Michelle McCracken
HES Professional
Marathon Oil Company
990 Town and Country Blvd.
Houston, TX 77024
(713) 296-3272
mmccracken@marathonoil.com

March 18, 2024

Ms. Claudia Smith
Minor NSR Permitting Coordinator
U.S. EPA, Region 8
1595 Wynkoop Street, 8P-AR
Denver, Colorado 80202-1129

Dear Ms. Smith:

Marathon Oil Company (Marathon) requests withdrawal of the Title V application for the Arvid Bangen USA well pad.

- A Title V permit application was submitted on October 5, 2022, covering the period from October 19, 2021 to October 18, 2023.
- Applicable emissions fees were paid for the period of October 19, 2021 to June 30, 2024.
- A Part 2 registration was submitted on March 5, 2024, indicating facility-wide potential annual non-fugitive emissions below 100 tpy for each criteria pollutant.

Wells producing into the facility are listed below.

Well Name	**API Number**
Arvid Bangen USA 31-18H	33-061-01004
Blackburn USA 41-18TFH	33-061-04842
Bowman USA 41-18H	33-061-04841
Burger USA 41-18TFH	33-061-04840
Old Bear USA 11-17H	33-061-04839

Please do not hesitate to contact me at the email address or telephone number shown above if you have any questions or require additional information.

Sincerely,

Michelle McCracken

Michelle McCracken

Attachment 1

Certificate of Truth, Accuracy, and Completeness

United States Environmental Protection Agency

OMB No. 2060-0336, Expires 11/30/2022

Federal Operating Permit Program (40 CFR Part 71)
CERTIFICATION OF TRUTH, ACCURACY, AND COMPLETENESS (CTAC)

This form must be completed, signed by the "Responsible Official" designated for the facility or emission unit, and sent with each submission of documents (i.e., application forms, updates to applications, reports, or any information required by a part 71 permit).

A. Responsible Official

Name: (Last)	Hudson	(First)	Chris		
Title	Operations Director				
Street or P.O. Box	990 Town & Country Blvd				
City	Houston	State	TX	ZIP	77024
Telephone	(713) 296-2081	Facsimile		(701) 456-7545	

B. Certification of Truth, Accuracy and Completeness (to be signed by the responsible official)

I certify under penalty of law, based on information and belief formed after reasonable inquiry, the statements and information contained in these documents are true, accurate and complete.

Name (signed) Chris Hudson

Name (typed) Chris Hudson Date 11/6/2023

Attachment 2

Actual Annual Emissions and Fees

United States Environmental Protection Agency

OMB No. 2060-0336, Expires 11/30/2022

Federal Operating Permit Program (40 CFR Part 71)
FEE FILING FORM (FF)

The purpose of this form is to ensure that fee payments made by check are credited to the proper facility and to the proper government account. Send this form, along with form FEE and the check, to the appropriate lockbox bank address listed on the following page. This form is required whenever you pay by check, including for initial fee payment and to pay annual fees. Part 71 fees may be paid by check or electronically, and further information on making payments by check or electronically is provided on the following page.

Source or Facility Name	Arvid Bangen Well Pad		
Source Location	47.817664 N, -102.499408 W		
EPA Region where Source Located	8		
Mailing Address:			
Street/P.O. Box	3172 Hwy 22 N		
City	Dickinson		
State	ND	ZIP	58601
Contact Person:	Michelle McCracken		
Title	HES Professional		
Telephone	(713) 296-3272		
Total Fee Payment Remitted:	**$14,437.74**		TOTAL
	$8,485.95		10/19/2022-10/18/2023
	$5,951.79		10/19/2023 - 6/30/2024

United States Environmental Protection Agency

OMB No. 2060-0336, Expires 11/30/2022

Federal Operating Permit Program (40 CFR Part 71)
FEE CALCUALTION WORKSHEET (FEE)

Use this form initially, or thereafter on an annual basis, to calculate part 71 fees.

A. General Information

Type of fee (Check one): ____ Initial X Annual

Deadline for submitting fee calculation worksheet 10/19/2023

For initial fees, emissions are based on (Check one):

X Actual emissions for the preceding calendar year. (Required in most circumstances.)

____ Estimates of actual emissions for the current calendar year. (Required when operations commenced during the preceding calendar year.)

Date commenced operations 10/19/2022

____ Estimates of actual emissions for the preceding calendar year. (Optional after a part 71 permit was issued to replace a part 70 permit, but only if initial fee payment is due between January 1 and March 31; otherwise use actual emissions for the preceding calendar year.)

For annual fee payment, you are required to use actual emissions for the preceding calendar year.

B. Source Information: Complete this section only if you are paying fees but not applying for a permit.

Source or facility name

Mailing address: Street or P.O. Box

City State ZIP

Contact person Title

Telephone Part 71 permit no.

C. Certification of Truth, Accuracy and Completeness: Only needed if not submitting a separate form CTAC.

I certify under penalty of law, based on information and belief formed after reasonable inquiry, the statements and information contained in this submittal (form and attachments) are true, accurate and complete.

Name (signed)

Name (typed) Date / /

D. Annual Emissions Report for Fee Calculation Purposes -- Non-HAP

You may use this to report actual emissions (tons per year) of regulated pollutants (for fee calculation) on a calendar-year basis for both initial and annual fee calculation purposes. Section E is designed to report HAP emissions. Quantify all actual emissions, including fugitives, but do not include insignificant emissions and certain regulated air pollutants that are not counted for fee purposes, such as CO and GHGs (see instructions). Sum the emissions in each column to calculate subtotals. Subtotals should be reported to the nearest tenth (0.1) of a ton at the bottom of the page. If any subtotal exceeds 4,000 tons, enter 4,000 for that column.

This data is for 2022/23 (year)

Emission Unit ID	NOx	VOC	SO2	PM10	Lead	Other
HT	0.86	0.04	0.00	0.07		
ENG	18.88	0.15	0.00	0.05		
FUG	--	5.95	--	--		
LOADING	--	31.35	--	--		
OT	Emissions represented at LP Flare					
WT	Emissions represented at LP Flare					
HP Flare	0.73	4.11	--	--		
VRT Flare	0.00	0.00	0.00	--		
LP Flare	8.03	51.23	--	--		
PNE	--	11.45	--	--		
Subtotals	28.50	104.28	0.01	0.11	0	0

E. Annual Emissions Report for Fee Calculation Purposes -- HAP

HAP Identification. Identify individual HAP emitted at the facility, identify the CAS number, and assign a unique identifier for use in the second table in this section. Whenever assigning identifier codes, use "HAP1" for the first, "HAP2" for the second, and so on.

Name of HAP	CAS No	Identifier
Benzene	71-43-2	HAP1
Toluene	108-88-3	HAP2
Ethylbenzene	100-41-4	HAP3
Xylene	1330-20-7	HAP4
n-Hexane	110-54-3	HAP5
2,2,4-Trimethylepentane	540-87-1	HAP6

HAP Emissions. Report the actual emissions of individual HAP identified above. Use the identifiers assigned in the table above. Include all emissions, including fugitives, and do not include insignificant emissions. Sum the emissions in each column to calculate subtotals. Report subtotals to the nearest tenth (0.1) of a ton at the bottom of the page. If any subtotal exceeds 4,000 tons, enter 4,000.

