Denbury

July 22, 2025

Mississippi Department of Environmental Quality
Office of Pollution Control
Environmental Permits Division
515 E. Amite Street
Jackson, MS 39201

RE: Notice of Intent for Coverage Under the Oil Production General Permit
Denbury Onshore, LLC
Eucutta EOR Facility
AI No.: 12605; Permit No.: 2840-00054
Wayne County, MS

In accordance with MAC Title 11, Part 2, submitted with this are two (2) bound sets of the referenced material. An electronic copy has also been submitted through the EPD Electronic Application Submittal webpage. Request is hereby made for coverage under the Oil Production General Permit (OPGP).

The facility functions as an oil & gas production site and operates controls such that criteria pollutant emissions will not exceed emission rates restricted in the Oil Production General Permit, nor will hazardous air pollutant (HAP) emissions exceed any HAP emission rates restricted in the Oil Production General Permit. Details of the operations, emission estimates, and associated emission programs are included herein and verify that the facility should be classified as a synthetic minor source under the State and Federal air permitting programs. All measures should be taken in the review process to assure that the minor classification is federally recognized.

A copy of the public notice is enclosed and will be published in the Wayne County News. Additionally, a copy of the public notice and the complete OPGP NOI will be provided to the Waynesboro Wayne County Library. The public notice, notarized proof of publication, and library proof of receipt will be submitted to MDEQ when available.

If any other information is required regarding these matters, please do not hesitate to contact HLP Engineering, Inc. at (337) 839-1075. All written correspondence should be directed to my attention at: **Denbury Onshore, LLC, 5851 Legacy Circle, Suite 1200, Plano, TX 75024**. Thank you in advance for your assistance with this matter.

Sincerely,
DENBURY ONSHORE, LLC

Kevin Hendricks
Enclosures

Notice of Intent for Oil Production General Permit

Denbury Onshore, LLC

Eucutta EOR Facility
Wayne County, MS

July 2025

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MDEQ NOTICE OF INTENT FOR COVERAGE UNDER THE OIL PRODUCTION GENERAL PERMIT TO CONSTRUCT/OPERATE AIR EMISSIONS EQUIPMENT AT A SYNTHETIC MINOR SOURCE

Facility (Agency Interest) Information | **Section OPGP - A**

1. Name, Address, and Location of Facility

A. Owner/Company Name: Denbury Onshore, LLC

B. Facility Name (*if different than A. above)* : Eucutta EOR Facility

C. Facility Air Permit/Coverage No. *(if known)* : 2840-00054

D. Agency Interest No. *(if known)* : 12605

E. Physical Address

1. Street Address: 31 Hess Camp Drive
2. City: Shubuta
3. State: MS
4. County: Wayne
5. Zip Code: 39360
6. Telephone No.: 972-673-2529
7. Fax No.:
8. Are facility records kept at this location? ☐ Yes ☑ No. Please complete Item 10.

F. Mailing Address

1. Street Address or P.O. Box: 5851 Legacy Circle, Suite 1200
2. City: Plano
3. State: TX
4. Zip Code: 75024

G. Latitude/Longitude Data

1. Collection Point (*check one*):
   ☑ Site Entrance ☐ Other:
2. Method of Collection (*check one*):
   ☐ GPS Specify coordinate system (NAD 83, etc.)
   ☑ Map Interpolation (Google Earth, etc.) ☐ Other:
3. Latitude (*degrees/minutes/seconds)* : 31 45 55
4. Longitude (*degrees/minutes/seconds*): 88 50 33
5. Elevation (*feet*): 408±

H. SIC Code: 1311

2. Name and Address of Facility Contact

A. Name: Kevin Hendricks Title: Environmental Compliance Coordinator

B. Mailing Address

1. Street Address or P.O. Box: 5851 Legacy Circle, Suite 1200
2. City: Plano
3. State: TX
4. Zip Code: 75024
5. Fax No.:
6. Telephone No.: 972-673-2529
7. Email: kevin.hendricks@exxonmobil.com

MDEQ NOTICE OF INTENT FOR COVERAGE UNDER THE OIL PRODUCTION GENERAL PERMIT TO CONSTRUCT/OPERATE AIR EMISSIONS EQUIPMENT AT A SYNTHETIC MINOR SOURCE

Facility (Agency Interest) Information | **Section OPGP - A**

3. Name and Address of Air Contact (*if different from Facility Contact*)

A. Name: _____ Title: _____

B. Mailing Address
1. Street Address or P.O. Box: _____
2. City: _____ 3. State: _____
4. Zip Code: _____ 5. Fax No.: _____
6. Telephone No.: _____
7. Email: _____

4. Name and Address of Responsible Official for the Facility

The Form must be signed by a Responsible Official as defined in 11 Miss. Admin. Code Pt.2, R. 2.1.C(24).

A. Name: Rusty Shaw Title: Director of Regulatory Affairs

B. Mailing Address
1. Street Address or P.O. Box: 5851 Legacy Circle, Suite 1200
2. City: Plano 3. State: TX
4. Zip Code: 75024 5. Fax No.: _____
6. Telephone No.: 972-673-2777
7. Email: rusty.shaw@exxonmobil.com

C. Is the person above a duly authorized representative and not a corporate officer?
☑ Yes ☐ No
If yes, has written notification of such authorization been submitted to MDEQ?
☑ Yes ☐ No ☐ Request for authorization is attached

5. Type of Oil Production Notice of Intent (*Check all that apply*)

☑ Initial Coverage
☐ Re-Coverage for existing Coverage
☐ Modification with Public Notice
☐ Modification without Public Notice
☐ Update Compliance Plan

MDEQ NOTICE OF INTENT FOR COVERAGE UNDER THE OIL PRODUCTION GENERAL PERMIT TO CONSTRUCT/OPERATE AIR EMISSIONS EQUIPMENT AT A SYNTHETIC MINOR SOURCE

Facility (Agency Interest) Information | **Section OPGP - A**

6. Equipment List (*Check all that apply*)

Complete supporting emission calculations must be included for each potential emission unit selected below.

- ☐ Heater Treater. Include a completed Section OPGP-C Form for each unit.
- ☑ Condensation Storage Vessel. Include a completed Section OPGP-E Form for each unit.
- ☑ Water Storage Vessel. Include a completed Section OPGP-E Form for each unit.
- ☐ Internal Combustion Engine. Include a completed Section OPGP-D Form for each unit.
- ☑ Flare. Include a completed Section OPGP-F Form for each unit.
- ☐ Oil Truck Loading (Section OPGP-B Form)
- ☑ Component Fugitive Emissions (Section OPGP-B Form)
- ☑ Other: Compressor Blowdowns

7. Process/Product Details

Maximum Anticipated Well(s) Production for Faciltiy:

Produced Material	Throughput	Units
Gas		MMCF/day
Oil	2,000	barrels/day
Water	15,000	barrels/day
Other (Specify)		

Maximum Anticipated Throughput for Principal Product(s) (*as applicable*):

Produced Material	Throughput	Units
Flared Gas	0.04	MMCF/day
Oil	2,000	barrels/day
Water	15,000	barrels/day
Other (Specify)		

8. Zoning

A. Is the facility (either existing or proposed) located in accordance with any applicable city and/or county zoning ordinances? If no, please explain
Yes

B. Is the facility (either existing or proposed) required to obtain any zoning variance to locate/expand the facility at this site? If yes, please explain.
No

C. Is the required USGS quadrangle map or equivalent attached? ☑ Yes ☐ No

MDEQ NOTICE OF INTENT FOR COVERAGE UNDER THE OIL PRODUCTION GENERAL PERMIT TO CONSTRUCT/OPERATE AIR EMISSIONS EQUIPMENT AT A SYNTHETIC MINOR SOURCE

Facility (Agency Interest) Information | **Section OPGP - A**

9. MS Secretary of State Registration / Certificate of Good Standing

No permit will be issued to a company that is not authorized to conduct business in Mississippi. If the company applying for the permit is a corporation, limited liability company, a partnership or a business trust, the application package should include proof of registration with the Mississippi Secretary of State and/or a copy of the company's Certificate of Good Standing. The name listed on the permit will include the company name as it is registered with the Mississippi Secretary of State.

It should be noted that for an application submitted in accordance with 11 Miss. Admin. Code Pt. 2, R. 2.8.B. to renew a State Permit to Operate or in accordance with 11 Miss. Admin. Code Pt. 2, R. 6.2.A(1)(c). to renew a Title V Permit to be considered timely and complete, the applicant shall be registered and in good standing with the Mississippi Secretary of State to conduct business in Mississippi.

10. Address and Location of Facility Records

Physical Address

1. Street Address: 5851 Legacy Circle, Suite 1200
2. City: Plano
3. State: TX
4. County: Collin
5. Zip Code: 75024
6. Telephone No.: 972-673-2529
7. Fax No.:

MDEQ NOTICE OF INTENT FOR COVERAGE UNDER THE OIL PRODUCTION GENERAL PERMIT TO CONSTRUCT/OPERATE AIR EMISSIONS EQUIPMENT AT A SYNTHETIC MINOR SOURCE

Facility (Agency Interest) Information	Section OPGP - A

11. Certification

The Form must be signed by a Responsible Official as defined in 11 Miss. Admin. Code Pt. 2, R. 2.1.C.(24).

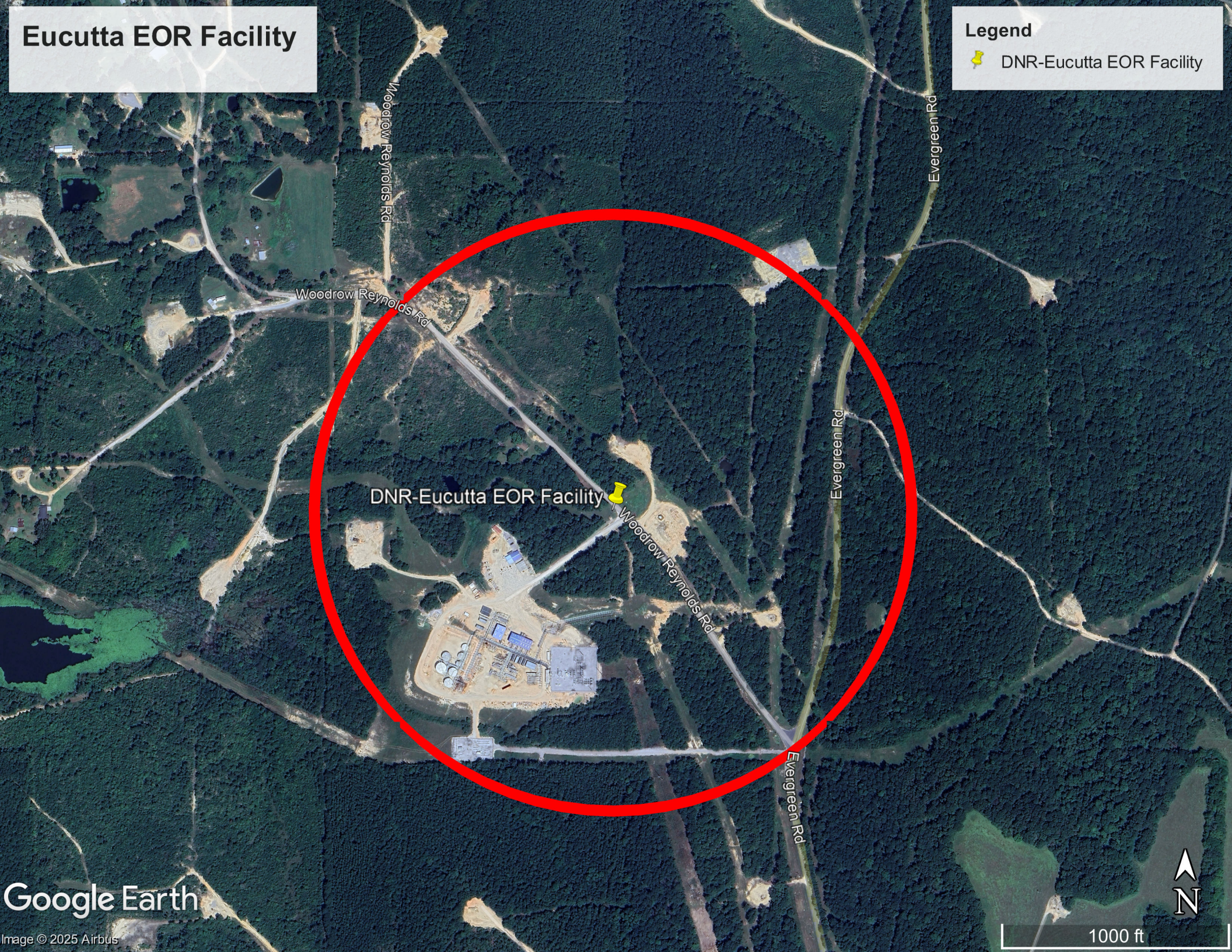
I certify that to the best of my knowledge and belief formed after reasonable inquiry, the statements and information in this application are true, complete, and accurate, and that as a responsible official, my signature shall constitute an agreement that the applicant assumes the responsibility for any alteration, additions, or changes in operation that may be necessary to achieve and maintain compliance with all applicable Rules and Regulations. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

Rusty Shaw
Signature of Responsible Official/DAR

7/16/25
Date

Rusty Shaw
Printed Name

Director of Regulatory Affairs
Title


Eucutta EOR Facility
Legend
DNR-Eucutta EOR Facility
Woodrow Reynolds Rd
Evergreen Rd
DNR-Eucutta EOR Facility
Google Earth
Image © 2025 Airbus
N
1000 ft


DNR-Eucutta EOR Facility
Woodrow Reynolds Rd
Evergreen Rd
Evergreen Rd
N
Google Earth
Image © 2025 Airbus

Denbury Onshore, LLC
Simplified Block Flow Diagram
Eucutta EOR Facility

MBD-101
Slug Catcher

MBF-105
Compressor Station Scrubber

MAM-102
Free-water Knockout

ABJ-129A/B
Produced Water Tank
5000 BBL
EPN: 1g-05-WST-CV
1h-05-WST-CV

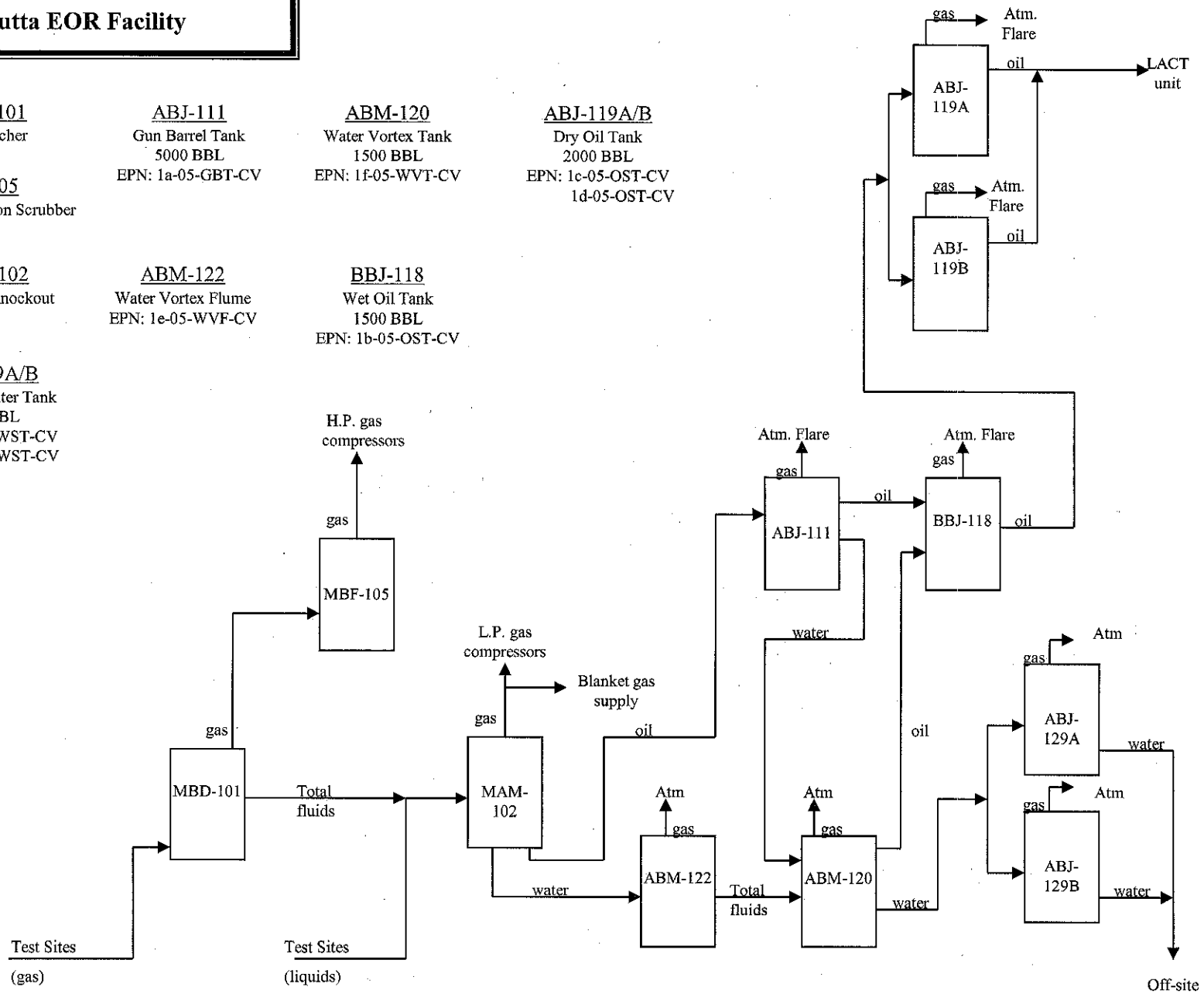
ABJ-111
Gun Barrel Tank
5000 BBL
EPN: 1a-05-GBT-CV

ABM-122
Water Vortex Flume
EPN: 1e-05-WVF-CV

ABM-120
Water Vortex Tank
1500 BBL
EPN: 1f-05-WVT-CV

BBJ-118
Wet Oil Tank
1500 BBL
EPN: 1b-05-OST-CV

ABJ-119A/B
Dry Oil Tank
2000 BBL
EPN: 1c-05-OST-CV
1d-05-OST-CV



Section OPGP-B.1: Maximum Uncontrolled Emissions (under normal operating conditions)

MDEQ NOTICE OF INTENT FOR COVERAGE UNDER THE OIL PRODUCTION GENERAL PERMIT TO CONSTRUCT/OPERATE AIR EMISSIONS EQUIPMENT AT A SYNTHETIC MINOR SOURCE

Maximum Uncontrolled Emissions are the emissions at maximum capacity and prior to (in the absence of) pollution control, emission-reducing process equipment, or any other emission reduction. Calculate the hourly emissions using the worst case hourly emissions for each pollutant. For each pollutant, calculate the annual emissions as if the facility were operating at maximum plant capacity without pollution controls for 8760 hours per year, unless otherwise approved by the Department. List Hazardous Air Pollutants (HAP) in Section OGP-B.3 and GHGs in Section OGP-B.4. Emission Point numbering must be consistent throughout the application package. Fill all cells in this table with the emission numbers or a "-" symbol. A "-" symbol indicates that emissions of this pollutant are not expected. Emissions > 0.01 TPY must be included. Please do not change the column widths on this table.

Emission Point ID	TSP[1] (PM)		PM-10[1]		PM-2.5[1]		SO_2		NOx		CO		VOC		TRS[2]		Lead		Total HAPs	
	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr
1a-05-GBT-CV	-	-	-	-	-	-	-	-	-	-	-	-	49.65	217.50	0.00	0.01	-	-	2.91	12.71
1b-05-OST-CV	-	-	-	-	-	-	-	-	-	-	-	-	2.11	9.25	0.00	0.00	-	-	0.12	0.54
1c-05-OST-CV	-	-	-	-	-	-	-	-	-	-	-	-	1.71	7.48	0.00	0.00	-	-	0.10	0.44
1d-05-OST-CV	-	-	-	-	-	-	-	-	-	-	-	-	1.71	7.48	0.00	0.00	-	-	0.10	0.44
CAP001	-	-	-	-	-	-	-	-	-	-	-	-	1.87	8.17	0.00	0.01	-	-	0.28	1.22
2-05-SUMP	-	-	-	-	-	-	-	-	-	-	-	-	0.02	0.11	0.00	0.00	-	-	0.02	0.11
3a-05-F	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3b-05-F	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4-05-FE	-	-	-	-	-	-	-	-	-	-	-	-	1.16	5.10	0.00	0.00	-	-	0.02	0.07
5-05-CB	-	-	-	-	-	-	-	-	-	-	-	-	24.78	0.45	0.02	0.00	-	-	2.45	0.04
Totals	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**83.01**	**255.54**	**0.02**	**0.02**	**0.00**	**0.00**	**6.00**	**15.57**

[1] **Condensables:** Include condensable particulate matter emissions in particulate matter calculations for PM-10 and PM-2.5, but not for TSP (PM).

[2] **TRS:** Total reduced sulfur (TRS) is the sum of the sulfur compounds hydrogen sulfide (H_2S), methyl mercaptan (CH_4S), dimethyl sulfide (C_2H_6S), and dimethyl disulfide ($C_2H_6S_2$).

Section OPGP-B.2: Proposed Allowable Emissions

MDEQ NOTICE OF INTENT FOR COVERAGE UNDER THE OIL PRODUCTION GENERAL PERMIT TO CONSTRUCT/OPERATE AIR EMISSIONS EQUIPMENT AT A SYNTHETIC MINOR SOURCE

Proposed Allowable Emissions (Potential to Emit) are those emissions the facility is currently permitted to emit as limited by a specific permit requirement or federal/state standard (e.g., a MACT standard); or the emission rate at which the facility proposes to emit considering emissions control devices, restrictions to operating rates/hours, or other requested permit limits that reduce the maximum emission rates. Emission Point numbering must be consistent throughout the application package. Fill all cells in this table with the emission numbers or a "-" symbol. A "-" symbol indicates that emissions of this pollutant are not expected. Additional columns may be added if there are regulated pollutants (other than HAPs and GHGs) emitted at the facility.

Emission Point ID	TSP[1]		PM10[1]		PM2.5[1]		SO_2		NOx		CO		VOC		TRS		Lead	
	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr
1a-05-GBT-CV	-	-	-	-	-	-	-	-	-	-	-	-	0.17	0.74	0.00	0.00	-	-
1b-05-OST-CV	-	-	-	-	-	-	-	-	-	-	-	-	0.06	0.28	0.00	0.00	-	-
1c-05-OST-CV	-	-	-	-	-	-	-	-	-	-	-	-	0.01	0.05	0.00	0.00	-	-
1d-05-OST-CV	-	-	-	-	-	-	-	-	-	-	-	-	0.01	0.05	0.00	0.00	-	-
CAP001	-	-	-	-	-	-	-	-	-	-	-	-	1.87	8.17	0.00	0.01	-	-
2-05-SUMP	-	-	-	-	-	-	-	-	-	-	-	-	0.02	0.11	0.00	0.00	-	-
3a-05-F	0.02	0.08	0.02	0.08	0.02	0.08	0.00	0.03	0.08	0.36	0.71	3.13	1.10	4.85	0.00	0.00	-	-
3b-05-F	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.00	0.02	0.09	0.04	0.18	0.00	0.02	0.00	0.00	-	-
4-05-FE	-	-	-	-	-	-	-	-	-	-	-	-	1.16	5.10	0.00	0.00	-	-
5-05-CB	-	-	-	-	-	-	-	-	-	-	-	-	24.78	0.45	0.02	0.00	-	-
Totals	**0.02**	**0.09**	**0.02**	**0.09**	**0.02**	**0.09**	**0.00**	**0.03**	**0.10**	**0.45**	**0.75**	**3.31**	**29.18**	**19.82**	**0.02**	**0.01**	**0.00**	**0.00**

[1] **Condensables:** Include condensable particulate matter emissions in particulate matter calculations for PM-10 and PM-2.5, but not for TSP (PM).

[2] **TRS:** Total reduced sulfur (TRS) is the sum of the sulfur compounds hydrogen sulfide (H_2S), methyl mercaptan (CH_4S), dimethyl sulfide (C_2H_6S), and dimethyl disulfide ($C_2H_6S_2$).

Section OPGP-B.3: Proposed Allowable Hazardous Air Pollutants (HAPs)

MDEQ NOTICE OF INTENT FOR COVERAGE UNDER THE OIL PRODUCTION GENERAL PERMIT TO CONSTRUCT/OPERATE AIR EMISSIONS EQUIPMENT AT A SYNTHETIC MINOR SOURCE

In the table below, report the Proposed Allowable Emissions (Potential to Emit) for each HAP from each regulated emission unit if the HAP > 0.01 tpy. Each facility-wide Individual HAP total and the facility-wide Total HAPs shall be the sum of all HAP sources. Use the HAP nomenclature as it appears in the Instructions. Emission Point numbering must be consistent throughout the application package. For each HAP listed, fill all cells in this table with the emission numbers or a "-" symbol. A "-" symbol indicates that emissions of this pollutant are not expected or the pollutant is emitted in a quantity less than the threshold amounts described above. Additional columns may be added as necessary to address each HAP.

Emission Point ID	Total HAPs		2,2,4-Trimethylpentane		Benzene		Ethylbenzene		Formaldehyde		N-Hexane		Toluene		Xylene	
	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr
1a-05-GBT-CV	0.01	0.04	0.00	0.00	0.00	0.00	0.00	0.00	-	-	0.01	0.04	0.00	0.00	0.00	0.00
1b-05-OST-CV	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	-	-	0.00	0.02	0.00	0.00	0.00	0.00
1c-05-OST-CV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	-	0.00	0.00	0.00	0.00	0.00	0.00
1d-05-OST-CV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	-	0.00	0.00	0.00	0.00	0.00	0.00
CAP001	0.28	1.21	0.12	0.52	0.00	0.00	0.01	0.02	-	-	0.11	0.50	0.02	0.07	0.02	0.10
2-05-SUMP	0.02	0.11	-	-	-	-	-	-	-	-	0.02	0.11	-	-	-	-
3a-05-F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	-	0.00	0.00	0.00	0.00	0.00	0.00
3b-05-F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	-	0.00	0.00	0.00	0.00	0.00	0.00
4-05-FE	0.01	0.07	0.00	0.00	0.00	0.01	0.00	0.00	-	-	0.01	0.04	0.00	0.01	0.00	0.01
5-05-CB	2.44	0.04	0.00	0.00	0.15	0.00	0.01	0.00	-	-	2.07	0.04	0.10	0.00	0.11	0.00
Totals:	2.76	1.49	0.12	0.52	0.15	0.01	0.02	0.02	0.00	0.00	2.22	0.75	0.12	0.08	0.13	0.11

Section OPGP-B.4: Greenhouse Gas Emissions

MDEQ NOTICE OF INTENT FOR COVERAGE UNDER THE OIL PRODUCTION GENERAL PERMIT TO CONSTRUCT/OPERATE AIR EMISSIONS EQUIPMENT AT A SYNTHETIC MINOR SOURCE

Applicants must report potential emission rates in SHORT TONS per year, as opposed to metric tons required by Part 98. Emission Point numbering must be consistent throughout the application package and, for existing emission points, should match any MDEQ ID's in the current permit.

		CO_2 (non-biogenic) ton/yr	CO_2 (biogenic)[2] ton/yr	N_2O ton/yr	CH_4 ton/yr	SF_6 ton/yr	PFC/HFC[3] ton/yr					Total GHG Mass Basis ton/yr[5]	Total CO_2e ton/yr[6]
Emission Point ID	**GWPs [1]**	**1**	**1**	**265**	**28**	**22,800**	**footnote 4**						
1a-05-GBT-CV	**mass GHG**	1.94	0.00	0.00	0.00	0.00	0.00					1.94	
	CO_2e	1.94	0.00	0.00	0.00	0.00	0.00						1.94
1b-05-OST-CV	**mass GHG**	0.74	0.00	0.00	0.00	0.00	0.00					0.74	
	CO_2e	0.74	0.00	0.00	0.00	0.00	0.00						0.74
1c-05-OST-CV	**mass GHG**	0.12	0.00	0.00	0.00	0.00	0.00					0.12	
	CO_2e	0.12	0.00	0.00	0.00	0.00	0.00						0.12
1d-05-OST-CV	**mass GHG**	0.12	0.00	0.00	0.00	0.00	0.00					0.12	
	CO_2e	0.12	0.00	0.00	0.00	0.00	0.00						0.12
CAP001	**mass GHG**	222.25	0.00	0.00	1.15	0.00	0.00					223.39	
	CO_2e	222.25	0.00	0.00	32.10	0.00	0.00						254.35
2-05-SUMP	**mass GHG**	0.00	0.00	0.00	0.00	0.00	0.00					0.00	
	CO_2e	0.00	0.00	0.00	0.00	0.00	0.00						0.00
3a-05-F	**mass GHG**	666.45	0.00	0.00	0.54	0.00	0.00					666.99	
	CO_2e	666.45	0.00	0.00	15.12	0.00	0.00						681.57
3b-05-F	**mass GHG**	77.67	0.00	0.00	0.53	0.00	0.00					78.20	
	CO_2e	77.67	0.00	0.00	14.82	0.00	0.00						92.48
4-05-FE	**mass GHG**	14.32	0.00	0.00	0.09	0.00	0.00					14.41	
	CO_2e	14.32	0.00	0.00	2.47	0.00	0.00						16.79
5-05-CB	**mass GHG**	14.21	0.00	0.00	0.09	0.00	0.00					14.30	
	CO_2e	14.21	0.00	0.00	2.47	0.00	0.00						16.68
FACILITY TOTAL	**mass GHG**	**997.81**	**0.00**	**0.00**	**2.39**	**0.00**	**0.00**					**1000.20**	**0.00**
	CO_2e	**997.81**	**0.00**	**0.00**	**66.98**	**0.00**	**0.00**					**0.00**	**1064.79**

[1] **GWP** (Global Warming Potential): Applicants must use the most current GWPs codified in Table A-1 of 40 CFR part 98. GWPs are subject to change, therefore, applicants need to check 40 CFR 98 to confirm GWP values.

[2] Biogenic CO2 is defined as carbon dioxide emissions resulting from the combustion or decomposition of non-fossilized and biodegradable organic material originating from plants, animals, or micro-organisms.

