

US EPA ARCHIVE DOCUMENT

**PREVENTION OF SIGNIFICANT DETERIORATION PERMIT
FOR GREENHOUSE GAS EMISSIONS
ISSUED PURSUANT TO THE REQUIREMENTS AT 40 CFR § 52.21**

U.S. ENVIRONMENTAL PROTECTION AGENCY, REGION 6

PSD PERMIT NUMBER: PSD-TX-102982-GHG

PERMITTEE: ExxonMobil Chemical Company
5000 Bayway Drive
P.O. Box 4004
Baytown, TX 77522

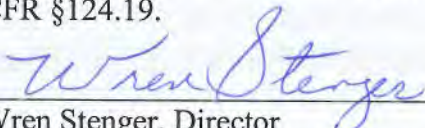
FACILITY NAME: ExxonMobil Chemical Company
Baytown Olefins Plant

FACILITY LOCATION: 3525 Decker Drive
Baytown, TX 77522

Pursuant to the provisions of the Clean Air Act (CAA), Subchapter I, Part C (42 U.S.C. Section 7470, *et. Seq.*), and the Code of Federal Regulations (CFR) Title 40, Section 52.21, and the Federal Implementation Plan at 40 CFR § 52.2305 (effective May 1, 2011 and published at 76 FR 25178), the U.S. Environmental Protection Agency, Region 6 is issuing a *Prevention of Significant Deterioration* (PSD) permit to ExxonMobil Chemical Company for Greenhouse Gas (GHG) emissions. The Permit applies to the addition of a new ethylene production unit consisting of eight steam cracking furnaces and recovery equipment at its Baytown Olefins Plant (BOP) located in Baytown, Texas.

ExxonMobil is authorized to construct the new ethylene production unit as described herein, in accordance with the permit application (and plans submitted with the permit application), the federal PSD regulations at 40 CFR § 52.21, and other terms and conditions set forth in this PSD permit. Failure to comply with any condition or term set forth in this PSD Permit may result in enforcement action pursuant to Section 113 of the Clean Air Act (CAA). This PSD Permit does not relieve ExxonMobil of the responsibility to comply with any other applicable provisions of the CAA (including applicable implementing regulations in 40 CFR Parts 51, 52, 60, 61, 72 through 75, and 98) or other federal and state requirements (including the state PSD program that remains under approval at 40 CFR § 52.2303).

In accordance with 40 CFR §124.15(b), this PSD Permit becomes effective 30 days after the service of notice of this final decision unless review is requested on the permit pursuant to 40 CFR §124.19.



Wren Stenger, Director
Multimedia Planning and Permitting Division

11/25/13
Date

ExxonMobil Chemical Company LP (PSD-TX-102982-GHG)
Prevention of Significant Deterioration Permit
For Greenhouse Gas Emissions
Final Permit Conditions

PROJECT DESCRIPTION

The proposed modification will add a new ethylene production unit consisting of eight steam cracking furnaces and recovery equipment to the existing Baytown Olefins Plant in Baytown, Texas. The new ethylene unit will increase the production capacity of the plant by approximately 2 million metric tons per year of polymer grade ethylene. Other products produced by the Baytown Olefins Plant include fuel gas, mixed C₃ and C₄ hydrocarbon streams, and other lower hydrocarbon streams.

EQUIPMENT LIST

The following devices are subject to this GHG PSD permit.

FIN	EPN	Description
XXAF01 XXBF01 XXCF01 XXDF01 XXEF01 XXFF01 XXGF01 XXHF01	XXAF01-ST XXBF01-ST XXCF01-ST XXDF01-ST XXEF01-ST XXFF01-ST XXGF01-ST XXHF01-ST	Eight Steam Cracking Furnaces (Combustion Units). Each furnace has a maximum design heat input rate of 515 MMBtu/hr, and will be equipped with a Selective Catalytic Reduction (SCR) system.
XXAB-DEC XXCD-DEC XXEF-DEC XXGH-DEC	XXAB-DEC XXCD-DEC XXEF-DEC XXGH-DEC	Furnace Decoke Vents
FLAREXX1 FLAREXX2	FLAREXX1 FLAREXX2	Staged Flare System (Combustion Unit). Consisting of an elevated flare (FLAREXX1) and ground flare (FLAREXX2).
HRSG05	HRSG05	Train 5 Duct Burners (Combustion Unit). The Duct Burners have a combined maximum design heat input rate of 773 MMbtu/hr (HHV), and are equipped with Selective Catalytic Reduction (SCR) controls.
DIESELXX01 DIESELXX02 DIESELXX03 DIESELXX04 DIESELXX05	DIESELXX01 DIESELXX02 DIESELXX03 DIESELXX04 DIESELXX05	Backup Generator Engines (Combustion Units). Up to five generators are allowed; however, the aggregate power output will not exceed 3.0 MW for all generators combined.
DIESELXXFW1 DIESELXXFW2	DIESELXXFW1 DIESELXXFW2	Firewater Booster Pump Engines (Combustion Units) 600 HP each.
BOPXXFUG	BOPXXFUG	Fugitive Emissions

