total carbon on a dry basis	None

POC Discussion:

S-1030 Hydrogen Plant is subject to the Miscellaneous Operations Standard 8-2-301. The District performed a source test on the Deaerator vents in 1997 and again in 2014 and found the 300 ppm exceeded but the mass emissions were below 15 lb/day. The mass emissions were 4.7 lb/day in 1997 and 4.5 lb/day in 2014. Because these tests demonstrate a significant margin of compliance with the 15 lb/day limit, the District has determined that periodic source testing is not required.

VIII. Test Methods

This section of the permit lists test methods that are associated with standards in District or other rules. It is included only for reference. In most cases, the test methods in the rules are source test methods that can be used to determine compliance but are not required on an ongoing basis. They are not applicable requirements.

If a rule or permit condition requires ongoing testing, the requirement will also appear in Section VI of the permit.

IX. Permit Shield:

The District rules allow two types of permit shields. The permit shield types are defined as follows: (1) A provision in a major facility review permit that identifies and justifies specific federally enforceable regulations and standards which the APCO has confirmed are not applicable to a source or group of sources, or (2) A provision in a major facility review permit that identifies and justifies specific federally enforceable applicable requirements for monitoring, recordkeeping and/or reporting which are subsumed because other applicable requirements for monitoring, recordkeeping, and reporting in the permit will assure compliance with all emission limits.

The second type of permit shield is allowed by EPA's White Paper 2 for Improved Implementation of the Part 70 Operating Permits Program. The District uses the second type of permit shield for all streamlining of monitoring, recordkeeping, and reporting requirements in Title V permits. The District's program does not allow other types of streamlining in Title V permits.

Compliance with the applicable requirement contained in the permit automatically results in compliance with any subsumed (= less stringent) requirement.

No provisions of any rule have been identified or proposed for any source as requirements for which the applicant seeks a permit shield, and no permit shield is included in the proposed permit.

This facility has no permit shields.

D. Alternate Operating Scenarios:

No alternate operating scenario has been requested for this facility.

E. Compliance Status:

As part of the permit application, the owner certified that all equipment was operating in compliance.

F. Differences between the Application and the Proposed Permit:

Differences related to sources and abatement devices included in the application are explained in Section C.II of this evaluation.

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Appendices

Appendix A – Engineering Evaluations

Application 24173, S-1031 SMR Furnace Change of Conditions

ENGINEERING EVALUATION

Air Product and Chemicals, Inc

PLANT NO. 10295

APPLICATION NO. 24173

BACKGROUND

Air Products and Chemicals, Inc. (Air Products) is applying for an administrative Change in Conditions to allow an extended startup time for the following equipment:

S-1031 No 2 Hydrogen Plant Reforming Furnace

Currently startup duration is limited to a 24 hour duration by permit condition 21087, Part 4:

4. For the purposes of this permit, "startup" and "shutdown" operations for furnace S-1031 are limited to a maximum of 24 hours in duration. The permittee/owner/operator may develop and present documentation in support of alternate startup and shutdown times for these units. These alternate times may be used if approved in writing by the APCO.
"Start-up" shall mean that period of time during which the piece of equipment in question is put into normal operation from an inactive status by following a prescribed series of separate steps or operations.
"Shutdown" shall mean that period of time during which the piece of equipment in question is taken out of service from a normal operating mode to an inactive status following a prescribed series of separate steps or operations.
(basis: cumulative increase, offsets)

During periodic maintenance for S-1031, refractory repair or replacement needs to be performed. For successful completion of this repair/replacement work, the refractory must be properly cured for a period that exceeds the 24-hr allowable startup period. During this extended startup period, the SCR cannot be operated because the S-1031 exhaust temperature is less than 550F, the minimum required temperature for SCR operation.

The requested duration for the extended startup for refractory curing is 72 hours.

Air Products qualified for the Limited Exemption, Accelerated Permitting Program Regulation 2-1-106, and therefore is exempt from Regulation 2-1-301 Authority to Construct. Accordingly, a Permit to Operate, Accelerated Permitting Program pursuant to Regulation 2-1-302.2 was granted February 14, 2012.

EMISSION CALCULATIONS

During the extended startup period, NOx emissions were estimated by Air Products not to exceed 4 lb/hr on a daily average.

The permitted NOx emissions are limited by Condition 21087, Part 1, to 10 ppmv at 3% O2. Using the maximum firing rate of 294MMBtu/hr, this is equivalent to 97 lb NOx/day, or $97/24 = 4.04$ lb/hr. The refractory curing period will be as substantially reduced firing. Actual CEM data during the startup showed NOx concentrations as high as 171 ppm @ 3% O2, and a 3-hr average as high as 165 ppm. However, because of the low fire refractory curing process, the total NOx emissions during the startup were 133 lbs over the 56 hour startup duration, or an average NOx emission rate of 2.4 lb/hr. Therefore, the NOx mass emissions during the extended startup do not exceed the NOx mass emissions permitted by Condition 21087-1.

The permitted CO emissions are limited by Condition 21087, Part 1, to 50 ppmv at 3% O2. Using the maximum firing rate of 294MMBtu/hr, this is equivalent to 261 lb NOx/day, or $261/24 = 11.9$ lb/hr. The refractory curing period will be as substantially reduced firing. Actual CEM data during the startup showed CO concentrations as high as 348 ppm @ 3% O2, and a 3-hr average as high as 314 ppm. However, because of the low fire curing process, the total CO emissions during the startup were 111 lbs over the 56 hour startup duration, or an average NOx emission rate of 2.0 lb/hr. Therefore, the CO mass emissions during the extended startup do not exceed the CO mass emissions permitted by Condition 21087-1.

Therefore, there are no emissions increases associated with this application.

STATEMENT OF COMPLIANCE

This application does not change the compliance of S-1031. S-1031 is expected to remain in compliance with the following:

Regulation 6, Rule 1 Particulate Matter General Requirements.

Regulation 9 Rule 10 Nitrogen Oxides and Carbon Monoxide from Boilers, Steam Generators, and Process Heaters in Petroleum Refineries.

The project is exempt from CEQA pursuant to Regulation 2-1-312.1:

312.1 Applications to modify permit conditions for existing or permitted sources or facilities that do not involve any increases in emissions or physical modifications.

The project is over 1000 feet from the nearest school and therefore not subject to the public notification requirements of Reg. 2-1-412.

PSD, BACT, Offsets, and Toxics do not apply.

PERMIT CONDITIONS

There is a similar permit condition for the Air Products Hydrogen Plant located at the Shell Martinez Refinery.