[3] For **HFCs** or **PFCs** describe the specific HFC or PFC compound and use a separate column for each individual compound.

[4] For each new compound, enter the appropriate GWP for each HFC or PFC compound from Table A-1 in 40 CFR 98.

[5] Greenhouse gas emissions on a **mass basis** is the ton per year greenhouse gas emission before adjustment with its GWP. Do not include biogenic CO_2 in this total.

[6] **CO_2e** means Carbon Dioxide Equivalent and is calculated by multiplying the TPY mass emissions of the greenhouse gas by its GWP. Do not include biogenic CO_2e in this total.

Section OPGP-B.5: Stack Parameters and Exit Conditions

MDEQ NOTICE OF INTENT FOR COVERAGE UNDER THE OIL PRODUCTION GENERAL PERMIT TO CONSTRUCT/OPERATE AIR EMISSIONS EQUIPMENT AT A SYNTHETIC MINOR SOURCE

Emission Point numbering must be consistent throughout the application package.

Emission Point ID	Orientation (H-Horizontal V=Vertical)	Rain Caps (Yes or No)	Height Above Ground (ft)	Base Elevation (ft)	Exit Temp. (^{o}F)	Inside Diameter or Dimensions (ft)	Velocity (ft/sec)	Moisture by Volume (%)	Geographic Position (degrees/minutes/seconds)	
									Latitude	Longitude
1a-05-GBT-CV	V	No	24	408±	80	0.5	0.01	0	31 45 55	88 50 33
1b-05-OST-CV	V	No	24	408±	80	0.5	<0.01	0	31 45 55	88 50 33
1c-05-OST-CV	V	No	16	408±	80	0.5	<0.01	0	31 45 55	88 50 33
1d-05-OST-CV	V	No	16	408±	80	0.5	<0.01	0	31 45 55	88 50 33
1e-05-WVF-CV	V	No	42.5	408±	80	0.5	0.40	0	31 45 55	88 50 33
1f-05-WVT-CV	V	No	32	408±	80	0.5	4.9	0	31 45 55	88 50 33
1g-05-WST-CV	V	No	24	408±	80	0.5	2.36	0	31 45 55	88 50 33
1h-05-WST-CV	V	No	24	408±	80	0.5	2.4	0	31 45 55	88 50 33
2-05-SUMP	V	No	6	408±	80	0.1	<0.01	0	31 45 55	88 50 33
3a-05-F	V	No	25	408±	1500	1	48.8	0	31 45 55	88 50 33
3b-05-F	V	No	25	408±	1500	1	5.31	0	31 45 55	88 50 33

[1] A WAAS-capable GPS receiver should be used and in the WGS84 or NAD83 coordinate system.

Denbury Onshore, LLC
Eucutta EOR Facility
Wayne County, MS

Section B.6: EMISSION POINT SOURCE LIST

Emission Point ID:	MDEQ EPN:	Footnote:	Emission Point Description:	Routes To:	Operating Rate/Capacity	Operating Schedule:		
						Hrs/Day or (Hrs/Yr)	Days/Wk	Wks/Yr
1a-05-GBT-CV	AA-002	a	5000 BBL Gun Barrel Tank-Common Vent (ABJ-111)	3a-05-F	730,000 BOPY	24	7	52.143
1b-05-OST-CV	AA-003	a	1500 BBL Wet Oil Tank-Common Vent (BBJ-118)	3a-05-F	735,475 BOPY	24	7	52.143
1c-05-OST-CV	AA-004	a	2000 BBL Dry Oil Tank-Common Vent (ABJ-119A)	3a-05-F	367,738 BOPY	24	7	52.143
1d-05-OST-CV	AA-005	a	2000 BBL Dry Oil Tank-Common Vent (ABJ-119B)	3a-05-F	367,738 BOPY	24	7	52.143
1e-05-WVF-CV	AA-001		Water Vortex Flume (ABM-122)		b	24	7	52.143
1f-05-WVT-CV	AA-006		10000 BBL Water Vortex Tank-Common Vent (ABM-120)		b	24	7	52.143
1g-05-WST-CV	AA-007		5000 BBL Water Storage Tank-Common Vent (ABJ-129A)		b	24	7	52.143
1h-05-WST-CV	AA-008		5000 BBL Water Storage Tank-Common Vent (ABJ-129B)		b	24	7	52.143
2-05-SUMP	AA-009		Sump Tank		12,700 Gallons/Yr	24	7	52.143
3a-05-F	AA-010	c	Control Flare (ZZZ-180A)		15.0 MMSCF/Yr	24	7	52.143
3b-05-F	AA-011	d	Control Flare (ZZZ-180B)		1.31 MMSCF/Yr	24	7	52.143
4-05-FE	AA-015		Fugitive Emissions		N/A	24	7	52.143
5-05-CB	AA-013		Compressor Blowdowns		261 MSCF/Yr	(36)	-	-

Footnotes:

a *Vapors from this source are routed to the control flare (EPN: 3a-05-F) for combustion, except during brief intervals when thief hatches are opened for purposes of sampling, gauging, etc.*

b *The combined water throughput rate for EPNs: 1e-05-WVF-CV, 1f-05-WVT-CV, 1g-05-WST-CV, & 1h-05-WST-CV will not exceed 15,000 barrels per year. Emission totals for these sources are presented as EPN: CAP001.*

c *Routine emission limits for this source account for vapors from the oil storage tanks (EPNs: 1a-05-GBT-CV through 1d-05-OST-CV) and assist gas. This source may also combust gas from the facility's pressure release system on an emergency and non-routine basis.*

d *Routine emission limits for this source account for purge gas. This source may also combust gas from the facility's pressure release system on an emergency and non-routine basis.*

MDEQ NOTICE OF INTENT FOR COVERAGE UNDER THE OIL PRODUCTION GENERAL PERMIT TO CONSTRUCT/OPERATE AIR EMISSIONS EQUIPMENT AT A SYNTHETIC MINOR SOURCE

Tank Summary | Section OPGP-E

1. Emission Point Description

A. Emission Point Designation (Ref. No.): AA-002 [1a-05-GBT-CV (ABJ-111)]

B. Product(s) Stored: Produced Oil

C. Status: ☒ Operating ☐ Proposed ☐ Under Construction

D. Date of construction, reconstruction, or most recent modification (for existing sources) or date of anticipated construction: 2005

2. Tank Data

A. Tank Specifications:

1.	Design capacity	210,000	gallons		
2.	True vapor pressure at storage temperature:	2.700	psia @	70.05	ºF
3.	Maximum true vapor pressure (as defined in §60.111b)	3.184	psia @	78.55	ºF
4.	Reid vapor pressure at storage temperature:	4.12	psia @	70.05	ºF
5.	Density of product at storage temperature:	N/A	lb/gal		
6.	Molecular weight of product vapor at storage temp.	50	lb/lbmol		

B. Tank Orientation: ☒ Vertical ☐ Horizontal

C. Type of Tank:

☒ Fixed Roof ☐ External Floating Roof ☐ Internal Floating Roof

☐ Pressure ☐ Variable Vapor Space ☐ Other: _____

D. Is the tank equipped with a Vapor Recovery System and/or flare? ☒ Yes ☐ No

If yes, describe below and include the efficiency of each.

Vapors from these sources are routed to the control flare (EPN: 3a-05-F) for combustion with a combustion efficiency of 98%.

E. Closest City:

☐ Jackson, MS ☒ Meridian, MS ☐ Tupelo, MS ☐ Mobile, AL

☐ New Orleans, LA ☐ Memphis, TN ☐ Baton Rouge, LA

F. Is an E&P or similar report described in Condition 5.4(5) of the General Permit included for this tank in the Notice of Intent? ☒ Yes ☐ No

MDEQ NOTICE OF INTENT FOR COVERAGE UNDER THE OIL PRODUCTION GENERAL PERMIT TO CONSTRUCT/OPERATE AIR EMISSIONS EQUIPMENT AT A SYNTHETIC MINOR SOURCE

Tank Summary — Section OPGP-E

3. Horizontal Fixed Roof Tank

A. Shell Length: _____ feet
B. Shell Diameter: _____ feet
C. Working Volume: _____ gal
D. Maximum Throughput: _____ gal/yr
E. Is the tank heated? ☐ Yes ☐ No
F. Is the tank underground? ☐ Yes ☐ No
G. Shell Color/Shade:
☐ ☐ Aluminum/Specular ☐ Aluminum/Diffuse
☐ Gray/Light ☐ Gray/Medium ☐ Red/Primer
H. Shell Condition: ☐ Good ☐ Poor

4. Vertical Fixed Roof Tank

A. Dimensions:
1. Shell Height: 24.00 feet
2. Shell Diameter: 38.67 feet
3. Maximum Liquid Height: 23.00 feet
4. Average Liquid Height: 11.50 feet
5. Working Volume: 210,000 gal
6. Turnovers per year: 151.72
7. Maximum throughput: 730,000 BBLs/yr
8. Is the tank heated? ☐ Yes ☒ No

B. Shell Characteristics:
1. Shell Color/Shade:
☐ White/White ☐ Aluminum/Specular ☒ Aluminum/Diffuse
☐ Gray/Light ☐ Gray/Medium ☐ Red/Primer
2. Shell Condition: ☒ Good ☐ Poor

C. Roof Characteristics:
1. Roof Color/Shade:
☐ White/White ☐ Aluminum/Specular ☒ Aluminum/Diffuse
☐ Gray/Light ☐ Gray/Medium ☐ Red/Primer
2. Roof Condition: ☒ Good ☐ Poor
3. Type: ☒ Cone ☐ Dome
4. Height: 1.21 feet

MDEQ NOTICE OF INTENT FOR COVERAGE UNDER THE OIL PRODUCTION GENERAL PERMIT TO CONSTRUCT/OPERATE AIR EMISSIONS EQUIPMENT AT A SYNTHETIC MINOR SOURCE

Tank Summary — Section OPGP-E

5. Internal Floating Roof Tank

A. Tank Characteristics:

1. Diameter: _____ feet
2. Tank Volume: _____ gal
3. Turnovers per year: _____
4. Maximum Throughput: _____ gal/yr
5. Number of Columns: _____
6. Self-Supporting Roof? ☐ Yes ☐ No
7. Effective Column Diameter:
   ☐ 9"x7" Built-up Column ☐ 8" Diameter Pipe ☐ Unknown
8. Internal Shell Condition:
   ☐ Light Rust ☐ Dense Rust ☐ Gunite Lining
9. External Shell Color/Shade:
   ☐ White/White ☐ Aluminum/Specular ☐ Aluminum/Diffuse
   ☐ Gray/Light ☐ Gray/Medium ☐ Red/Primer
10. External Shell Condition: ☐ Good ☐ Poor
11. Roof Color/Shade:
    ☐ White/White ☐ Aluminum/Specular ☐ Aluminum/Diffuse
    ☐ Gray/Light ☐ Gray/Medium ☐ Red/Primer
12. Roof Condition: ☐ Good ☐ Poor

B. Rim Seal System:

1. Primary Seal: ☐ Mechanical Shoe ☐ Liquid-mounted ☐ Vapor-mounted
2. Secondary Seal: ☐ Shoe-mounted ☐ Rim-mounted ☐ None

C. Deck Characteristics:

1. Deck Type: ☐ Bolted ☐ Welded
2. Deck Fitting Category: ☐ Typical ☐ Detail

6. External Floating Roof Tank

A. Tank Characteristics

1. Diameter: _____ feet
2. Tank Volume: _____ gal
3. Turnovers per year: _____
4. Maximum Throughput: _____ gal/yr
5. Internal Shell Condition:
   ☐ Light Rust ☐ Dense Rust ☐ Gunite Lining

MDEQ NOTICE OF INTENT FOR COVERAGE UNDER THE OIL PRODUCTION GENERAL PERMIT TO CONSTRUCT/OPERATE AIR EMISSIONS EQUIPMENT AT A SYNTHETIC MINOR SOURCE

Tank Summary | Section OPGP-E

6. External Floating Roof Tank (continued)

A. Tank Characteristics (continued):

6. Paint Color/Shade:

☐ White/White ☐ Aluminum/Specular ☐ Aluminum/Diffuse

☐ Gray/Light ☐ Gray/Medium ☐ Red/Primer

7. Paint Condition: ☐ Good ☐ Poor

B. Roof Characteristics

1. Roof Type: ☐ Pontoon ☐ Double Deck

2. Roof Fitting Category: ☐ Typical ☐ Detail

C. Tank Construction and Rim-Seal System:

1. Tank Construction: ☐ Welded ☐ Riveted

2. Primary Seal:

☐ Mechanical Shoe ☐ Liquid-mounted ☐ Vapor-mounted

3. Secondary Seal

☐ None ☐ Shoe-mounted ☐ Rim-mounted ☐ Weather shield

7. Pollutant Emissions

A. Fixed Roof Emissions:

Pollutant[1]	Working Loss (tons/yr)	Breathing Loss (tons/yr)	Total Emissions (tons/yr)
VOC	36.29*	3.24*	39.53*

**It should be noted that the emissions listed above represent the fixed roof emissions prior to emissions being routed to the control flare for combustion.*

B. Floating Roof Emissions:

Pollutant[1]	Rim Seal Loss (tons/yr)	Withdrawal Loss (tons/yr)	Deck Fitting Loss (tons/yr)	Deck Seam Loss (tons/yr)	Landing Loss[2] (tons/yr)	Total Emissions (tons/yr)

1. All regulated air pollutants including hazardous air pollutants emitted from this source should be listed in accordance with the OGP Application Instructions. A list of regulated air pollutants and a link to EPA's list of hazardous air pollutants is provided in the OGP Application Instructions.
2. Landing losses should be determined according to the procedures in *Organic Liquid Storage Tanks* chapter of EPA's AP-42 emission factors. If the roof is not landed at least once/yr, enter "NA".

MDEQ NOTICE OF INTENT FOR COVERAGE UNDER THE OIL PRODUCTION GENERAL PERMIT TO CONSTRUCT/OPERATE AIR EMISSIONS EQUIPMENT AT A SYNTHETIC MINOR SOURCE

Tank Summary | Section OPGP-E

1. Emission Point Description

A. Emission Point Designation (Ref. No.): AA-003 [1b-05-OST-CV (BBJ-118)]

B. Product(s) Stored: Produced Oil

C. Status: ☒ Operating ☐ Proposed ☐ Under Construction

D. Date of construction, reconstruction, or most recent modification (for existing sources) or date of anticipated construction: 2005

2. Tank Data

A. Tank Specifications:

1.	Design capacity	63,000	gallons		
2.	True vapor pressure at storage temperature:	2.677	psia @	69.62	ºF
3.	Maximum true vapor pressure (as defined in §60.111b)	3.159	psia @	78.12	ºF
4.	Reid vapor pressure at storage temperature:	4.12	psia @	69.62	ºF
5.	Density of product at storage temperature:	N/A	lb/gal		
6.	Molecular weight of product vapor at storage temp.	50	lb/lbmol		

B. Tank Orientation: ☒ Vertical ☐ Horizontal

C. Type of Tank:

☒ Fixed Roof ☐ External Floating Roof ☐ Internal Floating Roof

☐ Pressure ☐ Variable Vapor Space ☐ Other: _____

D. Is the tank equipped with a Vapor Recovery System and/or flare? ☒ Yes ☐ No

If yes, describe below and include the efficiency of each.

Vapors from these sources are routed to the control flare (EPN: 3a-05-F) for combustion with a combustion efficiency of 98%.

E. Closest City:

☐ Jackson, MS ☒ Meridian, MS ☐ Tupelo, MS ☐ Mobile, AL

☐ New Orleans, LA ☐ Memphis, TN ☐ Baton Rouge, LA

F. Is an E&P or similar report described in Condition 5.4(5) of the General Permit included for this tank in the Notice of Intent? ☒ Yes ☐ No

MDEQ NOTICE OF INTENT FOR COVERAGE UNDER THE OIL PRODUCTION GENERAL PERMIT TO CONSTRUCT/OPERATE AIR EMISSIONS EQUIPMENT AT A SYNTHETIC MINOR SOURCE

Tank Summary | Section OPGP-E

3. Horizontal Fixed Roof Tank

A. Shell Length: _____ feet
B. Shell Diameter: _____ feet
C. Working Volume: _____ gal
D. Maximum Throughput: _____ gal/yr
E. Is the tank heated? ☐ Yes ☐ No
F. Is the tank underground? ☐ Yes ☐ No
G. Shell Color/Shade:
☐ ☐ Aluminum/Specular ☐ Aluminum/Diffuse
☐ Gray/Light ☐ Gray/Medium ☐ Red/Primer
H. Shell Condition: ☐ Good ☐ Poor

4. Vertical Fixed Roof Tank

A. Dimensions:
1. Shell Height: 24.00 feet
2. Shell Diameter: 21.50 feet
3. Maximum Liquid Height: 23.00 feet
4. Average Liquid Height: 11.50 feet
5. Working Volume: 63,000 gal
6. Turnovers per year: 494.48
7. Maximum throughput: 735,475 BBLs/yr
8. Is the tank heated? ☐ Yes ☒ No

B. Shell Characteristics:
1. Shell Color/Shade:
☐ White/White ☐ Aluminum/Specular ☒ Aluminum/Diffuse
☐ Gray/Light ☐ Gray/Medium ☐ Red/Primer
2. Shell Condition: ☒ Good ☐ Poor

C. Roof Characteristics:
1. Roof Color/Shade:
☐ White/White ☐ Aluminum/Specular ☒ Aluminum/Diffuse
☐ Gray/Light ☐ Gray/Medium ☐ Red/Primer
2. Roof Condition: ☒ Good ☐ Poor
3. Type: ☒ Cone ☐ Dome
4. Height: 0.67 feet

MDEQ NOTICE OF INTENT FOR COVERAGE UNDER THE OIL PRODUCTION GENERAL PERMIT TO CONSTRUCT/OPERATE AIR EMISSIONS EQUIPMENT AT A SYNTHETIC MINOR SOURCE

Tank Summary — Section OPGP-E

5. Internal Floating Roof Tank

A. Tank Characteristics:

1. Diameter: _____ feet
2. Tank Volume: _____ gal
3. Turnovers per year: _____
4. Maximum Throughput: _____ gal/yr
5. Number of Columns: _____
6. Self-Supporting Roof? ☐ Yes ☐ No
7. Effective Column Diameter:
   ☐ 9"x7" Built-up Column ☐ 8" Diameter Pipe ☐ Unknown
8. Internal Shell Condition:
   ☐ Light Rust ☐ Dense Rust ☐ Gunite Lining
9. External Shell Color/Shade:
   ☐ White/White ☐ Aluminum/Specular ☐ Aluminum/Diffuse
   ☐ Gray/Light ☐ Gray/Medium ☐ Red/Primer
10. External Shell Condition: ☐ Good ☐ Poor
11. Roof Color/Shade:
    ☐ White/White ☐ Aluminum/Specular ☐ Aluminum/Diffuse
    ☐ Gray/Light ☐ Gray/Medium ☐ Red/Primer
12. Roof Condition: ☐ Good ☐ Poor

B. Rim Seal System:

1. Primary Seal: ☐ Mechanical Shoe ☐ Liquid-mounted ☐ Vapor-mounted
2. Secondary Seal: ☐ Shoe-mounted ☐ Rim-mounted ☐ None

C. Deck Characteristics:

1. Deck Type: ☐ Bolted ☐ Welded
2. Deck Fitting Category: ☐ Typical ☐ Detail

6. External Floating Roof Tank

A. Tank Characteristics

1. Diameter: _____ feet
2. Tank Volume: _____ gal
3. Turnovers per year: _____
4. Maximum Throughput: _____ gal/yr
5. Internal Shell Condition:
   ☐ Light Rust ☐ Dense Rust ☐ Gunite Lining

MDEQ NOTICE OF INTENT FOR COVERAGE UNDER THE OIL PRODUCTION GENERAL PERMIT TO CONSTRUCT/OPERATE AIR EMISSIONS EQUIPMENT AT A SYNTHETIC MINOR SOURCE

Tank Summary | Section OPGP-E

6. External Floating Roof Tank (continued)

A. Tank Characteristics (continued):

6. Paint Color/Shade:
☐ White/White ☐ Aluminum/Specular ☐ Aluminum/Diffuse
☐ Gray/Light ☐ Gray/Medium ☐ Red/Primer

7. Paint Condition: ☐ Good ☐ Poor

B. Roof Characteristics

1. Roof Type: ☐ Pontoon ☐ Double Deck

2. Roof Fitting Category: ☐ Typical ☐ Detail

C. Tank Construction and Rim-Seal System:

1. Tank Construction: ☐ Welded ☐ Riveted

2. Primary Seal:
☐ Mechanical Shoe ☐ Liquid-mounted ☐ Vapor-mounted

3. Secondary Seal
☐ None ☐ Shoe-mounted ☐ Rim-mounted ☐ Weather shield

7. Pollutant Emissions

A. Fixed Roof Emissions:

Pollutant[1]	Working Loss (tons/yr)	Breathing Loss (tons/yr)	Total Emissions (tons/yr)
VOC	8.26*	0.99*	9.25*

**It should be noted that the emissions listed above represent the fixed roof emissions prior to emissions being routed to the control flare for combustion.*

B. Floating Roof Emissions:

Pollutant[1]	Rim Seal Loss (tons/yr)	Withdrawal Loss (tons/yr)	Deck Fitting Loss (tons/yr)	Deck Seam Loss (tons/yr)	Landing Loss[2] (tons/yr)	Total Emissions (tons/yr)

1. All regulated air pollutants including hazardous air pollutants emitted from this source should be listed in accordance with the OGP Application Instructions. A list of regulated air pollutants and a link to EPA's list of hazardous air pollutants is provided in the OGP Application Instructions.
2. Landing losses should be determined according to the procedures in *Organic Liquid Storage Tanks* chapter of EPA's AP-42 emission factors. If the roof is not landed at least once/yr, enter "NA".

MDEQ NOTICE OF INTENT FOR COVERAGE UNDER THE OIL PRODUCTION GENERAL PERMIT TO CONSTRUCT/OPERATE AIR EMISSIONS EQUIPMENT AT A SYNTHETIC MINOR SOURCE

Tank Summary | Section OPGP-E

1. Emission Point Description

A. Emission Point Designation (Ref. No.): AA-004 & AA-005 [1c-05-OST-CV & 1d-05-OST-CV (ABJ-119A & ABJ-119B)]

B. Product(s) Stored: Produced Oil

C. Status: ☒ Operating ☐ Proposed ☐ Under Construction

D. Date of construction, reconstruction, or most recent modification (for existing sources) or date of anticipated construction: 2005

2. Tank Data

A. Tank Specifications:

1.	Design capacity	84,000	gallons		
2.	True vapor pressure at storage temperature:	2.705	psia @	70.15	ºF
3.	Maximum true vapor pressure (as defined in §60.111b)	3.191	psia @	78.65	ºF
4.	Reid vapor pressure at storage temperature:	4.12	psia @	70.15	ºF
5.	Density of product at storage temperature:	N/A	lb/gal		
6.	Molecular weight of product vapor at storage temp.	50	lb/lbmol		

B. Tank Orientation: ☒ Vertical ☐ Horizontal

C. Type of Tank:

☒ Fixed Roof ☐ External Floating Roof ☐ Internal Floating Roof

☐ Pressure ☐ Variable Vapor Space ☐ Other: _____

D. Is the tank equipped with a Vapor Recovery System and/or flare? ☒ Yes ☐ No

If yes, describe below and include the efficiency of each.

Vapors from these sources are routed to the control flare (EPN: 3a-05-F) for combustion with a combustion efficiency of 98%.

E. Closest City:

☐ Jackson, MS ☒ Meridian, MS ☐ Tupelo, MS ☐ Mobile, AL

☐ New Orleans, LA ☐ Memphis, TN ☐ Baton Rouge, LA

F. Is an E&P or similar report described in Condition 5.4(5) of the General Permit included for this tank in the Notice of Intent? ☒ Yes ☐ No

MDEQ NOTICE OF INTENT FOR COVERAGE UNDER THE OIL PRODUCTION GENERAL PERMIT TO CONSTRUCT/OPERATE AIR EMISSIONS EQUIPMENT AT A SYNTHETIC MINOR SOURCE

Tank Summary — Section OPGP-E

3. Horizontal Fixed Roof Tank

A. Shell Length: _____ feet
B. Shell Diameter: _____ feet
C. Working Volume: _____ gal
D. Maximum Throughput: _____ gal/yr
E. Is the tank heated? ☐ Yes ☐ No
F. Is the tank underground? ☐ Yes ☐ No
G. Shell Color/Shade:
☐ ☐ Aluminum/Specular ☐ Aluminum/Diffuse
☐ Gray/Light ☐ Gray/Medium ☐ Red/Primer
H. Shell Condition: ☐ Good ☐ Poor

4. Vertical Fixed Roof Tank

A. Dimensions:
1. Shell Height: 16.00 feet
2. Shell Diameter: 29.75 feet
3. Maximum Liquid Height: 15.00 feet
4. Average Liquid Height: 7.50 feet
5. Working Volume: 84,000 gal
6. Turnovers per year: 198.00
7. Maximum throughput: 367,737.50 BBLs/yr
8. Is the tank heated? ☐ Yes ☒ No

B. Shell Characteristics:
1. Shell Color/Shade:
☐ White/White ☐ Aluminum/Specular ☒ Aluminum/Diffuse
☐ Gray/Light ☐ Gray/Medium ☐ Red/Primer
2. Shell Condition: ☒ Good ☐ Poor

C. Roof Characteristics:
1. Roof Color/Shade:
☐ White/White ☐ Aluminum/Specular ☒ Aluminum/Diffuse
☐ Gray/Light ☐ Gray/Medium ☐ Red/Primer
2. Roof Condition: ☒ Good ☐ Poor
3. Type: ☒ Cone ☐ Dome
4. Height: 0.93 feet

MDEQ NOTICE OF INTENT FOR COVERAGE UNDER THE OIL PRODUCTION GENERAL PERMIT TO CONSTRUCT/OPERATE AIR EMISSIONS EQUIPMENT AT A SYNTHETIC MINOR SOURCE

Tank Summary | Section OPGP-E

5. Internal Floating Roof Tank

A. Tank Characteristics:

1. Diameter: _____ feet
2. Tank Volume: _____ gal
3. Turnovers per year: _____
4. Maximum Throughput: _____ gal/yr
5. Number of Columns: _____
6. Self-Supporting Roof? ☐ Yes ☐ No
7. Effective Column Diameter:
   ☐ 9"x7" Built-up Column ☐ 8" Diameter Pipe ☐ Unknown
8. Internal Shell Condition:
   ☐ Light Rust ☐ Dense Rust ☐ Gunite Lining
9. External Shell Color/Shade:
   ☐ White/White ☐ Aluminum/Specular ☐ Aluminum/Diffuse
   ☐ Gray/Light ☐ Gray/Medium ☐ Red/Primer
10. External Shell Condition: ☐ Good ☐ Poor
11. Roof Color/Shade:
    ☐ White/White ☐ Aluminum/Specular ☐ Aluminum/Diffuse
    ☐ Gray/Light ☐ Gray/Medium ☐ Red/Primer
12. Roof Condition: ☐ Good ☐ Poor

B. Rim Seal System:

1. Primary Seal: ☐ Mechanical Shoe ☐ Liquid-mounted ☐ Vapor-mounted
2. Secondary Seal: ☐ Shoe-mounted ☐ Rim-mounted ☐ None

C. Deck Characteristics:

1. Deck Type: ☐ Bolted ☐ Welded
2. Deck Fitting Category: ☐ Typical ☐ Detail

6. External Floating Roof Tank

A. Tank Characteristics

1. Diameter: _____ feet
2. Tank Volume: _____ gal
3. Turnovers per year: _____
4. Maximum Throughput: _____ gal/yr
5. Internal Shell Condition:
   ☐ Light Rust ☐ Dense Rust ☐ Gunite Lining

MDEQ NOTICE OF INTENT FOR COVERAGE UNDER THE OIL PRODUCTION GENERAL PERMIT TO CONSTRUCT/OPERATE AIR EMISSIONS EQUIPMENT AT A SYNTHETIC MINOR SOURCE

Tank Summary | Section OPGP-E

6. External Floating Roof Tank (continued)

A. Tank Characteristics (continued):

6. Paint Color/Shade:
☐ White/White ☐ Aluminum/Specular ☐ Aluminum/Diffuse
☐ Gray/Light ☐ Gray/Medium ☐ Red/Primer

7. Paint Condition: ☐ Good ☐ Poor

B. Roof Characteristics

1. Roof Type: ☐ Pontoon ☐ Double Deck

2. Roof Fitting Category: ☐ Typical ☐ Detail

C. Tank Construction and Rim-Seal System:

1. Tank Construction: ☐ Welded ☐ Riveted

2. Primary Seal:
☐ Mechanical Shoe ☐ Liquid-mounted ☐ Vapor-mounted

3. Secondary Seal
☐ None ☐ Shoe-mounted ☐ Rim-mounted ☐ Weather shield

7. Pollutant Emissions

A. Fixed Roof Emissions:

Pollutant[1]	Working Loss (tons/yr)	Breathing Loss (tons/yr)	Total Emissions (tons/yr)
VOC	5.83*	1.65*	7.48*

**It should be noted that the emissions listed above represent the fixed roof emissions prior to emissions being routed to the control flare for combustion.*

B. Floating Roof Emissions:

Pollutant[1]	Rim Seal Loss (tons/yr)	Withdrawal Loss (tons/yr)	Deck Fitting Loss (tons/yr)	Deck Seam Loss (tons/yr)	Landing Loss[2] (tons/yr)	Total Emissions (tons/yr)

1. All regulated air pollutants including hazardous air pollutants emitted from this source should be listed in accordance with the OGP Application Instructions. A list of regulated air pollutants and a link to EPA's list of hazardous air pollutants is provided in the OGP Application Instructions.
2. Landing losses should be determined according to the procedures in *Organic Liquid Storage Tanks* chapter of EPA's AP-42 emission factors. If the roof is not landed at least once/yr, enter "NA".