This data is for 2022/23 (year)

Emission Unit ID	Actual Emissions (Tons/Year)						
	HAP1	HAP2	HAP3	HAP4	HAP5	HAP6	
HT	--	--	--	--	--	--	
ENG	0.01	0.00	0.00	0.00	0.00	--	
FUG	0.01	0.02	0.00	0.04	0.10	--	
LOADING	0.09	0.11	0.01	0.07	0.69	0.10	
OT	Emissions represented at LP Flare						
WT	Emissions represented at LP Flare						
HP Flare	0.01	0.01	0.00	0.01	0.07	--	
LP Flare	0.12	0.17	0.01	0.11	0.99	--	
PNE	0.01	0.02	0.00	0.00	0.22	--	
Subtotals	0.24	0.33	0.03	0.23	2.07	0.10	

F. Fee Calculation Worksheet

This worksheet is used to calculate the total fee owed (including the emissions-based fee and the GHG fee adjustment) for both initial and annual fee payment purposes. Reconciliation is only for cases where you are paying the annual fee and you used any type of estimate of actual emissions when you calculated the initial fee. If you do not need to reconcile fees, complete line 1-5 (emissions summary) and then skip down to line 21 (emission calculation). See instructions for more detailed explanation.

EMISSIONS SUMMARY

1. Sum the subtotals from section D of this form (non-HAP) and enter the total, rounded to the nearest tenth (0.1) of a ton.	132.90
2. Sum the subtotals from section E of this form (HAP) and enter the total, rounded to the nearest tenth (0.1) of a ton.	3.01
3. Sum lines 1 and 2.	135.91
4. Enter the emissions that were counted twice. If none, enter "0."	3.01
5. Subtract line 4 from line 3, round to the nearest ton, and enter the result here. This is the total emissions that count for fees purposes.	132.90

RECONCILIATION
(WHEN INITIAL FEES WERE BASED ON ESTIMATES FOR THE "CURRENT" CALENDAR YEAR)

Only complete lines 6-10 if you are paying the first annual fee and initial fees were based on estimated actual emissions for the calendar year in which you paid initial fees; otherwise skip to line 11 or to line 21.

6. Enter the total estimated actual emissions for the year the initial fee was paid (previously reported on line 5 of the initial fee form).	
7. If line 5 is greater than line 6, subtract line 6 from line 5, and enter the result. Otherwise enter "0."	
8. If line 6 is greater than line 5, subtract line 5 from line 6, and enter the result. Otherwise enter "0."	
9. If line 7 is greater than 0, multiply line 7 by last year's fee rate ($/ton) and enter the result here. This is the underpayment. Go to line 21.	
10. If line 8 is greater than 0, multiply line 8 by last year's fee rate ($/ton) and enter the result here. This is the overpayment. Go to line 21.	

RECONCILIATION
(WHEN INITIAL FEES WERE BASED ON ESTIMATES FOR THE "PRECEDING" CALENDAR YEAR)

Only complete lines 11-20 if you are paying the first annual fee and initial fees were based on estimated actual emissions for the calendar year preceding initial fee payment; otherwise skip to line 21. If completing this section, you will also need to complete sections D and E to report actual emissions for the calendar year preceding initial fee payment.

11. Sum the actual emissions from section D (non-HAP) for the calendar year preceding initial fee payment and enter the result here.	
12. Sum the actual emissions from section E (HAP) for the calendar year preceding initial fee payment and enter the result here.	
13. Add lines 11 and 12 and enter the total here. These are total actual emissions for the calendar year preceding initial fee payment.	
14. Enter double counted emission from line 13 here. If none, enter "0."	
15. Subtract line 14 from line 13, round to the nearest ton, and enter the result here.	
the initial fee form. These are estimated actual emissions for the calendar year preceding initial fee payment.	
17. If line 15 is greater than line 16, subtract line 16 from line 15, and enter the result here. Otherwise enter "0."	
18. If line 16 is greater than line 15, subtract line 15 from line 16, and enter the result here. Otherwise enter "0."	
19. If line 17 is greater than 0, multiply line 17 by last year's fee rate ($/ton) and enter the result here. This is the underpayment.	
20. If line 18 is greater than 0, multiply line 18 by last year's fee rate ($/ton) and enter the result on this line. This is the overpayment.	

EMISSION FEE CALCULATION

21. Multiply line 5 (tons) by the current fee rate ($/ton) and enter the result here. This is the unadjusted emissions fee. Continue on to line 23.	8485.95

GHG FEE ADJUSTMENT	
22. If you are submitting an initial permit application and this is the first time you are paying fees, enter $2,236, otherwise enter “0”. [Note that any updates to the initial application are covered under this one-time charge.]	
23. Enter the number of permit modifications (or related permit actions) you have submitted to the permitting authority since you last paid fees. If none, skip to line 25.	
24. Multiply the number in line 23 by $365 and enter the result.	
25. If you have submitted a permit renewal application since the last time you paid fees enter $520, otherwise enter “0”	
26. Sum line 22, 24, and 25 and enter the result. This is the GHG fee adjustment	0
OTHER ADJUSTMENTS	
26. Add the total on line 21 and the total on line 26 and enter the result.	8485.95
27. Enter any underpayment from line 9 or 19 here. Otherwise enter "0."	
28. Enter any overpayment from line 10 or 20 here. Otherwise enter "0."	
29 is greater than "0," subtract this from line 27 and enter the result here. Otherwise enter the amount on line 27 here. This is the fee adjusted for over/underpayment.	
30. Enter any credit for fee assessment error here. Otherwise, enter "0."	
31. Subtract line 31 from line 30 and enter the result here. Stop here. This is the **TOTAL FEE (AFTER ADJUSTMENTS)** that you must remit to EPA.	8485.95

United States Environmental Protection Agency

OMB No. 2060-0336, Expires 11/30/2022

Federal Operating Permit Program (40 CFR Part 71)
FEE CALCUALTION WORKSHEET (FEE)

Use this form initially, or thereafter on an annual basis, to calculate part 71 fees.

A. General Information

Type of fee (Check one): ____ Initial X Annual

Deadline for submitting fee calculation worksheet 10/18/2024

For initial fees, emissions are based on (Check one):

X Actual emissions for the preceding calendar year. (Required in most circumstances.)

____ Estimates of actual emissions for the current calendar year. (Required when operations commenced during the preceding calendar year.)

Date commenced operations 10/19/2023

____ Estimates of actual emissions for the preceding calendar year. (Optional after a part 71 permit was issued to replace a part 70 permit, but only if initial fee payment is due between January 1 and March 31; otherwise use actual emissions for the preceding calendar year.)

For annual fee payment, you are required to use actual emissions for the preceding calendar year.

B. Source Information: Complete this section only if you are paying fees but not applying for a permit.

Source or facility name

Mailing address: Street or P.O. Box

City State ZIP

Contact person Title

Telephone Part 71 permit no.

C. Certification of Truth, Accuracy and Completeness: Only needed if not submitting a separate form CTAC.

I certify under penalty of law, based on information and belief formed after reasonable inquiry, the statements and information contained in this submittal (form and attachments) are true, accurate and complete.