I. GENERAL PERMIT CONDITIONS

A. PERMIT EXPIRATION

As provided in 40 CFR § 52.21(r), this PSD Permit shall become invalid if construction:

1. is not commenced (as defined in 40 CFR § 52.21(b)(9)) within 18 months after the approval takes effect; or
2. is discontinued for a period of 18 months or more; or
3. is not completed within a reasonable time.

Pursuant to 40 CFR § 52.21(r), EPA may extend the 18-month period upon a written satisfactory showing that an extension is justified.

B. PERMIT NOTIFICATION REQUIREMENTS

Permittee shall notify EPA Region 6 in writing or by electronic mail of the:

1. date construction is commenced, postmarked within 30 days of such date;
2. actual date of initial startup, as defined in 40 CFR § 60.2, postmarked within 15 days of such date; and
3. date upon which initial performance tests will commence, in accordance with the provisions of Section V, postmarked not less than 30 days prior to such date. Notification may be provided with the submittal of the performance test protocol required pursuant to Condition V.B.

C. FACILITY OPERATION

At all times, including periods of startup, shutdown, and maintenance, Permittee shall, to the extent practicable, maintain and operate the facility including associated air pollution control equipment in a manner consistent with good air pollution control practice for minimizing emissions. Determination of whether acceptable operating and maintenance procedures are being used will be based on information available to the EPA, which may include, but is not limited to, monitoring results, review of operating maintenance procedures and inspection of the facility.

D. MALFUNCTION REPORTING

1. Permittee shall notify EPA by mail, or other means identified by EPA, within 48 hours following the discovery of any failure of air pollution control equipment, process equipment, or of a process to operate in a normal manner, which results in an increase in GHG emissions above the allowable emission limits stated in Section II and III of this permit.
2. Within 10 days of the discovery of any GHG emissions above the allowable emission limits resulting from malfunctions as described in I.D.1., Permittee shall provide a written supplement to the initial notification that includes a description of the malfunctioning equipment or abnormal operation, the date of the initial malfunction, the period of time over which emissions were increased due to the failure, the cause of the failure, the estimated resultant emissions in excess of those allowed in Section II and III, and the methods utilized to mitigate emissions and restore normal operations.
3. Compliance with this malfunction notification provision shall not excuse or otherwise constitute a defense to any violation of this permit or any law or regulation such malfunction may cause.

E. RIGHT OF ENTRY

EPA authorized representatives, upon the presentation of credentials, shall be permitted:

1. to enter the premises where the facility is located or where any records are required to be kept under the terms and conditions of this PSD Permit;
2. during normal business hours, to have access to and to copy any records required to be kept under the terms and conditions of this PSD Permit;
3. to inspect any equipment, operation, or method subject to requirements in this PSD Permit; and,
4. to sample materials and emissions from the source(s).

F. TRANSFER OF OWNERSHIP

In the event of any changes in control or ownership of the facilities to be constructed, this PSD Permit shall be binding on all subsequent owners and operators. Permittee shall notify the succeeding owner and operator of the existence of the PSD Permit and its conditions by letter; a copy of the letter shall be forwarded to EPA Region 6 within thirty days of the letter signature.

G. SEVERABILITY

The provisions of this PSD Permit are severable, and, if any provision of the PSD Permit is held invalid, the remainder of this PSD Permit shall not be affected.

H. ADHERENCE TO APPLICATION AND COMPLIANCE WITH OTHER ENVIRONMENTAL LAWS

Permittee shall construct this project in compliance with this PSD Permit, the application on which this permit is based and all other applicable federal, state, and local air quality regulations. This PSD permit does not release the Permittee from any liability for compliance with other applicable federal, state and local environmental laws and regulations, including the Clean Air Act.