MDEQ NOTICE OF INTENT FOR COVERAGE UNDER THE OIL PRODUCTION GENERAL PERMIT TO CONSTRUCT/OPERATE AIR EMISSIONS EQUIPMENT AT A SYNTHETIC MINOR SOURCE

Tank Summary | Section OPGP-E

1. Emission Point Description

A. Emission Point Designation (Ref. No.): AA-001 [1e-05-WVF-CV (ABM-122)]

B. Product(s) Stored: Produced Water & Condensate

C. Status: ☒ Operating ☐ Proposed ☐ Under Construction

D. Date of construction, reconstruction, or most recent modification (for existing sources) or date of anticipated construction: 2005

2. Tank Data

A. Tank Specifications:

1.	Design capacity	1,000	gallons		
2.	True vapor pressure at storage temperature:	0.347	psia @	68.46	ºF
3.	Maximum true vapor pressure (as defined in §60.111b)	0.462	psia @	76.97	ºF
4.	Reid vapor pressure at storage temperature:	4.12	psia @	68.46	ºF
5.	Density of product at storage temperature:	N/A	lb/gal		
6.	Molecular weight of product vapor at storage temp.	18.26	lb/lbmol		

B. Tank Orientation: ☒ Vertical ☐ Horizontal

C. Type of Tank:

☒ Fixed Roof ☐ External Floating Roof ☐ Internal Floating Roof

☐ Pressure ☐ Variable Vapor Space ☐ Other: _____

D. Is the tank equipped with a Vapor Recovery System and/or flare? ☐ Yes ☒ No

If yes, describe below and include the efficiency of each.

E. Closest City:

☐ Jackson, MS ☒ Meridian, MS ☐ Tupelo, MS ☐ Mobile, AL

☐ New Orleans, LA ☐ Memphis, TN ☐ Baton Rouge, LA

F. Is an E&P or similar report described in Condition 5.4(5) of the General Permit included for this tank in the Notice of Intent? ☐ Yes ☒ No

MDEQ NOTICE OF INTENT FOR COVERAGE UNDER THE OIL PRODUCTION GENERAL PERMIT TO CONSTRUCT/OPERATE AIR EMISSIONS EQUIPMENT AT A SYNTHETIC MINOR SOURCE

Tank Summary | Section OPGP-E

3. Horizontal Fixed Roof Tank

A. Shell Length: _____ feet
B. Shell Diameter: _____ feet
C. Working Volume: _____ gal
D. Maximum Throughput: _____ gal/yr
E. Is the tank heated? ☐ Yes ☐ No
F. Is the tank underground? ☐ Yes ☐ No
G. Shell Color/Shade:
☐ ☐ Aluminum/Specular ☐ Aluminum/Diffuse
☐ Gray/Light ☐ Gray/Medium ☐ Red/Primer
H. Shell Condition: ☐ Good ☐ Poor

4. Vertical Fixed Roof Tank

A. Dimensions:
1. Shell Height: 42.5 feet
2. Shell Diameter: 2.0 feet
3. Maximum Liquid Height: 41.5 feet
4. Average Liquid Height: 20.75 feet
5. Working Volume: 1,000 gal
6. Turnovers per year: 235,989.48
7. Maximum throughput: 5,480,470 BBLs/yr
8. Is the tank heated? ☐ Yes ☒ No

B. Shell Characteristics:
1. Shell Color/Shade:
☐ White/White ☐ Aluminum/Specular ☒ Aluminum/Diffuse
☐ Gray/Light ☐ Gray/Medium ☐ Red/Primer
2. Shell Condition: ☒ Good ☐ Poor

C. Roof Characteristics:
1. Roof Color/Shade:
☐ White/White ☐ Aluminum/Specular ☒ Aluminum/Diffuse
☐ Gray/Light ☐ Gray/Medium ☐ Red/Primer
2. Roof Condition: ☒ Good ☐ Poor
3. Type: ☒ Cone ☐ Dome
4. Height: 0.06 feet

MDEQ NOTICE OF INTENT FOR COVERAGE UNDER THE OIL PRODUCTION GENERAL PERMIT TO CONSTRUCT/OPERATE AIR EMISSIONS EQUIPMENT AT A SYNTHETIC MINOR SOURCE

Tank Summary | Section OPGP-E

5. Internal Floating Roof Tank

A. Tank Characteristics:

1. Diameter: _____ feet
2. Tank Volume: _____ gal
3. Turnovers per year: _____
4. Maximum Throughput: _____ gal/yr
5. Number of Columns: _____
6. Self-Supporting Roof? ☐ Yes ☐ No
7. Effective Column Diameter:
   ☐ 9"x7" Built-up Column ☐ 8" Diameter Pipe ☐ Unknown
8. Internal Shell Condition:
   ☐ Light Rust ☐ Dense Rust ☐ Gunite Lining
9. External Shell Color/Shade:
   ☐ White/White ☐ Aluminum/Specular ☐ Aluminum/Diffuse
   ☐ Gray/Light ☐ Gray/Medium ☐ Red/Primer
10. External Shell Condition: ☐ Good ☐ Poor
11. Roof Color/Shade:
    ☐ White/White ☐ Aluminum/Specular ☐ Aluminum/Diffuse
    ☐ Gray/Light ☐ Gray/Medium ☐ Red/Primer
12. Roof Condition: ☐ Good ☐ Poor

B. Rim Seal System:

1. Primary Seal: ☐ Mechanical Shoe ☐ Liquid-mounted ☐ Vapor-mounted
2. Secondary Seal: ☐ Shoe-mounted ☐ Rim-mounted ☐ None

C. Deck Characteristics:

1. Deck Type: ☐ Bolted ☐ Welded
2. Deck Fitting Category: ☐ Typical ☐ Detail

6. External Floating Roof Tank

A. Tank Characteristics

1. Diameter: _____ feet
2. Tank Volume: _____ gal
3. Turnovers per year: _____
4. Maximum Throughput: _____ gal/yr
5. Internal Shell Condition:
   ☐ Light Rust ☐ Dense Rust ☐ Gunite Lining

MDEQ NOTICE OF INTENT FOR COVERAGE UNDER THE OIL PRODUCTION GENERAL PERMIT TO CONSTRUCT/OPERATE AIR EMISSIONS EQUIPMENT AT A SYNTHETIC MINOR SOURCE

Tank Summary | Section OPGP-E

6. External Floating Roof Tank (continued)

A. Tank Characteristics (continued):

6. Paint Color/Shade:

☐ White/White ☐ Aluminum/Specular ☐ Aluminum/Diffuse

☐ Gray/Light ☐ Gray/Medium ☐ Red/Primer

7. Paint Condition: ☐ Good ☐ Poor

B. Roof Characteristics

1. Roof Type: ☐ Pontoon ☐ Double Deck

2. Roof Fitting Category: ☐ Typical ☐ Detail

C. Tank Construction and Rim-Seal System:

1. Tank Construction: ☐ Welded ☐ Riveted

2. Primary Seal:

☐ Mechanical Shoe ☐ Liquid-mounted ☐ Vapor-mounted

3. Secondary Seal

☐ None ☐ Shoe-mounted ☐ Rim-mounted ☐ Weather shield

7. Pollutant Emissions

A. Fixed Roof Emissions:

Pollutant[1]	Working Loss (tons/yr)	Breathing Loss (tons/yr)	Total Emissions (tons/yr)
VOC	N/A*	N/A*	N/A*

**It should be noted that emissions from this tank are calculated using a metered gas volume.*

B. Floating Roof Emissions:

Pollutant[1]	Rim Seal Loss (tons/yr)	Withdrawal Loss (tons/yr)	Deck Fitting Loss (tons/yr)	Deck Seam Loss (tons/yr)	Landing Loss[2] (tons/yr)	Total Emissions (tons/yr)

1. All regulated air pollutants including hazardous air pollutants emitted from this source should be listed in accordance with the OGP Application Instructions. A list of regulated air pollutants and a link to EPA's list of hazardous air pollutants is provided in the OGP Application Instructions.
2. Landing losses should be determined according to the procedures in *Organic Liquid Storage Tanks* chapter of EPA's AP-42 emission factors. If the roof is not landed at least once/yr, enter "NA".

MDEQ NOTICE OF INTENT FOR COVERAGE UNDER THE OIL PRODUCTION GENERAL PERMIT TO CONSTRUCT/OPERATE AIR EMISSIONS EQUIPMENT AT A SYNTHETIC MINOR SOURCE

Tank Summary | Section OPGP-E

1. Emission Point Description

A. Emission Point Designation (Ref. No.): AA-006 [1f-05-WVT-CV (ABM-120)]

B. Product(s) Stored: Produced Water

C. Status: ☒ Operating ☐ Proposed ☐ Under Construction

D. Date of construction, reconstruction, or most recent modification (for existing sources) or date of anticipated construction: 2005

2. Tank Data

A. Tank Specifications:

1.	Design capacity	420,000	gallons		
2.	True vapor pressure at storage temperature:	0.363	psia @	69.99	ºF
3.	Maximum true vapor pressure (as defined in §60.111b)	0.483	psia @	78.49	ºF
4.	Reid vapor pressure at storage temperature:	0.363	psia @	69.99	ºF
5.	Density of product at storage temperature:	N/A	lb/gal		
6.	Molecular weight of product vapor at storage temp.	18.02	lb/lbmol		

B. Tank Orientation: ☒ Vertical ☐ Horizontal

C. Type of Tank:

☒ Fixed Roof ☐ External Floating Roof ☐ Internal Floating Roof

☐ Pressure ☐ Variable Vapor Space ☐ Other: _____

D. Is the tank equipped with a Vapor Recovery System and/or flare? ☐ Yes ☒ No

If yes, describe below and include the efficiency of each.

E. Closest City:

☐ Jackson, MS ☒ Meridian, MS ☐ Tupelo, MS ☐ Mobile, AL

☐ New Orleans, LA ☐ Memphis, TN ☐ Baton Rouge, LA

F. Is an E&P or similar report described in Condition 5.4(5) of the General Permit included for this tank in the Notice of Intent? ☒ Yes ☐ No

MDEQ NOTICE OF INTENT FOR COVERAGE UNDER THE OIL PRODUCTION GENERAL PERMIT TO CONSTRUCT/OPERATE AIR EMISSIONS EQUIPMENT AT A SYNTHETIC MINOR SOURCE

Tank Summary | Section OPGP-E

3. Horizontal Fixed Roof Tank

A. Shell Length: _____ feet
B. Shell Diameter: _____ feet
C. Working Volume: _____ gal
D. Maximum Throughput: _____ gal/yr
E. Is the tank heated? ☐ Yes ☐ No
F. Is the tank underground? ☐ Yes ☐ No
G. Shell Color/Shade:
☐ ☐ Aluminum/Specular ☐ Aluminum/Diffuse
☐ Gray/Light ☐ Gray/Medium ☐ Red/Primer
H. Shell Condition: ☐ Good ☐ Poor

4. Vertical Fixed Roof Tank

A. Dimensions:
1. Shell Height: 32.00 feet
2. Shell Diameter: 47.50 feet
3. Maximum Liquid Height: 31.00 feet
4. Average Liquid Height: 15.50 feet
5. Working Volume: 420,000 gal
6. Turnovers per year: 559.52
7. Maximum throughput: 5,475,000 BBLs/yr
8. Is the tank heated? ☐ Yes ☒ No

B. Shell Characteristics:
1. Shell Color/Shade:
☐ White/White ☐ Aluminum/Specular ☒ Aluminum/Diffuse
☐ Gray/Light ☐ Gray/Medium ☐ Red/Primer
2. Shell Condition: ☒ Good ☐ Poor

C. Roof Characteristics:
1. Roof Color/Shade:
☐ White/White ☐ Aluminum/Specular ☒ Aluminum/Diffuse
☐ Gray/Light ☐ Gray/Medium ☐ Red/Primer
2. Roof Condition: ☒ Good ☐ Poor
3. Type: ☒ Cone ☐ Dome
4. Height: 1.48 feet

MDEQ NOTICE OF INTENT FOR COVERAGE UNDER THE OIL PRODUCTION GENERAL PERMIT TO CONSTRUCT/OPERATE AIR EMISSIONS EQUIPMENT AT A SYNTHETIC MINOR SOURCE

Tank Summary | Section OPGP-E

5. Internal Floating Roof Tank

A. Tank Characteristics:

1. Diameter: _____ feet
2. Tank Volume: _____ gal
3. Turnovers per year: _____
4. Maximum Throughput: _____ gal/yr
5. Number of Columns: _____
6. Self-Supporting Roof? ☐ Yes ☐ No
7. Effective Column Diameter:
   ☐ 9"x7" Built-up Column ☐ 8" Diameter Pipe ☐ Unknown
8. Internal Shell Condition:
   ☐ Light Rust ☐ Dense Rust ☐ Gunite Lining
9. External Shell Color/Shade:
   ☐ White/White ☐ Aluminum/Specular ☐ Aluminum/Diffuse
   ☐ Gray/Light ☐ Gray/Medium ☐ Red/Primer
10. External Shell Condition: ☐ Good ☐ Poor
11. Roof Color/Shade:
    ☐ White/White ☐ Aluminum/Specular ☐ Aluminum/Diffuse
    ☐ Gray/Light ☐ Gray/Medium ☐ Red/Primer
12. Roof Condition: ☐ Good ☐ Poor

B. Rim Seal System:

1. Primary Seal: ☐ Mechanical Shoe ☐ Liquid-mounted ☐ Vapor-mounted
2. Secondary Seal: ☐ Shoe-mounted ☐ Rim-mounted ☐ None

C. Deck Characteristics:

1. Deck Type: ☐ Bolted ☐ Welded
2. Deck Fitting Category: ☐ Typical ☐ Detail

6. External Floating Roof Tank

A. Tank Characteristics

1. Diameter: _____ feet
2. Tank Volume: _____ gal
3. Turnovers per year: _____
4. Maximum Throughput: _____ gal/yr
5. Internal Shell Condition:
   ☐ Light Rust ☐ Dense Rust ☐ Gunite Lining

MDEQ NOTICE OF INTENT FOR COVERAGE UNDER THE OIL PRODUCTION GENERAL PERMIT TO CONSTRUCT/OPERATE AIR EMISSIONS EQUIPMENT AT A SYNTHETIC MINOR SOURCE

Tank Summary | Section OPGP-E

6. External Floating Roof Tank (continued)

A. Tank Characteristics (continued):

6. Paint Color/Shade:

☐ White/White ☐ Aluminum/Specular ☐ Aluminum/Diffuse

☐ Gray/Light ☐ Gray/Medium ☐ Red/Primer

7. Paint Condition: ☐ Good ☐ Poor

B. Roof Characteristics

1. Roof Type: ☐ Pontoon ☐ Double Deck

2. Roof Fitting Category: ☐ Typical ☐ Detail

C. Tank Construction and Rim-Seal System:

1. Tank Construction: ☐ Welded ☐ Riveted

2. Primary Seal:

☐ Mechanical Shoe ☐ Liquid-mounted ☐ Vapor-mounted

3. Secondary Seal

☐ None ☐ Shoe-mounted ☐ Rim-mounted ☐ Weather shield

7. Pollutant Emissions

A. Fixed Roof Emissions:

Pollutant[1]	Working Loss (tons/yr)	Breathing Loss (tons/yr)	Total Emissions (tons/yr)
VOC	N/A*	N/A*	N/A*

**It should be noted that emissions from this tank are calculated using a metered gas volume.*

B. Floating Roof Emissions:

Pollutant[1]	Rim Seal Loss (tons/yr)	Withdrawal Loss (tons/yr)	Deck Fitting Loss (tons/yr)	Deck Seam Loss (tons/yr)	Landing Loss[2] (tons/yr)	Total Emissions (tons/yr)

1. All regulated air pollutants including hazardous air pollutants emitted from this source should be listed in accordance with the OGP Application Instructions. A list of regulated air pollutants and a link to EPA's list of hazardous air pollutants is provided in the OGP Application Instructions.
2. Landing losses should be determined according to the procedures in *Organic Liquid Storage Tanks* chapter of EPA's AP-42 emission factors. If the roof is not landed at least once/yr, enter "NA".

MDEQ NOTICE OF INTENT FOR COVERAGE UNDER THE OIL PRODUCTION GENERAL PERMIT TO CONSTRUCT/OPERATE AIR EMISSIONS EQUIPMENT AT A SYNTHETIC MINOR SOURCE

Tank Summary | Section OPGP-E

1. Emission Point Description

A. Emission Point Designation (Ref. No.): AA-007 & AA-008 [1g-05-WST-CV & 1h-05-WST-CV (ABJ-129A & ABJ-129B)]

B. Product(s) Stored: Produced Water

C. Status: ☒ Operating ☐ Proposed ☐ Under Construction

D. Date of construction, reconstruction, or most recent modification (for existing sources) or date of anticipated construction: 2005

2. Tank Data

A. Tank Specifications:

1.	Design capacity	210,000	gallons		
2.	True vapor pressure at storage temperature:	0.364	psia @	70.05	°F
3.	Maximum true vapor pressure (as defined in §60.111b)	0.484	psia @	78.55	°F
4.	Reid vapor pressure at storage temperature:	0.364	psia @	70.05	°F
5.	Density of product at storage temperature:	N/A	lb/gal		
6.	Molecular weight of product vapor at storage temp.	18.02	lb/lbmol		

B. Tank Orientation: ☒ Vertical ☐ Horizontal

C. Type of Tank:

☒ Fixed Roof ☐ External Floating Roof ☐ Internal Floating Roof

☐ Pressure ☐ Variable Vapor Space ☐ Other: _____

D. Is the tank equipped with a Vapor Recovery System and/or flare? ☐ Yes ☒ No

If yes, describe below and include the efficiency of each.

E. Closest City:

☐ Jackson, MS ☒ Meridian, MS ☐ Tupelo, MS ☐ Mobile, AL

☐ New Orleans, LA ☐ Memphis, TN ☐ Baton Rouge, LA

F. Is an E&P or similar report described in Condition 5.4(5) of the General Permit included for this tank in the Notice of Intent? ☐ Yes ☒ No

MDEQ NOTICE OF INTENT FOR COVERAGE UNDER THE OIL PRODUCTION GENERAL PERMIT TO CONSTRUCT/OPERATE AIR EMISSIONS EQUIPMENT AT A SYNTHETIC MINOR SOURCE

Tank Summary | Section OPGP-E

3. Horizontal Fixed Roof Tank

A. Shell Length: _____ feet
B. Shell Diameter: _____ feet
C. Working Volume: _____ gal
D. Maximum Throughput: _____ gal/yr
E. Is the tank heated? ☐ Yes ☐ No
F. Is the tank underground? ☐ Yes ☐ No
G. Shell Color/Shade:
☐ ☐ Aluminum/Specular ☐ Aluminum/Diffuse
☐ Gray/Light ☐ Gray/Medium ☐ Red/Primer
H. Shell Condition: ☐ Good ☐ Poor

4. Vertical Fixed Roof Tank

A. Dimensions:
1. Shell Height: 24.00 feet
2. Shell Diameter: 38.67 feet
3. Maximum Liquid Height: 23.00 feet
4. Average Liquid Height: 11.50 feet
5. Working Volume: 210,000 gal
6. Turnovers per year: 568.93
7. Maximum throughput: 2,737,500 BBLs/yr
8. Is the tank heated? ☐ Yes ☒ No

B. Shell Characteristics:
1. Shell Color/Shade:
☐ White/White ☐ Aluminum/Specular ☒ Aluminum/Diffuse
☐ Gray/Light ☐ Gray/Medium ☐ Red/Primer
2. Shell Condition: ☒ Good ☐ Poor

C. Roof Characteristics:
1. Roof Color/Shade:
☐ White/White ☐ Aluminum/Specular ☒ Aluminum/Diffuse
☐ Gray/Light ☐ Gray/Medium ☐ Red/Primer
2. Roof Condition: ☒ Good ☐ Poor
3. Type: ☒ Cone ☐ Dome
4. Height: 1.21 feet

MDEQ NOTICE OF INTENT FOR COVERAGE UNDER THE OIL PRODUCTION GENERAL PERMIT TO CONSTRUCT/OPERATE AIR EMISSIONS EQUIPMENT AT A SYNTHETIC MINOR SOURCE

Tank Summary | Section OPGP-E

5. Internal Floating Roof Tank

A. Tank Characteristics:

1. Diameter: _____ feet
2. Tank Volume: _____ gal
3. Turnovers per year: _____
4. Maximum Throughput: _____ gal/yr
5. Number of Columns: _____
6. Self-Supporting Roof? ☐ Yes ☐ No
7. Effective Column Diameter:
   ☐ 9"x7" Built-up Column ☐ 8" Diameter Pipe ☐ Unknown
8. Internal Shell Condition:
   ☐ Light Rust ☐ Dense Rust ☐ Gunite Lining
9. External Shell Color/Shade:
   ☐ White/White ☐ Aluminum/Specular ☐ Aluminum/Diffuse
   ☐ Gray/Light ☐ Gray/Medium ☐ Red/Primer
10. External Shell Condition: ☐ Good ☐ Poor
11. Roof Color/Shade:
    ☐ White/White ☐ Aluminum/Specular ☐ Aluminum/Diffuse
    ☐ Gray/Light ☐ Gray/Medium ☐ Red/Primer
12. Roof Condition: ☐ Good ☐ Poor

B. Rim Seal System:

1. Primary Seal: ☐ Mechanical Shoe ☐ Liquid-mounted ☐ Vapor-mounted
2. Secondary Seal: ☐ Shoe-mounted ☐ Rim-mounted ☐ None

C. Deck Characteristics:

1. Deck Type: ☐ Bolted ☐ Welded
2. Deck Fitting Category: ☐ Typical ☐ Detail

6. External Floating Roof Tank

A. Tank Characteristics

1. Diameter: _____ feet
2. Tank Volume: _____ gal
3. Turnovers per year: _____
4. Maximum Throughput: _____ gal/yr
5. Internal Shell Condition:
   ☐ Light Rust ☐ Dense Rust ☐ Gunite Lining

MDEQ NOTICE OF INTENT FOR COVERAGE UNDER THE OIL PRODUCTION GENERAL PERMIT TO CONSTRUCT/OPERATE AIR EMISSIONS EQUIPMENT AT A SYNTHETIC MINOR SOURCE

Tank Summary | Section OPGP-E

6. External Floating Roof Tank (continued)

A. Tank Characteristics (continued):

6. Paint Color/Shade:

☐ White/White ☐ Aluminum/Specular ☐ Aluminum/Diffuse

☐ Gray/Light ☐ Gray/Medium ☐ Red/Primer

7. Paint Condition: ☐ Good ☐ Poor

B. Roof Characteristics

1. Roof Type: ☐ Pontoon ☐ Double Deck

2. Roof Fitting Category: ☐ Typical ☐ Detail

C. Tank Construction and Rim-Seal System:

1. Tank Construction: ☐ Welded ☐ Riveted

2. Primary Seal:

☐ Mechanical Shoe ☐ Liquid-mounted ☐ Vapor-mounted

3. Secondary Seal

☐ None ☐ Shoe-mounted ☐ Rim-mounted ☐ Weather shield

7. Pollutant Emissions

A. Fixed Roof Emissions:

Pollutant[1]	Working Loss (tons/yr)	Breathing Loss (tons/yr)	Total Emissions (tons/yr)
VOC	N/A*	N/A*	N/A*

**It should be noted that emissions from this tank are calculated using a metered gas volume.*

B. Floating Roof Emissions:

Pollutant[1]	Rim Seal Loss (tons/yr)	Withdrawal Loss (tons/yr)	Deck Fitting Loss (tons/yr)	Deck Seam Loss (tons/yr)	Landing Loss[2] (tons/yr)	Total Emissions (tons/yr)

1. All regulated air pollutants including hazardous air pollutants emitted from this source should be listed in accordance with the OGP Application Instructions. A list of regulated air pollutants and a link to EPA's list of hazardous air pollutants is provided in the OGP Application Instructions.
2. Landing losses should be determined according to the procedures in *Organic Liquid Storage Tanks* chapter of EPA's AP-42 emission factors. If the roof is not landed at least once/yr, enter "NA".

MDEQ NOTICE OF INTENT FOR COVERAGE UNDER THE OIL PRODUCTION GENERAL PERMIT TO CONSTRUCT/OPERATE AIR EMISSIONS EQUIPMENT AT A SYNTHETIC MINOR SOURCE

Tank Summary | Section OPGP-E

1. Emission Point Description

A. Emission Point Designation (Ref. No.): AA-009 [2-05-SUMP]

B. Product(s) Stored: Organic Chemical Blend (assumes 100% N-Hexane as worst case)

C. Status: ☒ Operating ☐ Proposed ☐ Under Construction

D. Date of construction, reconstruction, or most recent modification (for existing sources) or date of anticipated construction: 2005

2. Tank Data

A. Tank Specifications:

1.	Design capacity	13,000	gallons		
2.	True vapor pressure at storage temperature:	2.484	psia @	70.29	ºF
3.	Maximum true vapor pressure (as defined in §60.111b)	3.092	psia @	79.29	ºF
4.	Reid vapor pressure at storage temperature:	2.484	psia @	70.29	ºF
5.	Density of product at storage temperature:	N/A	lb/gal		
6.	Molecular weight of product vapor at storage temp.	86.18	lb/lbmol		

B. Tank Orientation: ☒ Vertical ☐ Horizontal

C. Type of Tank:

☒ Fixed Roof ☐ External Floating Roof ☐ Internal Floating Roof

☐ Pressure ☐ Variable Vapor Space ☐ Other: _____

D. Is the tank equipped with a Vapor Recovery System and/or flare? ☐ Yes ☒ No

If yes, describe below and include the efficiency of each.

E. Closest City:

☐ Jackson, MS ☒ Meridian, MS ☐ Tupelo, MS ☐ Mobile, AL

☐ New Orleans, LA ☐ Memphis, TN ☐ Baton Rouge, LA

F. Is an E&P or similar report described in Condition 5.4(5) of the General Permit included for this tank in the Notice of Intent? ☒ Yes ☐ No

MDEQ NOTICE OF INTENT FOR COVERAGE UNDER THE OIL PRODUCTION GENERAL PERMIT TO CONSTRUCT/OPERATE AIR EMISSIONS EQUIPMENT AT A SYNTHETIC MINOR SOURCE

Tank Summary — Section OPGP-E

3. Horizontal Fixed Roof Tank

A. Shell Length: _____ feet
B. Shell Diameter: _____ feet
C. Working Volume: _____ gal
D. Maximum Throughput: _____ gal/yr
E. Is the tank heated? ☐ Yes ☐ No
F. Is the tank underground? ☐ Yes ☐ No
G. Shell Color/Shade:
☐ ☐ Aluminum/Specular ☐ Aluminum/Diffuse
☐ Gray/Light ☐ Gray/Medium ☐ Red/Primer
H. Shell Condition: ☐ Good ☐ Poor

4. Vertical Fixed Roof Tank

A. Dimensions:
1. Shell Height: 6.00 feet
2. Shell Diameter: 6.00 feet
3. Maximum Liquid Height: 5.00 feet
4. Average Liquid Height: 2.50 feet
5. Working Volume: 13,000 gal
6. Turnovers per year: 12.01
7. Maximum throughput: 302.38 BBLs/yr
8. Is the tank heated? ☐ Yes ☒ No

B. Shell Characteristics:
1. Shell Color/Shade:
☐ White/White ☐ Aluminum/Specular ☐ Aluminum/Diffuse
☐ Gray/Light ☒ Gray/Medium ☐ Red/Primer
2. Shell Condition: ☒ Good ☐ Poor

C. Roof Characteristics:
1. Roof Color/Shade:
☐ White/White ☐ Aluminum/Specular ☐ Aluminum/Diffuse
☐ Gray/Light ☒ Gray/Medium ☐ Red/Primer
2. Roof Condition: ☒ Good ☐ Poor
3. Type: ☒ Cone ☐ Dome
4. Height: 0.19 feet

MDEQ NOTICE OF INTENT FOR COVERAGE UNDER THE OIL PRODUCTION GENERAL PERMIT TO CONSTRUCT/OPERATE AIR EMISSIONS EQUIPMENT AT A SYNTHETIC MINOR SOURCE

Tank Summary — Section OPGP-E

5. Internal Floating Roof Tank

A. Tank Characteristics:

1. Diameter: _____ feet
2. Tank Volume: _____ gal
3. Turnovers per year: _____
4. Maximum Throughput: _____ gal/yr
5. Number of Columns: _____
6. Self-Supporting Roof? ☐ Yes ☐ No
7. Effective Column Diameter:
   ☐ 9"x7" Built-up Column ☐ 8" Diameter Pipe ☐ Unknown
8. Internal Shell Condition:
   ☐ Light Rust ☐ Dense Rust ☐ Gunite Lining
9. External Shell Color/Shade:
   ☐ White/White ☐ Aluminum/Specular ☐ Aluminum/Diffuse
   ☐ Gray/Light ☐ Gray/Medium ☐ Red/Primer
10. External Shell Condition: ☐ Good ☐ Poor
11. Roof Color/Shade:
    ☐ White/White ☐ Aluminum/Specular ☐ Aluminum/Diffuse
    ☐ Gray/Light ☐ Gray/Medium ☐ Red/Primer
12. Roof Condition: ☐ Good ☐ Poor

B. Rim Seal System:

1. Primary Seal: ☐ Mechanical Shoe ☐ Liquid-mounted ☐ Vapor-mounted
2. Secondary Seal: ☐ Shoe-mounted ☐ Rim-mounted ☐ None

C. Deck Characteristics:

1. Deck Type: ☐ Bolted ☐ Welded
2. Deck Fitting Category: ☐ Typical ☐ Detail

6. External Floating Roof Tank

A. Tank Characteristics

1. Diameter: _____ feet
2. Tank Volume: _____ gal
3. Turnovers per year: _____
4. Maximum Throughput: _____ gal/yr
5. Internal Shell Condition:
   ☐ Light Rust ☐ Dense Rust ☐ Gunite Lining

6. External Floating Roof Tank (continued)

A. Tank Characteristics (continued):

6. Paint Color/Shade:

☐ White/White ☐ Aluminum/Specular ☐ Aluminum/Diffuse

☐ Gray/Light ☐ Gray/Medium ☐ Red/Primer

7. Paint Condition: ☐ Good ☐ Poor

B. Roof Characteristics

1. Roof Type: ☐ Pontoon ☐ Double Deck

2. Roof Fitting Category: ☐ Typical ☐ Detail

C. Tank Construction and Rim-Seal System:

1. Tank Construction: ☐ Welded ☐ Riveted

2. Primary Seal:

☐ Mechanical Shoe ☐ Liquid-mounted ☐ Vapor-mounted

3. Secondary Seal

☐ None ☐ Shoe-mounted ☐ Rim-mounted ☐ Weather shield

7. Pollutant Emissions

A. Fixed Roof Emissions:

Pollutant[1]	Working Loss (tons/yr)	Breathing Loss (tons/yr)	Total Emissions (tons/yr)
VOC	0.03	0.08	0.11

B. Floating Roof Emissions:

Pollutant[1]	Rim Seal Loss (tons/yr)	Withdrawal Loss (tons/yr)	Deck Fitting Loss (tons/yr)	Deck Seam Loss (tons/yr)	Landing Loss[2] (tons/yr)	Total Emissions (tons/yr)

1. All regulated air pollutants including hazardous air pollutants emitted from this source should be listed in accordance with the OGP Application Instructions. A list of regulated air pollutants and a link to EPA's list of hazardous air pollutants is provided in the OGP Application Instructions.
2. Landing losses should be determined according to the procedures in *Organic Liquid Storage Tanks* chapter of EPA's AP-42 emission factors. If the roof is not landed at least once/yr, enter "NA".