Name (signed)

Name (typed) Date / /

D. Annual Emissions Report for Fee Calculation Purposes -- Non-HAP

You may use this to report actual emissions (tons per year) of regulated pollutants (for fee calculation) on a calendar-year basis for both initial and annual fee calculation purposes. Section E is designed to report HAP emissions. Quantify all actual emissions, including fugitives, but do not include insignificant emissions and certain regulated air pollutants that are not counted for fee purposes, such as CO and GHGs (see instructions). Sum the emissions in each column to calculate subtotals. Subtotals should be reported to the nearest tenth (0.1) of a ton at the bottom of the page. If any subtotal exceeds 4,000 tons, enter 4,000 for that column.

This data is for 2023/24 (year)

Emission Unit ID	NOx	VOC	SO2	PM10	Lead	Other
HT	0.60	0.03	0.00	0.05		
ENG	13.24	0.10	0.00	0.03		
FUG	--	4.17	--	--		
LOADING	--	21.99	--	--		
OT	Emissions represented at LP Flare					
WT	Emissions represented at LP Flare					
HP Flare	0.51	2.88	--	--		
VRT Flare	0.00	0.00	0.00	--		
LP Flare	5.63	35.93	--	--		
PNE	--	8.03	--	--		
Subtotals	19.99	73.14	0.01	0.08	0	0

E. Annual Emissions Report for Fee Calculation Purposes -- HAP

HAP Identification. Identify individual HAP emitted at the facility, identify the CAS number, and assign a unique identifier for use in the second table in this section. Whenever assigning identifier codes, use "HAP1" for the first, "HAP2" for the second, and so on.

Name of HAP	CAS No	Identifier
Benzene	71-43-2	HAP1
Toluene	108-88-3	HAP2
Ethylbenzene	100-41-4	HAP3
Xylene	1330-20-7	HAP4
n-Hexane	110-54-3	HAP5
2,2,4-Trimethylepentane	540-87-1	HAP6

HAP Emissions. Report the actual emissions of individual HAP identified above. Use the identifiers assigned in the table above. Include all emissions, including fugitives, and do not include insignificant emissions. Sum the emissions in each column to calculate subtotals. Report subtotals to the nearest tenth (0.1) of a ton at the bottom of the page. If any subtotal exceeds 4,000 tons, enter 4,000.

This data is for 2023/24 (year)

Emission Unit ID	Actual Emissions (Tons/Year)						
	HAP1	HAP2	HAP3	HAP4	HAP5	HAP6	
HT	--	--	--	--	--	--	
ENG	0.01	0.00	0.00	0.00	0.00	--	
FUG	0.01	0.02	0.00	0.03	0.07	--	
LOADING	0.06	0.08	0.01	0.05	0.48	0.07	
OT	Emissions represented at LP Flare						
WT	Emissions represented at LP Flare						
HP Flare	0.01	0.01	0.00	0.01	0.05	--	
LP Flare	0.08	0.12	0.01	0.08	0.70	--	
PNE	0.01	0.01	0.00	0.00	0.16	--	
Subtotals	0.17	0.23	0.02	0.16	1.45	0.07	

F. Fee Calculation Worksheet

This worksheet is used to calculate the total fee owed (including the emissions-based fee and the GHG fee adjustment) for both initial and annual fee payment purposes. Reconciliation is only for cases where you are paying the annual fee and you used any type of estimate of actual emissions when you calculated the initial fee. If you do not need to reconcile fees, complete line 1-5 (emissions summary) and then skip down to line 21 (emission calculation). See instructions for more detailed explanation.

EMISSIONS SUMMARY

1. Sum the subtotals from section D of this form (non-HAP) and enter the total, rounded to the nearest tenth (0.1) of a ton.	93.22
2. Sum the subtotals from section E of this form (HAP) and enter the total, rounded to the nearest tenth (0.1) of a ton.	2.11
3. Sum lines 1 and 2.	95.33
4. Enter the emissions that were counted twice. If none, enter "0."	2.11
5. Subtract line 4 from line 3, round to the nearest ton, and enter the result here. This is the total emissions that count for fees purposes.	93.22

RECONCILIATION
(WHEN INITIAL FEES WERE BASED ON ESTIMATES FOR THE "CURRENT" CALENDAR YEAR)

Only complete lines 6-10 if you are paying the first annual fee and initial fees were based on estimated actual emissions for the calendar year in which you paid initial fees; otherwise skip to line 11 or to line 21.

6. Enter the total estimated actual emissions for the year the initial fee was paid (previously reported on line 5 of the initial fee form).	
7. If line 5 is greater than line 6, subtract line 6 from line 5, and enter the result. Otherwise enter "0."	
8. If line 6 is greater than line 5, subtract line 5 from line 6, and enter the result. Otherwise enter "0."	
9. If line 7 is greater than 0, multiply line 7 by last year's fee rate ($/ton) and enter the result here. This is the underpayment. Go to line 21.	
10. If line 8 is greater than 0, multiply line 8 by last year's fee rate ($/ton) and enter the result here. This is the overpayment. Go to line 21.	

RECONCILIATION
(WHEN INITIAL FEES WERE BASED ON ESTIMATES FOR THE "PRECEDING" CALENDAR YEAR)

Only complete lines 11-20 if you are paying the first annual fee and initial fees were based on estimated actual emissions for the calendar year preceding initial fee payment; otherwise skip to line 21. If completing this section, you will also need to complete sections D and E to report actual emissions for the calendar year preceding initial fee payment.

11. Sum the actual emissions from section D (non-HAP) for the calendar year preceding initial fee payment and enter the result here.	
12. Sum the actual emissions from section E (HAP) for the calendar year preceding initial fee payment and enter the result here.	
13. Add lines 11 and 12 and enter the total here. These are total actual emissions for the calendar year preceding initial fee payment.	
14. Enter double counted emission from line 13 here. If none, enter "0."	
15. Subtract line 14 from line 13, round to the nearest ton, and enter the result here.	
the initial fee form. These are estimated actual emissions for the calendar year preceding initial fee payment.	
17. If line 15 is greater than line 16, subtract line 16 from line 15, and enter the result here. Otherwise enter "0."	
18. If line 16 is greater than line 15, subtract line 15 from line 16, and enter the result here. Otherwise enter "0."	
19. If line 17 is greater than 0, multiply line 17 by last year's fee rate ($/ton) and enter the result here. This is the underpayment.	
20. If line 18 is greater than 0, multiply line 18 by last year's fee rate ($/ton) and enter the result on this line. This is the overpayment.	

EMISSION FEE CALCULATION

21. Multiply line 5 (tons) by the current fee rate ($/ton) and enter the result here. This is the unadjusted emissions fee. Continue on to line 23.	5951.79

GHG FEE ADJUSTMENT	
22. If you are submitting an initial permit application and this is the first time you are paying fees, enter $2,236, otherwise enter “0”. [Note that any updates to the initial application are covered under this one-time charge.]	
23. Enter the number of permit modifications (or related permit actions) you have submitted to the permitting authority since you last paid fees. If none, skip to line 25.	
24. Multiply the number in line 23 by $365 and enter the result.	
25. If you have submitted a permit renewal application since the last time you paid fees enter $520, otherwise enter “0”	
26. Sum line 22, 24, and 25 and enter the result. This is the GHG fee adjustment	0
OTHER ADJUSTMENTS	
26. Add the total on line 21 and the total on line 26 and enter the result.	5951.79
27. Enter any underpayment from line 9 or 19 here. Otherwise enter "0."	
28. Enter any overpayment from line 10 or 20 here. Otherwise enter "0."	
29 is greater than "0," subtract this from line 27 and enter the result here. Otherwise enter the amount on line 27 here. This is the fee adjusted for over/underpayment.	
30. Enter any credit for fee assessment error here. Otherwise, enter "0."	
31. Subtract line 31 from line 30 and enter the result here. Stop here. This is the **TOTAL FEE (AFTER ADJUSTMENTS)** that you must remit to EPA.	5951.79