I. ACRONYMS AND ABBREVIATIONS

AVO	Auditory, Visual, and Olfactory
BACT	Best Available Control Technology
C ₃ ⁺	Hydrocarbon with Three or More Carbon Atoms
CAA	Clean Air Act
CC	Carbon Content
CCS	Carbon Capture and Sequestration
CEMS	Continuous Emissions Monitoring System
CFR	Code of Federal Regulations
CH ₄	Methane
CO ₂	Carbon Dioxide
CO ₂ e	Carbon Dioxide Equivalent
dscf	Dry Standard Cubic Foot
EF	Emission Factor
EPN	Emission Point Number
FIN	Facility Identification Number
FR	Federal Register
GCV	Gross Calorific Value
GHG	Greenhouse Gas
gr	Grains
GWP	Global Warming Potential
HHV	High Heating Value
HP	Horsepower
hr	Hour
HRSG	Heat Recovery Steam Generating
LAER	Lowest Achievable Emission Rate
lb	Pound
LDAR	Leak Detection and Repair
LHV	Lower Heating Value
MMBtu	Million British Thermal Units
MSS	Maintenance, Start-up and Shutdown
MW	Megawatts
N ₂ O	Nitrous Oxides
NSPS	New Source Performance Standards
ppmvd	Parts per Million Volume, Dry
PSD	Prevention of Significant Deterioration
QA/QC	Quality Assurance and/or Quality Control
SCFH	Standard Cubic Feet per Hour
SCR	Selective Catalytic Reduction
TAC	Texas Administrative Code
TCEQ	Texas Commission on Environmental Quality
TOC	Total Organic Carbon
TPY	Tons per Year
USC	United States Code
VOC	Volatile Organic Compound

II. Annual Emission Limits

Annual emissions, in tons per year (TPY) on a 12-month total, rolling monthly, shall not exceed the following:

Table 1. Annual Emission Limits

FIN	EPN	Description	GHG Mass Basis		TPY CO ₂ e ^{1,2}	BACT Requirements
				TPY ¹		
XXAF01 XXBF01 XXCF01 XXDF01 XXEF01 XXFF01 XXGF01 XXHF01	XXAF01-ST XXBF01-ST XXCF01-ST XXDF01-ST XXEF01-ST XXFF01-ST XXGF01-ST XXHF01-ST	Steam Cracking Furnaces	CO ₂	982,000 ³	987,968 ³	Furnace Gas Exhaust Temperature ≤ 340 °F. Each furnace limited to a maximum firing rate of 515 MMBtu/hr. See permit conditions III.A.1.h. and j.
			CH ₄	48 ³		
			N ₂ O	16 ³		
XXAB-DEC XXCD-DEC XXEF-DEC XXGH-DEC	XXAB-DEC XXCD-DEC XXEF-DEC XXGH-DEC	Furnace Decoke Vents	CO ₂	796 ⁴	2,120 ⁴	Proper furnace design and operation. See permit conditions III.A.1.a. through III.A.1.i.
			CH ₄	4 ⁴		
			N ₂ O	4 ⁴		
FLAREXX1	FLAREXX1	Elevated Flare	CO ₂	11,641	13,038	Use of a flare gas recovery system (FGRS) minimum 70% recovery. See permit condition III.A.3.
			CH ₄	37		
			N ₂ O	2		
FLAREXX2	FLAREXX2	Ground Flare	CO ₂	50,303	51,485	Use of Good Combustion Practices. See permit condition III.A.3.
			CH ₄	12		
			N ₂ O	3		
HRSG05	HRSG05	Train 5 Duct Burner	CO ₂	397,231	397,709	Maintain a minimum thermal efficiency of 70%. See permit condition III.A.2.g.
			CH ₄	8		
			N ₂ O	1		
DIESELXX01 DIESELXX02 DIESELXX03 DIESELXX04 DIESELXX05	DIESELXX01 DIESELXX02 DIESELXX03 DIESELXX04 DIESELXX05	Backup Generator Engines ⁵	CO ₂	223 ⁵	554 ⁵	Use of Good Operating and Maintenance Practices. See permit condition III.A.4.
			CH ₄	1 ⁵		
			N ₂ O	1 ⁵		
DIESELXXFW1 DIESELXXFW2	DIESELXXFW1 DIESELXXFW2	Firewater Booster Pump Engines	CO ₂	67 ⁶	398 ⁶	Use of Good Operating and Maintenance Practices. See permit condition III.A.4.
			CH ₄	1 ⁶		
			N ₂ O	1 ⁶		

FIN	EPN	Description	GHG Mass Basis		TPY CO ₂ e ^{1,2}	BACT Requirements
				TPY ¹		
BOPXXFUG	BOPXXFUG	Fugitive Emissions	CH ₄	No Emission Limit Established ⁷	No Emission Limit Established ⁷	Implementation of LDAR/AVO program. See permit condition III.A.5.
Totals⁸			CO ₂	1,442,261	CO₂e 1,453,293	
			CH ₄	112		
			N ₂ O	28		