MDEQ NOTICE OF INTENT FOR COVERAGE UNDER THE OIL PRODUCTION GENERAL PERMIT TO CONSTRUCT/OPERATE AIR EMISSIONS EQUIPMENT AT A SYNTHETIC MINOR SOURCE

Flare | Section OPGP-F

1. Equipment Description

A. Emission Point Designation (Ref. No.): AA-010 [3a-05-F (ZZZ-180A)]

B. Equipment Description (include the process(es) that the flare controls emissions from): Control flare to combust emissions from oil storage tanks (EPNs: 1a-05-GBT-CV through 1d-05-OST-CV) and assist gas.

C. Manufacturer: Unknown D. Model: Unknown

E. Status: ☒ Operating ☐ Proposed ☐ Under Construction

F. ☐ Requesting a federally enforceable condition to route tank emissions to the flare.

2. System Data

A. Efficiency: 98 % Controlling the following pollutant(s): VOC, HAPs
Efficiency: _____ % Controlling the following pollutant(s): _____
Reason for different efficiency: _____

B. Flare Data (if applicable):

1. Flare type: ☒ Non-assisted ☐ Steam-assisted ☐ Air-assisted ☐ Other: _____

2. Net heating value of combusted gas: 776 Btu/scf

3. Design exit velocity: 48.8 ft/sec

4. System: ☒ Auto-ignitor ☒ Continuous Flame

5. Is the presence of a flare pilot flame monitored? ☒ Yes ☐ No

If yes, please describe the monitoring: The presence of the flare pilot flame is continuously monitored by use of a thermocouple.*

6. Is the auto-ignitor system monitored? ☒ Yes ☐ No

If yes, please describe the monitoring: The flare is equipped with an auto-ignitor.*

*Denbury will maintain a flare pilot flame or auto-igniter system at all times when emissions may be vented to the flare. Denbury will either continuously monitor & record the presence of the flare pilot flame by use of a thermocouple OR maintain & operate an auto-igniter system on the flare to ensure a flame is immediately restored when emissions are being sent to the flare.

MDEQ NOTICE OF INTENT FOR COVERAGE UNDER THE OIL PRODUCTION GENERAL PERMIT TO CONSTRUCT/OPERATE AIR EMISSIONS EQUIPMENT AT A SYNTHETIC MINOR SOURCE

Flare | Section OPGP-F

1. Equipment Description

A. Emission Point Designation (Ref. No.): AA-011 [3b-05-F (ZZZ-180B)]

B. Equipment Description (include the process(es) that the flare controls emissions from): Control flare to combust emissions from assist gas.

C. Manufacturer: Unknown D. Model: Unknown

E. Status: ☒ Operating ☐ Proposed ☐ Under Construction

F. ☐ Requesting a federally enforceable condition to route tank emissions to the flare.

2. System Data

A. Efficiency: 98 % Controlling the following pollutant(s): VOC, HAPs
Efficiency: _____ % Controlling the following pollutant(s): _____
Reason for different efficiency: _____

B. Flare Data (if applicable):

1. Flare type: ☒ Non-assisted ☐ Steam-assisted ☐ Air-assisted ☐ Other: _____

2. Net heating value of combusted gas: 1037 Btu/scf

3. Design exit velocity: 5.31 ft/sec

4. System: ☒ Auto-ignitor ☒ Continuous Flame

5. Is the presence of a flare pilot flame monitored? ☒ Yes ☐ No

If yes, please describe the monitoring: The presence of the flare pilot flame is continuously monitored by use of a thermocouple.*

6. Is the auto-ignitor system monitored? ☒ Yes ☐ No

If yes, please describe the monitoring: The flare is equipped with an auto-ignitor.*

*Denbury will maintain a flare pilot flame or auto-igniter system at all times when emissions may be vented to the flare. Denbury will either continuously monitor & record the presence of the flare pilot flame by use of a thermocouple OR maintain & operate an auto-igniter system on the flare to ensure a flame is immediately restored when emissions are being sent to the flare.

MDEQ NOTICE OF INTENT FOR COVERAGE UNDER THE OIL PRODUCTION GENERAL PERMIT TO CONSTRUCT/OPERATE AIR EMISSIONS EQUIPMENT AT A SYNTHETIC MINOR SOURCE

Compliance Plan — Section OPGP-G

Part 1. Equipment List

List all equipment and the corresponding federal and/or state regulation that is applicable. Clearly identify federal regulations from state requirements. Provide the expected or actual construction date, startup date and removal date if the equipment is no longer on site.

EMISSION UNIT (Ref No.)	FEDERAL or STATE REGULATION Ex. 40 CFR Part _____, Subpart _____ Ex. 11 Miss. Admin. Code Pt. 2, R. 1.4.B(2).	CONSTRUCTION DATE	STARTUP DATE	REMOVAL DATE
3a-05-F *Control Flare* 3b-05-F *Control Flare*	11 Miss. Admin. Code Pt. 2, R.1.4.B(2)	2005	2005	N/A
3a-05-F *Control Flare* 3b-05-F *Control Flare*	11 Miss. Admin. Code Pt. 2, R.2.2.B(10).	2005	2005	N/A
3a-05-F *Control Flare* 3b-05-F *Control Flare*	11 Miss. Admin. Code Pt. 2, R.2.2.B(11).	2005	2005	N/A

MDEQ NOTICE OF INTENT FOR COVERAGE UNDER THE OIL PRODUCTION GENERAL PERMIT TO CONSTRUCT/OPERATE AIR EMISSIONS EQUIPMENT AT A SYNTHETIC MINOR SOURCE

Compliance Plan — Section OPGP-G

Part 2. Applicable Requirements

List all applicable state and federal requirements, including emission limits, operating restrictions, etc., and the applicable test methods or monitoring used to demonstrate compliance with each applicable requirement. Clearly identify federal regulations from state requirements. Provide the compliance status as of the day the application is signed.

EMISSION UNIT (Ref No.)	APPLICABLE REQUIREMENT (Specific Regulatory citation)	POLLUTANT	LIMITS/ REQUIREMENTS	TEST METHOD/ COMPLIANCE MONITORING
3a-05-F *Control Flare* 3b-05-F *Control Flare*	11 Miss. Admin. Code Pt. 2, R.1.4.B(2)	H_2S	1 grain H_2S per 100 standard cubic feet (1 gr/100 scf)	Recordkeeping of H_2S composition of gas by gas analysis; Maintenance of continuous flame for gas combustion.
3a-05-F *Control Flare* 3b-05-F *Control Flare*	11 Miss. Admin. Code Pt. 2, R.2.2.B(10).	VOC, HAPs	Flare Operating Requirements	The flare shall be operated at all times when emissions may be vented to it. The flare is anticipated to provide a significant reduction in hydrocarbon emissions. Based on manufacturer's data, a minimum of 98% reduction can be expected. It should also be noted that the facility will operate the flare such that criteria pollutant emissions will not exceed emission rates restricted in the Oil Production General Permit, nor will hazardous air pollutant (HAP) emissions exceed any HAP emission rates restricted in the Oil Production General Permit.

MDEQ NOTICE OF INTENT FOR COVERAGE UNDER THE OIL PRODUCTION GENERAL PERMIT TO CONSTRUCT/OPERATE AIR EMISSIONS EQUIPMENT AT A SYNTHETIC MINOR SOURCE

Compliance Plan — Section OPGP-G

Part 2. Applicable Requirements

List all applicable state and federal requirements, including emission limits, operating restrictions, etc., and the applicable test methods or monitoring used to demonstrate compliance with each applicable requirement. Clearly identify federal regulations from state requirements. Provide the compliance status as of the day the application is signed.

EMISSION UNIT (Ref No.)	APPLICABLE REQUIREMENT (Specific Regulatory citation)	POLLUTANT	LIMITS/ REQUIREMENTS	TEST METHOD/ COMPLIANCE MONITORING
3a-05-F *Control Flare* 3b-05-F *Control Flare*	11 Miss. Admin. Code Pt. 2, R.2.2.B(11).	VOC, HAPs	Monitoring and recordkeeping	Denbury shall maintain a flare pilot flame or auto-igniter system at all times when emissions may be vented to the flare. Denbury will either continuously monitor & record the presence of the flare pilot flame by use of a thermocouple OR maintain & operate an auto-igniter system on the flare to ensure a flame is immediately restored when emissions are being sent to the flare. The flare shall be operated with no visible emissions as determined by EPA Method 22, except for periods not to exceed a total of five (5) minutes during any two (2) consecutive hours. Records of all visual observations/tests and corrective action shall be maintained.

Emission Calculations

Emission calculations shown below are presented for informational purposes only as vapors from the gun barrel tank are routed to the control flare (EPN: 3a-05-F) for combustion, except during brief intervals when thief hatches are opened for purposes of sampling, gauging, etc.

POINT SOURCE I.D. NUMBER: ***1a-05-GBT-CV***

EMISSION SOURCE DESCRIPTION: ***5000 BBL Gun Barrel Tank-Common Vent (ABJ-111)***

DATA:

Emission Source:	***Crude Oil Storage Vapors ('Working' & 'Standing')***
Average Daily Oil Throughput: **(Annual Average; BBLD - Q_{avg})**	***2000***
Maximum Daily Oil Throughput: **(BBLD - Q_{max})**	***2000***
Average VOC Working Losses - L_W (lb/yr):	***72,571.100***
Average VOC Standing Losses - L_S (lb/yr):	***6,482.298***
Basis of Estimates:	***AP-42, Chapter 7 (June 2020, Section 7.1.3.1); Refer to supporting documentation for summary***

Avg. Hourly Uncontrolled THC Losses (lb/hr)	= (Lw + Ls) * 3.6146/8760	=	**32.62**
Max. Hourly Uncontrolled THC Losses (lb/hr)	= (Ls + (Lw * QMax ÷ Qavg)) * 3.6146/8760	=	**32.62**
Annual Potential Uncontrolled THC Losses (TPY)	= Hourly * 8760/2000	=	**142.87**

SPECIATION FACTORS:

The composition of this gas is based on an actual analysis of the vapors routed to the control flare and normalized to account for the removal of Nitrogen and the presence of H2S; refer to Southern Petroleum Laboratories Report No.: 172-24100063-001A in supporting documentation.

UNCONTROLLED EMISSIONS SUMMARY:

POLLUTANT:	Weight Percent	CALCULATED EMISSION RATES		
		Average Hourly (lb/hr)	Maximum Hourly (lb/hr)	Annual (TPY)
Nitrogen (excluded from VOC total)	0.0000	0.0000	0.0000	0.0000
Carbon Dioxide (excluded from VOC total)	72.1957	23.5498	23.5498	103.1481
Methane (excluded from VOC total)	0.0575	0.0188	0.0188	0.0821
Ethane (excluded from VOC total)	0.0791	0.0258	0.0258	0.1129
Hydrogen Sulfide (excluded from VOC total)	0.0021	0.0007	0.0007	0.0030
Propane	1.5917	0.5192	0.5192	2.2742
Iso-Butane	3.7939	1.2375	1.2375	5.4205
N-Butane	6.0117	1.9610	1.9610	8.5890
Iso-Pentane	5.7972	1.8910	1.8910	8.2826
N-Pentane	4.8203	1.5723	1.5723	6.8869
Iso-Hexane	3.0442	0.9930	0.9930	4.3494
N-Hexane (TAP)	1.5744	0.5135	0.5135	2.2493
Methylcyclopentane	0.0000	0.0000	0.0000	0.0000
Benzene (TAP)	0.0219	0.0071	0.0071	0.0313
Cyclohexane	0.1801	0.0588	0.0588	0.2574

Heptanes	0.6697	0.2185	0.2185	0.9569
Methylcyclohexane	0.0484	0.0158	0.0158	0.0692
Toluene (TAP)	0.0157	0.0051	0.0051	0.0224
2,2,4-Trimethylpentane (TAP)	0.0000	0.0000	0.0000	0.0000
Octanes	0.0837	0.0273	0.0273	0.1196
Ethylbenzene (TAP)	0.0017	0.0005	0.0005	0.0024
Xylenes (TAP)	0.0021	0.0007	0.0007	0.0031
Nonanes	0.0089	0.0029	0.0029	0.0127
Decanes Plus	0.0000	0.0000	0.0000	0.0000
Total Weight Percent:	100.0000			
Total TAP Emissions		0.53	0.53	2.31
Total VOC Emissions		**9.02**	**9.02**	**39.53**
Total Non VOC & Non TAP-HC		0.04	0.04	0.20
Total Hydrocarbon Emissions		32.62	32.62	142.87

DATA:

Emission Source:	***Flash Gas from Oil***
Flash Gas Specific Gravity:	***1.6716***
Average Oil Throughput: **(BBLD)**	***2000***
Maximum Oil Throughput: **(BBLD)**	***2000***
Basis of Emission Estimates:	***Actual GOR & Actual Flare Gas Analysis***
Flash Gas Analysis Report Number:	***Southern Petroleum Laboratories Report No.: 172-24100063-001A***

Estimates for gas volumes and composition associated with this stage of the process were derived from a laboratory test of an oil sample collected at this facility, refer to Southern Petroleum Laboratories Report No.: 23080193-006A in supporting documentation. The following table shows the actual field and laboratory conditions.

API Oil Gravity @ 60°F	**Process Conditions**		**Gas/Oil Ratio**
	Pressure (PSIG)	**Temperature (°F)**	**(SCF/BBL)**
Actual Facility & Laboratory Conditions:			
29.83	43	99	
	0	60	13.80
		GOR Estimate:	**13.80**

Avg. Hourly Uncontrolled Flash Rate (SCF/Hr)	=	Oil Rate * GOR	=	**1150.00**
Avg. Hourly Uncontrolled Total Flash Emissions (lb/hr)	=	Flash Gas Gravity * Density of Air * Flash Rate	=	**146.87**
Max. Hourly Uncontrolled Total Flash Emissions (lb/hr)	=	Avg. Emissions * Ratio of Max. Oil Rate to Avg. Oil Rate	=	**146.87**
Annual Potential Uncontrolled Flash Emissions (TPY)	=	Hourly * 8760/2000	=	**643.29**

SPECIATION FACTORS:

Speciation of the flash gas mixture taken from the referenced laboratory results and normalized to account for the removal of Nitrogen and the presence of H2S; refer to supporting documentation

UNCONTROLLED EMISSIONS SUMMARY:

POLLUTANT:	Weight Percent	CALCULATED EMISSION RATES		
		Average Hourly (lb/hr)	Maximum Hourly (lb/hr)	Annual (TPY)
Nitrogen (excluded from VOC total)	0.0000	0.0000	0.0000	0.0000
Carbon Dioxide (excluded from VOC total)	72.1957	106.0315	106.0315	464.4282
Methane (excluded from VOC total)	0.0575	0.0844	0.0844	0.3699
Ethane (excluded from VOC total)	0.0791	0.1161	0.1161	0.5086
Hydrogen Sulfide (excluded from VOC total)	0.0021	0.0031	0.0031	0.0136
Propane	1.5917	2.3377	2.3377	10.2395
Iso-Butane	3.7939	5.5720	5.5720	24.4058
N-Butane	6.0117	8.8291	8.8291	38.6724
Iso-Pentane	5.7972	8.5141	8.5141	37.2926
N-Pentane	4.8203	7.0794	7.0794	31.0084
Iso-Hexane	3.0442	4.4710	4.4710	19.5832
N-Hexane (TAP)	1.5744	2.3122	2.3122	10.1277
Methylcyclopentane	0.0000	0.0000	0.0000	0.0000
Benzene (TAP)	0.0219	0.0321	0.0321	0.1408
Cyclohexane	0.1801	0.2646	0.2646	1.1588
Heptanes	0.6697	0.9836	0.9836	4.3083
Methylcyclohexane	0.0484	0.0711	0.0711	0.3115
Toluene (TAP)	0.0157	0.0231	0.0231	0.1010
2,2,4-Trimethylpentane (TAP)	0.0000	0.0000	0.0000	0.0000
Octanes	0.0837	0.1230	0.1230	0.5386
Ethylbenzene (TAP)	0.0017	0.0024	0.0024	0.0107
Xylenes (TAP)	0.0021	0.0031	0.0031	0.0138
Nonanes	0.0089	0.0131	0.0131	0.0573
Decanes Plus	0.0000	0.0000	0.0000	0.0000
Total Weight Percent:	100.0000			
Total TAP Emissions		2.38	2.38	10.41
Total VOC Emissions		**40.63**	**40.63**	**177.97**
Total Non VOC & Non TAP-HC		0.20	0.20	0.88
Total Emissions		146.87	146.87	643.29

DATA:

Emission Source:	***Blanket Gas***
Average Annual Tank Throughput (BBLs/Yr):	***730,000***
Gross Blanket Gas Required (MSCF/Yr):	***N/A****

**There are no emissions associated with supplied blanket gas as the gun barrel tank maintains a constant level.*

Uncontrolled VOC Emission Total (TPY)	Storage Vapors + Oil Flash + Blanket Gas	=	**217.50**

DATA:

Emission Source:	***Losses When Opening Thief Hatches***
Specific Gravity of Gas:	***1.6716***
Maximum Thief Hatch Venting (Hrs/Yr) **(Under Normal/Routine Operating Conditions)**	***30***
Max. Minutes a Hatch is Opened in a Single Hour:	***5***
Maximum Hourly Emission Rate (lb/hr): **(from preceding tank emission estimates)**	***14.96***

Avg. Hourly Emissions (lb/hr)	=	Annual Total/8760 (hrs/yr)	=	**0.61**
Maximum Hourly Emissions (lb/hr)	=	Max. Emission Rate * Max. Minutes/Hr Hatch is Open	=	**14.96**
Maximum Annual Emissions (TPY)	=	Max. Hourly THC Rate * Hours/Yr Hatch is Open	=	**2.69**

EMISSION SUMMARY (based on the above referenced flare gas analysis):

POLLUTANT:	Weight Percent	CALCULATED EMISSION RATES		
		Average Hourly (lb/hr)	Maximum Hourly (lb/hr)	Annual (TPY)
Water Vapor (excluded from VOC total)	0.0000	0.000	0.000	0.000
Nitrogen (excluded from VOC total)	0.0000	0.000	0.000	0.000
Carbon Dioxide (excluded from VOC total)	72.1957	0.443	10.800	1.944
Methane (excluded from VOC total)	0.0575	0.000	0.009	0.002
Ethane (excluded from VOC total)	0.0791	0.000	0.012	0.002
Hydrogen Sulfide (excluded from VOC total)	0.0021	0.000	0.000	0.000
Propane	1.5917	0.010	0.238	0.043
Iso-Butane	3.7939	0.023	0.568	0.102
N-Butane	6.0117	0.037	0.899	0.162
Iso-Pentane	5.7972	0.036	0.867	0.156
N-Pentane	4.8203	0.030	0.721	0.130
Iso-Hexane	3.0442	0.019	0.455	0.082
N-Hexane (TAP)	1.5744	0.010	0.236	0.042
Methylcyclopentane	0.0000	0.000	0.000	0.000
Benzene (TAP)	0.0219	0.000	0.003	0.001
Cyclohexane	0.1801	0.001	0.027	0.005
Heptanes	0.6697	0.004	0.100	0.018
Methylcyclohexane	0.0484	0.000	0.007	0.001
Toluene (TAP)	0.0157	0.000	0.002	0.000
2,2,4-Trimethylpentane (TAP)	0.0000	0.000	0.000	0.000
Octanes	0.0837	0.001	0.013	0.002
Ethylbenzene (TAP)	0.0017	0.000	0.000	0.000
Xylenes (TAP)	0.0021	0.000	0.000	0.000
Nonanes	0.0089	0.000	0.001	0.000

Decanes Plus	0.0000	0.000	0.000	0.000
Other NM/NE HC	0.0000	0.000	0.000	0.000
Total Weight Percent:	100.0000			
Total TAP Emissions		0.01	0.24	0.04
Total VOC Emissions		**0.17**	**4.14**	**0.74**
Total Non VOC & Non TAP-HC		0.00	0.02	0.00
Total Emissions		0.61	14.96	2.69

Emission Calculations

Emission calculations shown below are presented for informational purposes only as vapors from the wet oil tank are routed to the control flare (EPN: 3a-05-F) for combustion, except during brief intervals when thief hatches are opened for purposes of sampling, gauging, etc.

POINT SOURCE I.D. NUMBER: ***1b-05-OST-CV***

EMISSION SOURCE DESCRIPTION: ***1500 BBL Wet Oil Tank-Common Vent (BBJ-118)***

DATA:

Emission Source:	***Crude Oil Storage Vapors ('Working' & 'Standing')***
Average Daily Oil Throughput: **(Annual Average; BBLD - Q_{avg})**	***2015***
Maximum Daily Oil Throughput: **(BBLD - Q_{max})**	***2015***
Average VOC Working Losses - L_W (lb/yr):	***16,509.346***
Average VOC Standing Losses - L_S (lb/yr):	***1,982.538***
Basis of Estimates:	***AP-42, Chapter 7 (June 2020, Section 7.1.3.1); Refer to supporting documentation for summary***

Avg. Hourly Uncontrolled THC Losses (lb/hr)	= (Lw + Ls) * 3.6146/8760	=	**7.63**
Max. Hourly Uncontrolled THC Losses (lb/hr)	= (Ls + (Lw * QMax ÷ Qavg)) * 3.6146/8760	=	**7.63**
Annual Potential Uncontrolled THC Losses (TPY)	= Hourly * 8760/2000	=	**33.42**

SPECIATION FACTORS:

The composition of this gas is based on an actual analysis of the vapors routed to the control flare and normalized to account for the removal of Nitrogen and the presence of H2S; refer to Southern Petroleum Laboratories Report No.: 172-24100063-001A in supporting documentation.

UNCONTROLLED EMISSIONS SUMMARY:

POLLUTANT:	Weight Percent	CALCULATED EMISSION RATES		
		Average Hourly (lb/hr)	Maximum Hourly (lb/hr)	Annual (TPY)
Nitrogen (excluded from VOC total)	0.0000	0.0000	0.0000	0.0000
Carbon Dioxide (excluded from VOC total)	72.1957	5.5087	5.5087	24.1280
Methane (excluded from VOC total)	0.0575	0.0044	0.0044	0.0192
Ethane (excluded from VOC total)	0.0791	0.0060	0.0060	0.0264
Hydrogen Sulfide (excluded from VOC total)	0.0021	0.0002	0.0002	0.0007
Propane	1.5917	0.1215	0.1215	0.5320
Iso-Butane	3.7939	0.2895	0.2895	1.2679
N-Butane	6.0117	0.4587	0.4587	2.0091
Iso-Pentane	5.7972	0.4423	0.4423	1.9374
N-Pentane	4.8203	0.3678	0.3678	1.6110
Iso-Hexane	3.0442	0.2323	0.2323	1.0174
N-Hexane (TAP)	1.5744	0.1201	0.1201	0.5262
Methylcyclopentane	0.0000	0.0000	0.0000	0.0000
Benzene (TAP)	0.0219	0.0017	0.0017	0.0073
Cyclohexane	0.1801	0.0137	0.0137	0.0602

Heptanes	0.6697	0.0511	0.0511	0.2238
Methylcyclohexane	0.0484	0.0037	0.0037	0.0162
Toluene (TAP)	0.0157	0.0012	0.0012	0.0052
2,2,4-Trimethylpentane (TAP)	0.0000	0.0000	0.0000	0.0000
Octanes	0.0837	0.0064	0.0064	0.0280
Ethylbenzene (TAP)	0.0017	0.0001	0.0001	0.0006
Xylenes (TAP)	0.0021	0.0002	0.0002	0.0007
Nonanes	0.0089	0.0007	0.0007	0.0030
Decanes Plus	0.0000	0.0000	0.0000	0.0000
Total Weight Percent:	100.0000			
Total TAP Emissions		0.12	0.12	0.54
Total VOC Emissions		**2.11**	**2.11**	**9.25**
Total Non VOC & Non TAP-HC		0.01	0.01	0.05
Total Hydrocarbon Emissions		7.63	7.63	33.42

DATA:

Emission Source:	***Blanket Gas***
Average Annual Tank Throughput (BBLs/Yr):	***735,475***
Gross Blanket Gas Required (MSCF/Yr):	***4,130***
Gas from Process to Tank(s) (MSCF/Yr):	***10,074***
Calculated Volume Requirement (MSCF/Yr):	***-5,944***

**There are no emissions associated with supplied blanket gas as flash generated from the gun barrel tank should be sufficient to maintain the gas blanket as demonstrated herein.*

Uncontrolled VOC Emission Total (TPY)	Storage Vapors + Blanket Gas	=	**9.25**

DATA:

Emission Source:	***Losses When Opening Thief Hatches***
Specific Gravity of Gas:	***1.6716***
Maximum Thief Hatch Venting (Hrs/Yr) **(Under Normal/Routine Operating Conditions)**	***30***
Max. Minutes a Hatch is Opened in a Single Hour:	***5***
Maximum Hourly Emission Rate (lb/hr): **(from preceding tank emission estimates)**	***5.66***

Avg. Hourly Emissions (lb/hr)	=	Annual Total/8760 (hrs/yr)	=	**0.23**
Maximum Hourly Emissions (lb/hr)	=	Max. Emission Rate * Max. Minutes/Hr Hatch is Open	=	**5.66**
Maximum Annual Emissions (TPY)	=	Max. Hourly THC Rate * Hours/Yr Hatch is Open	=	**1.02**

EMISSION SUMMARY (based on the above referenced flare gas analysis):

POLLUTANT:	Weight Percent	CALCULATED EMISSION RATES		
		Average Hourly (lb/hr)	Maximum Hourly (lb/hr)	Annual (TPY)
Water Vapor (excluded from VOC total)	0.0000	0.000	0.000	0.000
Nitrogen (excluded from VOC total)	0.0000	0.000	0.000	0.000
Carbon Dioxide (excluded from VOC total)	72.1957	0.168	4.086	0.735
Methane (excluded from VOC total)	0.0575	0.000	0.003	0.001
Ethane (excluded from VOC total)	0.0791	0.000	0.004	0.001

Hydrogen Sulfide (excluded from VOC total)	0.0021	0.000	0.000	0.000
Propane	1.5917	0.004	0.090	0.016
Iso-Butane	3.7939	0.009	0.215	0.039
N-Butane	6.0117	0.014	0.340	0.061
Iso-Pentane	5.7972	0.014	0.328	0.059
N-Pentane	4.8203	0.011	0.273	0.049
Iso-Hexane	3.0442	0.007	0.172	0.031
N-Hexane (TAP)	1.5744	0.004	0.089	0.016
Methylcyclopentane	0.0000	0.000	0.000	0.000
Benzene (TAP)	0.0219	0.000	0.001	0.000
Cyclohexane	0.1801	0.000	0.010	0.002
Heptanes	0.6697	0.002	0.038	0.007
Methylcyclohexane	0.0484	0.000	0.003	0.000
Toluene (TAP)	0.0157	0.000	0.001	0.000
2,2,4-Trimethylpentane (TAP)	0.0000	0.000	0.000	0.000
Octanes	0.0837	0.000	0.005	0.001
Ethylbenzene (TAP)	0.0017	0.000	0.000	0.000
Xylenes (TAP)	0.0021	0.000	0.000	0.000
Nonanes	0.0089	0.000	0.001	0.000
Decanes Plus	0.0000	0.000	0.000	0.000
Other NM/NE HC	0.0000	0.000	0.000	0.000
Total Weight Percent:	100.0000			
Total TAP Emissions		0.00	0.09	0.02
Total VOC Emissions		**0.06**	**1.57**	**0.28**
Total Non VOC & Non TAP-HC		0.00	0.01	0.00
Total Emissions		0.23	5.66	1.02

Emission Calculations

Emission calculations shown below are presented for informational purposes only as vapors from the dry oil tank are routed to the control flare (EPN: 3a-05-F) for combustion, except during brief intervals when thief hatches are opened for purposes of sampling, gauging, etc.

POINT SOURCE I.D. NUMBER: ***1c-05-OST-CV***

EMISSION SOURCE DESCRIPTION: ***2000 BBL Dry Oil Tank-Common Vent (ABJ-119A)***

DATA:

Emission Source:	***Crude Oil Storage Vapors ('Working' & 'Standing')***
Average Daily Oil Throughput: **(Annual Average; BBLD - Q_{avg})**	***1007.5***
Maximum Daily Oil Throughput: **(BBLD - Q_{max})**	***2015***
Average VOC Working Losses - L_W (lb/yr):	***11,650.761***
Average VOC Standing Losses - L_S (lb/yr):	***3,303.329***
Basis of Estimates:	***AP-42, Chapter 7 (June 2020, Section 7.1.3.1); Refer to supporting documentation for summary***

Avg. Hourly Uncontrolled THC Losses (lb/hr)	= (Lw + Ls) * 3.6146/8760	=	**6.17**
Max. Hourly Uncontrolled THC Losses (lb/hr)	= (Ls + (Lw * QMax ÷ Qavg)) * 3.6146/8760	=	**10.98**
Annual Potential Uncontrolled THC Losses (TPY)	= Hourly * 8760/2000	=	**27.03**

SPECIATION FACTORS:

The composition of this gas is based on an actual analysis of the vapors routed to the control flare and normalized to account for the removal of Nitrogen and the presence of H2S; refer to Southern Petroleum Laboratories Report No.: 172-24100063-001A in supporting documentation.