Marathon Oil Company
990 Town & Country Boulevard
Houston, TX 77001-669

Remittance Advice

To	Remittance Address
UNITED STATES ENVIRONMENTAL PROTECTION AGENCY REGION II 290 BROADWAY 17TH FLOOR NEW YORK NY 10007-1866 Attn: Accounts Receivable	UNITED STATES ENVIRONMENTAL PROTECTION AGENCY REGION II 290 BROADWAY 17TH FLOOR NEW YORK NY 10007-1866

Vendor No.: 5005415
Deposit Date: 03/14/2024
Remittance Advice The Payment for the following invoices will be deposited on the above **deposit date** to your bank account **XXXXXX9008, US ENVIRONMENTAL PROTECTION AGENCY,** through the Automated Clearing House (ACH). If you have questions, please contact the AP Supplier Hotline 866-323-1836 or for Joint Venture contact 866-925-6093. You can also email OpenInvoiceSupport@marathonoil.com.

Invoice Number	Inv Date	Document Number/Text	Gross Amount	Disc/WHTax	Net Amount
0324 UN1443774	03/08/2024	1900001568 *Arvid Bangen*	14,437.74	0.00	14,437.74
		Total		**USD**	**14,437.74**

Michelle McCracken
HES Professional

Marathon Oil Company
990 Town and Country Blvd
Houston, TX 77024
(713) 296-3272
mmccracken@marathonoil.com

October 10, 2022

U.S. EPA
OCFO/OC/ACAD/FCB
Attn: Collections Team
1300 Pennsylvania Ave NW
Mail Code 2733R
Washington, DC 20004

Marathon Oil Company's (Marathon) Arvid Bangen well pad has become subject to permitting requirements under 40 CFR Part 71 Federal Operating Permit Program. Attached is the Part 71 permit application fee payment.

If you have any questions or require additional information concerning this submittal, please contact me at the telephone number or email address indicated above.

Sincerely,

Michelle McCracken

Michelle McCracken

United States Environmental Protection Agency

OMB No. 2060-0336, Expires 11/30/2022

Federal Operating Permit Program (40 CFR Part 71)
FEE FILING FORM (FF)

The purpose of this form is to ensure that fee payments made by check are credited to the proper facility and to the proper government account. Send this form, along with form FEE and the check, to the appropriate lockbox bank address listed on the following page. This form is required whenever you pay by check, including for initial fee payment and to pay annual fees. Part 71 fees may be paid by check or electronically, and further information on making payments by check or electronically is provided on the following page.

Source or Facility Name	Arvid Bangen USA Well Pad
Source Location	47.817664 N, -102.499408 W
EPA Region where Source Located	8
Mailing Address:	
Street/P.O. Box	3172 Highway 22 N
City	Dickinson
State	ND ZIP 58601
Contact Person:	Michelle McCracken
Title	HSE Professional
Telephone	(713) 296-3772
Total Fee Payment Remitted:	$14,656.23

United States Environmental Protection Agency

OMB No. 2060-0336, Expires 11/30/2022

Federal Operating Permit Program (40 CFR Part 71)
FEE CALCUALTION WORKSHEET (FEE)

Use this form initially, or thereafter on an annual basis, to calculate part 71 fees.

A. General Information

Type of fee (Check one): X Initial _____ Annual

Deadline for submitting fee calculation worksheet 10/19/2022

For initial fees, emissions are based on (Check one):

X Actual emissions for the preceding calendar year. (Required in most circumstances.)

_____ Estimates of actual emissions for the current calendar year. (Required when operations commenced during the preceding calendar year.)

Date commenced operations 10/19/2021

_____ Estimates of actual emissions for the preceding calendar year. (Optional after a part 71 permit was issued to replace a part 70 permit, but only if initial fee payment is due between January 1 and March 31; otherwise use actual emissions for the preceding calendar year.)

For annual fee payment, you are required to use actual emissions for the preceding calendar year.

B. Source Information: Complete this section only if you are paying fees but not applying for a permit.

Source or facility name _____

Mailing address: Street or P.O. Box _____

City _____ State _____ ZIP _____

Contact person _____ Title _____

Telephone / / Part 71 permit no. _____

C. Certification of Truth, Accuracy and Completeness: Only needed if not submitting a separate form CTAC.

I certify under penalty of law, based on information and belief formed after reasonable inquiry, the statements and information contained in this submittal (form and attachments) are true, accurate and complete.

Name (signed) _____

Name (typed) _____ Date / /

D. Annual Emissions Report for Fee Calculation Purposes -- Non-HAP

You may use this to report actual emissions (tons per year) of regulated pollutants (for fee calculation) on a calendar-year basis for both initial and annual fee calculation purposes. Section E is designed to report HAP emissions. Quantify all actual emissions, including fugitives, but do not include insignificant emissions and certain regulated air pollutants that are not counted for fee purposes, such as CO and GHGs (see instructions). Sum the emissions in each column to calculate subtotals. Subtotals should be reported to the nearest tenth (0.1) of a ton at the bottom of the page. If any subtotal exceeds 4,000 tons, enter 4,000 for that column.

This data is for 2021/2022 (year)

Emission Unit ID	NOx	VOC	SO2	PM10	Lead	Other
HT	0.9	0.0	0.0	0.1	0.0	0.0
Engines	0.0	0.0	0.0	0.0	0.0	0.0
FUG	0.0	8.6	0.0	0.0	0.0	0.0
LOAD	0.0	56.3	0.0	0.0	0.0	0.0
OT	All OT now represented at LP Flare					
WT	All WT now represented at LP Flare					
HP Flare	2.7	18.8	0.0	0.2	0.0	0.0
MP Flare	0.0	0.0	0.0	0.0	0.0	0.0
LP Flare	13.4	117.3	0.0	0.8	0.0	0.0
Combustor	0.2	1.8	0.0	0.0	0.0	0.0
Subtotals	17.1	202.8	0.0	1.0	0.0	0.0

E. Annual Emissions Report for Fee Calculation Purposes -- HAP

HAP Identification. Identify individual HAP emitted at the facility, identify the CAS number, and assign a unique identifier for use in the second table in this section. Whenever assigning identifier codes, use "HAP1" for the first, "HAP2" for the second, and so on.

Name of HAP	CAS No	Identifier
Benzene	71-43-2	HAP1
Toluene	108-88-3	HAP2
Ethylbenzene	100-41-4	HAP3
Xylene	1330-20-7	HAP4
n-Hexane	110-54-3	HAP5
2,2,4-Trimethylepentane	540-87-1	HAP6
Formaldehyde	50-00-0	HAP7

HAP Emissions. Report the actual emissions of individual HAP identified above. Use the identifiers assigned in the table above. Include all emissions, including fugitives, and do not include insignificant emissions. Sum the emissions in each column to calculate subtotals. Report subtotals to the nearest tenth (0.1) of a ton at the bottom of the page. If any subtotal exceeds 4,000 tons, enter 4,000.