12271, Part 22. For purposes of this permit, unless otherwise specified in a permit condition, startup and shutdown of combustion sources are limited to a maximum of 8 hours in duration for non-SCR controlled combustion sources, or 24 hours in duration for SCR controlled combustion sources.

a. Upon approval by the District, the startup or shutdown period may be extended to a period not to exceed 72 hours for the following situations:

1. the startup or shutdown has been proceeding continuously, and the owner/operator has been increasing or decreasing temperatures at a rate limited by metallurgy or other physical constraints prescribed in their startup/shutdown procedure.

2. startup following installation or replacement of refractory lining.
3. startup following initial catalyst pre-sulfiding following catalyst replacement or catalyst regeneration.

The following permit conditions will be revised by this application:

Condition 21087

Application #27769

Amended by Application #5222

Amended by Application #7978

[Administratively changed by Application 24173 \(April 2012\). Longer startup duration allowed in Part 4 for refractory curing.](#)

Permit Condition

Sources S-1030, S-1031 and A-38

Plant 10295, Air Products and Chemicals, Inc.

1. Permittee/Owner/Operator shall ensure that, except during periods of startup or shutdown, concentrations of nitrogen oxides (calculated as NO₂) and carbon monoxide from the Hydrogen Plant furnace S-1031 shall not exceed the following limits. These limits shall be based on a 3 hour average and corrected to 3% excess oxygen on a dry basis.

NO	CO
(ppmvd)	(ppmvd)
10	50

(basis: BACT)
2. Permittee/Owner/Operator shall ensure that S-1031 is fired exclusively on natural gas and/or pressure swing adsorber purge gas and/or refinery fuel gas. (basis: BACT)
3. Permittee/Owner/Operator shall ensure that the total reduced sulfur (TRS)/hydrogen sulfide content of the refinery fuel gas fired at S-1031 does not exceed each and all of the following limits:
 - i) hydrogen sulfide limited to not more than 0.1 grain per dry standard cubic foot (230 mg/dscm), based on a three hour average.
 - ii) hydrogen sulfide limited to not more than 100 ppmv averaged over any consecutive 24-hour period.
 - iii) hydrogen sulfide limited to not more than 50 ppmv averaged over any consecutive 12-month period.
 - iv) total reduced sulfur (hydrogen sulfide, methyl mercaptan, carbon disulfide, dimethyl sulfide, dimethyl disulfide, and carbonyl sulfide) expressed as hydrogen sulfide equivalent is limited to not more than 100 ppmv averaged over any consecutive 12-month period.
(basis: BACT)
4. For the purposes of this permit, "startup" and "shutdown" operations for furnace S-1031 are limited to a maximum of 24 hours in duration, [except for startup operation following the installation, repair or replacement of the refractory lining, where the startup is limited to 72 hours in duration.](#) The permittee/owner/operator may develop and present documentation in

support of alternate startup and shutdown times for these units. These alternate times may be used if approved in writing by the APCO.

"Start-up" shall mean that period of time during which the piece of equipment in question is put into normal operation from an inactive status by following a prescribed series of separate steps or operations.

"Shutdown" shall mean that period of time during which the piece of equipment in question is taken out of service from a normal operating mode to an inactive status following a prescribed series of separate steps or operations.

(basis: cumulative increase, offsets)

5. Deleted (basis for deletion: Requested by Applicant as per Settlement Agreement, May 18, 2004. Deletion is NOT a relaxation of requirements.)
6. The Permittee/Owner/Operator shall ensure that a District approved continuous emission monitor (CEM) is installed and operated in the exhaust stack of the No. 2 Hydrogen Plant SCR Unit (A-38) to measure NO_x and CO concentrations from furnace S-1031. These measurements shall be used to calculate NO_x and CO mass emissions. (These mass emissions are included in the monthly emission reports currently submitted by Tesoro, Plant 14628.) Accordingly, source S-1031 shall be included in Group A of Table A of the Appendix of the Engineering Evaluation Report for Application No. 27769 (February 9, 1982). (basis: cumulative increase, offsets)
7. Permittee/Owner/Operator shall provide to Tesoro Refining and Marketing Company or the current owner of the petroleum refinery at 150 Solano Way, commonly referred to as Avon refinery, a daily or more frequent report of the monitoring system data required by Condition 6. The report may be provided electronically or in a printed form. Each daily or more frequent report must be provided within 7 calendar days of the end of the reporting day.
8. The Permittee/Owner/Operator shall ensure that any new valves in volatile hydrocarbon service (i.e., handling material above 0.5 psia true vapor pressure) or anhydrous ammonia service associated with this project shall be "low-emission" valves. For the purposes of this permit, "low-emission" valves are one of the following:
 - A) live-loaded valves,
 - B) bellows valves,
 - C) diaphragm valves, or
 - D) other valve approved by the APCO, in writing.(basis: BACT, offsets)
9. The Permittee/Owner/Operator shall ensure that any new pumps in volatile hydrocarbon service (i.e. handling material above 0.5 psia vapor pressure) or ammonia service associated with this project shall have double mechanical seals with a barrier fluid which either: 1) is at a higher pressure than the seal pressure, or 2) is vented to a closed system, or 3) shall install an equivalent sealing system approved by the APCO. (basis: BACT, offsets)
10. Ammonia emissions slip from the SCR Unit (A-38) controlling the No. 2 Hydrogen Plant furnaces shall be limited to 25 ppmvd, averaged over 3 hours and corrected to 3% oxygen. Within 60 days of startup of the No. 2 Hydrogen Plant (S-1030), Owner/operator shall conduct a source test for ammonia emissions. This test shall be repeated annually. (basis: toxics)
11. For the purposes of these permit conditions, all source testing and monitoring requirements will be subject to the following general provisions:
 - a) At least two weeks prior to testing, Owner/operator shall contact the District's Source Test Section, in writing, to provide notification of the testing procedure, date and

time, and to obtain details on source testing requirements. Source test procedures are subject to approval of the APCO.

- b) Prior to commencement of construction, Owner/operator shall submit plans and specifications for the Continuous Emission Monitor (CEM) to the District's Source Test Section and obtain approval.
- c) Prior to commencement of construction, Owner/operator shall submit plans showing the details of sampling facilities to the District's Source Test Section and obtain approval.