UNCONTROLLED EMISSIONS SUMMARY:

POLLUTANT:	Weight Percent	CALCULATED EMISSION RATES		
		Average Hourly (lb/hr)	Maximum Hourly (lb/hr)	Annual (TPY)
Nitrogen (excluded from VOC total)	0.0000	0.0000	0.0000	0.0000
Carbon Dioxide (excluded from VOC total)	72.1957	4.4548	7.9255	19.5120
Methane (excluded from VOC total)	0.0575	0.0035	0.0063	0.0155
Ethane (excluded from VOC total)	0.0791	0.0049	0.0087	0.0214
Hydrogen Sulfide (excluded from VOC total)	0.0021	0.0001	0.0002	0.0006
Propane	1.5917	0.0982	0.1747	0.4302
Iso-Butane	3.7939	0.2341	0.4165	1.0254
N-Butane	6.0117	0.3709	0.6599	1.6247
Iso-Pentane	5.7972	0.3577	0.6364	1.5668
N-Pentane	4.8203	0.2974	0.5292	1.3027
Iso-Hexane	3.0442	0.1878	0.3342	0.8227
N-Hexane (TAP)	1.5744	0.0971	0.1728	0.4255
Methylcyclopentane	0.0000	0.0000	0.0000	0.0000
Benzene (TAP)	0.0219	0.0014	0.0024	0.0059
Cyclohexane	0.1801	0.0111	0.0198	0.0487

Heptanes	0.6697	0.0413	0.0735	0.1810
Methylcyclohexane	0.0484	0.0030	0.0053	0.0131
Toluene (TAP)	0.0157	0.0010	0.0017	0.0042
2,2,4-Trimethylpentane (TAP)	0.0000	0.0000	0.0000	0.0000
Octanes	0.0837	0.0052	0.0092	0.0226
Ethylbenzene (TAP)	0.0017	0.0001	0.0002	0.0005
Xylenes (TAP)	0.0021	0.0001	0.0002	0.0006
Nonanes	0.0089	0.0005	0.0010	0.0024
Decanes Plus	0.0000	0.0000	0.0000	0.0000
Total Weight Percent:	100.0000			
Total TAP Emissions		0.10	0.18	0.44
Total VOC Emissions		**1.71**	**3.04**	**7.48**
Total Non VOC & Non TAP-HC		0.01	0.01	0.04
Total Hydrocarbon Emissions		6.17	10.98	27.03

DATA:

Emission Source:	***Blanket Gas***
Average Annual Tank Throughput (BBLs/Yr):	***367,738***
Gross Blanket Gas Required (MSCF/Yr):	***2,065***
Gas from Process to Tank(s) (MSCF/Yr):	***2,972***
Calculated Volume Requirement (MSCF/Yr):	***-907***

**There are no emissions associated with supplied blanket gas as flash generated from the gun barrel tank should be sufficient to maintain the gas blanket as demonstrated herein.*

Uncontrolled VOC Emission Total (TPY)	Storage Vapors + Blanket Gas	=	**7.48**

DATA:

Emission Source:	***Losses When Opening Thief Hatches***
Specific Gravity of Gas:	***1.6716***
Maximum Thief Hatch Venting (Hrs/Yr) **(Under Normal/Routine Operating Conditions)**	***30***
Max. Minutes a Hatch is Opened in a Single Hour:	***5***
Maximum Hourly Emission Rate (lb/hr): **(from preceding tank emission estimates)**	***0.92***

Avg. Hourly Emissions (lb/hr)	=	Annual Total/8760 (hrs/yr)	=	**0.04**
Maximum Hourly Emissions (lb/hr)	=	Max. Emission Rate * Max. Minutes/Hr Hatch is Open	=	**0.92**
Maximum Annual Emissions (TPY)	=	Max. Hourly THC Rate * Hours/Yr Hatch is Open	=	**0.16**

EMISSION SUMMARY (based on the above referenced flare gas analysis):

POLLUTANT:	Weight Percent	CALCULATED EMISSION RATES		
		Average Hourly (lb/hr)	Maximum Hourly (lb/hr)	Annual (TPY)
Water Vapor (excluded from VOC total)	0.0000	0.000	0.000	0.000
Nitrogen (excluded from VOC total)	0.0000	0.000	0.000	0.000
Carbon Dioxide (excluded from VOC total)	72.1957	0.026	0.664	0.119
Methane (excluded from VOC total)	0.0575	0.000	0.001	0.000
Ethane (excluded from VOC total)	0.0791	0.000	0.001	0.000

Hydrogen Sulfide (excluded from VOC total)	0.0021	0.000	0.000	0.000
Propane	1.5917	0.001	0.015	0.003
Iso-Butane	3.7939	0.001	0.035	0.006
N-Butane	6.0117	0.002	0.055	0.010
Iso-Pentane	5.7972	0.002	0.053	0.010
N-Pentane	4.8203	0.002	0.044	0.008
Iso-Hexane	3.0442	0.001	0.028	0.005
N-Hexane (TAP)	1.5744	0.001	0.014	0.003
Methylcyclopentane	0.0000	0.000	0.000	0.000
Benzene (TAP)	0.0219	0.000	0.000	0.000
Cyclohexane	0.1801	0.000	0.002	0.000
Heptanes	0.6697	0.000	0.006	0.001
Methylcyclohexane	0.0484	0.000	0.000	0.000
Toluene (TAP)	0.0157	0.000	0.000	0.000
2,2,4-Trimethylpentane (TAP)	0.0000	0.000	0.000	0.000
Octanes	0.0837	0.000	0.001	0.000
Ethylbenzene (TAP)	0.0017	0.000	0.000	0.000
Xylenes (TAP)	0.0021	0.000	0.000	0.000
Nonanes	0.0089	0.000	0.000	0.000
Decanes Plus	0.0000	0.000	0.000	0.000
Other NM/NE HC	0.0000	0.000	0.000	0.000
Total Weight Percent:	100.0000			
Total TAP Emissions		0.00	0.01	0.00
Total VOC Emissions		**0.01**	**0.25**	**0.05**
Total Non VOC & Non TAP-HC		0.00	0.00	0.00
Total Emissions		0.04	0.92	0.16

Emission Calculations

Emission calculations shown below are presented for informational purposes only as vapors from the dry oil tank are routed to the control flare (EPN: 3a-05-F) for combustion, except during brief intervals when thief hatches are opened for purposes of sampling, gauging, etc.

POINT SOURCE I.D. NUMBER: ***1d-05-OST-CV***

EMISSION SOURCE DESCRIPTION: ***2000 BBL Dry Oil Tank-Common Vent (ABJ-119B)***

DATA:

Emission Source:	***Crude Oil Storage Vapors ('Working' & 'Standing')***
Average Daily Oil Throughput: **(Annual Average; BBLD - Q_{avg})**	***1007.5***
Maximum Daily Oil Throughput: **(BBLD - Q_{max})**	***2015***
Average VOC Working Losses - L_W (lb/yr):	***11,650.761***
Average VOC Standing Losses - L_S (lb/yr):	***3,303.329***
Basis of Estimates:	***AP-42, Chapter 7 (June 2020, Section 7.1.3.1); Refer to supporting documentation for summary***

Avg. Hourly Uncontrolled THC Losses (lb/hr)	= (Lw + Ls) * 3.6146/8760	=	**6.17**
Max. Hourly Uncontrolled THC Losses (lb/hr)	= (Ls + (Lw * QMax ÷ Qavg)) * 3.6146/8760	=	**10.98**
Annual Potential Uncontrolled THC Losses (TPY)	= Hourly * 8760/2000	=	**27.03**

SPECIATION FACTORS:

The composition of this gas is based on an actual analysis of the vapors routed to the control flare and normalized to account for the removal of Nitrogen and the presence of H2S; refer to Southern Petroleum Laboratories Report No.: 172-24100063-001A in supporting documentation.

UNCONTROLLED EMISSIONS SUMMARY:

POLLUTANT:	Weight Percent	CALCULATED EMISSION RATES		
		Average Hourly (lb/hr)	Maximum Hourly (lb/hr)	Annual (TPY)
Nitrogen (excluded from VOC total)	0.0000	0.0000	0.0000	0.0000
Carbon Dioxide (excluded from VOC total)	72.1957	4.4548	7.9255	19.5120
Methane (excluded from VOC total)	0.0575	0.0035	0.0063	0.0155
Ethane (excluded from VOC total)	0.0791	0.0049	0.0087	0.0214
Hydrogen Sulfide (excluded from VOC total)	0.0021	0.0001	0.0002	0.0006
Propane	1.5917	0.0982	0.1747	0.4302
Iso-Butane	3.7939	0.2341	0.4165	1.0254
N-Butane	6.0117	0.3709	0.6599	1.6247
Iso-Pentane	5.7972	0.3577	0.6364	1.5668
N-Pentane	4.8203	0.2974	0.5292	1.3027
Iso-Hexane	3.0442	0.1878	0.3342	0.8227
N-Hexane (TAP)	1.5744	0.0971	0.1728	0.4255
Methylcyclopentane	0.0000	0.0000	0.0000	0.0000
Benzene (TAP)	0.0219	0.0014	0.0024	0.0059
Cyclohexane	0.1801	0.0111	0.0198	0.0487

Heptanes	0.6697	0.0413	0.0735	0.1810
Methylcyclohexane	0.0484	0.0030	0.0053	0.0131
Toluene (TAP)	0.0157	0.0010	0.0017	0.0042
2,2,4-Trimethylpentane (TAP)	0.0000	0.0000	0.0000	0.0000
Octanes	0.0837	0.0052	0.0092	0.0226
Ethylbenzene (TAP)	0.0017	0.0001	0.0002	0.0005
Xylenes (TAP)	0.0021	0.0001	0.0002	0.0006
Nonanes	0.0089	0.0005	0.0010	0.0024
Decanes Plus	0.0000	0.0000	0.0000	0.0000
Total Weight Percent:	100.0000			
Total TAP Emissions		0.10	0.18	0.44
Total VOC Emissions		**1.71**	**3.04**	**7.48**
Total Non VOC & Non TAP-HC		0.01	0.01	0.04
Total Hydrocarbon Emissions		6.17	10.98	27.03

DATA:

Emission Source:	***Blanket Gas***
Average Annual Tank Throughput (BBLs/Yr):	***367,738***
Gross Blanket Gas Required (MSCF/Yr):	***2,065***
Gas from Process to Tank(s) (MSCF/Yr):	***2,972***
Calculated Volume Requirement (MSCF/Yr):	***-907***

**There are no emissions associated with supplied blanket gas as flash generated from the gun barrel tank should be sufficient to maintain the gas blanket as demonstrated herein.*

Uncontrolled VOC Emission Total (TPY)	Storage Vapors + Blanket Gas	=	**7.48**

DATA:

Emission Source:	***Losses When Opening Thief Hatches***
Specific Gravity of Gas:	***1.6716***
Maximum Thief Hatch Venting (Hrs/Yr) **(Under Normal/Routine Operating Conditions)**	***30***
Max. Minutes a Hatch is Opened in a Single Hour:	***5***
Maximum Hourly Emission Rate (lb/hr): **(from preceding tank emission estimates)**	***0.92***

Avg. Hourly Emissions (lb/hr)	=	Annual Total/8760 (hrs/yr)	=	**0.04**
Maximum Hourly Emissions (lb/hr)	=	Max. Emission Rate * Max. Minutes/Hr Hatch is Open	=	**0.92**
Maximum Annual Emissions (TPY)	=	Max. Hourly THC Rate * Hours/Yr Hatch is Open	=	**0.16**

EMISSION SUMMARY (based on the above referenced flare gas analysis):

POLLUTANT:	Weight Percent	CALCULATED EMISSION RATES		
		Average Hourly (lb/hr)	Maximum Hourly (lb/hr)	Annual (TPY)
Water Vapor (excluded from VOC total)	0.0000	0.000	0.000	0.000
Nitrogen (excluded from VOC total)	0.0000	0.000	0.000	0.000
Carbon Dioxide (excluded from VOC total)	72.1957	0.026	0.664	0.119
Methane (excluded from VOC total)	0.0575	0.000	0.001	0.000
Ethane (excluded from VOC total)	0.0791	0.000	0.001	0.000

Hydrogen Sulfide (excluded from VOC total)	0.0021	0.000	0.000	0.000
Propane	1.5917	0.001	0.015	0.003
Iso-Butane	3.7939	0.001	0.035	0.006
N-Butane	6.0117	0.002	0.055	0.010
Iso-Pentane	5.7972	0.002	0.053	0.010
N-Pentane	4.8203	0.002	0.044	0.008
Iso-Hexane	3.0442	0.001	0.028	0.005
N-Hexane (TAP)	1.5744	0.001	0.014	0.003
Methylcyclopentane	0.0000	0.000	0.000	0.000
Benzene (TAP)	0.0219	0.000	0.000	0.000
Cyclohexane	0.1801	0.000	0.002	0.000
Heptanes	0.6697	0.000	0.006	0.001
Methylcyclohexane	0.0484	0.000	0.000	0.000
Toluene (TAP)	0.0157	0.000	0.000	0.000
2,2,4-Trimethylpentane (TAP)	0.0000	0.000	0.000	0.000
Octanes	0.0837	0.000	0.001	0.000
Ethylbenzene (TAP)	0.0017	0.000	0.000	0.000
Xylenes (TAP)	0.0021	0.000	0.000	0.000
Nonanes	0.0089	0.000	0.000	0.000
Decanes Plus	0.0000	0.000	0.000	0.000
Other NM/NE HC	0.0000	0.000	0.000	0.000
Total Weight Percent:	100.0000			
Total TAP Emissions		0.00	0.01	0.00
Total VOC Emissions		**0.01**	**0.25**	**0.05**
Total Non VOC & Non TAP-HC		0.00	0.00	0.00
Total Emissions		0.04	0.92	0.16

Emission Calculations

EPN: CAP001 emission totals represent the maximum possible combined emissions from EPNs: 1e-05-WVF-CV, 1f-05-WVT-CV, 1g-05-WST-CV, & 1h-05-WST-CV to allow for operational flexibility. It should be noted that the combined water throughput rate for these sources will not exceed 15,000 barrels per year.

POINT SOURCE I.D. NUMBER: ***CAP001***

EMISSION SOURCE DESCRIPTION: ***Water Storage Tank Emissions Cap***

DATA:

Emission Source:	***Flash Gas from Brine Solution***
Approx. Pressure Drop of Brine Solution: (psig)	***43***
Approx. Temperature of Brine Solution: (^{o}F)	***99***
Flash Gas Specific Gravity:	***1.5197***
Max. Water Throughput: (BBLD)	***15000***
Vented Gas Rate: (MSCF/Day)	***11***
Basis of Emission Estimates:	***Metered Gas Volume & Actual Water Tank Vapor Analysis***

Avg. Hourly Uncontrolled Flash Rate (SCF/Hr)	=	Vented Gas Rate * 1000/24	=	**458.33**
Avg. Hourly Uncontrolled Total Flash Emissions (lb/hr)	=	Flash Gas Gravity * Density of Air * Flash Rate	=	**53.21**
Max. Hourly Uncontrolled Total Flash Emissions (lb/hr)	=	Hourly * Ratio of Max. Water Rate to Avg. Water Rate	=	**53.21**
Annual Potential Uncontrolled Flash Emissions (TPY)	=	Hourly * 8760/2000	=	**233.06**

EMISSION ESTIMATES:

The composition of this gas is based on an actual water tank vapor analysis and normalized to account for the presence of H_2S; refer to Southern Flow Companies, Inc. Report in supporting documentation.

EMISSIONS SUMMARY:

POLLUTANT:	Weight Percent	CALCULATED EMISSION RATES		
		Average Hourly (lb/hr)	Maximum Hourly (lb/hr)	Annual (TPY)
Nitrogen (excluded from VOC total)	0.3251	0.1730	0.1730	0.7576
Carbon Dioxide (excluded from VOC total)	95.3602	50.7454	50.7454	222.2463
Methane (excluded from VOC total)	0.4908	0.2612	0.2612	1.1440
Ethane (excluded from VOC total)	0.3169	0.1686	0.1686	0.7385
Hydrogen Sulfide (excluded from VOC total)	0.0023	0.0012	0.0012	0.0054
Propane	0.3862	0.2055	0.2055	0.9001
Iso-Butane	0.4022	0.2140	0.2140	0.9375
N-Butane	0.5170	0.2751	0.2751	1.2049
Iso-Pentane	0.4060	0.2161	0.2161	0.9462
N-Pentane	0.3520	0.1873	0.1873	0.8203
Iso-Hexane	0.3148	0.1675	0.1675	0.7337
N-Hexane (TAP)	0.2151	0.1145	0.1145	0.5013
Methylcyclopentane	0.0000	0.0000	0.0000	0.0000

Benzene (TAP)	0.0018	0.0009	0.0009	0.0041
Cyclohexane	0.0191	0.0102	0.0102	0.0445
Heptanes	0.2888	0.1537	0.1537	0.6730
Methylcyclohexane	0.0000	0.0000	0.0000	0.0000
Toluene (TAP)	0.0293	0.0156	0.0156	0.0682
2,2,4-Trimethylpentane (TAP)	0.2229	0.1186	0.1186	0.5195
Octanes Plus	0.1037	0.0552	0.0552	0.2416
Ethylbenzene (TAP)	0.0096	0.0051	0.0051	0.0225
Xylenes (TAP)	0.0434	0.0231	0.0231	0.1011
Nonanes	0.1251	0.0666	0.0666	0.2916
Decanes Plus	0.0678	0.0361	0.0361	0.1580
Total Weight Percent:	100.0000			
Total TAP Emissions		0.28	0.28	1.22
Total VOC Emissions		**1.87**	**1.87**	**8.17**
Total Non VOC & Non TAP-HC		0.43	0.43	1.88
Total Emissions		53.21	53.21	233.06

VOC Emission Total (TPY)	=	Brine Flash Gas	=	**8.17**

Emission Calculations

POINT SOURCE I.D. NUMBER: ***2-05-SUMP***

EMISSION SOURCE DESCRIPTION: ***Sump Tank***

DATA:

Emission Source:	***"Working" & "Standing" Losses***		
Maximum Annual Throughput: **(Gallons/Yr)**	***12,700***		
Average VOC Working Losses - L_W (lb/yr):	***63.540***		
Average VOC Standing Losses - L_S (lb/yr):	***150.666***		
Basis of Estimates:	***AP-42, Chapter 7 (June 2020, Section 7.1.3.1); Refer to supporting documentation for summary***		
Avg. Hourly Uncontrolled THC Losses (lb/hr)	= (Lw + Ls) / 8760	=	**0.02**
Annual Potential Uncontrolled THC Losses (TPY)	= Hourly * 8760/2000	=	**0.11**

For purposes of permitting and/or providing conservative emission estimates, emissions were calculated using N-Hexane as the stored material for this tank. A throughput of approximately 12,700 gallons/yr was used in the emissions model in an effort to demonstrate a conservative potential emissions estimate.

Emission Calculations

POINT SOURCE I.D. NUMBER: ***3a-05-F***

EMISSION SOURCE DESCRIPTION: ***Control Flare (ZZZ-180A)***

DATA:

Emission Source:	***Unburned Hydrocarbons and Products of Combustion***
Atmospheric Gas Streams:	
Gas Stream #1:	***Oil Storage Tank Vapors***
Gas Heat of Combustion (BTU/Ft^3-actual flare gas analysis):	***751***
Assist Gas Feed:	***Yes***
Gas Heat of Combustion (BTU/Ft^3-typical fuel gas analysis):	***1037***
Combustion Efficiency:	***98% for all HC***

Gas Stream #1 - Oil Storage Tank Vapors

Gas volume estimates are supported by the calculations associated with EPNs: 1a-05-GBT-CV through 1d-05-OST-CV and are outlined below:

INPUT

Maximum Gas Flowrate (scf/hr)	*Operating Time (hrs/year)*	*Burn Efficiency (%)*	*Gas Heat of Combustion (BTU/FT^3)*	*Specific Gravity of Gas*
1,561.79	*8760*	*98*	*751*	*1.6716*

CALCULATIONS

Gas Combusted (annual hourly average)	=	*gas rate (scf/hr)*	*x*	*efficiency*	*x*	*usage (hrs/yr)*
	=	*1,561.79*	*x*	*0.98*	*x*	*8,760*
	=	***13,407,655 scf/yr***		=	***1,530.55 SCF/hr***	
Heat Content (annual hourly average)	=	*gas rate (scf/yr)*	*x*	*gas heat of combustion (BTU/scf)*		
	=	*13,407,655*	*x*	*751*		
	=			***1.1494 MMBTU/Hr***		
Uncontrolled Max. Hourly Emissions (lbs/hr)	=	*gas specific gravity*	*x*	*density of air (lb/SCF)*	*x*	*Maximum Gas Rate (SCF/Hr)*
	=	*1.6716*	*x*	*0.0764*	*x*	*1,561.79*
	=	***199.46 lbs/hr***				
Uncontrolled Annual Emissions (TPY)	=	*gas specific gravity*	*x*	*density of air (tons/SCF)*	*x*	*Total Gas Rate (SCF/Yr)*
	=	*1.6716*	*x*	*0.0000382*	*x*	*13,681,280*
	=	***873.62 TPY***				

SPECIATION FACTORS:

Speciation of the flash gas mixture is based on an actual analysis of the vapors routed to the control flare and normalized to account for the removal of Nitrogen and the presence of H2S; refer to in supporting documentation.

EMISSIONS SUMMARY:

POLLUTANT:	**Weight Percent**	**CALCULATED EMISSION RATES**		
		Average Hourly (lb/hr)	**Maximum Hourly (lb/hr)**	**Annual (TPY)**
Nitrogen (excluded from VOC total)	0.0000	0.0000	0.0000	0.0000
Carbon Dioxide (excluded from VOC total)	72.1957	143.9991	143.9991	630.7160

Methane (excluded from VOC total)	0.0575	0.0023	0.0023	0.0100
Ethane (excluded from VOC total)	0.0791	0.0032	0.0032	0.0138
Hydrogen Sulfide (TAP; excluded from VOC total)	0.0021	0.0001	0.0001	0.0004
Propane	1.5917	0.0635	0.0635	0.2781
Iso-Butane	3.7939	0.1513	0.1513	0.6629
N-Butane	6.0117	0.2398	0.2398	1.0504
Iso-Pentane	5.7972	0.2313	0.2313	1.0129
N-Pentane	4.8203	0.1923	0.1923	0.8422
Iso-Hexanes	3.0442	0.1214	0.1214	0.5319
N-Hexane (TAP)	1.5744	0.0628	0.0628	0.2751
Methylcyclopentane	0.0000	0.0000	0.0000	0.0000
Benzene (TAP)	0.0219	0.0009	0.0009	0.0038
Cyclohexane	0.1801	0.0072	0.0072	0.0315
Heptanes	0.6697	0.0267	0.0267	0.1170
Methylcyclohexane	0.0484	0.0019	0.0019	0.0085
Toluene (TAP)	0.0157	0.0006	0.0006	0.0027
2,2,4-Trimethylpentane (TAP)	0.0000	0.0000	0.0000	0.0000
Octanes	0.0837	0.0033	0.0033	0.0146
Ethylbenzene (TAP)	0.0017	0.0001	0.0001	0.0003
Xylenes (TAP)	0.0021	0.0001	0.0001	0.0004
Nonanes	0.0089	0.0004	0.0004	0.0016
Decanes Plus	0.0000	0.0000	0.0000	0.0000
Other NM/NE HC	0.0000	0.0000	0.0000	0.0000
TOTAL WEIGHT PERCENT:	100.0000			
TOTAL TAP EMISSIONS:		0.06	0.06	0.28
TOTAL VOC EMISSIONS:		**1.10**	**1.10**	**4.83**
TOTAL Non-VOC & Non-TAP HC:		0.01	0.01	0.02
TOTAL EMISSIONS:		145.11	145.11	635.57

Assist Gas (maximum gas flowrate based on conservative estimate):

Gas volume is a conservative estimate provided by operator:

INPUT				
Maximum Gas Flowrate (scf/hr)	*Operating Time (hrs/year)*	*Burn Efficiency (%)*	*Gas Heat of Combustion (BTU/FT^3)*	*Specific Gravity of Gas*
150.00	*8760*	*98*	*1037*	*0.5925*

CALCULATIONS						
Gas Combusted (annual hourly average)	=	*gas rate (scf/hr)*	*x*	*efficiency*	*x*	*usage (hrs/yr)*
	=	*150.00*	*x*	*0.98*	*x*	*8,760*
	=	***1,287,720***	***scf/yr***	=	***147.00***	***SCF/hr***
Heat Content (annual hourly average)	=	*gas rate (scf/yr)*	*x*	*gas heat of combustion (BTU/scf)*		
	=	*1,287,720*	*x*	*1037*		
	=			***0.1524***	***MMBTU/Hr***	
Uncontrolled Max. Hourly Emissions (lbs/hr)	=	*gas specific gravity*	*x*	*density of air (lb/SCF)*	*x*	*Maximum Gas Rate (SCF/Hr)*
	=	*0.5925*	*x*	*0.0764*	*x*	*150.00*
	=	***6.79***	***lbs/hr***			
Uncontrolled Annual Emissions (TPY)	=	*gas specific gravity*	*x*	*density of air (tons/SCF)*	*x*	*Total Gas Rate (SCF/Yr)*
	=	*0.5925*	*x*	*0.0000382*	*x*	*1,314,000*
	=	***29.74***	***TPY***			

SPECIATION FACTORS:

Speciation of the assist gas is based on a typical fuel gas analysis; refer to in supporting documentation.

EMISSIONS SUMMARY:

POLLUTANT:	Weight Percent	CALCULATED EMISSION RATES		
		Average Hourly (lb/hr)	Maximum Hourly (lb/hr)	Annual (TPY)
Nitrogen (excluded from VOC total)	0.6661	0.0452	0.0452	0.1981
Carbon Dioxide (excluded from VOC total)	2.9413	0.1997	0.1997	0.8748
Methane (excluded from VOC total)	89.0707	0.1210	0.1210	0.5298
Ethane (excluded from VOC total)	4.4023	0.0060	0.0060	0.0262
Hydrogen Sulfide (TAP; excluded from VOC total)	0.0000	0.0000	0.0000	0.0000
Propane	1.2597	0.0017	0.0017	0.0075
Iso-Butane	0.4244	0.0006	0.0006	0.0025
N-Butane	0.4075	0.0006	0.0006	0.0024
Iso-Pentane	0.2192	0.0003	0.0003	0.0013
N-Pentane	0.1264	0.0002	0.0002	0.0008
Iso-Hexanes	0.2925	0.0004	0.0004	0.0017
N-Hexane (TAP)	0.0678	0.0001	0.0001	0.0004
Methylcyclopentane	0.0000	0.0000	0.0000	0.0000
Benzene (TAP)	0.0137	0.0000	0.0000	0.0001
Cyclohexane	0.0000	0.0000	0.0000	0.0000
Heptanes	0.0366	0.0000	0.0000	0.0002

Methylcyclohexane	0.0000	0.0000	0.0000	0.0000
Toluene (TAP)	0.0140	0.0000	0.0000	0.0001
2,2,4-Trimethylpentane (TAP)	0.0162	0.0000	0.0000	0.0001
Octanes Plus	0.0368	0.0000	0.0000	0.0002
Ethylbenzene (TAP)	0.0008	0.0000	0.0000	0.0000
Xylenes (TAP)	0.0041	0.0000	0.0000	0.0000
TOTAL WEIGHT PERCENT:	100.0000			
TOTAL TAP EMISSIONS:		0.00	0.00	0.00
TOTAL VOC EMISSIONS:		**0.00**	**0.00**	**0.02**
TOTAL Non-VOC & Non-TAP HC:		0.13	0.13	0.56
TOTAL EMISSIONS:		0.38	0.38	1.65

Total of Average Hourly VOC emissions estimated for this source:	**1.10 Lbs/Hr**
Total of Maximum Hourly VOC emissions estimated for this source:	**1.10 Lbs/Hr**
Total of Maximum Annual VOC emissions estimated for this source:	**4.85 TPY**

CALCULATIONS - Selected Combustion Products

Summary of all routine streams combusted by this flare:

Gas Stream	*Annual Operating Hours*	*Average Flowrate (SCF/Hr)*	*Maximum Flowrate (SCF/Hr)*	*Average Heat Rate (MMBTU/Hr)*	*Maximum Heat Rate (MMBTU/Hr)*
1. Oil Storage Tank Vapors	8760	1561.79	1561.79	1.1494	1.1494
Assist Gas Feed	8760	150.00	150.00	0.1524	0.1524
Totals:		***1,711.79***	***1,711.79***	***1.30***	***1.30***

Emission factor for soot is from AP-42 "Compilation of Air Pollution Emission Factors" for an industrial burn flare stack (refer to supporting documentation for copies).
SO_2 emissions based on the composite H_2S composition of the flare gas streams assuming stoichiometric combustion.

POLLUTANT:	**Emission Factor (lb/SCF)**	**CALCULATED EMISSION RATES**		
		Average Hourly (lb/hr)	**Maximum Hourly (lb/hr)**	**Annual (TPY)**
Soot (expressed as PM_{10})	0.000011	0.02	0.02	0.08
Soot (expressed as $PM_{2.5}$)	0.000011	0.02	0.02	0.08
SO_2	N/A	0.00	0.00	0.03

Emission factors for nitrogen oxide and carbon monoxide are from a 1983 CMA document entitled "A Report on a Flare Efficiency Study", for a non-assisted industrial burn flares. (refer to supporting documentation for copies).