This data is for 2021/2022 (year)

Emission Unit ID	Actual Emissions (Tons/Year)						
	HAP1	HAP2	HAP3	HAP4	HAP5	HAP6	HAP7
HT	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Engines	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FUG	0.0	0.0	0.0	0.0	0.4	0.0	0.0
LOAD	0.2	0.1	0.0	0.0	1.7	0.0	0.0
OT	All OT now represented at LP Flare						
WT	All WT now represented at LP Flare						
HP Flare	0.1	0.0	0.0	0.0	0.5	0.0	0.0
LP Flare	0.4	0.1	0.1	0.1	3.5	0.0	0.0
Combustor	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Subtotals	0.7	0.2	0.1	0.1	6.0	0.0	0.0

F. Fee Calculation Worksheet

This worksheet is used to calculate the total fee owed (including the emissions-based fee and the GHG fee adjustment) for both initial and annual fee payment purposes. Reconciliation is only for cases where you are paying the annual fee and you used any type of estimate of actual emissions when you calculated the initial fee. If you do not need to reconcile fees, complete line 1-5 (emissions summary) and then skip down to line 21 (emission calculation). See instructions for more detailed explanation.

EMISSIONS SUMMARY

1. Sum the subtotals from section D of this form (non-HAP) and enter the total, rounded to the nearest tenth (0.1) of a ton.	220.9
2. Sum the subtotals from section E of this form (HAP) and enter the total, rounded to the nearest tenth (0.1) of a ton.	7.2
3. Sum lines 1 and 2.	228.0
4. Enter the emissions that were counted twice. If none, enter "0."	7.2
5. Subtract line 4 from line 3, round to the nearest ton, and enter the result here. This is the total emissions that count for fees purposes.	220.9

RECONCILIATION
(WHEN INITIAL FEES WERE BASED ON ESTIMATES FOR THE "CURRENT" CALENDAR YEAR)

Only complete lines 6-10 if you are paying the first annual fee and initial fees were based on estimated actual emissions for the calendar year in which you paid initial fees; otherwise skip to line 11 or to line 21.

6. Enter the total estimated actual emissions for the year the initial fee was paid (previously reported on line 5 of the initial fee form).	
7. If line 5 is greater than line 6, subtract line 6 from line 5, and enter the result. Otherwise enter "0."	
8. If line 6 is greater than line 5, subtract line 5 from line 6, and enter the result. Otherwise enter "0."	
9. If line 7 is greater than 0, multiply line 7 by last year's fee rate ($/ton) and enter the result here. This is the underpayment. Go to line 21.	
10. If line 8 is greater than 0, multiply line 8 by last year's fee rate ($/ton) and enter the result here. This is the overpayment. Go to line 21.	

RECONCILIATION (WHEN INITIAL FEES WERE BASED ON ESTIMATES FOR THE "PRECEDING" CALENDAR YEAR) Only complete lines 11-20 if you are paying the first annual fee and initial fees were based on estimated actual emissions for the calendar year preceding initial fee payment; otherwise skip to line 21. If completing this section, you will also need to complete sections D and E to report actual emissions for the calendar year preceding initial fee payment.	
11. Sum the actual emissions from section D (non-HAP) for the calendar year preceding initial fee payment and enter the result here.	
12. Sum the actual emissions from section E (HAP) for the calendar year preceding initial fee payment and enter the result here.	
13. Add lines 11 and 12 and enter the total here. These are total actual emissions for the calendar year preceding initial fee payment.	
14. Enter double counted emission from line 13 here. If none, enter "0."	
15. Subtract line 14 from line 13, round to the nearest ton, and enter the result here.	
5 of the initial fee form. These are estimated actual emissions for the calendar year preceding initial fee payment.	
17. If line 15 is greater than line 16, subtract line 16 from line 15, and enter the result here. Otherwise enter "0."	
18. If line 16 is greater than line 15, subtract line 15 from line 16, and enter the result here. Otherwise enter "0."	
19. If line 17 is greater than 0, multiply line 17 by last year's fee rate ($/ton) and enter the result here. This is the underpayment.	
20. If line 18 is greater than 0, multiply line 18 by last year's fee rate ($/ton) and enter the result on this line. This is the overpayment.	
EMISSION FEE CALCULATION	
21. Multiply line 5 (tons) by the current fee rate ($/ton) and enter the result here. This is the unadjusted emissions fee. Continue on to line 23.	12420.23

GHG FEE ADJUSTMENT	
22. If you are submitting an initial permit application and this is the first time you are paying fees, enter $2,236, otherwise enter “0”. [Note that any updates to the initial application are covered under this one-time charge.]	2236
23. Enter the number of permit modifications (or related permit actions) you have submitted to the permitting authority since you last paid fees. If none, skip to line 25.	
24. Multiply the number in line 23 by $365 and enter the result.	
25. If you have submitted a permit renewal application since the last time you paid fees enter $520, otherwise enter “0”	
26. Sum line 22, 24, and 25 and enter the result. This is the GHG fee adjustment	2236
OTHER ADJUSTMENTS	
26. Add the total on line 21 and the total on line 26 and enter the result.	14656.23
27. Enter any underpayment from line 9 or 19 here. Otherwise enter "0."	
28. Enter any overpayment from line 10 or 20 here. Otherwise enter "0."	
If line 29 is greater than "0," subtract this from line 27 and enter the result here. Otherwise enter the amount on line 27 here. This is the fee adjusted for over/underpayment.	
30. Enter any credit for fee assessment error here. Otherwise, enter "0."	
31. Subtract line 31 from line 30 and enter the result here. Stop here. This is the **TOTAL FEE (AFTER ADJUSTMENTS)** that you must remit to EPA.	14656.23

Check No	Check Date	Bank	Bank No	Vendor No	Marathon Oil Company 990 Town and Country Blvd. Houston, TX 77024	Direct Inquiries to: ACCOUNTS PAYABLE DEPARTMENT Accounts Payable Phone: 866-323-1836	Hndlg
1498156	10/04/2022	NCBA	7780	0005004375			HS

Invoice Number	Invoice Date	Document No	Remit Comment	Gross Amount	Discount	Invoice/Pay Amount
1022 EP1465623		1900004925		14,656.23		14,656.23
			TOTAL:	14,656.23		14,656.23

(FOLD ON PERFORATION BELOW AND DETACH CHECK STUB BEFORE DEPOSITING)

DO NOT CASH UNLESS WARNING BAND AND THE CHECK BACKGROUND ARE IN VIOLET. THE LINE BELOW CONTAINS MICROPRINTING.

FORM 25078 REV. 5/00

ACCOUNTS PAYABLE CHECK

Marathon Oil Company
990 Town and Country Blvd.
Houston, TX 77024

56-389 / 412

CHECK DATE
10/4/2022

CHECK NUMBER
1498156

Fourteen thousand six hundred fifty six and 23/100 Dollars

$14,656.23

PAY TO THE ORDER OF:

EPA US ENVIRONMENTAL PROTECTION
AGENCY
CINCINNATI FINACNCE CENTER
ST LOUIS, MO 63197-9000

U.S. Funds

MATCH AMOUNT IN WORDS WITH NUMBERS

By: _____
Authorized Representative

VOID AFTER 180 DAYS

PNC Bank, N.A. 070
Ashland, OH

DO NOT CASH UNLESS THIS CHECK IS ON WATERMARKED PAPER. HOLD TO LIGHT TO VIEW. THE LINE ABOVE CONTAINS MICROPRINTING.

