

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-1286-GHG

PERMITTEE: Enterprise Products Operating LLC
1100 Louisiana Street
Houston, TX 77002

MAILING ADDRESS: P.O. Box 4324
Houston, TX 77210

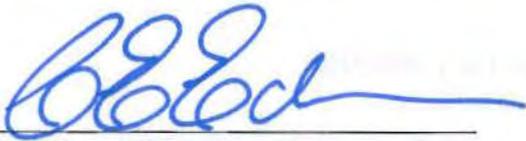
FACILITY NAME: Eagleford Fractionation and DIB Units
Mont Belvieu Complex

FACILITY LOCATION: 10207 FM 1942
Mont Belvieu, TX 77580

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 Enterprise Products Operating LLC (Enterprise) for Greenhouse Gas (GHG) emissions. The Permit applies to the addition of a two new natural gas liquids (NGL) fractionation (Eagleford Fractionation) units and a deisobutanizer (DIB) unit at their existing facility located in Mont Belvieu, Texas.

Enterprise is authorized to construct two new NGL fractionation units and a DIB 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 in conjunction with the corresponding Texas Commission on Environmental Quality (TCEQ) PSD permit No. PSD-TX-1286. 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 Enterprise 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)(3), this PSD Permit becomes effective immediately upon issuance of this final decision.



Carl E. Edlund, Director
Multimedia Planning and Permitting Division

10/12/12

Date

**Enterprise Products Operating LLC (PSD-TX-1286-GHG)
Prevention of Significant Deterioration Permit
For Greenhouse Gas Emissions
Final Permit Conditions**

PROJECT DESCRIPTION

Following the construction authorized by this permit, the facility will add two new natural gas liquids (NGL) fractionation (Eagleford Fractionation) units and a deisobutanizer (DIB) unit at the Enterprise Mont Belvieu Complex in Mont Belvieu, Texas. The Eagleford Fractionation units will be capable of separating an NGL feed into separate ethane, propane, butane, and gasoline fractions. Each fractionation unit will have a nominal feed capacity of 110,000 barrels per day. The DIB unit will be capable of separating isobutene and normal butane from mixed butane streams. The Eagleford Fractionation and DIB unit will consist of two fractionation unit deethanizer distillation columns, two fractionation unit debutanizer distillation columns, two depropanizer columns, two hot oil heaters, two regenerant gas heaters, one flare, one deisobutanizer distillation column, and supporting equipment.

EQUIPMENT LIST

The following devices are subject to this GHG PSD permit.

FIN	EPN	Description
HR15.001A HR15.001B	HR15.001A HR15.001B	2 Hot Oil Heaters (Combustion Unit). Each unit has a maximum design heat input rate of 140 MMbtu/hr, and is fired with natural gas.
HR15.002A HR15.002B	HR15.002A HR15.002B	2 Regenerant Heaters (Combustion Units). Each unit has a maximum design heat input rate of 28.5 MMbtu/hr, and is fired with natural gas.
SK25.001	SK25.001	Flare to control emissions from DIB and Fractionation unit process vents
FRAC F EFa FRAC F EFb	FRAC F EFa FRAC F EFb	Process Fugitives

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 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 restoration of normal operations after any failure 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, the TCEQ PSD Permit PSD-TX-1286 (when issued) 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

API	American Petroleum Institute
BACT	Best Available Control Technology
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
DIB	Deisobutanizer
dscf	Dry Standard Cubic Foot
EF	Emission Factor
EPN	Emission Point Number
FIN	Facility Identification Number
FR	Federal Register
GHG	Greenhouse Gas
gr	Grains
GWP	Global Warming Potential
HHV	High Heating Value
hr	Hour
LAER	Lowest Achievable Emission Rate
lb	Pound
LDAR	Leak Detection and Repair
MMBtu	Million British Thermal Units
MSS	Maintenance, Start-up and Shutdown
NNSR	Nonattainment New Source Review
N ₂ O	Nitrous Oxides
NSPS	New Source Performance Standards
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
TPY	Tons per Year
USC	United States Code
VOC	Volatile Organic Compound

II. Annual Emission Limits

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

Table 1. Annual Emission Limits¹

FIN	EPN	Description	GHG Mass Basis		TPY CO ₂ e ^{2,3}	BACT Requirements
				TPY ²		
HR15.001A	HR15.001A	Hot Oil Heater	CO ₂	72,987	73,058	Minimum Thermal Efficiency of 85%. See permit condition III.A.1.r.
			CH ₄	1.35		
			N ₂ O	0.14		
HR15.001B	HR15.001B	Hot Oil Heater	CO ₂	72,987	73,058	Minimum Thermal Efficiency of 85%. See permit condition III.A.1.r.
			CH ₄	1.35		
			N ₂ O	0.14		
HR15.002A	HR15.002A	Regenerant Heater	CO ₂	14,858	14,872	Use of Good Combustion Practices. See permit condition III.A.1.d. through III.A.1.j.
			CH ₄	0.28		
			N ₂ O	0.03		
HR15.002B	HR15.002B	Regenerant Heater	CO ₂	14,858	14,872	Use of Good Combustion Practices. See permit condition III.A.1.d. through III.A.1.j.
			CH ₄	0.28		
			N ₂ O	0.03		
SK25.001	SK25.001	Flare	CO ₂	62,494	62,542	Use of Good Combustion Practices. See permit condition III.A.2.
			CH ₄	0.68		
			N ₂ O	0.11		
FRAC F EFa and FRAC F EFb	FRAC F EFa and FRAC F EFb	Fugitive Process Emissions	CH ₄	Not Applicable	Not Applicable	Implementation of LDAR Program. See permit condition III.A.3.
Totals⁴			CO ₂	238,186	CO₂e 238,425	
			CH ₄	4.99		
			N ₂ O	0.43		