1. The TPY emission limits specified in this table are not to be exceeded for this facility and include emissions from the facility during all operations and include MSS activities.
2. Global Warming Potentials (GWP): CH₄ = 21, N₂O = 310
3. The GHG Mass Basis TPY limit and the CO₂e TPY limit for the steam cracking furnaces applies for all eight furnaces combined.
4. The GHG Mass Basis TPY limit and the CO₂e TPY limit for the furnace decoke vents is for all four furnace decoke vents combined.
5. Up to five generators are allowed, however; total power output will not exceed 3.0 MW for all generators combined. The GHG Mass Basis and CO₂e TPY emissions stated in this table are for all Emergency Generator Engines combined regardless of the number installed.
6. The GHG Mass Basis and CO₂e TPY emissions stated in this table are for both Firewater Booster Pump Engines (EPNs: DIESELXXFW1 and DIESELXXFW2) combined.
7. Fugitive process emissions from EPN BOPXXFUG are estimated to be 1 TPY of CH₄ and 21 TPY CO₂e. In lieu of an emission limit, the emissions will be limited by implementing a design/work practice standard as specified in the permit.
8. Total emissions include the PTE for fugitive emissions. Totals are given for informational purposes only and do not constitute emission limits.

III. SPECIAL PERMIT CONDITIONS

A. Emission Unit Work Practice Standards, Operational Requirements, and Monitoring

1. Steam Cracking Furnaces (EPNs: XXAF01-ST, XXBF01-ST, XXCF01-ST, XXDF01-ST, XXEF01-ST, XXFF01-ST, XXGF01-ST, and XXHF01-ST) and Furnace Decoke Vents (EPNs: XXAB-DEC, XXCD-DEC, XXEF-DEC, XXGH-DEC)

- a. The steam cracking furnaces shall combust blended fuel gas (fuel gas) or pipeline quality natural gas.
- b. The steam cracking furnaces also receive ethylene process off gas for control of VOC emissions. The process off gas stream is mainly steam, nitrogen, and a small amount of hydrocarbons and is not considered a fuel source.¹
- c. The steam cracking furnaces identified in this permit shall have fuel metering for the fuel gas and natural gas (a group of equipment can utilize a common fuel flow meter, as long as actual fuel usage is allocated to the individual equipment based upon actual operating hours and maximum firing rate), and the Permittee shall:
 - i. Continuously measure and record the fuel flow to the steam cracking furnaces, and provide the capability to totalize the fuel flow. This may be done using a dedicated device or a computer system that collects, sums, and stores electronic data from continuous fuel flow meters.
 - ii. Record the total fuel amount combusted monthly.
 - iii. The fuel gross calorific value (GCV) [high heat value (HHV)], carbon content and, if applicable, molecular weight, shall be determined, at a minimum, monthly by the procedures contained in 40 CFR § 98.34(b)(3). Records of the fuel GCV shall be maintained for a minimum period of five years. Upon request, Permittee shall provide a sample and/or analysis of the fuel that is fired in any unit covered by this permit at the time of the request, or shall allow a sample to be taken by EPA for analysis.
- d. Permittee shall calibrate and perform preventative maintenance check of the fuel gas flow meters and document annually.
- e. Permittee shall install, operate, and maintain an O₂ analyzer on the furnaces (XXAF01-ST, XXBF01-ST, XXCF01-ST, XXDF01-ST, XXEF01-ST, XXFF01-ST, XXGF01-ST, and XXHF01-ST). Oxygen concentration shall be a maximum of 10

¹ Ethylene process off gas will account for less than 0.4% of the carbon entering the furnaces on an annual basis. The estimated emissions from the ethylene process off gas shall be calculated using 40 CFR Part 98 Subpart C Equation C-1 for CO₂ and C-8 for CH₄.