(basis: cumulative increase, offsets)

- 12. To demonstrate compliance with the above conditions, the permittee/owner/operator shall maintain records of required pollutant measurements and mass emissions calculations, as well as other data used in the emissions calculations. These records shall be kept on site and made available for District inspection for a period of not less than 60 months from the date on which a record was made. (basis: cumulative increase, offsets, BACT)
- 13. Permittee/Owner/Operator shall ensure that hydrogen production at S-1030 does not exceed 38 million standard cubic feet during each calendar day. (basis: cumulative increase, offsets)
- 14. In a District approved log, Permittee/Owner/Operator shall ensure that the following records are retained regarding the refinery fuel gas fired at S-1031:
 - i) hydrogen sulfide content of the refinery fuel gas measured in grains per dry standard cubic foot, based on a three hour average.
 - ii) hydrogen sulfide content of the refinery fuel gas in ppmv units, averaged over each/any consecutive 24-hour period.
 - iii) hydrogen sulfide content of the refinery fuel gas in ppmv units, averaged over each consecutive 12-month period.
 - iv) total reduced sulfur (hydrogen sulfide, methyl mercaptan, carbon disulfide, dimethyl sulfide, dimethyl disulfide, and carbonyl sulfide) content of the refinery fuel gas expressed in ppmv units as hydrogen sulfide equivalent averaged over each consecutive 12-month period.

Permittee/Owner/Operator shall ensure that the log is made available for inspection by the District staff for a period of not less than 5 years from date of last entry. (basis: BACT, cumulative increase, offsets)

- 15. Deleted (basis for deletion: Requested by Applicant as per Settlement Agreement, May 18, 2004. Deletion is NOT a relaxation of requirements.)
- 16. In a District approved log, Permittee/Owner/Operator shall record the rate of hydrogen production at S-1030 in standard cubic feet per hour and in standard cubic feet per calendar day, and record the S-1031 CEM data. Permittee/Owner/Operator shall ensure that the log is retained on site and is made available for inspection by the District staff for a period of not less than 5 years from date of last entry. (basis: cumulative increase, offsets)

RECOMMENDATION

It is recommended that an administrative change in conditions be granted Air Products for the following sources:

S-1031 No 2 Hydrogen Plant Reforming Furnace

Permit Evaluation and Statement of Basis: Site B0295, Air Products and Chemicals, Inc.,
Golden Eagle Refinery 150 Solano Way, Martinez, CA 94553

By: _____
Arthur P Valla
Senior Air Quality Engineer
April 11, 2012

Application 23933, S-1031 SMR Furnace Burner Replacement Alteration

ENGINEERING EVALUATION

Air Products and Chemicals, Inc.

PLANT NO. 10295

APPLICATION NO. 23933

BACKGROUND

Air Products and Chemicals, Inc. (Air Products) has applied for an Authority to Construct for the following equipment:

S-1031 No. 2 Hydrogen Plant Reforming Furnace

The project proposes to replace 20 of the 50 burners in the furnace with larger burners to provide an increased efficiency for the furnace heat input. After the burner replacement, the furnace will be capable of firing at a rate of about 309 MMBtu/hr. However, the application is for an alteration to S-1031 since its proposed emissions will not increase above the permitted annual limits and the daily limits implied by the current 294 MMBtu/hr permitted maximum firing rate.

S-1031 furnace was initially permitted by Tosco via 1989 Application 3318 when an Authority to Construct was granted for a 25 MMSCFD Hydrogen Plant. A second furnace S-1032 was also granted an Authority to Construct. S-1031 was permitted for 261.5 MMBtu/hr and S-1032 was permitted for 32.5 MMBtu/hr. Combustion emissions for both furnaces were subject to NSR and were offset by the Tosco Refinery Emissions Cap (established by the Tosco No. 3 HDS Project Application 27769 in the early 1980's). The 25 MMSCFD Hydrogen Plant was never constructed. S-1031 was permitted again via 1993 Ultramar (new refinery owner) Application 10912 Clean Fuels Project (CFP), when the Authority to Construct was amended for a 50 MMSCFD Hydrogen Plant. There was no increase in combustion emissions for S-1031 in the second CFP application. In 1995, operation of the No. 2 Hydrogen Plant was transferred to Air Products and the as-built capacity of S-1031 was permitted at 222 MMBtu/hr (S-1032 was not built). Details of the No. 2 Hydrogen Plant permitting history and unresolved permitting issues are included in Appendix A of this evaluation.

In 2002 via Air Products Application 5222, the District granted S-1031 a Permit to Operate for 294 MM Btu/hr. This application was treated as an administrative correction of the as-built capacity with the rationale that S-1031 (permitted at 261.5 MMBtu/hr) plus S-1032 (permitted at 32.5 MMBtu/hr) equals 294 MMBtu/hr. The application also mis-identified the S-1031 capacity permitted by 1995 Application 14929 as 261.5 MMBtu/hr (the correct permitted capacity is 222 MMBtu/hr). Nonetheless, the District granted a Permit to Operate for S-1031 at 294 MMBtu/hr on October 22, 2002.

Therefore, since October 2002, when Air Products Application 5222 was approved, S-1031 was permitted at 294 MMBtu/hr and the combustion emissions for S-1031 were subject to and included in the Tesoro (current refinery owner) Refinery Emissions Cap.

In the 2011 permit renewal for Air Products, the District corrected a permit condition error. The emissions for the No. 2 Hydrogen Plant were included in the Tesoro Refinery Emissions Cap, but S-1031 was not properly linked to Permit Condition 8077, the condition that detailed the requirements and emission limits of the Tesoro Refinery Emissions Cap. This omission was corrected. When Air Products received its renewed Permit to Operate, exception was taken over the inclusion of Condition 8077. Air Products was concerned that there was a permit condition in its Permit to Operate with requirements that were not the responsibility of or in the control of Air Products. Negotiations occurred between the District and Air Products, and separately between Air Products and Tesoro. The results of these negotiations created a “carve-out” of the emissions associated with the No. 2 Hydrogen Plant from the Tesoro Refinery Emissions Cap. With concurrence with the District Legal Division, the annual emissions permitted in the original 1989 Application 3318 were removed from the emission limits of the Tesoro Refinery Emission Cap and transferred to Air Products Permit Condition 25199. This “carve-out” process removed Air Products emissions from the Tesoro Refinery Emissions Cap effectively removing the applicability of Condition 8077. This satisfied the Air Products concern. Part of the “carve-out” agreement was to revise Air Products Condition 21087 in this Application 23933 to properly reflect the removal of Air Products sources from the Tesoro Refinery Emissions Cap.

Since this S-1031 Burner Replacement Project will replace 20 burners tips with larger capacity burners tips, the Potential to Emit for S-1031 can increase. According to Regulation 2-1-234, a source is modified if there is an increase in either daily or annual emissions. The “carve-out” exercise clearly defined annual mass emission limits for S-1031. However, daily mass emissions were not as clearly addressed. After extensive discussion, the District decided that daily emissions will not be increased based on the fact that the maximum permitting firing rate of 294 MMBtu/hr for S-1031 will not increase.