1. Compliance with the annual emission limits (tons per year) is based on a 12-month rolling basis.
2. The TPY emission limits specified in this table are not to be exceeded for this facility and include emissions only from the facility during all operations and include MSS activities.
3. Global Warming Potentials (GWP): CH₄ = 21, N₂O = 310
4. The total emissions for CH₄ and CO₂e include the PTE for process fugitive emissions of CH₄. These 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. Hot Oil Heaters (HR15.001A and HR15.001B) and Regenerant Heaters (HR15.002A and HR15.002B)
 - a. Permittee shall calculate, on a monthly basis, the amount of CO₂ emitted from combustion in tons/yr using equation C-2a in 40 CFR Part 98 Subpart C, converted to short tons. Compliance shall be based on a 12-month rolling basis.
 - b. Permittee shall calculate the CH₄ and N₂O emissions on a 12-month rolling basis. Permittee shall determine compliance with the CH₄ and N₂O emissions limits contained in this section using the default CH₄ and N₂O emission factors contained in Table C-2 and equation C-9a of 40 CFR Part 98 and the measured actual heat input (HHV), converted to short tons.
 - c. Permittee shall calculate the CO₂e emissions on a 12-month rolling basis, based on the procedures and Global Warming Potentials (GWP) contained in Greenhouse Gas Regulations, 40 CFR Part 98, Subpart A, Table A-1, as published on October 30, 2009 (74 FR 56395).
 - d. Fuel for the heaters shall be limited to pipeline quality natural gas with a fuel sulfur content of up to 5 grains of sulfur per 100 dry standard cubic feet (gr S/100 dscf). The fuel gross calorific value (GCV) [high heat value (HHV)] of the fuel shall be determined, at a minimum, semiannually by the procedures contained in 40 CFR Part 98.34(a)(6) and records shall be maintained of the semiannual fuel GCV for a period of five years. Upon request, Permittee shall provide a sample and/or analysis of the fuel that is fired in the heaters or shall allow a sample to be taken by EPA for analysis.
 - e. Permittee shall install and maintain an operational non-resettable elapsed time meter for the heaters. The flow meters must be calibrated on an annual basis.
 - f. The flow rate of the fuel combusted in natural gas-fired combustion emission units identified in this section shall be measured and recorded using an operational totalizing fuel flow meter at each inlet.
 - g. Permittee shall perform cleaning of the burner tips, at a minimum of, annually.
 - h. Permittee shall install, operate, and maintain an automated air/fuel control system.
 - i. Permittee shall calibrate and perform preventative maintenance on the air/fuel control analyzers once per quarter, at a minimum.
 - j. Permittee shall utilize insulation materials (e.g. ceramic fiber blankets and Kaolite™) where feasible to reduce heat loss.
 - k. Permittee shall install, operate, and maintain an O₂ analyzer on the hot oil heaters (HR15.001A and HR15.001B).

- l. Oxygen analyzers shall continuously monitor and record oxygen concentration in the hot oil heaters (HR15.001A and HR15.001B). It shall reduce the oxygen readings to an averaging period of 15 minutes or less and record it at that frequency.
 - m. 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, with the following exception: a relative accuracy test audit is not required once every four quarters (i.e., two successive semiannual CGAs may be conducted).
 - n. The one-hour maximum firing rate for the hot oil heaters (HR15.001A and HR15.001B) shall not exceed 160 MMBtu/hr per unit. The annual average firing rate shall not exceed 140 MMBtu/hr.
 - o. The maximum firing rate for the regenerant heaters (HR15.002A and HR15.002B) shall not exceed 28.5 MMBtu/hr per unit. The annual average firing rate shall not exceed 28.5 MMBtu/hr.
 - p. A rolling 12 month average and the one-hour maximum firing rates shall be calculated daily to demonstrate compliance with the firing rates in III.A.1.m. and III.A.1.n.
 - q. The Permittee shall maintain a minimum overall thermal efficiency of 85% on a 12-month rolling average basis, calculated monthly, for the hot oil heaters (HR15.001A and HR15.001B) excluding periods of start-up, shutdown, and malfunction.
 - r. The hot oil heaters (HR15.001A and HR15.001B) will be continuously monitored for exhaust temperature, input fuel temperature, and stack oxygen. Thermal efficiency for emission units will be calculated for each operating hour from these parameters using equation G-1 from American Petroleum Institute (API) methods 560 (4th ed.) Annex G.
 - s. The heaters are not expected to have GHG emissions in excess of the allowed emission rates during periods of startup, shutdown, or maintenance. The fuel firing rates will be below the maximum rate and startups will be limited to 240 minutes.
2. Flare (SK25.001)
 - a. Permittee shall install, operate, and maintain a flow rate and composition analyzer to monitor the waste gas combusted by the flare. The flow rate and composition analyzer shall continuously record the molecular weight and mass flow rate of the flare gas.
 - b. The flare shall be air assisted.
 - c. Flare shall have a minimum destruction and removal efficiency (DRE) of 99.5% based on flowrate and gas composition.
 - d. Permittee must record the inlet waste gas heat input (HHV) in MMBtu/hr during flare operation. The records must include hourly CH₄ emission levels as measured by the in-line gas analyzer (Gas chromatograph or equivalent with inlet gas flowrate) and the calculations based on the actual heat input for the CO₂, N₂O, and CH₄