⑈0001498156⑈ ⑆041203895⑆ 4239711179⑈

Attachment 3

Potential Annual Emissions

Michelle McCracken
HES Professional

Marathon Oil Company
990 Town and Country Blvd.
Houston, TX 77024
(713) 296-3272
mmccracken@marathonoil.com

February 27, 2024

Ms. Claudia Smith
Minor NSR Permitting Coordinator
U.S. EPA, Region 8
1595 Wynkoop Street, 8P-AR
Denver, Colorado 80202-1129

Dear Ms. Smith:

Enclosed please find an updated Part 2 registration form for the Arvid Bangen USA well pad. This submittal addresses the removal of some high pressure separators and adjusts production rates.

Wells producing into the facility are listed below.

Arvid Bangen USA 31-18H	33-061-01004
Blackburn USA 41-18TFH	33-061-04842
Bowman USA 41-18H	33-061-04841
Burger USA 41-18TFH	33-061-04840
Old Bear USA 11-17H	33-061-04839

Please do not hesitate to contact me if you have any questions regarding this registration.

Sincerely,

Michelle McCracken

Michelle McCracken
Enclosures

EPA Form No. 5900-391
EPA ICR No. 1230.27
OMB Control No. 2060-0003
Approval expires 10/31/2020

United States Environmental Protection Agency
https://www.epa.gov/tribal-air/tribal-minor-new-source-review
April 29, 2019

Part 2: Submit Within 60 Days After Startup of Production -- Emission and Production Information

FEDERAL IMPLEMENTATION PLAN FOR TRUE MINOR SOURCES IN INDIAN COUNTRY IN THE OIL AND NATURAL GAS PRODUCTION AND NATURAL GAS PROCESSING SEGMENTS OF THE OIL AND NATURAL GAS SECTOR

Registration for New True Minor Oil and Natural Gas Sources and Minor Modifications at Existing True Minor Oil and Natural Gas Sources

Please submit information to:

[Reviewing Authority Address Phone]	Claudia Smith Minor NSR Permitting Coordinator U.S. EPA, Region 8 1595 Wynkoop Street, 8P-AR Denver, CO 80202-1129

A. GENERAL SOURCE INFORMATION (See Instructions Below)

1. Company Name Marathon Oil Company		**2. Source Name** Arvid Bangen USA well pad	
3. Type of Oil and Natural Gas Operation oil and gas well-site		**4. New Minor Source?** ☐ Yes ■ No **5. True Source Modification?** ■ Yes ☐ No	
6. NAICS Code 211111		**7. SIC Code** 1311	
8. U.S. Well ID(s) or API Number(s) [if applicable] 33-061-01004, 33-061-04842, 33-061-04841, 33-061-04840, 33-061-04839			
9. Area of Indian Country Fort Berthold	**10. County** Mountrail	**11a. Latitude** 47.817664	**11b. Longitude** -102.499408

B. CONTACT INFORMATION (See Instructions Below)

1. Owner Name Chris Hudson	Title Operations Director
Mailing Address 990 Town & Country Blvd, Houston, TX 77024	
Email Address cghudson@marathonoil.com	
Telephone Number 713.296.2081	Facsimile Number 701.456.7525
2. Operator Name (if different from owner) **Same**	Title
Mailing Address	
Email Address	
Telephone Number	Facsimile Number
3. Source Contact Michelle McCracken	Title HES Professional
Mailing Address 990 Town & Country Blvd, Houston, TX 77024	
Email Address mmccracken@marathonoil.com	
Telephone Number 713.296.3272	Facsimile Number 701.456.7525

4. Compliance Contact	Title
Chris Hudson	Operations Director
Mailing Address	
990 Town & Country Blvd, Houston, TX 77024	
Email Address	
cghudson@marathonoil.com	
Telephone Number	Facsimile Number
713.296.2081	701.456.7525

C. EMISSIONS AND OTHER SOURCE INFORMATION

Include all of the following information in the table below and as attachments to this form:

Note: The emission estimates can be based upon actual test data or, in the absence of such data, upon procedures acceptable to the Reviewing Authority. The following procedures are generally acceptable for estimating emissions from air pollution sources: (1) unit-specific emission tests; (2) mass balance calculations; (3) published, verifiable emission factors that are applicable to the unit (i.e., manufacturer specifications); (4) other engineering calculations; or (5) other procedures to estimate emissions specifically approved by the Reviewing Authority. Guidance for estimating emissions can be found at https://www.epa.gov/chief.

- ■ Narrative description of the operations.
- ■ Identification and description of any air pollution control equipment and compliance monitoring devices or activities.
- ■ Type and actual amount (annually) of each fuel that will be used.
- ■ Type of raw materials used (e.g., water for hydraulic fracturing).
- ■ Actual, annual production rates.
- ■ Actual operating schedules.
- ■ Any existing limitations on source operations affecting emissions or any work practice standards, where applicable, for all regulated New Source Review (NSR) pollutants at your source. Indicate all requirements referenced in the Federal Implementation Plan (FIP) for True Minor Sources in Indian Country in the Oil and Natural Gas Production and Natural Gas Processing Segments of the Oil and Natural Gas Sector that apply to emissions units and air pollution generating activities at the source or proposed. Include statements indicating each emissions unit that is an emissions unit potentially subject to the requirements referenced in the FIP, but does not meet the definition of an affected facility under the referenced requirement, and therefore, is not subject to those requirements.
- ■ For each emissions unit comprising the new source or modification, estimates of the total allowable (potential to emit) annual emissions at startup of production from the air pollution source for the following air pollutants: particulate matter, PM_{10}, $PM_{2.5}$, sulfur oxides ( ), nitrogen oxides (NO_x), carbon monoxide (CO), volatile organic compound (VOC), lead (Pb) and lead compounds, fluorides (gaseous and particulate), sulfuric acid mist (H_2SO_4), hydrogen sulfide (H_2S), total reduced sulfur (TRS) and reduced sulfur compounds, including all calculations for the estimates. Allowable annual emissions are defined as: emissions rate of an emissions unit calculated using the maximum capacity of a stationary source to emit a pollutant under its physical and operational design. Any physical

or operational limitation on the capacity of the source to emit a pollutant, including air pollution control equipment and restrictions on hours of operation or on the type or amount of material combusted, stored, or processed, shall be treated as part of its design if the limitation, or the effect it would have on emissions, is legally and practically enforceable. You must determine the potential for emissions within 30 days from the startup of production.

☒ For each emissions unit comprising the new source or modification, estimates of the total actual annual emissions during the upcoming, consecutive 12 months from the air pollution source for the following air pollutants: particulate matter (PM, PM_{10}, $PM_{2.5}$), sulfur oxides (SO_x), nitrogen oxides (NOx), carbon monoxide (CO), volatile organic compound (VOC), lead (Pb) and lead compounds, ammonia (NH_3), fluorides (gaseous and particulate), sulfuric acid mist (H_2SO_4), hydrogen sulfide (H_2S), total reduced sulfur (TRS) and reduced sulfur compounds, including all calculations for the estimates. Estimates of actual emissions must take into account equipment, operating conditions, and air pollution control measures. You should calculate an estimate of the actual annual emissions using estimated operating hours, production rates, in-place control equipment, and types of materials processed, stored, or combusted.

D. TABLE OF ESTIMATED EMISSIONS

Provide in the table below estimates of the total allowable annual emissions in tons per year (tpy) and total actual annual emissions (tpy) for the following pollutants for all emissions units comprising the new source or modification.