Finally, Air Products will be required to demonstrate compliance with the annual emission limits first permitted via 1989 Application 3318. S-1031 is currently equipped with a NOx and CO CEM. For compliance with the POC, PM10 and SO2 limits, the District participated in discussion with Air Products regarding adequate monitoring to demonstrate compliance. The result of this discussion was the following agreement:

- SO2 emissions will be verified based on fuel gas sulfur measurements currently required by permit Condition 21087, Part 3.
- Conduct an initial stack emissions test for PM10 and POC within 90 days of installing all new burner tips.
- Conduct a one-time stack emissions test for PM10 and POC within 90 days of utilizing Refinery Fuel Gas as a fuel for S-1031 or a feedstock to S-1030
- Conduct additional stack emissions tests for PM10 and POC once every 5 years in conjunction with the Title V permit renewal process

These monitoring requirements will be added to the permit conditions.

EMISSION CALCULATIONS

Permit Evaluation and Statement of Basis: Site B0295, Air Products and Chemicals, Inc.,
Golden Eagle Refinery 150 Solano Way, Martinez, CA 94553

Based on the discussion in the Background Section above, there are no increases in emissions associated with this S-1031 Burner Replacement Project. Daily emissions will not increase above the emission limits implied by the S-1031 Maximum Firing Rate of 294 MMBtu/hr. Annual emissions will not increase above the original emission limits permitted in 1989 Application 3318:

NOx: 16.13 tons
CO: 21.93 tons
POC: 3.87 tons
SO2: 4.46 tons
PM10: 12.90 tons

This S-1031 Burner Replacement Project will require any additional fugitive components. Therefore there is no increase in fugitive emissions. Total facility fugitive emissions remain permitted at 11.108 tons/year of POC. Fugitive emissions from this facility are permitted and offset in two manners. Fugitive emissions permitted by 1989 Application 3318 in the amount of 10.078 tons/yr of POC that was offset by a reduction of the Tosco Refinery Emissions Cap in 1997. Fugitive emissions from the hydrogen plant expansion were initially permitted by 1993 Application 10912 Clean Fuels Project in the amount of 3.268 ton/yr of POC. However, a final fugitive count for the CFP was never provided and the emissions were not offset. In 2010, this omission was discovered and in Tesoro Application 21711 the final fugitive count for the Hydrogen Plant expansion was provided resulted in 1.03 tons/year of POC emissions. These fugitive emissions were properly offset 7/13/2011 via Emissions Banking Certificate # 921.

Changes in Toxic emissions have not been quantified for this project. However, based on the expectation that CO emissions will not increase above permitted levels, it is expected that toxic emissions will not increase above the amounts currently permitted. Therefore, there are no increases in Toxic emissions and a risk screen is not required. Permit conditions will be imposed to ensure CO emissions are not increased.

Greenhouse Gases have not been previously quantified for S-1031. Furthermore, since S-1031 fires a high proportion of Pressure Swing Absorption waste gas from the hydrogen manufacturing process, the standard greenhouse gas emission factors are not applicable. To resolve this problem, a GHG emission factor needs to be derived by a material balance assuming all carbon atoms are converted to CO2. The carbon atoms originate from both the fuel and the process feed gas. Air Products reviewed the feed and fuel gas for the operation period between September 2004 and August 2012 and calculated effective CO2e Emission factors that ranged between 0.132 to 0.145 tons CO2e/MMBtu.

Based on the average emission factor of 0.138 tons CO2e/MMBtu, the potential GHG emissions from S-1031 are as follows:

$$294 \text{ MMBtu/hr} \times 8760 \text{ hr/yr} \times 0.138 \text{ ton CO}_2\text{e/MMBtu} = 355,411 \text{ tons CO}_2\text{e/year}$$

PSD

To determine if this S-1031 Burner Replacement Project triggers PSD, the following analysis was completed. Based on the emission limits of Condition 25199, PTE-BAE for criteria pollutants subject to PSD will not exceed any significance threshold. PM2.5 and H2SO4 emissions have not been quantified but are not expected to exceed thresholds for natural gas and sulfur free PSA recycle gas fuels. Therefore, only greenhouse gases are evaluated.

The baseline period is the 24-month period ending February 28, 2008. The throughput information is as follows:

Month	Natural Gas Fuel	PSA Fuel	Natural Gas Feed	Butane Feed
	MMSCF/mo	MSCF/mo	MMSCF/mo	MCF/Mo
Mar-06	24.43	539,839	400	-
Apr-06	33.81	523,532	403	-
May-06	36.01	547,460	398	-

Permit Evaluation and Statement of Basis: Site B0295, Air Products and Chemicals, Inc.,
Golden Eagle Refinery 150 Solano Way, Martinez, CA 94553

Month	Natural Gas Fuel	PSA Fuel	Natural Gas Feed	Butane Feed
	MMSCF/mo	MSCF/mo	MMSCF/mo	MCF/Mo
Jun-06	37.71	548,585	379	3,979
Jul-06	33.32	546,305	404	-
Aug-06	25.54	553,548	408	-
Sep-06	29.31	548,647	399	-
Oct-06	25.76	560,746	410	-
Nov-06	23.98	530,312	389	-
Dec-06	23.92	565,789	416	-
Jan-07	21.10	509,176	378	-
Feb-07	12.10	152,641	112	-
Mar-07	20.38	294,507	224	-
Apr-07	33.64	445,197	284	10,690
May-07	36.32	556,231	398	829
Jun-07	28.00	500,790	376	-
Jul-07	26.19	558,363	406	-
Aug-07	27.33	563,307	406	-
Sep-07	26.52	501,624	360	-
Oct-07	25.02	548,380	360	-
Nov-07	24.22	538,438	395	-
Dec-07	26.72	554,509	406	-
Jan-08	28.47	517,171	381	-
Feb-08	40.60	468,635	334	-
24-mo Total:	670	12,173,733	8,827	15,498

Baseline CO₂e emissions are calculated as follows:

Material	24-mo MMSCF	Btu/SCF	24-Mo MMBtu	MMBtu/yr
Natural Gas Fuel	670	1020	683,400	341,700
PSA Gas Fuel	12,174	280	3,408,720	1,704,360
Natural Gas Feed	8,827	1020	9,003,540	4,501,770
Butane Feed	15.5	3225	49,988	24,994

PSA Fuel Gas is recycled from the hydrogen generation process, so it does not contribute to GHG emissions when all other materials are considered for the material balance.