- mole % (dry) during normal operations, not including commissioning, startup, shutdown, decoke, and hot steam standby.
- f. Oxygen analyzers shall continuously monitor and record oxygen concentration in the furnaces (XXAF01-ST, XXBF01-ST, XXCF01-ST, XXDF01-ST, XXEF01-ST, XXFF01-ST, XXGF01-ST, and XXHF01-ST). It shall reduce the oxygen readings to an averaging period of 15 minutes or less and record it hourly.
 - g. A relative accuracy test audit (RATA) is required once every four quarters in accordance with 40 CFR Part 60, Appendix F, Procedure 1, § 5.1.1.
 - h. The oxygen analyzers shall be quality-assured at least quarterly using cylinder gas audits (CGAs) in accordance with 40 CFR Part 60, Appendix F, Procedure 1, § 5.1.2.
 - i. The Permittee shall perform a visual inspection of the air ingress seal bags when the O₂ analyzer indicates an oxygen concentration greater than 10% as stated in A.III.1.e.
 - j. Permittee shall install and maintain a CO CEMS and perform preventative maintenance checks every quarter per 40 CFR 60 Appendix B4.
 - k. The Permittee shall maintain a CO concentration at or below 50 ppmv corrected for 3% oxygen on a 12-month rolling average.
 - l. Permittee shall perform and maintain records of online burner inspections when indicated by CO levels >100 ppmv corrected to 3% oxygen for a one-hour average and during planned shutdowns.
 - m. Each steam cracking furnace shall not exceed a one hour heat input of 515 MMBtu/hr (HHV) per furnace.
 - n. The one-hour maximum heat input shall be determined monthly for each cracking furnace, using Equation F-20 from 40 CFR Part 75, Appendix F, Section 5, to demonstrate compliance with the firing rate condition in III.A.1.h.
 - o. Permittee shall continuously monitor and record the furnace gas exhaust temperature hourly and limit the temperature to less than or equal to 340°F on a 365 day rolling average basis. This stack temperature is for normal operations and does not include commissioning, startup, shutdown, hot steam standby, and decoking operations.
 - p. Exceedance of the temperature specified in III.A.1.o. shall require a wash of the convection section of the furnace that is out of compliance with the temperature requirement.
 - q. The Permittee shall monitor the furnace for coke buildup and perform a decoke when needed.
 - r. The furnace coils shall be decoked, using decoking drums.
 - s. Compliance with the Annual Emission Limit for steam cracking furnaces and furnace decoke vents shall be demonstrated on a 12-month total, rolling monthly, calculated in accordance with 40 CFR Part 98 Subpart C § 98.33(a)(3)(iii).

2. Train 5 Duct Burners (EPN: HRSG05)

- a. Permittee shall continue operation of the existing condensate recovery, HRSG blowdown heat recovery, and economizers as needed to maintain a thermal efficiency of 70%.
- b. Permittee shall combust pipeline quality natural gas, or a fuel with a lower carbon content than natural gas.
- c. Permittee shall calibrate and perform preventative maintenance check of the fuel gas flow meters and document annually.
- d. Permittee shall perform an annual visual inspection of the of the Train 5 duct burner to maintain optimal thermal efficiency.
- e. The Train 5 duct burners shall have a 12-month rolling average heat input, not to exceed 773 MMBtu/hr (HHV).
- f. A rolling 12-month average firing rate shall be calculated monthly, using Equation F-20 from 40 CFR Part 75, Appendix F, Section 5, to demonstrate compliance with the firing rate in III.A.2.e.
- g. The permittee shall maintain a minimum overall thermal efficiency of 70% (HHV) on a 12-month rolling average basis, calculated monthly, for Train 5.
- h. Efficiency shall be demonstrated by the following equation. All values shall be on a HHV basis.

$$\text{Unit Efficiency} = \frac{\text{Heat Content of Steam Produced} + \text{Heat Content of Power Produced}}{\text{Heat Content of Fuel Supply}} \times 100\%$$

- i. Compliance with the Annual Emission Limit shall be demonstrated on a 12-month total, rolling monthly, calculated in accordance with 40 CFR Part 98 Subpart C § 98.33(a)(3)(iii).

3. Staged Flaring Operation (EPNs: FLAREXX1 and FLAREXX2)

- a. The elevated flare (FLAREXX1) and multipoint ground flare (FLAREXX2) shall be designed and operated in accordance with 40 CFR 60.18 including specifications of minimum heating value of the gas being combusted, maximum tip velocity, and pilot flame monitoring or an approved alternate. An infrared monitor is considered equivalent to a thermocouple for flame monitoring purposes.
- b. The elevated flare (FLAREXX1) shall have a minimum destruction and removal efficiency (DRE) of 98%, and the multipoint ground flare (FLAREXX2) shall have a minimum DRE of 99% based on flowrate and gas composition measurements as specified in 40 CFR § 98.243(d)(5) for methane.