POLLUTANT	TOTAL ALLOWABLE ANNUAL EMISSIONS (TPY)	TOTAL ACTUAL ANNUAL EMISSIONS (TPY)
PM	0.11	0.11
PM_{10}	0.11	0.11
$PM_{2.5}$	0.11	0.11
SO_x	0.01	0.01
NO_x	30.25	30.25
CO	46.05	46.05
VOC	103.54	103.54
Pb	0.00	0.00

POLLUTANT	TOTAL ALLOWABLE ANNUAL EMISSIONS (TPY)	TOTAL ACTUAL ANNUAL EMISSIONS (TPY)
NH3	0.00	0.00
Fluorides	0.00	0.00
H_2SO_4	0.00	0.00
H_2S	0.00	0.00
TRS	0.00	0.00

Attachment 1

Narrative and Process Flow Diagram

Narrative Description of Operations

The Arvid Bangen USA well pad includes the following wells: Arvid Bangen USA 31-18H, Blackburn USA 41-18TFH, Bowman USA 41-18H, Burger USA 41-18TFH, and Old Bear USA 11-17H. The Arvid Bangen USA well pad is owned and operated by Marathon Oil Company (Marathon) and located on the Ft. Berthold Indian Reservation in Mountrail County, North Dakota. This oil and gas production facility consists of multiple wells and associated onsite equipment (discussed in detail below).

Produced fluid from the formation, initially an emulsion comprised of produced oil, natural gas, and produced water flows or is pumped from the well to heater treaters. Gas is separated from the liquids and goes to sales or is combusted by a control device with a 98% minimum destruction efficiency.

Oil and produced water from the heater treaters transfer to above-ground storage tanks. Storage tanks utilize a control device with a minimum destruction efficiency of 98% to reduce emissions. Oil and produced water are loaded into tanker trucks for sales and off-site disposal.

This site may have compressors in order to supply high-pressure gas for artificial lift as well as to compress unsold gas and sell it to a secondary pipeline. This site may contain natural gas liquid (NGL) recovery equipment to remove NGLs from gas prior to sales or combustion.

Identification and Description of Emission Units and Air Pollution Generating Activities (Including Portable Equipment)

The following is a narrative of potential emission equipment that may be used at this facility. Site-specific equipment for Marathon facilities may vary depending on site layout and location. Please refer to Table 1 (see below) and Attachment 2 for equipment specific to the location.

1. Electrically-operated pumping units extract produced fluid from the formation. The fluid leaves the production well casing head via an underground flowline and enters heater treaters for separation. Each heater treater is equipped with a 500,000 to 2,000,000 Btu/hr burner fueled by natural gas from the well.
2. Heater treater gas at this facility may be flared when the gas sales line is unavailable. Unsold gas will be sent to control devices with a minimum destruction efficiency of 98% and equipped with a continuous automatic igniter and pilot flame with a thermocouple. This device is monitored via the SCADA network and/or visually (when personnel are on site).
3. Produced water and oil from the heater treaters are routed to multiple vertical above ground fixed-roof storage tanks, where the fluids are stored prior to being loaded to trucks. Emissions of regulated air pollutants (i.e., Volatile Organic Compounds (VOCs) and Hazardous Air Pollutants (HAPs)) from working/breathing/flash losses from oil and water tanks are routed to control devices with a minimum destruction efficiency of 98% and equipped with a continuous automatic igniter and pilot flame with a thermocouple. This device is monitored via the SCADA network and/or visually (when personnel are on site).

4. Produced oil and water tanks may have blanket or sweep gas present to prevent process safety events. The sweep and blanket gas are also controlled by the same combustion devices that control the oil and water tanks.
5. All oil is loaded onto trucks. The emissions of oil truck loading are included. Produced water loading emissions are assumed to be negligible.
6. If the temperature of the sales gas, sales oil or produced water is too high to sell or transfer, the site may require the use of one or more natural gas-driven or electric driven coolers to meet sales or transport temperature specifications.
7. A recirculation pump may be used to recirculate produced oil from storage tanks to the heater treater if the oil does not meet buyer specifications. This pump is powered by on-site electrical power or a gas powered spark ignition (SI) reciprocating internal combustion engines (RICE).
8. This facility design may include multiple pneumatic controllers. Marathon may use intermittent bleed pneumatic devices powered by pressurized natural gas for flow control devices or for maintaining process conditions such as liquid level, pressure, delta-pressure, and temperature.
9. The facility may have one or more generators onsite to provide power to facility equipment. Once the site is connected to electrical power, generators are removed from the site.
10. All equipment is assumed to operate for 8,760 hours per year unless otherwise stated.

Identification and Description of Existing Air Pollution Control Equipment and Compliance Monitoring Devices or Activities

Emission Source	Emission Controls	Control Efficiency	Monitoring Type
Produced Oil/Produced Water Storage Tanks	Destruction efficiency control device(s)[1]	98%	Via SCADA and/or visually by operator (when on site)
Unsold Separator or Heater Treater Produced Natural Gas	Destruction efficiency control device(s)	98%	Via SCADA and/or visually by operator (when on site)
Heater Treater Fuel Gas	See Footnote 2 below	See Footnote 2	See Footnote 2
RICE Engine	See Footnote 3 below	See Footnote 3	See Footnote 3
Produced Oil Truck Loadout	Submerged Fill	40%	Procount volume tracking
Well Pad Site Generator	See Footnote 3 below	See Footnote 3	See Footnote 3
Pneumatic Controllers	None (uncontrolled)	N/A	N/A

(1) The use of a utility flare to control tank emissions by 98% is acceptable on any location.
(2) The heater treater burner is controlled by a Burner Management System which regulates the flow of fuel gas to the burner to achieve a temperature in the vessel within the desired operational parameters.
(3) EPA certified engines, Catalytic Converter or Oxidizers if required by NSPS JJJJ.

Type and Amount of Fuels Used

Field gas not utilized in the heater treater burner, for onsite power generation, or as tank blanket or sweep gas, is either captured and sent to sales or routed to control devices with a minimum destruction efficiency of 98%. Emissions from the use of the gas are included in the emissions calculations.

Type of Raw Materials Used

The produced fluid is initially an emulsion comprised of produced oil, natural gas, and produced water. Please see the narrative above for a further description of the process.

Production Rates

Production rates vary depending on the facility. The initial production rates are normally higher and decline over time. For new wells, emissions are based on production from the first thirty days with a decline factor of 0.6 for oil, consistent with the Bakken Pool Air Pollution Control Permitting and Guidance as published by the North Dakota Department of Health. No decline is assumed for water or gas. For existing wells, no decline is assumed for oil, water, or gas.

In the absence of the actual production data, the production forecast may be used to estimate emissions. The permit will be updated based upon actual production if needed.

Operating Schedules

The well pad is anticipated to operate 24 hours per day, 7 days per week, and 52 weeks per year for a total of 8,760 hours per year. Exceptions to this operating schedule may include but are not limited to shutdowns associated with extreme weather conditions, scheduled maintenance, operation updates, and temporary shut-in.