The following Greenhouse gases were emitted annually based on the 24-month baseline period:

Material	MMBtu	Emission Factor, lb/MMBtu			Emissions, lb/yr		
		CO ₂	CH ₄	N ₂ O	CO ₂	CH ₄	N ₂ O
Natural Gas Fuel	341,700	117	0.002205	0.000220	40,000,000	754	75
Natural Gas Feed	4,501,770	117	0.002205	0.000220	526,700,000	9,925	992
Butane Feed	24,994	144	0.006614	0.001323	3,600,000	165	33
Total					570,300,000	10,844	1100
GWP					1	21	310

Permit Evaluation and Statement of Basis: Site B0295, Air Products and Chemicals, Inc.,
Golden Eagle Refinery 150 Solano Way, Martinez, CA 94553

CO2e lb/yr					570,300,000	227,700	341,300
Total CO2e lb/yr					570,869,000		
Total CO2e tons/yr					285,435		

The following table summarizes the PSD applicability:

	PTE, ton/yr	BAE, ton/yr	PTE-BAE, ton/yr	>75,000 ton/yr
CO2e	355,411	285,435	69,976	No

Since the increase in GHG emissions does not exceed 75,000 tons/yr, PSD is not triggered.

STATEMENT OF COMPLIANCE

This application does not change the compliance of S-1031. S-1031 is expected to remain in compliance with the following:

Regulation 6, Rule 1, Particulate Matter General Requirements.

Regulation 8, Rule 2, Miscellaneous Operations

Regulation 9 Rule 10, Nitrogen Oxides and Carbon Monoxide from Boilers, Steam Generators, and Process Heaters in Petroleum Refineries

NSPS Subpart J, Standards of Performance for Petroleum Refineries. Air Products is a Hydrogen Manufacturing Facility, but is considered a support facility for the Tesoro Golden Eagle Refinery. S-1031 was constructed after June 11, 1973 and has not been modified or reconstructed since the May 14, 2007 effective date of NSPS Subpart Ja.

The project is exempt from CEQA under the District's CEQA Regulation 2-1-312.6. Permit applications relating exclusively to the repair, maintenance or minor alteration of existing facilities, equipment or sources involving negligible or no expansion of use beyond that previously existing are exempt. Therefore this application is not subject to a CEQA review.

The project is over 1000 feet from the nearest school and therefore not subject to the public notification requirements of Reg. 2-1-412.

The project does not trigger PSD.

BACT, Offsets, Toxics, and NESHAPS do not apply.

PERMIT CONDITIONS

Permit Evaluation and Statement of Basis: Site B0295, Air Products and Chemicals, Inc.,
Golden Eagle Refinery 150 Solano Way, Martinez, CA 94553

The following permit conditions will be revised as indicated below. Condition 21087 will be revised primarily to reflect the "carve-out" of the Air Products emissions from the Tesoro Refinery emissions Cap. Since Condition 25199 contains the annual emission limits that were "carved out", it will be revised to add the agreed additional monitoring required to ensure compliance with the emission limits.

COND# 21087 -----

Application #[331827769 \(1991\)](#)
[Amended by Application 10912 \(1995\)](#)
Amended by Application #5222 (2002),
Amended by Application #7978 (2003),
Administratively changed by Application 24173 (Apr2012)
Longer startup duration allowed in Part 4 for
Refractory curing
[Altered by Application 23933, Replaced 20 Burners tips in S-1031 \(May 2013\)](#)

Permit Condition
Sources S-1030, S-1031 and A-38
Plant 10295, Air Products and Chemicals, Inc.

1. [The Permittee/Owner/Operator](#) shall ensure that, except during periods of startup or shutdown, concentrations of nitrogen oxides (calculated as NO₂) and carbon monoxide from the Hydrogen Plant furnace S-1031 shall not exceed the following limits. These limits shall be based on a 3 hour average and corrected to 3% excess oxygen on a dry basis.

NO _x	CO
(ppmvd)	(ppmvd)
10	50

(basis: BACT)
2. [The Permittee/Owner/Operator](#) shall ensure that S-1031 is fired exclusively on natural gas and/or pressure swing adsorber purge gas and/or refinery fuel gas.
(basis: BACT)
3. [The Permittee/Owner/Operator](#) shall ensure that the total reduced sulfur (TRS)/hydrogen sulfide content of the refinery fuel gas fired at S-1031 does not exceed each and all of the following limits:
 - i) hydrogen sulfide limited to not more than 0.1 grain per dry standard cubic foot (230 mg/dscm), based on a three hour average.
 - ii) hydrogen sulfide limited to not more than 100 ppmv averaged over any consecutive 24-hour period.
 - iii) hydrogen sulfide limited to not more than 50 ppmv averaged over any consecutive 12-month period.

iv) total reduced sulfur (hydrogen sulfide, methyl mercaptan, carbon disulfide, dimethyl sulfide, dimethyl disulfide, and carbonyl sulfide) expressed as hydrogen sulfide equivalent is limited to not more than 100 ppmv averaged over any consecutive 12-month period.
(basis: BACT)

4. For the purposes of this permit, "startup" and "shutdown" operations for furnace S-1031 are limited to a maximum of 24 hours in duration, except for startup operation following the installation, repair or replacement of the refractory lining, where the startup is limited to 72 hours duration.

The ~~permittee~~/owner/operator may develop and present documentation in support of alternate startup and shutdown times for these units. These alternate times may be used if approved in writing by the APCO.

"Start-up" shall mean that period of time during which the piece of equipment in question is put into normal operation from an inactive status by following a prescribed series of separate steps or operations. "Shutdown" shall mean that period of time during which the piece of equipment in question is taken out of service from a normal operating mode to an inactive status following a prescribed series of separate steps or operations.

(basis: cumulative increase, offsets)

5. Deleted (basis for deletion: Requested by Applicant as per Settlement Agreement, May 18, 2004. Deletion is NOT a relaxation of requirements.)