- c. The flares are designed for control of routine venting of emissions including maintenance, startup, and shutdown (MSS) activities, and upset conditions.
- d. The elevated flare (FLAREXX1) shall only combust pipeline natural gas in the pilots during normal operations. The ground flare (FLAREXX2) shall combust pipeline natural gas and/or ethane in the pilots.
- e. For each MSS event, the Permittee must record the time, date, duration, and heat input (LHV) in MMBtu/hr of the gas being combusted (waste gas and supplemental natural gas). These records must be kept for five years following the date of each event. Process knowledge and engineering calculations are acceptable if the in-line gas analyzer is not operational during the MSS event.
- f. The Permittee shall maintain a minimum heating value of 800 Btu/scf of the waste gas (adjusted for hydrogen) routed to the multipoint ground flare.
- g. The Permittee shall continuously monitor the flow rate to the ground flare (FLAREXX2) and maintain a system pressure greater than 4 psig.
- h. As an alternative to Conditions III.A.3.a., III.A.3.f., and III.A.3.g., the Permittee may submit a request for an equivalency determination for the multipoint ground flare (FLAREXX2), the requirements established in an approved equivalency determination may be utilized if approved by the EPA.
- i. The Permittee shall continuously monitor the composition of the gas being combusted in the flare system and record the calculated heating value of the gas being combusted through an on-line analyzer located on the flare header. The on-line analyzer shall be calibrated and maintained at least annually.
- j. The Permittee shall continuously monitor and record both the gas being combusted and steam flow to the elevated flare (FLAREXX1) and multipoint ground flare (FLAREXX2) through a flow monitoring system, and have the capability to record the steam to hydrocarbon ratio.
- k. While the flare is operating, the permittee shall continuously monitor for flame presence at the elevated flare (FLAREXX1) and the multipoint ground flare (FLAREXX2) pilots.
- l. The elevated flare (FLAREXX1) shall be connected to the flare gas recovery system (FGRS) associated with the existing plant. The FGRS shall collect a minimum of 70% of the flare gas from the elevated flare on a 12-month rolling average basis.
- m. The recovered flare gas shall be used as a fuel in any of the following unmodified emission units: Boiler A, Boiler B, Boiler C, Boiler D (Boiler A – D share a common stack: E-7-1), Train 1 (HRSG1), Train 2 (HRSG2), Train 3 (HRSG3), and Train 4 (HRSG4)².
- n. The Permittee shall keep daily records of the volume of gas collected and sent to the FGRS from the elevated flare (FLAREXX1) by continuous measurement of the flow of the recovered elevated flare gas using an operational non-resettable elapsed flow

²This condition applies to recovered gas from the flare authorized for construction by this permit and does not authorize any modification of these listed emission units.

meter, or a computer that collects, sums, and stores electronic data from the continuous fuel flow meter as a totalizer.

- o. The elevated flare (FLAREXX1) shall not have emissions exceeding 13,038 TPY of CO₂e.
- p. The ground flare (FLAREXX2) shall not have emissions exceeding 51,485 TPY of CO₂e.
- q. CO₂ emissions are calculated using equation Y-1a found in 40 CFR § 98.253(b)(1)(ii)(A). CH₄ and N₂O emissions are calculated using equations Y-4 and Y-5 as found in 40 CFR Part 98 Subpart Y.
- r. The on-line composition analyzer shall have an on-stream time of 95% on a 12-month rolling average basis.

4. Emergency Generator Engines (EPNs: DIESELXX01, DIESELXX02, DIESELXX03, DIESELXX04, and DIESELXX05) and Firewater Pump Engines (EPNs: DIESELXXFW1 and DIESELXXFW2)

- a. Each engine shall be diesel fired.
- b. Up to five emergency generator engines are allowed.
- c. The emergency generators shall have an aggregate power output not to exceed 3.0 MW, regardless of the number installed.
- d. The emission limit in Table 1 is based on each emergency generator engine and firewater pump engine operating 120 hours a year for maintenance and testing.
- e. Each engine shall meet the requirements of 40 CFR Part 60 Subpart IIII.
- f. Compliance with the Annual Emission Limit shall be demonstrated on a 12-month total, rolling monthly, calculated in accordance with 40 CFR Part 98, Subpart C, § 98.33(a)(1)(i).

5. Equipment Fugitives (EPN: BOPXXFUG)

- a. The Permittee shall implement the TCEQ 28VHP leak detection and repair (LDAR) program for fugitive emissions of methane for process lines in VOC service.
- b. The Permittee shall implement an auditory, visual, and olfactory (AVO) method for detecting leaks in natural gas piping components and fugitive emissions of methane for process lines not in VOC service but contain methane.
- c. AVO monitoring shall be performed weekly.