POLLUTANT:	**Emission Factor ($lb/10^6$ BTU)**	**CALCULATED EMISSION RATES**		
		Average Hourly (lb/hr)	**Maximum Hourly (lb/hr)**	**Annual (TPY)**
Nitrogen Oxides	0.0641	0.08	0.08	0.36
CO	0.5496	0.71	0.71	3.13

Emission Calculations

POINT SOURCE I.D. NUMBER: ***3b-05-F***

EMISSION SOURCE DESCRIPTION: ***Control Flare (ZZZ-180B)***

DATA:

Emission Source:	***Unburned Hydrocarbons and Products of Combustion***
Atmospheric Gas Streams:	
Purge Gas Feed:	***Yes***
Gas Heat of Combustion (BTU/Ft^3-typical fuel gas analysis):	***1037***
Combustion Efficiency:	***98% for all HC***

Purge Gas (maximum gas flowrate based on conservative estimate):

INPUT				
Maximum Gas Flowrate (scf/hr)	*Operating Time (hrs/year)*	*Burn Efficiency (%)*	*Gas Heat of Combustion (BTU/FT^3)*	*Specific Gravity of Gas*
150.00	*8760*	*98*	*1037*	*0.5925*

CALCULATIONS						
Gas Combusted (annual hourly average)	=	*gas rate (scf/hr)*	*x*	*efficiency*	*x*	*usage (hrs/yr)*
	=	*150.00*	*x*	*0.98*	*x*	*8,760*
	=	***1,287,720 scf/yr***		=	***147.00 SCF/hr***	
Heat Content (annual hourly average)	=	*gas rate (scf/yr)*	*x*	*gas heat of combustion (BTU/scf)*		
	=	*1,287,720*	*x*	*1037*		
	=			***0.1524 MMBTU/Hr***		
Uncontrolled Max. Hourly Emissions (lbs/hr)	=	*gas specific gravity*	*x*	*density of air (lb/SCF)*	*x*	*Maximum Gas Rate (SCF/Hr)*
	=	*0.5925*	*x*	*0.0764*	*x*	*150.00*
	=	***6.79 lbs/hr***				
Uncontrolled Annual Emissions (TPY)	=	*gas specific gravity*	*x*	*density of air (tons/SCF)*	*x*	*Total Gas Rate (SCF/Yr)*
	=	*0.5925*	*x*	*0.0000382*	*x*	*1,314,000*
	=	***29.74 TPY***				

SPECIATION FACTORS:

Speciation of the purge gas is based on a typical fuel gas analysis; refer to supporting documentation.

EMISSIONS SUMMARY:

POLLUTANT:	**Weight Percent**	**CALCULATED EMISSION RATES**		
		Average Hourly (lb/hr)	**Maximum Hourly (lb/hr)**	**Annual (TPY)**
Nitrogen (excluded from VOC total)	0.6661	0.0452	0.0452	0.1981
Carbon Dioxide (excluded from VOC total)	2.9413	0.1997	0.1997	0.8748
Methane (excluded from VOC total)	89.0707	0.1210	0.1210	0.5298
Ethane (excluded from VOC total)	4.4023	0.0060	0.0060	0.0262

Hydrogen Sulfide (TAP; excluded from VOC total)	0.0000	0.0000	0.0000	0.0000
Propane	1.2597	0.0017	0.0017	0.0075
Iso-Butane	0.4244	0.0006	0.0006	0.0025
N-Butane	0.4075	0.0006	0.0006	0.0024
Iso-Pentane	0.2192	0.0003	0.0003	0.0013
N-Pentane	0.1264	0.0002	0.0002	0.0008
Iso-Hexanes	0.2925	0.0004	0.0004	0.0017
N-Hexane (TAP)	0.0678	0.0001	0.0001	0.0004
Methylcyclopentane	0.0000	0.0000	0.0000	0.0000
Benzene (TAP)	0.0137	0.0000	0.0000	0.0001
Cyclohexane	0.0000	0.0000	0.0000	0.0000
Heptanes	0.0366	0.0000	0.0000	0.0002
Methylcyclohexane	0.0000	0.0000	0.0000	0.0000
Toluene (TAP)	0.0140	0.0000	0.0000	0.0001
2,2,4-Trimethylpentane (TAP)	0.0162	0.0000	0.0000	0.0001
Octanes Plus	0.0368	0.0000	0.0000	0.0002
Ethylbenzene (TAP)	0.0008	0.0000	0.0000	0.0000
Xylenes (TAP)	0.0041	0.0000	0.0000	0.0000
TOTAL WEIGHT PERCENT:	100.0000			
TOTAL TAP EMISSIONS:		0.00	0.00	0.00
TOTAL VOC EMISSIONS:		**0.00**	**0.00**	**0.02**
TOTAL Non-VOC & Non-TAP HC:		0.13	0.13	0.56
TOTAL EMISSIONS:		0.38	0.38	1.65

Total of Average Hourly VOC emissions estimated for this source:	**0.00 Lbs/Hr**
Total of Maximum Hourly VOC emissions estimated for this source:	**0.00 Lbs/Hr**
Total of Maximum Annual VOC emissions estimated for this source:	**0.02 TPY**

CALCULATIONS - Selected Combustion Products

Summary of all routine streams combusted by this flare:

Gas Stream	*Annual Operating Hours*	*Average Flowrate (SCF/Hr)*	*Maximum Flowrate (SCF/Hr)*	*Average Heat Rate (MMBTU/Hr)*	*Maximum Heat Rate (MMBTU/Hr)*
Purge Gas Feed	8760	150.00	150.00	0.1524	0.1524
	Totals:	***150.00***	***150.00***	***0.15***	***0.15***

Emission factor for soot is from AP-42 "Compilation of Air Pollution Emission Factors" for an industrial burn flare stack (refer to supporting documentation for copies).
SO_2 emissions based on the composite H_2S composition of the flare gas streams assuming stoichiometric combustion.

POLLUTANT:	Emission Factor (lb/SCF)	CALCULATED EMISSION RATES		
		Average Hourly (lb/hr)	Maximum Hourly (lb/hr)	Annual (TPY)
Soot (expressed as PM_{10})	0.000011	0.00	0.00	0.01
Soot (expressed as $PM_{2.5}$)	0.000011	0.00	0.00	0.01
SO_2	N/A	0.00	0.00	0.00

Emission factors for nitrogen oxide and carbon monoxide are from a 1983 CMA document entitled "A Report on a Flare Efficiency Study", for a non-assisted industrial burn flares. (refer to supporting documentation for copies).

POLLUTANT:	Emission Factor ($lb/10^6$ BTU)	CALCULATED EMISSION RATES		
		Average Hourly (lb/hr)	Maximum Hourly (lb/hr)	Annual (TPY)
Nitrogen Oxides	0.1380	0.02	0.02	0.09
CO	0.2755	0.04	0.04	0.18

Emission Calculations

POINT SOURCE I.D. NUMBERS: ***4-05-FE***

EMISSION SOURCE DESCRIPTION: ***Fugitive Emissions***

DATA:

Emission Source:	***Fugitive from Light Liquid & Gas-Service Components***
Basis of Emission Estimates:	***U.S. EPA***

EMISSION CALCULATIONS:

	Count - by Service			THC Emission Factors [(c)] (kg/hr/source)		Calculated THC Emissions			
						Hourly Emissions (lb/hr)		Annual Emissions (TPY)	
	Lt. Liquid	Gas	Total	Lt. Liquid Service	Gas Service	LL	Gas	LL	Gas
Connectors	1204	1,046	2250	2.1E-04	2.0E-04	0.557	0.461	2.44	2.02
Flanges	493	170	663	1.1E-04	3.9E-04	0.120	0.146	0.52	0.64
Open Ends	43	38	81	1.4E-03	2.0E-03	0.133	0.168	0.58	0.73
Pumps[(a)]	9		9	1.3E-02	2.4E-03	0.258	N/A	1.13	N/A
Valves	400	225	625	2.5E-03	4.5E-03	2.205	2.232	9.66	9.78
"Others"[(b)]	22	23	45	7.5E-03	8.8E-03	0.364	0.446	1.59	1.95
TOTALS:	**2,171**	**1,502**	**3,673**			**3.64**	**3.45**	**15.93**	**15.13**

[(a)] Process Pumps Only

[(b)] "Others" equipment derived from compressors, diaphragms, drains, dump arms, hatches, instruments, meters, pressure relief valves, polished rods, relief valves, and vents

[(c)] Refer to EPA Publication No. 453/R-95-017, "Protocol for Equipment Leak Emission Estimates", copy included in supporting documentation

LIGHT LIQUID-SERVICE SPECIATION FACTORS:

Speciation of the emission stream from components in light liquid service was taken from EPA Publication No.: 453/R-95-017; "Protocol for Equipment Leak Emission Estimates" and normalized to account for the presence of H_2S.

EMISSIONS SUMMARY:

Component	Weight Percent	Calculated Emission Rate	
		Avg. Hourly (lb/hr)	Avg. Annual (TPY)
Hydrogen Sulfide (TAP; excluded from VOC total)	0.0045	0.0002	0.0007
NMEHC (expressed as VOC)	29.1987	1.0617	4.6501
Benzene (TAP)	0.0270	0.0010	0.0043
Ethylbenzene (TAP)	0.0170	0.0006	0.0027

Toluene (TAP)	0.0750	0.0027	0.0119
Xylenes (m,p,o) (TAP)	0.0360	0.0013	0.0057
	TOTAL TAP EMISSIONS:	0.01	0.03
	TOTAL VOC EMISSIONS:	**1.06**	**4.65**

GAS SERVICE SPECIATION FACTORS:

Speciation of the emission stream from components in gas service is based on an actual inlet gas analysis and normalized to account for the presence of H2S; refer to Southern Petroleum Laboratories Report No.: 172-23080193-003A in supporting documentation.

EMISSIONS SUMMARY:

Component	Weight Percent	Calculated Emission Rate	
		Avg. Hourly (lb/hr)	Avg. Annual (TPY)
Nitrogen (excluded from VOC total)	1.6596	0.0573	0.2510
Carbon Dioxide (excluded from VOC total)	94.6851	3.2698	14.3217
Methane (excluded from VOC total)	0.5808	0.0201	0.0879
Ethane (excluded from VOC total)	0.1010	0.0035	0.0153
Hydrogen Sulfide (TAP; excluded from VOC total)	0.0023	0.0001	0.0004
Propane	0.3348	0.0116	0.0506
Iso-Butane	0.3557	0.0123	0.0538
N-Butane	0.4863	0.0168	0.0736
Iso-Pentane	0.3356	0.0116	0.0508
N-Pentane	0.3146	0.0109	0.0476
Iso-Hexanes	0.3159	0.0109	0.0478
N-Hexane (TAP)	0.2477	0.0086	0.0375
Methylcyclopentane	0.0000	0.0000	0.0000
Benzene (TAP)	0.0177	0.0006	0.0027
Cyclohexane	0.0884	0.0031	0.0134
Heptanes	0.2195	0.0076	0.0332
Methylcyclohexane	0.0565	0.0020	0.0085
Toluene (TAP)	0.0116	0.0004	0.0018
2,2,4-Trimethylpentane (TAP)	0.0000	0.0000	0.0000
Octanes	0.0783	0.0027	0.0118
Ethylbenzene (TAP)	0.0015	0.0001	0.0002
Xylenes (TAP)	0.0134	0.0005	0.0020
Nonanes	0.0600	0.0021	0.0091
Decanes Plus	0.0336	0.0012	0.0051
TOTAL WEIGHT PERCENT:	100.0000		
	TOTAL TAP EMISSIONS:	0.01	0.04
	TOTAL VOC EMISSIONS:	**0.10**	**0.45**
	TOTAL Non-VOC & Non-TAP HC:	0.02	0.10
	TOTAL Emissions:	3.45	15.13

Facility-Wide VOC Fugitive Totals	=	**1.16 lb/hr**	**5.10 TPY**

Emission Calculations

POINT SOURCE I.D. NUMBER: ***5-05-CB***

EMISSION SOURCE DESCRIPTION: ***Compressor Blowdowns***

DATA:

Emission Source:	***Compressor Blowdowns***
Gas Specific Gravity:	***1.5034***
Maximum Volume per Blowdown Rate (SCF): *(conservative estimate provided by operator)*	***7261***
Maximum Number of Blowdowns per Year:	***36***
Basis of Emission Estimates:	***Conservative Estimate Provided By Operator & Actual Inlet Gas Analysis (Refer to supporting documentation)***
Well Gas Analysis Report Number:	***Southern Petroleum Laboratories Report No.: 172-23080193-003A***

Total Blowdown Gas Volume (SCF/Yr)	=	Volume per Event * Number of Events	=	**261396.00**
Avg. Hourly Uncontrolled Total Emissions (lb/hr)	=	Gas Gravity * Density of Air * Volume per Blowdown	=	**834.00**
Max. Hourly Uncontrolled Total Emissions (lb/hr)	=	Gas Gravity * Density of Air * Volume per Blowdown	=	**834.00**
Annual Potential Uncontrolled Total Emissions (TPY)	=	Hourly * Number of Events per Year/2000	=	**15.01**

SPECIATION FACTORS:

Speciation of the compressor blowdowns is based on the referenced analysis and normalized to account for the presence of H_2S.

EMISSIONS SUMMARY:

POLLUTANT:	Weight Percent	CALCULATED EMISSION RATES		
		Average Hourly (lb/hr)	Maximum Hourly (lb/hr)	Annual (TPY)
Nitrogen (excluded from VOC total)	1.6596	13.8410	13.8410	0.2491
Carbon Dioxide (excluded from VOC total)	94.6851	789.6710	789.6710	14.2141
Methane (excluded from VOC total)	0.5808	4.8441	4.8441	0.0872
Ethane (excluded from VOC total)	0.1010	0.8427	0.8427	0.0152
Hydrogen Sulfide (excluded from VOC total)	0.0023	0.0196	0.0196	0.0004
Propane	0.3348	2.7920	2.7920	0.0503
Iso-Butane	0.3557	2.9663	2.9663	0.0534
N-Butane	0.4863	4.0558	4.0558	0.0730
Iso-Pentane	0.3356	2.7989	2.7989	0.0504
N-Pentane	0.3146	2.6236	2.6236	0.0472
Iso-Hexane	0.3159	2.6342	2.6342	0.0474
N-Hexane (TAP)	0.2477	2.0655	2.0655	0.0372
Methylcyclopentane	0.0000	0.0000	0.0000	0.0000
Benzene (TAP)	0.0177	0.1479	0.1479	0.0027
Cyclohexane	0.0884	0.7373	0.7373	0.0133
Heptanes	0.2195	1.8305	1.8305	0.0329
Methylcyclohexane	0.0565	0.4714	0.4714	0.0085
Toluene (TAP)	0.0116	0.0969	0.0969	0.0017

2,2,4-Trimethylpentane (TAP)	0.0000	0.0000	0.0000	0.0000
Octanes	0.0783	0.6533	0.6533	0.0118
Ethylbenzene (TAP)	0.0015	0.0122	0.0122	0.0002
Xylenes (TAP)	0.0134	0.1117	0.1117	0.0020
Nonanes	0.0600	0.5005	0.5005	0.0090
Decanes Plus	0.0336	0.2803	0.2803	0.0050
Total Weight Percent:	100.0000			
Total TAP Emissions		2.45	2.45	0.04
Total VOC Emissions		**24.78**	**24.78**	**0.45**
Total Non VOC & Non TAP-HC		5.69	5.69	0.10
Total Emissions		834.00	834.00	15.01

Uncontrolled VOC Emission Total (TPY)	Compressor Blowdowns	=	**0.45**

Michael Watson
SECRETARY OF STATE

This is not an official certificate of good standing.

Name History

Name	Name Type
DENBURY ONSHORE, LLC	Legal

Business Information

Business Type:	Limited Liability Company
Business ID:	743899
Status:	Good Standing
Effective Date:	12/31/2003
State of Incorporation:	DE
Principal Office Address:	5851 Legacy Circle, Suite 1200 Plano, TX 75024

Registered Agent

Name

CORPORATION SERVICE COMPANY
109 Executive Drive, Suite 3
Madison, MS 39110

Officers & Directors

Name	Title
Alan Rhoades 5320 LEGACY DRIVE PLANO, TX 75024	Organizer
KATHLEEN D ASH 5851 LEGACY CIRCLE, SUITE 1200 PLANO, TX 75024	Manager
KATHLEEN A BRACCI 5851 LEGACY CIRCLE, SUITE 1200 PLANO, TX 75024	Manager
ROBERT D TRACY 5851 LEGACY CIRCLE, SUITE 1200 PLANO, TX 75024	Manager

Tank Emission Calculations Based on AP 42 Chapter 7 (June 2020, Section 7.1.3.1), Fixed Roof

Tank ID	**1a-05-GBT-CV**
Tank Description	**5000 BBL Gun Barrel Tank (ABJ-111)**
Company Name	**Denbury Onshore, LLC**

Tank Orientation	**Vertical**
Tank Diameter (D ft)	**38.67**
Vertical Height/Horizontal Length (H_S ft)	**24.00**
Roof Height (H_R ft)	**1.21**
Max Liquid Height (H_{LX} ft)	**23.00**
Avg Liquid Height (H_L ft)	**11.50**
Breather Vent Pressure Setting (P_{BP} psig)	
Breather Vent Vacuum Setting (P_{BV} psig)	
actual tank pressure (P_I psig)	**0.0**
Shell Paint Solar Absorptance (S_A)	**0.64**
Roof Paint Solar Absorptance (R_A)	**0.64**
breather vent pressure range (ΔP_B psi)	**0.00**
roof outage (H_{RO} ft)	**0.4028**

Tank Shell Color/Shade	**Aluminum - Diffuse**
Tank Shell Paint Condition	**average**
Tank Roof Color/Shade	**Aluminum - Diffuse**
Tank Roof Paint Condition	**average**
Roof Type	**vertical tank with cone roof**
Tank Insulation	**no insulation**
Tank Underground?	**no**
Annual Throughput (Q bbl/year)	**730,000.00**
Annual Turnovers, N	**151.72**
Annual Hours	**8,760**
tank max liquid volume (V_{LX} ft^3)	**27,012.58**
vapor space outage (H_{VO} ft)	**12.903**
vapor space volume (V_V ft^3)	**15,153.84**

Major City for Meterological Data	**Meridian, MS**
Site Elevation (ft)	**400**
Atmospheric Pressure (P_A psia)	**14.485**
Table 7.1-2 Liquid	**crude oil**
*RVP**	**4.12**
*API gravity**	**29.8**
*°F basis for gv**	**60.0**
bubble point psia	
API gravity at 60F	**29.8**
API gravity at 100F	**32.5**
Working Loss Product Factor (K_P)	**0.75**
working loss turnover factor K_N	**1.000**

*sales oil data determines RVP per API pub 4683

Tank contents (if not selected from Table 7.1-2):

component	*mole%*	*MW*	*lb/mole*	*wt%*	*Antoine constants (log 10, mmHg, °C) A*	*B*	*C*
0	0.000						
0	0.000						
0	0.000						
0	0.000						
0	0.000						
0	0.000						
0	0.000						
0	0.000						
0	0.000						
0	0.000						
	0.000		0.000	0.000			

	Jan	*Feb*	*Mar*	*Apr*	*May*	*Jun*	*Jul*	*Aug*	*Sep*	*Oct*	*Nov*	*Dec*	*Avg*
hourly average maximum ambient temperature (T_{AX} °F)	57.10	61.40	68.80	76.20	83.40	88.80	91.40	91.10	86.50	77.30	66.90	58.50	75.60
hourly average minimum ambient temperature (T_{AN} °F)	35.80	38.10	44.50	51.50	60.80	67.80	70.80	70.20	64.20	52.50	42.50	36.90	53.00
daily total solar insolation factor (I btu/ft^2 day)	783	1044	1380	1726	1918	1989	1945	1823	1544	1252	924	727	1421
daily average ambient temperature (T_{AA} °F)	46.45	49.75	56.65	63.85	72.10	78.30	81.10	80.65	75.35	64.90	54.70	47.70	64.30
liquid bulk temperature (T_B °F)	47.95	51.75	59.30	67.16	75.78	82.12	84.83	84.15	78.31	67.30	56.47	49.10	67.03
average vapor temperature (T_V °F)	51.28	56.19	65.16	74.50	83.93	90.57	93.10	91.89	84.87	72.62	60.40	52.18	73.06
daily ambient temperature range (ΔT_A °R)	21.30	23.30	24.30	24.70	22.60	21.00	20.60	20.90	22.30	24.80	24.40	21.60	22.60
daily vapor temperature range (ΔT_V °R)	25.00	29.67	34.67	39.38	40.37	40.16	39.32	37.96	35.37	33.39	28.95	24.59	34.01
daily average liquid surface temperature (T_{LA} °F)	49.62	53.97	62.23	70.83	79.86	86.34	88.97	88.02	81.59	69.96	58.44	50.64	70.05
daily maximum liquid surface temperature (T_{LX} °F)	55.87	61.39	70.90	80.68	89.95	96.38	98.79	97.51	90.44	78.31	65.67	56.79	78.55
daily minimum liquid surface temperature (T_{LN} °F)	43.37	46.55	53.56	60.98	69.76	76.30	79.14	78.53	72.75	61.62	51.20	44.49	61.54
vapor pressure at daily avg liq surface temp T_{LA} (P_{VA} psia)	1.775	1.946	2.308	2.742	3.265	3.688	3.872	3.805	3.374	2.695	2.136	1.814	2.700
vapor pressure at daily max liq surface temp T_{LX} (P_{VX} psia)	2.025	2.269	2.745	3.316	3.942	4.430	4.625	4.520	3.978	3.170	2.475	2.064	3.184
vapor pressure at daily min liq surface temp T_{LN} (P_{VN} psia)	1.550	1.662	1.929	2.250	2.684	3.050	3.220	3.183	2.847	2.280	1.835	1.589	2.276
daily vapor pressure range (ΔP_V)	0.4745	0.6075	0.8159	1.0658	1.2578	1.3799	1.4043	1.3370	1.1310	0.8904	0.6391	0.4751	0.9083
vapor space expansion factor (K_E)	0.0864	0.1062	0.1334	0.1650	0.1869	0.2014	0.2040	0.1945	0.1671	0.1386	0.1076	0.0857	0.1413
vapor molecular weight (M_V lb/lbmole)	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00
monthly hours with avg = total annual	744	672	744	720	744	720	744	744	720	744	720	744	8,760
throughputs (ft^3/month) and avg = total annual	348,068	314,384	348,068	336,840	348,068	336,840	348,068	348,068	336,840	348,068	336,840	348,068	4,098,220
monthly turnovers (N/month) with avg = total annual	12.89	11.64	12.89	12.47	12.89	12.47	12.89	12.89	12.47	12.89	12.47	12.89	151.72
vented vapor saturation factor (K_S)	0.4518	0.4290	0.3878	0.3479	0.3093	0.2839	0.2741	0.2776	0.3023	0.3517	0.4064	0.4464	0.3514
vent setting correction factor (K_B)	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
vapor density (W_V lb/ft^3)	0.0162	0.0176	0.0205	0.0239	0.0280	0.0312	0.0326	0.0321	0.0289	0.0236	0.0191	0.0165	0.0236
standing storage losses (L_S lb/month & avg is lb/yr)	377.35	370.20	477.83	539.63	652.54	704.82	761.00	749.51	651.52	550.10	431.75	384.99	6651.24
working losses (L_W lb/month & avg is lb/yr)	4224.48	4144.51	5349.43	6041.34	7305.39	7890.61	8519.58	8390.94	7293.99	6158.54	4833.59	4310.03	74462.44
total losses (L_T lb/month & avg is lb/yr)	4601.83	4514.71	5827.26	6580.98	7957.93	8595.42	9280.57	9140.45	7945.51	6708.65	5265.34	4695.02	81113.68
max hourly Q in bbl/hour	467.83	467.83	467.83	467.83	467.83	467.83	467.83	467.83	467.83	467.83	467.83	467.83	
max hourly working loss at P_{VX} & Q/hr & K_N=1 (L_W lb/hr)	5.678	6.167	7.190	8.391	9.819	10.959	11.451	11.278	10.131	8.278	6.713	5.793	
breathing/standing loss (L_S lb/hr)	0.507	0.551	0.670	0.867	1.022	1.127	1.152	1.096	0.921	0.739	0.600	0.517	
max hourly total loss (L_T lb/hr)	6.185	6.718	7.860	9.257	10.841	12.087	12.603	12.374	11.052	9.017	7.313	6.311	

L_S sum months	L_W sum months	L_T sum months
6651.24	74462.44	81113.68

The monthly sums will be greater than the annual average since the monthly variables yield higher emissions

Emissions Summary:

	avg lbs/hr	**max lbs/hr**	**lbs/yr**
Standing/Breathing Loss L_S	**0.740**	**1.152**	**6,482.298**
Working Loss L_W	**8.284**	**11.451**	**72,571.100**
Total Loss L_T	**9.024**	**12.603**	**79,053.398**

max hourly total loss may not add up to L_S + L_W as their max values may be in different months

HLP engineering inc.
A Professional Environmental Firm

Certificate of Analysis

Number: 172-24100063-001A

Williston Laboratory
3111 1st Ave W
Williston, ND 58801

Kevin Hendricks
Denbury
202 S 4th Street West
Baker, MT 59313

Oct. 08, 2024

Sample ID: WO 211779796
Station Name: MS Eucutta EOR Facility
Sample Point: Flare-ZZZ-180A
Cylinder No: TB1
Analyzed: 10/08/2024 12:04:06

Sampled By: Tim Keene
Sample Of: Gas Spot
Sample Date: 09/26/2024
Sample Conditions: 70 °F
PO/Ref. No: 4300204782
Method: GPA 2286

Analytical Data

Components	Mol. %	Wt. %	GPM at 14.696 psia
Nitrogen	7.9642	4.7625	
Methane	0.1599	0.0548	
Carbon Dioxide	73.1910	68.7590	
Ethane	0.1173	0.0753	0.0316
Propane	1.6105	1.5159	0.4466
Iso-Butane	2.9123	3.6133	0.9592
n-Butane	4.6147	5.7255	1.4643
Iso-Pentane	3.5849	5.5212	1.3196
n-Pentane	2.9808	4.5908	1.0876
Hexanes	1.5761	2.8993	0.6518
n-Hexane	0.8151	1.4994	0.3374
Benzene	0.0125	0.0208	0.0035
Cyclohexane	0.0955	0.1716	0.0327
Heptanes	0.2982	0.6378	0.1385
Methylcyclohexane	0.0220	0.0461	0.0089
Toluene	0.0076	0.0149	0.0026
Octanes	0.0327	0.0797	0.0169
Ethylbenzene	0.0007	0.0016	0.0003
Xylenes	0.0009	0.0020	0.0004
Nonanes	0.0031	0.0085	0.0018
	100.0000	100.0000	6.5037

GPM TOTAL C2+ 6.505

Calculated Physical Properties	**Total**
Calculated Molecular Weight	46.85
GPA 2172 Calculation:	
Calculated Gross BTU per ft³ @ 14.696 psia & 60°F	
Higher Heating Value, Real Gas Dry BTU	697.3
Water Sat. Gas Base BTU	685.5
Relative Density Real Gas	1.6316
Compressibility Factor	0.9910

Data reviewed by: Lalena Showalter, Laboratory Technician

Quality Assurance: The above analyses are performed in accordance with ASTM, UOP, GPA guidelines for quality assurance, unless otherwise stated.