6. The ~~Permittee~~/Owner/Operator shall ensure that a District approved continuous emission monitor (CEM) is installed and operated in the exhaust stack of the No. 2 Hydrogen Plant SCR Unit (A-38) to measure NOx and CO concentrations from furnace S-1031. These measurements shall be used to calculate NOx and CO mass emissions. ~~(These mass emissions are included in the monthly emission reports currently submitted by Tesoro, Plant 14628.) Accordingly, source S 1031 shall be included in Group A of Table A of the Appendix of the Engineering Evaluation Report for Application No. 27769 (February 9, 1982).~~

(basis: cumulative increase, offsets)

7. ~~Deleted. (Emissions from Air Products Plant 10295 were removed from the Tesoro Refinery Emissions Cap in 2012. CEM procedures and reporting requirements are detailed in Regulations 1-522 and 1-544.) Permittee/Owner/Operator shall provide to Tesoro Refining and Marketing Company or the current owner of the petroleum refinery at 150 Solano Way, commonly~~

~~referred to as Avon refinery, a daily or more frequent report of the monitoring system data required by Condition 6. The report may be provided electronically or in a printed form. Each daily or more frequent report must be provided within 7 calendar days of the end of the reporting day.~~

8. The Permittee/Owner/Operator shall ensure that any new valves in volatile hydrocarbon service (i.e., handling material above 0.5 psia true vapor pressure) or anhydrous ammonia service associated with this project facility shall be "low-emission" valves. For the purposes of this permit, "low-emission" valves are one of the following:
- A) live-loaded valves,
 - B) bellows valves,
 - C) diaphragm valves, or
 - D) other valve approved by the APCO, in writing.
- (basis: BACT, offsets)

9. The Permittee/Owner/Operator shall ensure that any new pumps in volatile hydrocarbon service (i.e. handling material above 0.5 psia vapor pressure) or ammonia service associated with this project facility shall have double mechanical seals with a barrier fluid which either: 1) is at a higher pressure than the seal pressure, or 2) is vented to a closed system, or 3) shall install an equivalent sealing system approved by the APCO.
- (basis: BACT, offsets)

10. The Owner/Operator shall ensure Ammonia emissions slip from the SCR Unit (A-38) controlling the No. 2 Hydrogen Plant furnaces ~~do not exceed~~shall be limited to 25 ppmvd, averaged over 3 hours and corrected to 3% oxygen. Within 60 days of startup of the No. 2 Hydrogen Plant (S-1030), Owner/operator shall conduct a source test for ammonia emissions. This test shall be repeated annually.
- (basis: toxics)

11. For the purposes of these permit conditions, all Owner/Operator source testing and monitoring requirements will be subject to the following general provisions:
- a) At least two weeks prior to testing, Owner/operator shall contact the District's Source Test Section, in writing, to provide notification of the testing procedure, date and time, and to obtain details on source testing requirements. Source test procedures are subject to approval of the APCO.
 - b) Prior to commencement of construction, Owner/operator shall submit plans and specifications for the Continuous Emission Monitor (CEM) to the District's Source Test Section and obtain approval.
 - c) Prior to commencement of construction, Owner/operator

shall submit plans showing the details of sampling facilities to the District's Source Test Section and obtain approval.

(basis: cumulative increase, offsets)

12. To demonstrate compliance with the above conditions, the ~~permittee~~/owner/operator shall maintain records of required pollutant measurements and mass emissions calculations, as well as other data used in the emissions calculations. These records shall be kept on site and made available for District inspection for a period of not less than 60 months from the date on which a record was made.

(basis: cumulative increase, offsets, BACT)

13. ~~The Permittee~~/Owner/Operator shall ensure that hydrogen production at S-1030 does not exceed 38 million standard cubic feet during each calendar day.

(basis: cumulative increase, offsets)

14. In a District approved log, ~~the Permittee~~/Owner/Operator shall ensure that that the following records are retained regarding the refinery fuel gas fired at S-1031:

i) hydrogen sulfide content of the refinery fuel gas measured in grains per dry standard cubic foot, based on a three hour average.

ii) hydrogen sulfide content of the refinery fuel gas in ppmv units, averaged over each/any consecutive 24-hour period.

iii) hydrogen sulfide content of the refinery fuel gas in ppmv units, averaged over each consecutive 12-month period.

iv) total reduced sulfur (hydrogen sulfide, methyl mercaptan, carbon disulfide, dimethyl sulfide, dimethyl disulfide, and carbonyl sulfide) content of the refinery fuel gas expressed in ppmv units as hydrogen sulfide equivalent averaged over each consecutive 12-month period.

~~The Permittee~~/Owner/Operator shall ensure that the log is made available for inspection by the District staff for a period of not less than 5 years from date of last entry.

(basis: BACT, cumulative increase, offsets)

15. Deleted (basis for deletion: Requested by Applicant as per Settlement Agreement, May 18, 2004. Deletion is NOT a relaxation of requirements.)

16. In a District approved log, the Permittee/Owner/Operator shall record the rate of hydrogen production at S-1030 in standard cubic feet per hour and in standard cubic feet per calendar day, and record the S-1031 CEM data. The Permittee/Owner/Operator shall ensure that the log is retained on site and is made available for inspection by the District staff for a period of not less than 5 years from date of last entry.
(basis: cumulative increase, offsets)

COND# 25199 -----

Air Products and Chemicals, Inc.
Golden Eagle Refinery, Martinez, Ca
[Application 3318 \(1991\)](#)
[Application 10912 \(1995\)](#)
[Application 5222 \(2002\)](#)
[Altered by Application 23933, Replaced 20 Burners Tips in S-1031 \(May 2013\)](#)

No. 2 Hydrogen Plant

1. The Owner/Operator shall only operate S-1031 SMR Furnace when total firing rate does not exceed 294 MMBtu/hr.
(Basis: Cumulative Increase, Offsets, BACT)
2. The Owner/Operator shall only operate S-1031 SMR Furnace when the total emissions do not exceed any of the following limits in any consecutive 12-month period:

NOx: 16.13 tons
CO: 21.93 tons
POC: 3.87 tons
SO2: 4.46 tons
PM10:12.90 tons
(Basis: Cumulative Increase, Offsets)

3. In order to demonstrate compliance with the NOx emission limit in Part 2, the Owner/Operator shall, on a monthly basis, calculate the NOx mass emissions from S-1031 using the recorded concentrations from the NOx CEM required by Condition 21087, Part 6. The calculated monthly NOx mass emissions shall be totaled for each consecutive 12-month period. (Basis: Cumulative Increase, Offsets)

4. In order to demonstrate compliance with the CO emission limit in Part 2, the Owner/Operator shall, on a monthly basis, calculate the CO emissions from S-1030 and S-1031. The calculated monthly CO emissions shall be totaled for each consecutive 12-month period. (Basis: Cumulative Increase, Toxics)

5. In order to demonstrate compliance with the POC emission limit in Part 2, the Owner/Operator shall conduct a District approved source test at the discharge of A-38 SCR, and at any other process atmospheric discharge (if they exist), within 90 days of the startup of the SMR Furnace Burner Tip Replacement Project. This source test shall determine a POC emissions factor in lb POC/MMBtu of S-1031 firing. Annual POC emissions shall be calculated by multiplying the source test emission factor by 294MMBtu/hr and by 8760 hrs/year, and by then dividing this product by 2000 lb/ton. This source test shall be repeated when Refinery Fuel Gas is used as a fuel or feedstock for

S-1030 or S-1031, and this source test shall be repeated every 5 years when the Owner/Operator applies for a Title V Permit Renewal. (Basis: Cumulative Increase, Offsets)