B. Continuous Emissions Monitoring Systems (CEMS)

- 1. As an alternative to Special Conditions III.A.1.i. and III.A.2.i., Permittee may install a CO₂ CEMS and volumetric stack gas flow monitoring system with an automated data acquisition and handling system for measuring and recording CO₂ emissions discharged

to the atmosphere, and use these values to show compliance with the annual emission limit in Table 1.

2. Permittee shall ensure that all required CO₂ monitoring system/equipment is installed and all certification tests are completed on or before the earlier of 90 unit operating days or 180 calendar days after the date the unit commences operation or after CO₂ CEMS are installed.
3. Permittee shall ensure compliance with the specifications and test procedures for CO₂ emission monitoring system at stationary sources, 40 CFR Part 75, or 40 CFR Part 60, Appendix B, Performance Specification numbers 1 through 9, as applicable.

IV. Recordkeeping and Reporting

A. Records

1. In order to demonstrate compliance with the GHG emission limits in Table 1, the Permittee shall maintain the following parameters on a calendar month basis.
 - a. Records of operating hours for all emission sources listed in Table 1;
 - b. Records of the usage of blended fuel gas, pipeline quality natural gas, ethylene process off-gas; and gas being combusted in flares, measured in accordance with the Special Conditions in Section III of this permit.
 - c. Records of fuel sampling for natural gas, sampling of blended fuel gas, as required by 40 CFR § 98.34(b)(3).
2. For the EPNs listed in Table 1 and as required by this permit, the Permittee shall maintain records of the following for GHG emissions from the Equipment List (excluding fugitives): all records or reports pertaining to maintenance performed; duration of startup, shutdown; the initial startup period for the emission units; malfunctions; all records relating to performance tests, calibrations, checks, and monitoring of combustion equipment; duration of an inoperative monitoring device and emission units with the required corresponding emission data; and all other information required by this permit recorded in a permanent form suitable for inspection. These records may be maintained in electronic databases.
3. Permittee shall maintain records of all GHG emission units and CO₂ emission certification tests and monitoring and compliance information required by this permit.
4. Permittee shall maintain records and submit a written report of all excess emissions to EPA semi-annually, except when: more frequent reporting is specifically required by an applicable subpart; or the Administrator or authorized representative, on a case-by-case basis, determines that more frequent reporting is necessary to accurately assess the compliance status of the source. The report is due on the 30th day following the end of each semi-annual period and shall include the following:

- a. Time intervals, data and magnitude of the excess emissions, the nature and cause (if known), corrective actions taken and preventive measures adopted;
 - b. Applicable time and date of each period during which the monitoring equipment was inoperative (monitoring down-time);
 - c. A statement in the report of a negative declaration; that is; a statement when no excess emissions occurred or when the monitoring equipment has not been inoperative, repaired or adjusted;
 - d. Any failure to conduct any required source testing, monitoring, or other compliance activities; and
 - e. Any violation of limitations on operation, including but not limited to restrictions on hours of operation of the emergency generator or fire pump.
5. Excess emissions shall be defined as any period in which the facility emissions exceed a maximum emission limit set forth in this permit, a malfunction occurs of an emission unit listed in the Equipment List that results in excess GHG emissions, or any other unauthorized GHG emissions occur.
 6. Excess emissions indicated by GHG emission source certification testing or compliance monitoring shall be considered violations of the applicable emission limits in Table 1 for the purpose of this permit.
 7. Instruments and monitoring systems required by this PSD permit shall have a 95% on-stream time on a 12-month rolling average basis.
 8. All records required by this PSD Permit shall be retained for not less than 5 years following the date of such measurements, maintenance, and reporting.

V. Initial Performance Testing Requirements:

- A. The Permittee shall perform stack sampling and other testing to establish the actual pattern and quantities of air contaminants being emitted into the atmosphere from at least four of the stacks of the Steam Cracking Furnaces (XXAF01-ST, XXBF01-ST, XXCF01-ST, XXDF01-ST, XXEF01-ST, XXFF01-ST, XXGF01-ST, and XXHF01-ST), Train 5 Duct Burners (HRSG05), and Flare System (FLAREXX1 and FLAREXX2) to determine the initial compliance with the CO₂ emission limits established in this permit. Sampling shall be conducted in accordance with 40 CFR § 60.8 and EPA Method 3a or 3b for the concentration of CO₂.