Normalized Component Calculation

Flare Gas Analysis (EPN: 3a-05-F); Southern Petroleum Laboratories Report No.: 172-24100063-001A

COMPONENT	mole %	Normalized mole %	COMPONENT MW	Fuel Weight	Normalized WT %	Component BTU/scf	Partial Heating Values
Water	0.0000	0.0000	18	0.00	0.0000	0	0
Nitrogen	7.9642	0.0000	28.0134	0.00	0.0000	0	0
Carbon Dioxide	73.1910	79.5221	44.01	35.00	72.1957	0	0
Methane	0.1599	0.1737	16.043	0.03	0.0575	1010	2
Ethane	0.1173	0.1274	30.07	0.04	0.0791	1770	2
Hydrogen Sulfide	0.0000	0.0030	34.08	0.00	0.0021	637	0
Propane	1.6105	1.7498	44.097	0.77	1.5917	2516	44
I-Butane	2.9123	3.1642	58.123	1.84	3.7939	3252	103
N-Butane	4.6147	5.0139	58.123	2.91	6.0117	3262	164
I-Pentane	3.5849	3.8950	72.15	2.81	5.7972	4001	156
N-Pentane	2.9808	3.2386	72.15	2.34	4.8203	4009	130
Other/Iso Hexanes	1.5761	1.7124	86.177	1.48	3.0442	4750	81
N-Hexane	0.8151	0.8856	86.177	0.76	1.5744	4756	42
Methylcyclopentane	0.0000	0.0000	84.1608	0.00	0.0000	4501	0
Benzene	0.0125	0.0136	78.114	0.01	0.0219	3742	1
Cyclohexane	0.0955	0.1038	84.1608	0.09	0.1801	4482	5
Heptane	0.2982	0.3240	100.204	0.32	0.6697	5503	18
Methylcyclohexane	0.0220	0.0239	98.188	0.02	0.0484	5216	1
Toluene	0.0076	0.0083	92.141	0.01	0.0157	4475	0
Iso-Octane/224-Trimethylpentane	0.0000	0.0000	114.231	0.00	0.0000	6232	0
Octanes	0.0327	0.0355	114.231	0.04	0.0837	6249	2
Ethylbenzene	0.0007	0.0008	106.167	0.00	0.0017	5222	0
Xylenes	0.0009	0.0010	106.167	0.00	0.0021	5209	0
Nonanes	0.0031	0.0034	128.258	0.00	0.0089	6997	0
Decanes Plus	0.0000	0.0000	142.285	0.00	0.0000	7743	0
TOTALS	**100.0000**	**100.0000**	**MW=**	**48.48**	**100.0000**	**btu/scf =**	**750.79498**
				sg	**1.6716**		
				VOC wt%	**27.6656**		
				Toxic wt%	**1.6157**		

SPL, Inc.
3111 1st Ave W
Williston, ND 58801
701-368-7183

Flash Liberation of Hydrocarbon Liquid Study

Client:	Denbury	Sample Lab ID:	23080193-006A
Facility:	MS Eucutta EOR Facility	Facility Well:	Not Indicated
Equipment:	Not Indicated	Sample Source:	MAM 102
Unique Number:	Not Indicated	Analyst:	JMC
Date Sampled:	08/08/23	Date Analyzed:	08/25/23
State:	MS	Site Notes:	
County:	Not Indicated		

Flash Liberation of Hydrocarbon Liquid Conditions

	Pressure (psig)	Temperature (°F)
Separator Hydrocarbon Liquid	43.0	99.0
Stock Tank	0.0	60.0

Base Conditions

	Condition	Units/Description
Base Conditions, Pressure	15.025	psi

Flash Liberation of Hydrocarbon Liquid Results

	Result	Units/Description
Gas Oil Ratio	13.80	SCF flashed vapor/bbl stock tank oil
Gas Oil Ratio	1.784	lb flashed vapor/bbl stock tank oil
Gas Specific Gravity	1.690	Air = 1.000
Separator Volume Factor	1.012	Separator Volume/Stock tank Volume

Stock Tank Fluid Properties

	Result	Units/Description
Shrinkage Recovery Factor	0.9879	Fraction of first stage separator liquid
Oil API Gravity at 60 °F	29.83	
Oil API Gravity, observed	29.83	at 59.96°F
Specific Gravity at 60 °F	0.8771	ASTM D7777, Measured
Reid Vapor Pressure, psi	3.25	Absolute Pressure at 100°F by D5191

Cylinder Pressure Check

	Pressure (psi)	Temperature (°F)
Sample Conditions	43.0	99.0
Test Sample	31.6	76.3

Quality Control Summary

Duplicate Results		Acceptable Range
Gas Oil Ratio (% difference)	0.2	<5%
Separator Volume Factor (% difference)	1.1	<5%
Shrinkage Recovery Factor (% difference)	1.1	<5%
Cylinder Type	Piston	
Cylinder Size (cc)	500	
Cylinder Number	3116	
Sample Collection Rate (mL/min)	42	<50 mL/min

Tank Emission Calculations Based on AP 42 Chapter 7 (June 2020, Section 7.1.3.1), Fixed Roof

Tank ID	**1b-05-OST-CV**
Tank Description	**1500 BBL Wet Oil Tank (BBJ-118)**
Company Name	**Denbury Onshore, LLC**

Tank Orientation	**Vertical**
Tank Diameter (D ft)	**21.50**
Vertical Height/Horizontal Length (H_S ft)	**24.00**
Roof Height (H_R ft)	**0.67**
Max Liquid Height (H_{LX} ft)	**23.00**
Avg Liquid Height (H_L ft)	**11.50**
Breather Vent Pressure Setting (P_{BP} psig)	
Breather Vent Vacuum Setting (P_{BV} psig)	
actual tank pressure (P_I psig)	**0.0**
Shell Paint Solar Absorptance (S_A)	**0.64**
Roof Paint Solar Absorptance (R_A)	**0.64**
breather vent pressure range (ΔP_B psi)	**0.00**
roof outage (H_{RO} ft)	**0.2240**

Tank Shell Color/Shade	**Aluminum - Diffuse**
Tank Shell Paint Condition	**average**
Tank Roof Color/Shade	**Aluminum - Diffuse**
Tank Roof Paint Condition	**average**
Roof Type	**vertical tank with cone roof**
Tank Insulation	**no insulation**
Tank Underground?	**no**
Annual Throughput (Q bbl/year)	**735,475.00**
Annual Turnovers, N	**494.48**
Annual Hours	**8,760**
tank max liquid volume (V_{LX} ft^3)	**8,350.16**
vapor space outage (H_{VO} ft)	**12.724**
vapor space volume (V_V ft^3)	**4,619.44**

Major City for Meterological Data	**Meridian, MS**
Site Elevation (ft)	**400**
Atmospheric Pressure (P_A psia)	**14.485**
Table 7.1-2 Liquid	**crude oil**
*RVP**	**4.12**
*API gravity**	**29.8**
*°F basis for gv**	**60.0**
bubble point psia	
API gravity at 60F	**29.8**
API gravity at 100F	**32.5**
Working Loss Product Factor (K_P)	**0.75**
working loss turnover factor K_N	**0.227**

*sales oil data determines RVP per API pub 4683

Tank contents (if not selected from Table 7.1-2):

component	*mole%*	*MW*	*lb/mole*	*wt%*	*Antoine constants (log 10, mmHg, °C) A*	*B*	*C*
0	0.000						
0	0.000						
0	0.000						
0	0.000						
0	0.000						
0	0.000						
0	0.000						
0	0.000						
0	0.000						
0	0.000						
	0.000		0.000	0.000			

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Avg
hourly average maximum ambient temperature (T_{AX} °F)	57.10	61.40	68.80	76.20	83.40	88.80	91.40	91.10	86.50	77.30	66.90	58.50	75.60
hourly average minimum ambient temperature (T_{AN} °F)	35.80	38.10	44.50	51.50	60.80	67.80	70.80	70.20	64.20	52.50	42.50	36.90	53.00
daily total solar insolation factor (I btu/ft^2 day)	783	1044	1380	1726	1918	1989	1945	1823	1544	1252	924	727	1421
daily average ambient temperature (T_{AA} °F)	46.45	49.75	56.65	63.85	72.10	78.30	81.10	80.65	75.35	64.90	54.70	47.70	64.30
liquid bulk temperature (T_B °F)	47.95	51.75	59.30	67.16	75.78	82.12	84.83	84.15	78.31	67.30	56.47	49.10	67.03
average vapor temperature (T_V °F)	50.81	55.57	64.34	73.46	82.78	89.38	91.93	90.80	83.95	71.87	59.85	51.75	72.22
daily ambient temperature range (ΔT_A °R)	21.30	23.30	24.30	24.70	22.60	21.00	20.60	20.90	22.30	24.80	24.40	21.60	22.60
daily vapor temperature range (ΔT_V °R)	25.56	29.92	34.67	39.38	40.37	40.16	39.32	37.96	35.37	33.39	29.56	25.22	34.01
daily average liquid surface temperature (T_{LA} °F)	49.38	53.66	61.82	70.31	79.28	85.75	88.38	87.48	81.13	69.59	58.16	50.42	69.62
daily maximum liquid surface temperature (T_{LX} °F)	55.77	61.14	70.49	80.16	89.38	95.79	98.21	96.97	89.98	77.94	65.55	56.73	78.12
daily minimum liquid surface temperature (T_{LN} °F)	42.99	46.18	53.15	60.47	69.19	75.71	78.56	77.99	72.29	61.24	50.77	44.12	61.12
vapor pressure at daily avg liq surface temp T_{LA} (P_{VA} psia)	1.766	1.933	2.289	2.714	3.229	3.648	3.831	3.767	3.345	2.675	2.123	1.805	2.677
vapor pressure at daily max liq surface temp T_{LX} (P_{VX} psia)	2.021	2.257	2.723	3.284	3.901	4.383	4.577	4.477	3.944	3.147	2.468	2.061	3.159
vapor pressure at daily min liq surface temp T_{LN} (P_{VN} psia)	1.538	1.648	1.913	2.227	2.654	3.015	3.185	3.150	2.821	2.262	1.819	1.576	2.257
daily vapor pressure range (ΔP_V)	0.4831	0.6092	0.8104	1.0571	1.2468	1.3677	1.3923	1.3263	1.1230	0.8851	0.6496	0.4854	0.9022
vapor space expansion factor (K_E)	0.0882	0.1068	0.1329	0.1641	0.1857	0.1998	0.2024	0.1931	0.1662	0.1380	0.1096	0.0877	0.1407
vapor molecular weight (M_V lb/lbmole)	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00
monthly hours with avg = total annual	744	672	744	720	744	720	744	744	720	744	720	744	8,760
throughputs (ft^3/month) and avg = total annual	350,679	316,742	350,679	339,366	350,679	339,366	350,679	350,679	339,366	350,679	339,366	350,679	4,128,957
monthly turnovers (N/month) with avg = total annual	42.00	37.93	42.00	40.64	42.00	40.64	42.00	42.00	40.64	42.00	40.64	42.00	494.48
vented vapor saturation factor (K_S)	0.4565	0.4341	0.3931	0.3533	0.3147	0.2890	0.2791	0.2825	0.3071	0.3566	0.4112	0.4510	0.3565
vent setting correction factor (K_B)	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
vapor density (W_V lb/ft^3)	0.0161	0.0175	0.0204	0.0237	0.0277	0.0310	0.0324	0.0319	0.0287	0.0235	0.0190	0.0164	0.0235
standing storage losses (L_S lb/month & avg is lb/yr)	115.72	113.39	146.13	164.80	199.17	215.11	232.32	228.93	199.21	168.38	132.33	118.10	2033.60
working losses (L_W lb/month & avg is lb/yr)	963.64	944.21	1216.92	1372.39	1658.58	1791.29	1934.64	1906.40	1658.92	1402.15	1101.97	983.46	16934.57
total losses (L_T lb/month & avg is lb/yr)	1079.36	1057.60	1363.06	1537.19	1857.75	2006.40	2166.96	2135.33	1858.14	1570.53	1234.31	1101.56	18968.17
max hourly Q in bbl/hour	471.34	471.34	471.34	471.34	471.34	471.34	471.34	471.34	471.34	471.34	471.34	471.34	
max hourly working loss at P_{VX} & Q/hr & K_N=1 (L_W lb/hr)	5.697	6.181	7.195	8.384	9.806	10.944	11.438	11.271	10.135	8.290	6.732	5.815	
breathing/standing loss (L_S lb/hr)	0.156	0.169	0.205	0.265	0.312	0.344	0.352	0.335	0.282	0.226	0.184	0.159	
max hourly total loss (L_T lb/hr)	5.853	6.349	7.400	8.649	10.118	11.288	11.790	11.606	10.417	8.516	6.916	5.973	

L_S sum months	L_W sum months	L_T sum months
2033.60	16934.57	18968.17

The monthly sums will be greater than the annual average since the monthly variables yield higher emissions

Emissions Summary:

	avg lbs/hr	max lbs/hr	lbs/yr
Standing/Breathing Loss L_S	**0.226**	**0.352**	**1,982.538**
Working Loss L_W	**1.885**	**11.438**	**16,509.346**
Total Loss L_T	**2.111**	**11.790**	**18,491.885**

max hourly total loss may not add up to L_S + L_W as their max values may be in different months

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Tank Emission Calculations Based on AP 42 Chapter 7 (June 2020, Section 7.1.3.1), Fixed Roof

Tank ID	**1c-05-OST-CV & 1d-05-OST-CV**
Tank Description	**2000 BBL Dry Oil Tank (ABJ-119A/B)**
Company Name	**Denbury Onshore, LLC**

Tank Orientation	**Vertical**
Tank Diameter (D ft)	**29.75**
Vertical Height/Horizontal Length (H_S ft)	**16.00**
Roof Height (H_R ft)	**0.93**
Max Liquid Height (H_{LX} ft)	**15.00**
Avg Liquid Height (H_L ft)	**7.50**
Breather Vent Pressure Setting (P_{BP} psig)	
Breather Vent Vacuum Setting (P_{BV} psig)	
actual tank pressure (P_I psig)	**0.0**
Shell Paint Solar Absorptance (S_A)	**0.64**
Roof Paint Solar Absorptance (R_A)	**0.64**
breather vent pressure range (ΔP_B psi)	**0.00**
roof outage (H_{RO} ft)	**0.3099**

Tank Shell Color/Shade	**Aluminum - Diffuse**
Tank Shell Paint Condition	**average**
Tank Roof Color/Shade	**Aluminum - Diffuse**
Tank Roof Paint Condition	**average**
Roof Type	**vertical tank with cone roof**
Tank Insulation	**no insulation**
Tank Underground?	**no**
Annual Throughput (Q bbl/year)	**367,737.50**
Annual Turnovers, N	**198.00**
Annual Hours	**8,760**
tank max liquid volume (V_{LX} ft^3)	**10,426.90**
vapor space outage (H_{VO} ft)	**8.810**
vapor space volume (V_V ft^3)	**6,123.99**

Major City for Meterological Data	**Meridian, MS**
Site Elevation (ft)	**400**
Atmospheric Pressure (P_A psia)	**14.485**
Table 7.1-2 Liquid	**crude oil**
*RVP**	**4.12**
*API gravity**	**29.8**
*°F basis for gv**	**60.0**
bubble point psia	
API gravity at 60F	**29.8**
API gravity at 100F	**32.5**
Working Loss Product Factor (K_P)	**0.75**
working loss turnover factor K_N	**0.318**

*sales oil data determines RVP per API pub 4683

Tank contents (if not selected from Table 7.1-2):

component	*mole%*	*MW*	*lb/mole*	*wt%*	*Antoine constants (log 10, mmHg, °C) A*	*B*	*C*
0	0.000						
0	0.000						
0	0.000						
0	0.000						
0	0.000						
0	0.000						
0	0.000						
0	0.000						
0	0.000						
0	0.000						
	0.000		0.000	0.000			

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	Jan	*Feb*	*Mar*	*Apr*	*May*	*Jun*	*Jul*	*Aug*	*Sep*	*Oct*	*Nov*	*Dec*	*Avg*
hourly average maximum ambient temperature (T_{AX} °F)	57.10	61.40	68.80	76.20	83.40	88.80	91.40	91.10	86.50	77.30	66.90	58.50	75.60
hourly average minimum ambient temperature (T_{AN} °F)	35.80	38.10	44.50	51.50	60.80	67.80	70.80	70.20	64.20	52.50	42.50	36.90	53.00
daily total solar insolation factor (I btu/ft^2 day)	783	1044	1380	1726	1918	1989	1945	1823	1544	1252	924	727	1421
daily average ambient temperature (T_{AA} °F)	46.45	49.75	56.65	63.85	72.10	78.30	81.10	80.65	75.35	64.90	54.70	47.70	64.30
liquid bulk temperature (T_B °F)	47.95	51.75	59.30	67.16	75.78	82.12	84.83	84.15	78.31	67.30	56.47	49.10	67.03
average vapor temperature (T_V °F)	51.39	56.34	65.36	74.74	84.20	90.85	93.37	92.15	85.09	72.80	60.53	52.29	73.26
daily ambient temperature range (ΔT_A °R)	21.30	23.30	24.30	24.70	22.60	21.00	20.60	20.90	22.30	24.80	24.40	21.60	22.60
daily vapor temperature range (ΔT_V °R)	24.93	29.67	34.67	39.38	40.37	40.16	39.32	37.96	35.37	33.39	28.91	24.44	34.01
daily average liquid surface temperature (T_{LA} °F)	49.67	54.05	62.33	70.95	79.99	86.48	89.10	88.15	81.70	70.05	58.50	50.69	70.15
daily maximum liquid surface temperature (T_{LX} °F)	55.90	61.46	71.00	80.80	90.08	96.52	98.93	97.64	90.55	78.40	65.73	56.80	78.65
daily minimum liquid surface temperature (T_{LN} °F)	43.44	46.63	53.66	61.11	69.90	76.44	79.27	78.66	72.86	61.70	51.27	44.58	61.64
vapor pressure at daily avg liq surface temp T_{LA} (P_{VA} psia)	1.777	1.949	2.313	2.748	3.273	3.698	3.882	3.814	3.381	2.700	2.138	1.816	2.705
vapor pressure at daily max liq surface temp T_{LX} (P_{VX} psia)	2.026	2.272	2.751	3.324	3.952	4.441	4.636	4.531	3.986	3.175	2.477	2.065	3.191
vapor pressure at daily min liq surface temp T_{LN} (P_{VN} psia)	1.553	1.664	1.933	2.256	2.692	3.058	3.229	3.191	2.853	2.284	1.838	1.592	2.281
daily vapor pressure range (ΔP_V)	0.4736	0.6082	0.8172	1.0679	1.2604	1.3828	1.4071	1.3396	1.1328	0.8916	0.6389	0.4726	0.9097
vapor space expansion factor (K_E)	0.0862	0.1063	0.1336	0.1652	0.1872	0.2017	0.2043	0.1948	0.1674	0.1387	0.1075	0.0852	0.1414
vapor molecular weight (M_V lb/lbmole)	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00
monthly hours with avg = total annual	744	672	744	720	744	720	744	744	720	744	720	744	8,760
throughputs (ft^3/month) and avg = total annual	175,339	158,371	175,339	169,683	175,339	169,683	175,339	175,339	169,683	175,339	169,683	175,339	2,064,478
monthly turnovers (N/month) with avg = total annual	16.82	15.19	16.82	16.27	16.82	16.27	16.82	16.82	16.27	16.82	16.27	16.82	198.00
vented vapor saturation factor (K_S)	0.5466	0.5235	0.4808	0.4380	0.3955	0.3667	0.3556	0.3596	0.3878	0.4424	0.5004	0.5412	0.4419
vent setting correction factor (K_B)	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
vapor density (W_V lb/ft^3)	0.0162	0.0176	0.0205	0.0240	0.0280	0.0313	0.0327	0.0322	0.0289	0.0236	0.0192	0.0165	0.0236
standing storage losses (L_S lb/month & avg is lb/yr)	192.17	188.59	243.50	275.09	332.69	359.35	387.96	382.06	332.03	280.27	219.91	196.05	3389.66
working losses (L_W lb/month & avg is lb/yr)	677.78	665.14	858.82	970.22	1173.38	1267.41	1368.34	1347.52	1171.06	988.52	775.60	691.45	11955.24
total losses (L_T lb/month & avg is lb/yr)	869.95	853.73	1102.32	1245.31	1506.07	1626.75	1756.30	1729.58	1503.09	1268.80	995.51	887.50	15344.90
max hourly Q in bbl/hour	235.67	235.67	235.67	235.67	235.67	235.67	235.67	235.67	235.67	235.67	235.67	235.67	
max hourly working loss at P_{VX} & Q/hr & K_N=1 (L_W lb/hr)	2.863	3.111	3.628	4.235	4.957	5.532	5.780	5.692	5.112	4.176	3.386	2.921	
breathing/standing loss (L_S lb/hr)	0.258	0.281	0.336	0.442	0.530	0.591	0.606	0.576	0.479	0.377	0.305	0.264	
max hourly total loss (L_T lb/hr)	3.121	3.391	3.964	4.677	5.486	6.123	6.386	6.268	5.591	4.552	3.691	3.184	

L_S sum months	L_W sum months	L_T sum months
3389.66	11955.24	15344.90

The monthly sums will be greater than the annual average since the monthly variables yield higher emissions

Emissions Summary:

	avg lbs/hr	**max lbs/hr**	**lbs/yr**
Standing/Breathing Loss L_S	**0.377**	**0.606**	**3,303.329**
Working Loss L_W	**1.330**	**5.780**	**11,650.761**
Total Loss L_T	**1.707**	**6.386**	**14,954.090**

max hourly total loss may not add up to L_S + L_W as their max values may be in different months

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SFC

SOUTHERN FLOW COMPANIES, INC.

P.O. BOX 51475 LAFAYETTE, LA 70505 (337)233-2066

CUST:	3291.01	Denbury Offshore	FOR:	Denbury Offshore
FIELD:	1107	Eucutta CO2 Facility		P.O. Box 1003
STA:	505	Water Flare Test		Heidelberg, MS 39439

SAMPLE DATE:	4/5/2013	PRESS:	1 PSI
SAMPLED BY:	R. Green	TEMP:	49 °F.
SAMPLE OF:	Gas	CYLINDER:	301

MEMO: H2S Content (PPM): 2

COMPONENT	MOL %	WEIGHT %	GPM (14.696 PSIA)
N2	0.511	0.325	0.056
CO2	95.494	95.365	16.239
METHANE	1.348	0.491	0.228
ETHANE	0.464	0.317	0.124
PROPANE	0.386	0.386	0.106
I-BUTANE	0.305	0.402	0.100
N-BUTANE	0.392	0.517	0.123
I-PENTANE	0.248	0.406	0.091
N-PENTANE	0.215	0.352	0.078
I-HEXANES	0.161	0.315	0.066
N-HEXANE	0.110	0.215	0.045
I-HEPTANES	0.076	0.168	0.032
2,2,4-TMC5	0.003	0.007	0.001
N-HEPTANE	0.051	0.116	0.023
BENZENE	0.001	0.002	0.000
CYCLOHEXANE	0.010	0.019	0.003
TOLUENE	0.014	0.029	0.005
I-OCTANES	0.083	0.214	0.041
N-OCTANE	0.040	0.104	0.020
E-BENZENE	0.004	0.010	0.002
m,o,&p-XYLENE	0.018	0.044	0.007
I-NONANES	0.025	0.072	0.014
N-NONANE	0.018	0.052	0.010
I-DECANES	0.005	0.017	0.003
N-DECANE	0.005	0.016	0.003
I-UNDECANES +	0.011	0.039	0.007
TOTALS	100.000	100.000	17.427

CALCULATED VALUES

	TOTAL	C6+	C7+
MOLECULAR WEIGHT	44.07	97.939	108.914
SPECIFIC GRAVITY(AIR = 1)	1.522	3.452	3.820
REAL DRY BTU @ 15.025, 60°F.	110.9	5613.9	6155.7
REAL DRY BTU @ 14.730, 60°F.	108.7	5503.7	6034.8
REAL DRY BTU @ 14.650, 60°F.	108.1	5473.2	6001.4
REAL WET BTU @ 15.025, 60°F.	109	5518.1	6050.7
REAL WET BTU @ 14.730, 60°F.	106.8	5409.8	5931.9
REAL WET BTU @ 14.650, 60°F.	106.3	5379.8	5899
GPM'S @ 15.025 PSIA	17.818	0.290	0.177
GPM'S @ 14.730 PSIA	17.468	0.285	0.173
COMPRESSIBILITY FACTOR	0.99408		

Normalized Component Calculation (Hydrogen Sulfide)

Water Tank Vapor Analysis; Southern Flow Companies, Inc. Report

COMPONENT	mole %	Normalized mole %	COMPONENT MW	Fuel Weight	Normalized WT %	Component BTU/scf	Partial Heating Values
Water	0.0000	0.0000	18	0.00	0.0000	0	0
Nitrogen	0.511	0.5114	28.0134	0.14	0.3251	0	0
Carbon Dioxide	95.494	95.4919	44.01	42.03	95.3602	0	0
Methane	1.348	1.3484	16.043	0.22	0.4908	1010	14
Ethane	0.464	0.4644	30.07	0.14	0.3169	1770	8
Hydrogen Sulfide	0.000	0.0030	34.08	0.00	0.0023	637	0
Propane	0.386	0.3860	44.097	0.17	0.3862	2516	10
I-Butane	0.305	0.3050	58.123	0.18	0.4022	3252	10
N-Butane	0.392	0.3920	58.123	0.23	0.5170	3262	13
I-Pentane	0.248	0.2480	72.15	0.18	0.4060	4001	10
N-Pentane	0.215	0.2150	72.15	0.16	0.3520	4009	9
Other/Iso Hexanes	0.161	0.1610	86.177	0.14	0.3148	4750	8
N-Hexane	0.110	0.1100	86.177	0.09	0.2151	4756	5
Methylcyclopentane	0.000	0.0000	84.1608	0.00	0.0000	4501	0
Benzene	0.001	0.0010	78.114	0.00	0.0018	3742	0
Cyclohexane	0.010	0.0100	84.1608	0.01	0.0191	4482	0
Heptane	0.127	0.1270	100.204	0.13	0.2888	5503	7
Methylcyclohexane	0.000	0.0000	98.188	0.00	0.0000	5216	0
Toluene	0.014	0.0140	92.141	0.01	0.0293	4475	1
Iso-Octane/224-Trimethylpentane	0.086	0.0860	114.231	0.10	0.2229	6232	5
Octanes	0.040	0.0400	114.231	0.05	0.1037	6249	2
Ethylbenzene	0.004	0.0040	106.167	0.00	0.0096	5222	0
Xylenes	0.018	0.0180	106.167	0.02	0.0434	5209	1
Nonanes	0.043	0.0430	128.258	0.06	0.1251	6997	3
Decanes Plus	0.021	0.0210	142.285	0.03	0.0678	7743	2
TOTALS	**100.000**	**100.0000**	**MW=**	**44.07**	**100.0000**	**btu/scf =**	**107.434657**
				sg	**1.5197**		
Max Total Hydrogen Sulfide:	**0.003**	mol%		**VOC wt%**	**3.5047**		
				Toxic wt%	**0.5220**		

Tank Emission Calculations Based on AP 42 Chapter 7 (June 2020, Section 7.1.3.1), Fixed Roof

Tank ID	**2-05-SUMP**
Tank Description	**Sump Tank**
Company Name	**Denbury Onshore, LLC**

Tank Orientation	**Vertical**
Tank Diameter (D ft)	**6.00**
Vertical Height/Horizontal Length (H_S ft)	**6.00**
Roof Height (H_R ft)	**0.19**
Max Liquid Height (H_{LX} ft)	**5.00**
Avg Liquid Height (H_L ft)	**2.50**
Breather Vent Pressure Setting (P_{BP} psig)	
Breather Vent Vacuum Setting (P_{BV} psig)	
actual tank pressure (P_I psig)	**0.0**
Shell Paint Solar Absorptance (S_A)	**0.71**
Roof Paint Solar Absorptance (R_A)	**0.71**
breather vent pressure range (ΔP_B psi)	**0.00**
roof outage (H_{RO} ft)	**0.0625**

Tank Shell Color/Shade	**Gray - Medium**
Tank Shell Paint Condition	**average**
Tank Roof Color/Shade	**Gray - Medium**
Tank Roof Paint Condition	**average**
Roof Type	**vertical tank with cone roof**
Tank Insulation	**no insulation**
Tank Underground?	**no**
Annual Throughput (Q bbl/year)	**302.38**
Annual Turnovers, N	**12.01**
Annual Hours	**8,760**
tank max liquid volume (V_{LX} ft^3)	**141.37**
vapor space outage (H_{VO} ft)	**3.563**
vapor space volume (V_V ft^3)	**100.73**

Major City for Meterological Data	**Meridian, MS**
Site Elevation (ft)	**400**
Atmospheric Pressure (P_A psia)	**14.485**
Table 7.1-2 Liquid	
*RVP**	
*API gravity**	
*°F basis for gv**	
bubble point psia	
API gravity at 60F	
API gravity at 100F	
Working Loss Product Factor (K_P)	**1**
working loss turnover factor K_N	**1.000**

*sales oil data determines RVP per API pub 4683

Tank contents (if not selected from Table 7.1-2):

component	*mole%*	*MW*	*lb/mole*	*wt%*	*Antoine constants (log 10, mmHg, °C) A*	*B*	*C*
Hexane N-	100.000	86.180	86.18000	100.00000	6.878	1171.500	224.370
0	0.000						
0	0.000						
0	0.000						
0	0.000						
0	0.000						
0	0.000						
0	0.000						
0	0.000						
0	0.000						
0	0.000						
	100.000		86.180	100.000			

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Avg
hourly average maximum ambient temperature (T_{AX} °F)	57.10	61.40	68.80	76.20	83.40	88.80	91.40	91.10	86.50	77.30	66.90	58.50	75.60
hourly average minimum ambient temperature (T_{AN} °F)	35.80	38.10	44.50	51.50	60.80	67.80	70.80	70.20	64.20	52.50	42.50	36.90	53.00
daily total solar insolation factor (I btu/ft^2 day)	783	1044	1380	1726	1918	1989	1945	1823	1544	1252	924	727	1421
daily average ambient temperature (T_{AA} °F)	46.45	49.75	56.65	63.85	72.10	78.30	81.10	80.65	75.35	64.90	54.70	47.70	64.30
liquid bulk temperature (T_B °F)	48.12	51.97	59.59	67.53	76.19	82.54	85.24	84.53	78.64	67.57	56.67	49.25	67.33
average vapor temperature (T_V °F)	51.39	56.33	65.35	74.73	84.19	90.84	93.36	92.14	85.08	72.79	60.52	52.28	73.26
daily ambient temperature range (ΔT_A °R)	21.30	23.30	24.30	24.70	22.60	21.00	20.60	20.90	22.30	24.80	24.40	21.60	22.60
daily vapor temperature range (ΔT_V °R)	26.36	31.13	36.61	41.80	43.06	42.94	42.04	40.52	37.53	35.14	30.52	25.95	36.00
daily average liquid surface temperature (T_{LA} °F)	49.75	54.15	62.47	71.13	80.19	86.69	89.30	88.34	81.86	70.18	58.60	50.77	70.29
daily maximum liquid surface temperature (T_{LX} °F)	56.34	61.94	71.62	81.58	90.95	97.42	99.81	98.47	91.24	78.96	66.23	57.25	79.29
daily minimum liquid surface temperature (T_{LN} °F)	43.16	46.37	53.32	60.68	69.42	75.95	78.79	78.21	72.48	61.39	50.97	44.28	61.29
vapor pressure at daily avg liq surface temp T_{LA} (P_{VA} psia)	1.455	1.638	2.038	2.536	3.159	3.678	3.906	3.821	3.286	2.477	1.843	1.495	2.484
vapor pressure at daily max liq surface temp T_{LX} (P_{VX} psia)	1.737	2.010	2.567	3.265	4.055	4.686	4.938	4.795	4.082	3.068	2.243	1.779	3.092
vapor pressure at daily min liq surface temp T_{LN} (P_{VN} psia)	1.212	1.325	1.602	1.946	2.431	2.854	3.055	3.013	2.622	1.982	1.504	1.250	1.977
daily vapor pressure range (ΔP_V)	0.5253	0.6850	0.9647	1.3186	1.6244	1.8328	1.8830	1.7822	1.4605	1.0856	0.7395	0.5288	1.1150
vapor space expansion factor (K_E)	0.0921	0.1139	0.1476	0.1891	0.2232	0.2482	0.2546	0.2410	0.1997	0.1567	0.1174	0.0915	0.1608
vapor molecular weight (M_V lb/lbmole)	86.18	86.18	86.18	86.18	86.18	86.18	86.18	86.18	86.18	86.18	86.18	86.18	86.18
monthly hours with avg = total annual	744	672	744	720	744	720	744	744	720	744	720	744	8,760
throughputs (ft^3/month) and avg = total annual	144	130	144	140	144	140	144	144	140	144	140	144	1,698
monthly turnovers (N/month) with avg = total annual	1.02	0.92	1.02	0.99	1.02	0.99	1.02	1.02	0.99	1.02	0.99	1.02	12.01
vented vapor saturation factor (K_S)	0.7845	0.7637	0.7221	0.6762	0.6264	0.5901	0.5756	0.5809	0.6171	0.6814	0.7418	0.7798	0.6807
vent setting correction factor (K_B)	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
vapor density (W_V lb/ft^3)	0.0229	0.0255	0.0312	0.0381	0.0466	0.0537	0.0567	0.0556	0.0484	0.0374	0.0285	0.0235	0.0374
standing storage losses (L_S lb/month & avg is lb/yr)	7.82	7.87	10.66	12.61	15.95	17.75	19.39	19.01	16.03	12.77	9.41	8.02	157.29
working losses (L_W lb/month & avg is lb/yr)	3.30	3.32	4.49	5.32	6.73	7.49	8.18	8.02	6.76	5.39	3.97	3.38	66.33
total losses (L_T lb/month & avg is lb/yr)	11.11	11.20	15.15	17.93	22.67	25.24	27.57	27.03	22.79	18.16	13.38	11.40	223.62
max hourly Q in bbl/hour	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	
max hourly working loss at P_{VX} & Q/hr & K_N=1 (L_W lb/hr)	0.004	0.005	0.006	0.007	0.009	0.010	0.011	0.011	0.009	0.007	0.006	0.005	
breathing/standing loss (L_S lb/hr)	0.011	0.012	0.014	0.020	0.027	0.033	0.035	0.033	0.025	0.017	0.013	0.011	
max hourly total loss (L_T lb/hr)	0.015	0.017	0.020	0.028	0.036	0.043	0.046	0.043	0.034	0.024	0.019	0.015	

L_S sum months	L_W sum months	L_T sum months
157.29	66.33	223.62

The monthly sums will be greater than the annual average since the monthly variables yield higher emissions

Emissions Summary:	**avg lbs/hr**	**max lbs/hr**	**lbs/yr**
Standing/Breathing Loss L_S	**0.017**	**0.035**	**150.666**
Working Loss L_W	**0.007**	**0.011**	**63.540**
Total Loss L_T	**0.024**	**0.046**	**214.206**

max hourly total loss may not add up to L_S + L_W as their max values may be in different months

HLP engineering inc.
A Professional Environmental Firm

Weighted Average for Oil Storage Tank Vapors to Control Flare (EPN: 3a-05-F)

Total Working & Standing Losses:	**52.59**	**lb/hr**
Total Oil Flash Vapors:	**1150.00**	**SCFH**
Total Stream Flowrate:	**1561.79**	**SCFH**

June 1998
RG-109

Air Permit Technical Guidance for Chemical Sources:

Flares and Vapor Oxidizers

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New Source Review Permits Division

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION

Flare Emission Factors

The usual flare destruction efficiencies and emission factors are provided in Table 4. The high-Btu waste streams referred to in the table have a heating value greater than 1,000 Btu/scf.