6. In order to demonstrate compliance with the SO2 emission limit in Part 2, the Owner/Operator shall, on a monthly basis, calculate the SO2 emissions from S-1030 and S-1031. The calculations shall be based on Stoichiometric conversion of all sulfur in the natural gas trim fuel to SO2 emissions. The calculated monthly SO2 emissions shall be totaled for each consecutive 12-month period. (Basis: Cumulative Increase, Offsets)

7. In order to demonstrate compliance with the PM-10 emission limit in Part 2, the Owner/Operator shall conduct a District approved source test at the discharge of A-38 SCR, and at any other process atmospheric discharge (if they exist), within 90 days of the startup of the SMR Furnace Burner Tip Replacement Project. This source test shall determine a PM-10 emissions factor in lb PM-10/MMBtu of S-1031 firing. Annual PM-10 emissions shall be calculated by multiplying the source test emission factor by 294MMBtu/hr and by 8760 hrs/year, and by then dividing this product by 2000 lb/ton. This source test shall be repeated when Refinery Fuel Gas is used as a fuel or feedstock for S-1030 or S-1031, and this source test shall be repeated every 5 years when the Owner/Operator applies for a Title V Permit Renewal. (Basis: Cumulative Increase, Offsets)

8. For the purposes of these permit conditions, all Owner/Operator source testing and monitoring requirements will be subject to the following general provisions:

a) At least two weeks prior to testing, Owner/operator shall contact the District's Source Test Section, in writing, to provide notification of the testing procedure, date and time, and to obtain details on source testing requirements. Source test procedures are subject to approval of the APCO.

b) Prior to commencement of construction, Owner/operator shall submit plans showing the details of sampling facilities to the District's Source Test Section and obtain approval. (basis: cumulative increase, offsets)

9. To demonstrate compliance with the above conditions, the Owner/Operator shall maintain records of required pollutant measurements and mass emissions calculations, as well as other data used in the emissions calculations. These records shall be kept on site and made available for District inspection for a period of not less than 60 months from the date on which a record was made. (basis: cumulative increase, offsets, BACT)

RECOMMENDATION

It is recommended that an Authority to Construct be granted to Air Products and Chemicals, Inc. for the following source:

S-1031 No. 2 Hydrogen Plant Reforming Furnace, Alteration to replace 20 furnace burners tips

By: _____

Arthur P Valla
Senior Air Quality Engineer
June 17, 2013

Appendix B – Glossary

APPENDIX B
GLOSSARY

ACT

Federal Clean Air Act

APCO

Air Pollution Control Officer

API

American Petroleum Institute

ARB

Air Resources Board

BAAQMD

Bay Area Air Quality Management District

BACT

Best Available Control Technology

BARCT

Best Available Retrofit Control Technology

Basis

The underlying authority that allows the District to impose requirements.

C5

An Organic chemical compound with five carbon atoms

C6

An Organic chemical compound with six carbon atoms

CAA

The federal Clean Air Act

CAAQS

California Ambient Air Quality Standards

CAPCOA

California Air Pollution Control Officers Association

CEC

California Energy Commission

CEQA

California Environmental Quality Act

CEM

A "continuous emission monitor" is a monitoring device that provides a continuous direct measurement of some pollutant (e.g. NO_x concentration) in an exhaust stream.

CFP

Clean Fuels Project

CFR

The Code of Federal Regulations. 40 CFR contains the implementing regulations for federal environmental statutes such as the Clean Air Act. Parts 50-99 of 40 CFR contain the requirements for air pollution programs.

CO

Carbon Monoxide

CO₂

Carbon Dioxide

Cumulative Increase

The sum of permitted emissions from each new or modified source since a specified date pursuant to BAAQMD Rule 2-1-403, Permit Conditions (as amended by the District Board on 7/17/91) and SIP Rule 2-1-403, Permit Conditions (as approved by EPA on 6/23/95). Used to determine whether threshold-based requirements are triggered.

DAF

A "dissolved air flotation" unit is a process vessel where air bubbles injected at the bottom of the vessel are used to carry solids in the liquid into a froth on the liquid surface, where it is removed.

DWT

Dead Weight Ton

District

The Bay Area Air Quality Management District

DNF

Dissolved Nitrogen Flotation (See DAF)

dscf

Dry Standard Cubic Feet

dscm

Dry Standard Cubic Meter

E 6, E 9, E 12

Very large or very small number values are commonly expressed in a form called scientific notation, which consists of a decimal part multiplied by 10 raised to some power. For example, 4.53 E 6 equals $(4.53) \times (10^6) = (4.53) \times (10 \times 10 \times 10 \times 10 \times 10 \times 10) = 4,530,000$. Scientific notation is used to express large or small numbers without writing out long strings of zeros.

EFRT

An "external floating roof tank" minimizes VOC emissions with a roof with floats on the surface of the liquid, thus preventing the formation of a VOC-rich vapor space above the liquid surface as the level in the tank drops. If such a vapor space were allowed to form, it would be expelled when the tank was re-filled. On an EFRT, the floating roof is not enclosed by a second, fixed tank roof, and is thus described as an "external" roof.

EPA

The federal Environmental Protection Agency.

ETP

Effluent Treatment Plant

Excluded

Not subject to any District Regulations.

FCC

Fluid Catalytic Cracker

Federally Enforceable, FE

All limitations and conditions which are enforceable by the Administrator of the EPA including those requirements developed pursuant to 40 CFR Part 51, subpart I (NSR), Part 52.21 (PSD), Part 60 (NSPS), Part 61 (NESHAPs), Part 63 (HAP), and Part 72 (Permits Regulation, Acid Rain), and also including limitations and conditions contained in operating permits issued under an EPA-approved program that has been incorporated into the SIP.

FP

Filterable Particulate as measured by BAAQMD Method ST-15, Particulate.

FR

Federal Register

FRT

Floating Roof Tank (See EFRT and IFRT)

GDF

Gasoline Dispensing Facility

GLM

Ground Level Monitor

grains

1/7000 of a pound

Graphitic

Made of graphite.

HAP

Hazardous Air Pollutant. Any pollutant listed pursuant to Section 112(b) of the Act. Also refers to the program mandated by Title I, Section 112, of the Act and implemented by 40 CFR Part 63.

H₂S

Hydrogen Sulfide

H₂SO₄

Sulfuric Acid

Hg

Mercury

HHV

Higher Heating Value. The quantity of heat evolved as determined by a calorimeter where the combustion products are cooled to 60F and all water vapor is condensed to liquid.