emissions. These records must be kept for five years following the date of each event.

- e. The flare shall be designed and operated in accordance with 40 CFR 60.18 including specifications of minimum heating value of the waste gas, maximum tip velocity, and pilot flame monitoring. An infrared monitor is considered equivalent to a thermocouple for flame monitoring purposes.

3. Process Fugitives (FRAC F EFa and FRAC F EFb)

The permittee shall implement the TCEQ 28LAER leak detection and repair (LDAR) program for fugitive emissions of methane.¹

B. Continuous Emissions Monitoring Systems (CEMS)

1. As an alternative to Special Conditions III.A.1.k, III.A.1.l, III.A.1.m, III.A.1.q, and III.A.1.r. 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 are 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.
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.
4. Permittee shall meet the appropriate quality assurance requirements specified in 40 CFR Part 60, Appendix F for the CO₂ emission monitoring system.

IV. Recordkeeping and Reporting

1. In order to demonstrate compliance with the GHG emission limits in Table 1, the permittee will monitor the following parameters and summarize the data on a calendar month basis.
 - a. Operating hours for all air emission sources;
 - b. The natural gas fuel usage for all combustion sources, using continuous fuel flow monitors (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

¹ The boilerplate special conditions for the TCEQ 28LAER LDAR program can be found at http://www.tceq.state.tx.us/assets/public/permitting/air/Guidance/NewSourceReview/bpc_rev28laer.pdf. These conditions are included in the TCEQ issued NSR permit.

- c. Annual fuel sampling for natural gas, and quarterly sampling of waste gas at a minimum.
2. Permittee shall maintain and keep records of the monitoring results, as well as the repair and maintenance records in implementing the TCEQ 28LAER leak detection and repair program.
3. Permittee shall maintain a all records, data, measurements, reports, and documents related to the operation of the facility, including, but not limited to, the following: all records or reports pertaining to significant maintenance performed on any system or device at the facility; duration of startup, shutdown; the initial startup period for the emission units; pollution control 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. The records must be retained for not less than five years following the date of such measurements, maintenance, reports, and/or records.
4. Permittee shall maintain records of all GHG emission units and CO₂ emission certification tests and monitoring and compliance information required by this permit.
5. 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; and
 - d. Any failure to conduct any required source testing, monitoring, or other compliance activities.
6. Excess emissions shall be defined as any period in which the facility emissions exceed a maximum emission limit set forth in this permit.
7. Excess emissions indicated by GHG emission source certification testing or compliance monitoring shall be considered violations of the applicable emission limit for the purpose of this permit.

8. All records required by this PSD Permit shall be retained and remain accessible for not less than 5 years following the date of such measurements, maintenance, and reporting.

V. Initial Performance Testing Requirements:

- A. The holder of this permit shall perform an initial stack test to establish the actual quantities of air contaminants being emitted into the atmosphere from emission units HR15.001A, HR15.001B, HR15.002A, and HR15.002B and 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, in 40 CFR 60 Appendix B, for the concentration of CO₂ for the heaters.
 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.
- B. The Permittee shall conduct an evaluation of the thermal efficiency of the hot oil heaters (HR15.001A and HR15.001B) to verify compliance with minimal thermal efficiency requirements at III.A.1.r. when performing testing as stated in V.A. above. The results of the thermal efficiency evaluation shall be submitted to the EPA within 30 days of testing.
- C. Within 60 days after achieving the maximum production rate at which the affected facility will 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.
- D. 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.
- E. Performance testing must be conducted using flow rates that are comparable to the normal operating flow rates.
- F. Fuel sampling for emission unit SK25.001 (flare) shall be conducted in accordance with 40 CFR Part 98.
- G. Flare compliance determinations shall be made following the requirements in 40 CFR Part 65 sections 65.147(b)(3)(i) through 65.147(b)(3)(iv).

- H. 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.
- I. 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.
- L. 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.
- M. 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. Emissions testing, as outlined above, shall be performed every three years, or more frequently if identified above, 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:

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