Flare Destruction Efficiencies

Claims for destruction efficiencies greater than those listed in Table 4 will be considered on a case-by-case basis. The applicant may make one of the three following demonstrations to justify the higher destruction efficiency: (1) general method, (2) 99.5 percent justification, or (3) flare stack sampling.

Table 4. Flare Factors

Waste Stream	Destruction/Removal Efficiency (DRE)		
VOC	98 percent (generic)		
	99 percent for compounds containing no more than 3 carbons that contain no elements other than carbon and hydrogen in addition to the following compounds: methanol, ethanol, propanol, ethylene oxide and propylene oxide		
H_2S	98 percent		
NH_3	case by case		
CO	case by case		
Air Contaminants	**Emission Factors**		
thermal NO_x	steam-assist:	high Btu	0.0485 lb/MMBtu
		low Btu	0.068 lb/MMBtu
	other:	high Btu	0.138 lb/MMBtu
		low Btu	0.0641 lb/MMBtu
fuel NO_x	NO_x is 0.5 wt percent of inlet NH_3, other fuels case by case		
CO	steam-assist:	high Btu	0.3503 lb/MMBtu
		low Btu	0.3465 lb/MMBtu
	other:	high Btu	0.2755 lb/MMBtu
		low Btu	0.5496 lb/MMBtu
PM	none, required to be smokeless		
SO_x	100 percent S in fuel to SO_x		

Technical Guidance Package for
Chemical Sources

Flare Sources

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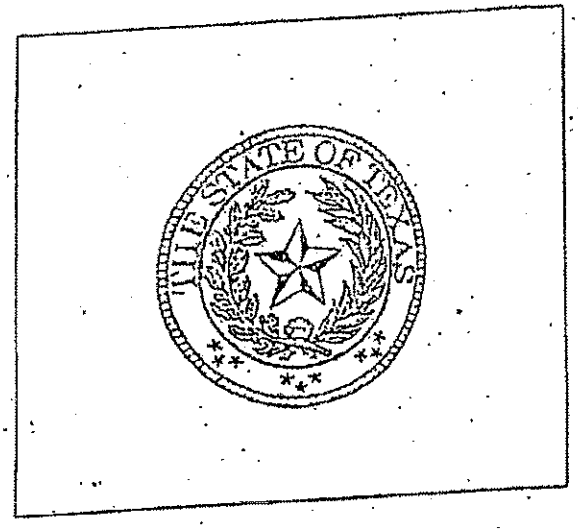

John Hall, Chairman
Pam Reed, Commissioner
Peggy Garner, Commissioner
Dan Pearson, Executive Director

Compiled by TNRCC Chemical Section Engineers
November 1994

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Austin, Texas 78711-3087
(512) 239-1250

greater than standard destruction efficiencies (>SDE) are claimed. The determinations shall indicate the maximum or minimum values required for flare performance at the claimed efficiency. The determinations shall be made during the testing protocols used to demonstrate >SDE.

A. Tip Velocities and Flow rates (maximum)

B. Heating Values (minimum).

4. The applicant shall install, calibrate, operate and maintain a flow meter to monitor actual stream flow rates to, and calculate tip velocities of, flares for which >SDE are claimed.

5. Records shall be maintained which indicate on a continuous basis the flow rates and heating values of the streams directed to the flares for which >SDE are claimed.

6. Flow rates of streams to flares for which >SDE are claimed shall not exceed the lesser of the indicated maxima; (1) flow rates which produce the tip velocities specified in 40 CFR 60.18, or (2) flow rates demonstrated during testing to correspond to the demonstrated flare efficiency.

7. Tip velocities of flares for which >SDE are claimed shall not exceed the lesser of the indicated maxima; (1) tip velocities specified in 40 CFR 60.18, or (2) tip velocities demonstrated during testing to correspond to the demonstrated flare efficiency.

8. Heating values of streams directed to flares for which >SDE are claimed shall be no less than the greater of the indicated minima; (1) 300 BTU/scf for streams directed to non-assisted flares and 400 BTU/scf for streams directed to assisted flares, or (2) heating values demonstrated during testing to correspond to the demonstrated flare efficiency.

9. The applicant shall provide vendor data supportive of the claimed flare efficiency.

NO$_x$ and CO Emissions

The following NO$_x$ and CO factors were derived by the Chemical Section of the New Source Review Division based on data published in the 1983 CMA document entitled, *A Report on A Flare Efficiency Study*. These factors should be used in estimating NO$_x$ and CO emissions rather than the emission factors found in Section 11.5 of AP-42.

Table 3: Flare Factors.

Type	Waste Gas	NO lb/MM Btu	CO lb/MM Btu
Steam Assisted	High Btu (>1000/scf)	0.0465	0.3503
Steam Assisted	Low Btu (192-1000/scf)	0.0660	0.3465
Air & Nonassisted	High Btu (>1000/scf)	0.1380	0.2755
Air & Nonassisted	Low Btu (184-1000/scf)	0.0641	0.5496

Example 2:

For the sample case, calculate the mole percent of each constituent in the waste stream for both the average and maximum scenarios by dividing the individual flow rates by the total flow rates and multiplying by 100 percent.

Table 4: Calculation of constituents in mole percent.

	Average Case		Maximum Case	
	scfm	mole %	scfm	mole %
Butane+	10.16	5.08	12.70	5.08
Propylene	5.94	2.97	7.43	2.97
Propane	5.08	2.54	6.35	2.54
Ethylene	84.74	42.37	105.93	42.37
Ethane	37.28	18.64	46.60	18.64
Hydrogen	22.04	11.02	27.55	11.02
Ammonia	4.24	2.12	5.30	2.12
Inerts	30.50	15.26	38.13	15.26
Totals	200.00	100.00	250.00	100.00

In this case, our calculations are simplified since the average and maximum case waste streams have the same compositions. If they were of different composition, the following heating value calculations would be required for both cases. Note that the maximum case shows the maximum vent stream to the flare under normal operating conditions for the purpose of calculating emissions from the flare (upset and maintenance conditions are not considered).

Next, estimate the net, or lower, heating value of the waste stream

Since flares do not lend themselves to conventional emission testing techniques, only a few attempts have been made to characterize flare emissions. Recent EPA tests using propylene as flare gas indicated that efficiencies of 98 percent can be achieved when burning an offgas with at least 11,200 kJ/m^3 (300 Btu/ft^3). The tests conducted on steam-assisted flares at velocities as low as 39.6 meters per minute (m/min) (130 ft/min) to 1140 m/min (3750 ft/min), and on air-assisted flares at velocities of 180 m/min (617 ft/min) to 3960 m/min (13,087 ft/min) indicated that variations in incoming gas flow rates have no effect on the combustion efficiency. Flare gases with less than 16,770 kJ/m^3 (450 Btu/ft^3) do not smoke.

Table 13.5-1 presents flare emission factors, and Table 13.5-2 presents emission composition data obtained from the EPA tests.[1] Crude propylene was used as flare gas during the tests. Methane was a major fraction of hydrocarbons in the flare emissions, and acetylene was the dominant intermediate hydrocarbon species. Many other reports on flares indicate that acetylene is always formed as a stable intermediate product. The acetylene formed in the combustion reactions may react further with hydrocarbon radicals to form polyacetylenes followed by polycyclic hydrocarbons.[2]

In flaring waste gases containing no nitrogen compounds, NO is formed either by the fixation of atmospheric nitrogen (N) with oxygen (O) or by the reaction between the hydrocarbon radicals present in the combustion products and atmospheric nitrogen, by way of the intermediate stages, HCN, CN, and OCN.[2] Sulfur compounds contained in a flare gas stream are converted to SO_2 when burned. The amount of SO_2 emitted depends directly on the quantity of sulfur in the flared gases.

Table 13.5-1 (English Units). EMISSION FACTORS FOR FLARE OPERATIONS[a]

EMISSION FACTOR RATING: B

Component	Emission Factor (lb/10^6 Btu)
Total hydrocarbons[b]	0.14
Carbon monoxide	0.37
Nitrogen oxides	0.068
Soot[c]	0 - 274

[a] Reference 1. Based on tests using crude propylene containing 80% propylene and 20% propane.
[b] Measured as methane equivalent.
[c] Soot in concentration values: nonsmoking flares, 0 micrograms per liter (µg/L); lightly smoking flares, 40 µg/L; average smoking flares, 177 µg/L; and heavily smoking flares, 274 µg/L.

Table 13.5-2. HYDROCARBON COMPOSITION OF FLARE EMISSION[a]

Composition	Volume %	
	Average	Range
Methane	55	14 - 83
Ethane/Ethylene	8	1 - 14
Acetylene	5	0.3 - 23
Propane	7	0 - 16
Propylene	25	1 - 65

[a] Reference 1. The composition presented is an average of a number of test results obtained under the following sets of test conditions: steam-assisted flare using high-Btu-content feed; steam-assisted using low-Btu-content feed; air-assisted flare using high-Btu-content feed; and air-assisted flare using low-Btu-content feed. In all tests, "waste" gas was a synthetic gas consisting of a mixture of propylene and propane.

References For Section 13.5

1. *Flare Efficiency Study*, EPA-600/2-83-052, U. S. Environmental Protection Agency, Cincinnati, OH, July 1983.

2. K. D. Siegel, *Degree Of Conversion Of Flare Gas In Refinery High Flares*, Dissertation, University of Karlsruhe, Karlsruhe, Germany, February 1980.

3. *Manual On Disposal Of Refinery Wastes, Volume On Atmospheric Emissions*, API Publication 931, American Petroleum Institute, Washington, DC, June 1977.

MCComb-Summit City Gate Gas Sample1
Gulf South Pipeline Company, LP 04/08/05 07:31:19
Houston, Texas PAGE 1
CERTIFICATE OF ANALYSIS
for 03/05

Station ID: 002489
Station Name: MCCOMB-SUMMIT #1 CITY GATE
Analysis Source:

Effective Date: 03/01/05
Analyzed Date: 03/24/05
Sample Date On: 02/07/05
Sample Date Off: 03/08/05
Sample Type: C

Lab ID: 00052472
Analysis ID: 184246

Component	Mol %	GPM
H2S	0.0000	
CO2	1.1440	
N2	0.4070	
Methane	95.0360	
Ethane	2.5060	0.670
Propane	0.4890	0.135
I-butane	0.1250	0.041
N-butane	0.1200	0.038
I-pentane	0.0520	0.019
N-pentane	0.0300	0.011
Hexanes+(C6+)	0.0910	0.041
TOTAL	100.0000	0.955
Pentane+		0.071

Sample Pressure(psig): 525.0
Line Pressure(psig): 280.0

Line Temp (deg F): 48.0

Ideal Gravity: 0.5912
Sample Gravity: 0.5925

Compress. Factor: 1.0020

LBs of H2O: 2.0

Grains H2S/100 CF: 0.00
PPM H2S: 0.0

Dry BTU @ 14.730: 1037.3000
Wet BTU @ 14.730: 1019.3000
AWC BTU @ 14.730: 1037.3000

Dry BTU @ 14.730 w/o H2S: 1037.3000
Wet BTU @ 14.730 w/o H2S: 1019.3000
AWC BTU @ 14.730 w/o H2S: 1037.3000

Calculation Parameters: Pressure Base: 14.730 Temperature Base: 60 F

Grains/PPM H2S equal to 0.00 does not indicate testing for H2S
Remark: 0
□□&l1X□&l60F□&l6D□(8U□(s10h3T□(10U

Typical Fuel Gas Analysis

COMPONENT	mole %	MOLE FRACTION	MW	fuel weight	WT frac	Wt %	dh*	Heat Value (BTU/SCF)	Carbon Weight %	C-H ratio	
Nitrogen	0.4070	0.004	28.0134	0.11	0.0067	0.6661	0	0.00	0.0000	0	0
Hydrogen Sulfide	0.0000	0.000	34.08	0.00	0.0000	0.0000	637.1	0.00	0.0000	0	0
Carbon Dioxide	1.1440	0.011	44.01	0.50	0.0294	2.9413	0	0.00	0.1374	0	0
Methane	95.0360	0.950	16.043	15.25	0.8907	89.0707	1010	959.86	11.4045	0.25	0.23759
Ethane	2.5060	0.025	30.07	0.75	0.0440	4.4023	1770	44.35	0.6013	0.33333	0.00835325
Propane	0.4890	0.005	44.097	0.22	0.0126	1.2597	2516	12.30	0.1761	0.375	0.00183375
I-Butane	0.1250	0.001	58.123	0.07	0.0042	0.4244	3252	4.06	0.0600	0.4	0.0005
N-Butane	0.1200	0.001	58.123	0.07	0.0041	0.4075	3262	3.91	0.0576	0.4	0.00048
I-Pentane	0.0520	0.001	72.15	0.04	0.0022	0.2192	4001	2.08	0.0312	0.41667	0.000216668
N-Pentane	0.0300	0.000	72.15	0.02	0.0013	0.1264	4009	1.20	0.0180	0.41667	0.000125001
Other hexanes	0.0581	0.001	86.177	0.05	0.0029	0.2925	4750	2.76	0.0418	0.42857	0.000249014
N-hexane	0.0135	0.000	86.177	0.01	0.0007	0.0678	4756	0.64	0.0097	0.42857	5.76808E-05
heptane	0.0063	0.000	100.204	0.01	0.0004	0.0366	5503	0.34	0.0053	0.4375	2.73512E-05
iso-octane	0.0024	0.000	114.231	0.00	0.0002	0.0162	6232	0.15	0.0023	0.4444	1.07976E-05
octanes+	0.0044	0.000	144.231	0.01	0.0004	0.0368	6500	0.28	0.0052	0.4444	1.94114E-05
benzene	0.0030	0.000	78.114	0.00	0.0001	0.0137	3742	0.11	0.0022	1	0.000030121
toluene	0.0026	0.000	92.141	0.00	0.0001	0.0140	4475	0.12	0.0022	0.875	2.26931E-05
ethylbenzene	0.0001	0.000	106.167	0.00	0.0000	0.0008	5222	0.01	0.0001	0.8	1.0192E-06
xylene	0.0007	0.000	106.167	0.00	0.0000	0.0041	5209	0.03	0.0006	0.8	5.2416E-06
TOTALS	**100.0000**	**1.000**		**17.12**	**1.0000**	**100.0000**		***1032***	***12.5556***		0.249521999
				sg	**0.5903**						
hexanes+	0.0910			**VOC wt%**	**2.9197**		Carbon wt%		73.34956		
				Toxic wt%	**0.1165**						

United States Environmental Protection Agency
Office of Air Quality Planning and Standards Research Triangle Park NC 27711
EPA-453/R-95-017 November 1995
Air

EPA

Protocol for Equipment Leak Emission Estimates

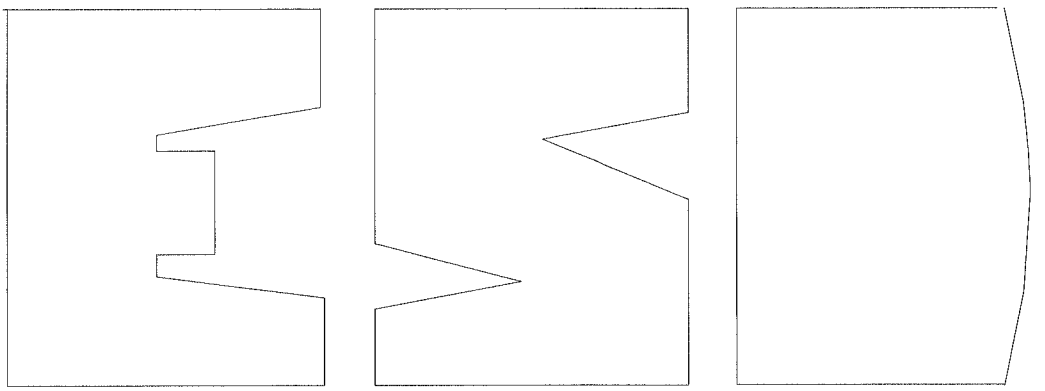

TABLE 2-4. OIL AND GAS PRODUCTION OPERATIONS AVERAGE EMISSION FACTORS (kg/hr/source)

Equipment Type	Service[a]	Emission Factor (kg/hr/source)[b]
Valves	Gas	4.5E-03
	Heavy Oil	8.4E-06
	Light Oil	2.5E-03
	Water/Oil	9.8E-05
Pump seals	Gas	2.4E-03
	Heavy Oil	NA
	Light Oil	1.3E-02
	Water/Oil	2.4E-05
Others[c]	Gas	8.8E-03
	Heavy Oil	3.2E-05
	Light Oil	7.5E-03
	Water/Oil	1.4E-02
Connectors	Gas	2.0E-04
	Heavy Oil	7.5E-06
	Light Oil	2.1E-04
	Water/Oil	1.1E-04
Flanges	Gas	3.9E-04
	Heavy Oil	3.9E-07
	Light Oil	1.1E-04
	Water/Oil	2.9E-06
Open-ended lines	Gas	2.0E-03
	Heavy Oil	1.4E-04
	Light Oil	1.4E-03
	Water/Oil	2.5E-04

[a]Water/Oil emission factors apply to water streams in oil service with a water content greater than 50%, from the point of origin to the point where the water content reaches 99%. For water streams with a water content greater than 99%, the emission rate is considered negligible.

[b]These factors are for total organic compound emission rates (including non-VOC's such as methane and ethane) and apply to light crude, heavy crude, gas plant, gas production, and off shore facilities. "NA" indicates that not enough data were available to develop the indicated emission factor.

[c]The "other" equipment type was derived from compressors, diaphrams, drains, dump arms, hatches, instruments, meters, pressure relief valves, polished rods, relief valves, and vents. This "other" equipment type should be applied for any equipment type other than connectors, flanges, open-ended lines, pumps, or valves.

EPA Average Emission Factors

The EPA emission factors used by GRI-HAPCalc 3.01 to estimate fugitive emissions were developed from data obtained during a joint American Petroleum Institute (API)/GRI fugitive testing program at natural gas production and processing sites [U.S. Environmental Protection Agency, 1995; American Petroleum Institute, 1995]. Over 184,000 components at 20 sites were screened for total hydrocarbon (THC) emissions, and the results were averaged for each component type to develop THC emission factors. Furthermore, a statistical analysis conducted by the EPA found no difference in THC fugitive emissions by industry segment for oil and gas production operation. The average THC emission factors for equipment in gas and light liquid service are shown in Table 20.

Table 20. EPA Average Emission Factors for THC

	Emission Factor, lb THC/yr		
Component	Gas Service	Light Liquids Service	Heavy Liquids Service
Connections	3.9	4.1	0.1
Flanges	7.5	2.1	0.0075
Open-Ended Line	39	27	2.7
Pump Seals	46	250	NA
Valves	87	48	0.16
Other*	170	140	0.62

** The "Other" category includes compressors, diaphragms, drains, dump arms, hatches, instruments, meters, pressure relief valves, polished rods, relief valves, and vents.*

To calculate speciated fugitive emissions for BTEX, methane, NMHC, and NMEHC, composition data obtained during a joint American Petroleum Institute (API)/GRI fugitive testing program are used with the THC emission factors above. The average compositions of fugitive leaks from production facilities and natural gas plants are shown in Table 21.

Table 21. Fractional Composition of Fugitive Emissions

	Fractional Composition, lb/lb THC			
Compound	Gas Production/ Compressor Station	Gas Plant	Light Liquid Service	Heavy Liquid Service
Benzene	0.00023	0.00123	0.00027	0.00935
Toluene	0.00039	0.00032	0.00075	0.00344
Ethylbenzene	0.000020	0.000010	0.000170	0.00051
Xylenes (m,p,o)	0.00010	0.000040	0.000360	0.00372
Methane	0.920	0.564	0.613	0.942
NMHC	0.080	0.436	0.387	0.058
NMEHC	0.0350	0.253	0.292	0.030

The following equation shows how annual emission rates are calculated from the above emission factors. The user-entered component count of each type of fugitive emission source is multiplied by the emission factor (lb THC/component/year) and the fractional composition (lb compound *i* / lb THC). This is then converted to an annual emission rate. Note that all calculations in GRI-HAPCalc 3.01 are done in U.S. Standard units and converted to metric units when necessary.

Normalized Component Calculation (Hydrogen Sulfide)

Fugitive Emission Speciation - Light-Liquid Service

COMPONENT	mole %	Normalized mole %	COMPONENT MW	Fuel Weight	Normalized WT %	Component BTU/scf	Partial Heating Values
Water	0.0000	0.0000	18	0.00	0.0000	0	0
Nitrogen	0.0000	0.0000	28.0134	0.00	0.0000	0	0
Carbon Dioxide	0.0000	0.0000	44.01	0.00	0.0000	0	0
Methane	86.3875	86.3849	16.043	13.86	61.2972	1010	872
Ethane	7.1428	7.1425	30.07	2.15	9.4996	1770	126
Hydrogen Sulfide	0.0000	0.0030	34.08	0.00	0.0045	637	0
Propane	0.0000	0.0000	44.097	0.00	0.0000	2516	0
I-Butane	0.0000	0.0000	58.123	0.00	0.0000	3252	0
N-Butane	0.0000	0.0000	58.123	0.00	0.0000	3262	0
I-Pentane	0.0000	0.0000	72.15	0.00	0.0000	4001	0
N-Pentane	0.0000	0.0000	72.15	0.00	0.0000	4009	0
Other/Iso Hexanes	0.0000	0.0000	86.177	0.00	0.0000	4750	0
N-Hexane	0.0000	0.0000	86.177	0.00	0.0000	4756	0
Methylcyclopentane	0.0000	0.0000	84.1608	0.00	0.0000	4501	0
Benzene	0.0078	0.0078	78.114	0.01	0.0270	3742	0
Cyclohexane	0.0000	0.0000	84.1608	0.00	0.0000	4482	0
Heptane	0.0000	0.0000	100.204	0.00	0.0000	5503	0
Methylcyclohexane	0.0000	0.0000	98.188	0.00	0.0000	5216	0
Toluene	0.0184	0.0184	92.141	0.02	0.0750	4475	1
Iso-Octane/224-Trimethylpentane	0.0000	0.0000	114.231	0.00	0.0000	6232	0
Octanes	0.0000	0.0000	114.231	0.00	0.0000	6249	0
Ethylbenzene	0.0036	0.0036	106.167	0.00	0.0170	5222	0
Xylenes	0.0077	0.0077	106.167	0.01	0.0360	5209	0
Nonanes	0.0000	0.0000	128.258	0.00	0.0000	6997	0
Decanes	0.0000	0.0000	142.285	0.00	0.0000	7743	0
Other NM/NE HC	6.4323	6.4321	102.09	6.57	29.0437	5200	334
TOTALS	**100.0000**	**100.0000**	**MW=**	**22.61**	**100.0000**	**btu/scf =**	**1335.10155**
				sg	**0.7796**		
Max Total Hydrogen Sulfide:	**0.003**	mol%		**VOC wt%**	**29.1987**		
				Toxic wt%	**0.1550**		

Certificate of Analysis

Number: 172-23080193-003A

Williston Laboratory
3111 1st Ave W
Williston, ND 58801

Aug. 29, 2023

Kevin Hendricks
Denbury
202 S 4th Street West
Baker, MT 59313

Station Name: MS Eucutta EOR Facility
Sample Point: Facility Inlet Separator
Method: GPA 2286
Cylinder No: 9104
Analyzed: 08/18/2023 11:50:35

Sampled By: Tim Keene
Sample Of: Gas Spot
Sample Date: 08/08/2023 08:15
Sample Conditions: 370 psig, @ 84 °F
PO/Ref. No: 4300204782

Analytical Data

Components	Mol. %	Wt. %	GPM at 14.696 psia
Nitrogen	2.5830	1.6597	
Methane	1.5785	0.5808	
Carbon Dioxide	93.8029	94.6875	
Ethane	0.1465	0.1010	0.0393
Propane	0.3310	0.3348	0.0915
Iso-Butane	0.2668	0.3557	0.0876
n-Butane	0.3648	0.4863	0.1154
Iso-Pentane	0.2028	0.3356	0.0744
n-Pentane	0.1901	0.3146	0.0691
Hexanes	0.1598	0.3158	0.0658
n-Hexane	0.1253	0.2477	0.0517
Benzene	0.0099	0.0177	0.0028
Cyclohexane	0.0458	0.0884	0.0156
Heptanes	0.0955	0.2195	0.0442
Methylcyclohexane	0.0251	0.0565	0.0101
Toluene	0.0055	0.0116	0.0018
Octanes	0.0299	0.0783	0.0154
Ethylbenzene	0.0006	0.0015	0.0002
Xylenes	0.0055	0.0134	0.0021
Nonanes	0.0204	0.0600	0.0115
Decanes Plus	0.0103	0.0336	0.0063
	100.0000	100.0000	0.7048

GPM TOTAL C2+ 0.704

Calculated Physical Properties	Total	C10+
Calculated Molecular Weight	43.60	142.28
GPA 2172 Calculation:		
Calculated Gross BTU per ft³ @ 14.696 psia & 60°F		
Higher Heating Value, Real Gas Dry BTU	90.89	7742.9
Water Sat. Gas Base BTU	89.35	7607.8
Relative Density Real Gas	1.5134	4.9126
Compressibility Factor	0.9943	

Data reviewed by: Ahsenur Kara, Lab Technician 1

Quality Assurance: The above analyses are performed in accordance with ASTM, UOP, GPA guidelines for quality assurance, unless otherwise stated.

Normalized Component Calculation (Hydrogen Sulfide)

Inlet Gas Analysis; Southern Petroleum Laboratories Report No.: 172-23080193-003A

COMPONENT	mole %	Normalized mole %	COMPONENT MW	Fuel Weight	Normalized WT %	Component BTU/scf	Partial Heating Values
Water	0.0000	0.0000	18	0.00	0.0000	0	0
Nitrogen	2.5830	2.5829	28.0134	0.72	1.6596	0	0
Carbon Dioxide	93.8029	93.8001	44.01	41.28	94.6851	0	0
Methane	1.5785	1.5785	16.043	0.25	0.5808	1010	16
Ethane	0.1465	0.1465	30.07	0.04	0.1010	1770	3
Hydrogen Sulfide	0.0000	0.0030	34.08	0.00	0.0023	637	0
Propane	0.3310	0.3310	44.097	0.15	0.3348	2516	8
I-Butane	0.2668	0.2668	58.123	0.16	0.3557	3252	9
N-Butane	0.3648	0.3648	58.123	0.21	0.4863	3262	12
I-Pentane	0.2028	0.2028	72.15	0.15	0.3356	4001	8
N-Pentane	0.1901	0.1901	72.15	0.14	0.3146	4009	8
Other/Iso Hexanes	0.1598	0.1598	86.177	0.14	0.3159	4750	8
N-Hexane	0.1253	0.1253	86.177	0.11	0.2477	4756	6
Methylcyclopentane	0.0000	0.0000	84.1608	0.00	0.0000	4501	0
Benzene	0.0099	0.0099	78.114	0.01	0.0177	3742	0
Cyclohexane	0.0458	0.0458	84.1608	0.04	0.0884	4482	2
Heptane	0.0955	0.0955	100.204	0.10	0.2195	5503	5
Methylcyclohexane	0.0251	0.0251	98.188	0.02	0.0565	5216	1
Toluene	0.0055	0.0055	92.141	0.01	0.0116	4475	0
Iso-Octane/224-Trimethylpentane	0.0000	0.0000	114.231	0.00	0.0000	6232	0
Octanes	0.0299	0.0299	114.231	0.03	0.0783	6249	2
Ethylbenzene	0.0006	0.0006	106.167	0.00	0.0015	5222	0
Xylenes	0.0055	0.0055	106.167	0.01	0.0134	5209	0
Nonanes	0.0204	0.0204	128.258	0.03	0.0600	6997	1
Decanes Plus	0.0103	0.0103	142.285	0.01	0.0336	7743	1
TOTALS	**100.0000**	**100.0000**	**MW=**	**43.60**	**100.0000**	**btu/scf =**	**90.3863909**
				sg	**1.5034**		
Max Total Hydrogen Sulfide:	**0.003**	mol%		**VOC wt%**	**2.9710**		
				Toxic wt%	**0.2919**		