IFRT

An "internal floating roof tank" minimizes VOC emissions with a roof with floats on the surface of the liquid, thus preventing the formation of a VOC-rich vapor space above the liquid surface as the level in the tank drops. If such a vapor space were allowed to form, it would be expelled when the tank was re-filled. On an IFRT, the floating roof is enclosed by a second, fixed tank roof, and thus is described as an "internal" roof.

ISOM

Isomerization plant

LHV

Lower Heating Value. Similar to the higher heating value (see HHV) except that the water produced by the combustion is not condensed but retained as vapor at 60F.

Lighter

"Lightering" is a transfer operation during which liquid is pumped from an ocean-going tanker vessel to a smaller vessel such as a barge. Like any liquid transfer operation, lightering of organic liquids produces organic vapor emissions.

Long ton

2200 pounds

Major Facility

A facility with potential emissions of: (1) at least 100 tons per year of regulated air pollutants, (2) at least 10 tons per year of any single hazardous air pollutant, and/or (3) at least 25 tons per year of any combination of hazardous air pollutants, or such lesser quantity of hazardous air pollutants as determined by the EPA administrator.

MDEA

Methyl Diethanolamine

MFR

Major Facility Review. The District's term for the federal operating permit program mandated by Title V of the Act and implemented by District Regulation 2, Rule 6.

Mo Gas

Motor gasoline

MOP

The District's Manual of Procedures

MOSC

Mobil Oil Sludge Conversion (licensed technology)

MSDS

Material Safety Data Sheet

MTBE

methyl tertiary-butyl ether

NA

Not Applicable

NAAQS

National Ambient Air Quality Standards

NESHAPs

National Emission Standards for Hazardous Air Pollutants. See in 40 CFR Parts 61 and 63.

NMHC

Non-methane Hydrocarbons

NMOC

Non-methane Organic Compounds (Same as NMHC)

NO_x

Oxides of nitrogen.

NSPS

Standards of Performance for New Stationary Sources. Federal standards for emissions from new stationary sources. Mandated by Title I, Section 111 of the Act, and implemented by 40 CFR Part 60 and District Regulation 10.

NSR

New Source Review. A federal program for pre-construction review and permitting of new and modified sources of air pollutants for which the District is classified "non-attainment". Mandated by Title I of the Clean Air Act and implemented by 40 CFR Parts 51 and 52 as well as District Regulation 2, Rule 2. (Note: There are additional NSR requirements mandated by the California Clean Air Act.)

O₂

The chemical name for naturally-occurring oxygen gas.

Offset Requirement

A New Source Review requirement to provide federally enforceable emission offsets at a specified ratio for the emissions from a new or modified source and any pre-existing cumulative increase minus any onsite contemporaneous emission reduction credits. Applies to emissions of POC, NO_x, PM₁₀, and SO₂.

Phase II Acid Rain Facility

A facility that generates electricity for sale through fossil-fuel combustion and is not exempted by 40 CFR 72 from Titles IV and V of the Clean Air Act.

POC

Precursor Organic Compounds

PM

Total Particulate Matter

PM10

Particulate matter with aerodynamic equivalent diameter of less than or equal to 10 microns

PSD

Prevention of Significant Deterioration. A federal program for permitting new and modified sources of air pollutants for which the District is classified "attainment" of the National Air Ambient Quality Standards. Mandated by Title I of the Act and implemented by both 40 CFR Part 52 and District Regulation 2, Rule 2.

Regulated Organic Liquid

"Regulated organic liquids" are those liquids which require permits, or which are subject to some regulation, when processed at a liquid-handling operation. For example, for refinery marine terminals, regulated organic liquids are defined as "organic liquids" in Regulation 8, Rule 44.

RFG

Refinery Fuel Gas

RMG

Refinery Make Gas

SCR

A "selective catalytic reduction" unit is an abatement device that reduces NOx concentrations in the exhaust stream of a combustion device. SCRs utilize a catalyst, which operates at a specific temperature range, and injected ammonia to promote the conversion of NOx compounds to nitrogen gas.

SIP

State Implementation Plan. State and District programs and regulations approved by EPA and developed in order to attain the National Air Ambient Quality Standards. Mandated by Title I of the Act.

SO2

Sulfur dioxide

SO2 Bubble

An SO2 bubble is an overall cap on the SO2 emissions from a defined group of sources, or from an entire facility. SO2 bubbles are sometimes used at refineries because combustion sources are typically fired entirely or in part by "refinery fuel gas" (RFG), a waste gas product from refining operations. Thus, total SO2 emissions may be conveniently quantified by monitoring the total amount of RFG that is consumed, and the concentration of H2S and other sulfur compounds in the RFG.

SO3

Sulfur trioxide

THC

Total Hydrocarbons (NMHC + Methane)

therm

100,000 British Thermal Unit

Title V

Title V of the federal Clean Air Act. Requires a federally enforceable operating permit program for major and certain other facilities.

TOC

Total Organic Compounds (NMOC + Methane, Same as THC)

TPH

Total Petroleum Hydrocarbons

TRMP

Toxic Risk Management Plan

TRS

"Total reduced sulfur" is a measure of the amount of sulfur-containing compounds in a gas stream, typically a fuel gas stream, including, but not limited to, hydrogen sulfide. The TRS content of a fuel gas determines the concentration of SO₂ that will be present in the combusted fuel gas, since sulfur compounds are converted to SO₂ by the combustion process.

TSP

Total Suspended Particulate

TVP

True Vapor Pressure

VOC

Volatile Organic Compounds

Units of Measure:

bbl	=	barrel of liquid (42 gallons)
bhp	=	brake-horsepower
btu	=	British Thermal Unit
C	=	degrees Celcius
F	=	degrees Farenheight
f ³	=	cubic feet
g	=	grams
gal	=	gallon
gpm	=	gallons per minute
hp	=	horsepower
hr	=	hour
lb	=	pound
in	=	inches
max	=	maximum

Permit Evaluation and Statement of Basis: Site B0295, Air Products and Chemicals, Inc.,
Golden Eagle Refinery 150 Solano Way, Martinez, CA 94553

m ²	=	square meter
min	=	minute
M	=	thousand
Mg	=	mega-gram, one thousand grams
μg	=	micro-gram, one millionth of a gram
MM	=	million
mm	=	millimeter
MMbtu	=	million btu
mm Hg	=	millimeters of Mercury (pressure)
MW	=	megawatts
ppmv	=	parts per million, by volume
ppmw	=	parts per million, by weight
psia	=	pounds per square inch, absolute
psig	=	pounds per square inch, gauge
scfm	=	standard cubic feet per minute
yr	=	year

Symbols:

<	=	less than
>	=	greater than
≤	=	less than or equal to
≥	=	greater than or equal to