For the Steam Cracking furnaces:

1. Multiply the CO₂ hourly average emission rate determined under maximum operating test conditions by 8,760 hours.
2. If the above calculated CO₂ emission total does not exceed the tons per year (TPY) specified on Table 1, no compliance strategy needs to be developed.
3. If the above calculated CO₂ emission total exceeds the tons per year (TPY) specified

in Table 1, the facility shall;

- a. Document the exceedance in the test report; and
- b. Explain within the report how the facility will assure compliance with the CO₂ emission limit listed in Table 1.

For the Train 5 Duct Burners:

1. Multiply the CO₂ hourly average emission rate determined under maximum operating test conditions by 8,760 hours of the Train 5 gas turbine with duct burners firing.
 2. Multiply the CO₂ hourly average emission rate determined under maximum operating test conditions by 8,760 hours of the Train 5 gas turbine without duct burners firing.
 3. Subtract the Train 5 gas turbine only emissions from the Train 5 gas turbine with duct burner firing to calculate only the emissions from the duct burners.
 4. If the above calculated CO₂ emission total does not exceed the tons per year (TPY) specified on Table 1, no compliance strategy needs to be developed.
 5. If the above calculated CO₂ emission total exceeds the tons per year (TPY) specified in Table 1, the facility shall;
 - a. Document the exceedance in the test report; and
 - b. Explain within the report how the facility will assure compliance with the CO₂ emission limit listed in Table 1.
- B.** Within 60 days after achieving the maximum production rate at which the affected facility shall be operated, but not later than 180 days after initial startup of the facility, performance tests(s) must be conducted and a written report of the performance testing results furnished to the EPA. Additional sampling may be required by TCEQ or EPA.
- C.** Permittee shall submit a performance test protocol to EPA no later than 30 days prior to the test to allow review of the test plan and to arrange for an observer to be present at the test. The performance test shall be conducted in accordance with the submitted protocol, and any changes required by EPA.
- D.** The steam cracking furnaces (XXAF01-ST, XXBF01-ST, XXCF01-ST, XXDF01-ST, XXEF01-ST, XXFF01-ST, XXGF01-ST, and XXHF01-ST) and Train 5 Duct Burners (HRSG05) shall operate at representative production rates during stack emission testing.
- E.** Performance testing must be conducted using flow rates that are comparable to the normal operating flow rates.
- F.** Fuel sampling for emission units FLAREXX1 and FLAREXX2 (flares) shall be conducted in accordance with 40 CFR Part 98.
- G.** Elevated Flare (FLAREXX1) compliance determinations shall be made following the requirements in 40 CFR sections 65.147(b)(3)(i) through 65.147(b)(3)(iv).
- H.** An equivalency determination for the multipoint ground flare (FLAREXX2) may be approved by EPA.
- I.** Performance tests must be conducted under such conditions to ensure representative performance of the affected facility. The owner or operator must make available to the EPA such records as may be necessary to determine the conditions of the performance tests.

- J.** The owner or operator must provide the EPA at least 30 days prior notice of any performance test, except as specified under other subparts, to afford the EPA the opportunity to have an observer present and/or to attend a pre-test meeting. If there is a delay in the original test date, the facility must provide at least 7 days prior notice of the rescheduled date of the performance test unless EPA approves an earlier rescheduled date due to unforeseen events, such as delays that are caused by weather.
- K.** The owner or operator shall provide, or cause to be provided, performance testing facilities as follows:
1. Sampling ports adequate for test methods applicable to this facility,
 2. Safe sampling platform(s),
 3. Safe access to sampling platform(s), and
 4. Utilities for sampling and testing equipment.
- L.** Unless otherwise specified, each performance test shall consist of three separate runs using the applicable test method. Each run shall be conducted for the time and under the conditions specified in the applicable standard. For purposes of determining compliance with an applicable standard, the arithmetic mean of the results of the three runs shall apply.
- M.** During subsequent operations of the steam cracking furnaces and the Train 5 duct burners, if the firing rate is greater than that recorded during the previous stack test, by more than 10%, stack sampling shall be performed at the new operating conditions within 120 days, to verify continued performance at permitted emission limits.

VI. Agency Notifications

Permittee shall submit GHG permit applications, permit amendments, and other applicable permit information to:

Multimedia Planning and Permitting Division
EPA Region 6
1445 Ross Avenue (6 PD-R)
Dallas, TX 75202
Email: Group R6AirPermits@EPA.gov

Permittee shall submit a copy of all compliance and enforcement correspondence as required by this Approval to Construct to:

Compliance Assurance and Enforcement Division
EPA Region 6
1445 Ross Avenue (6EN)
Dallas, TX 75202