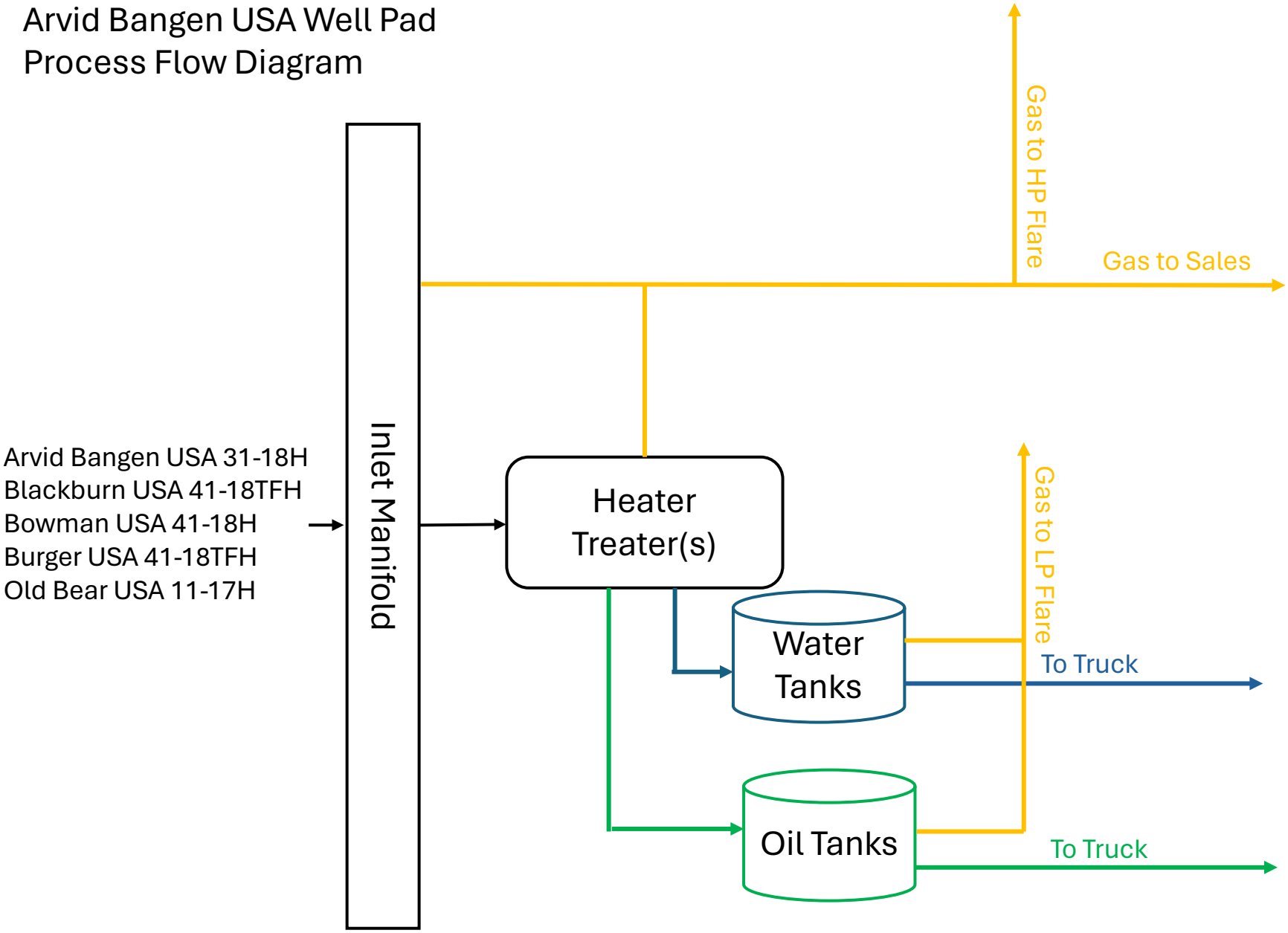
Existing Limitations on Source Operation Affecting Emissions/Work Practice Standards

In accordance with 40 CFR part 60, Subpart OOOOa storage tanks with emissions greater than 6 tons per year utilize controls to reduce VOC emissions by at least 95 percent. Control devices on storage vessels affected by Subpart OOOOa also comply with the monitoring and recordkeeping requirements. Additionally, 40 CFR part 60, Subpart OOOOa requires a Leak Detection and Repair Program to reduce emissions from fugitive emission sources.

Cooler and generator engines may be fueled by natural gas or propane and are SI RICE, manufactured after July 1, 2008, certified in accordance with the requirements for new non-road SI engines (40 CFR Part 90), operated in accordance with the manufacturer's instructions (40 CFR 60.4243(a) (1)), and subject to the maintenance and recordkeeping requirements for SI RICE in 40 CFR 63, subpart ZZZZ effective October 19, 2013.

Pneumatic controllers are snap-acting that discharge the full volume of the actuator intermittently when control action is necessary but do not bleed continuously. Therefore, pneumatic controllers are not subject to NSPS OOOOa.

Arvid Bangen USA Well Pad
Process Flow Diagram



Attachment 2

Emissions Calculations

General Emission Calculations

The Arvid Bangen USA well pad includes five existing wells. This submittal addresses the removal of some high pressure separators.

Emissions

The following provides a summary of emissions for the well pad. Fugitive emissions are not required to be included when determining major source status. As such, the well pad is a minor source.

Model	NOx	CO	VOC	HAPS	Largest Single HAP	PM_{10}	SO_2
Arvid Bangen Total (tpy)	30.25	46.05	103.54	3.04	2.01	0.11	0.01
Arvid Bangen Minus Fugitives (tpy)	30.25	46.05	97.59	2.84	1.91	0.11	0.01

Throughput

For new wells, a production decline of 0.6 may be assumed for oil. No decline is assumed for water or gas. For existing wells, no decline is assumed for oil, water, or gas. Any days of no production are replaced with an average production from the full production day prior to and after the day(s) with no production or with forecasted production.

Equipment

This site has the following separation equipment in order of highest operating pressure to lowest operating pressure:

- Heater treater(s),

The site also has:

- Oil tanks
- Water tanks
- High pressure flare(s) to control any gas from the heater treaters that cannot be sold.
- Low pressure flare(s) to control flash and working and breathing emissions from the oil and water tanks
- Truck loading point(s) for oil and water
- Pneumatic device(s)
- Cooler engine(s) and/or generator engine(s) (only at some locations)

Sampling

A pressurized oil sample and a gas sample are collected from the highest pressure separation equipment for analysis to model the emissions from the facility. If the analyses do not meet QA/QC criteria, another set of samples are collected, or representative analyses or sales gas analysis are used. Samples are acceptable if:

- Pressure on the sample vessel is within 15% of the pressure on the vessel sampled (from SCADA, account for pressure loss across sample valve),
- Passes lab QA/QC, and

- Methane plus ethane is within 3 mole % of gas sales analysis.

The sample used in the models for this facility was collected from a heater treater at the Baker USA well pad. The Baker USA well pad is in close proximity to the Arvid Bangen USA well pad and the heater treaters operate under similar temperature and pressure.

Model

The sampling analyses described above are used in a process simulation, Promax, along with normal operating temperatures and pressures of the separation equipment to model emissions. The following are user defined inputs into modelling software:

- Oil sample composition
- Gas sample composition
- Separation equipment operating temperatures and pressures
- Site ambient conditions (for tank emissions)
- Production rates for crude oil, produced water, and gas
- Volume of gas flared from the highest pressure separation equipment

Model outputs are used to estimate the following sources:

- Gas and oil compositions from any stage of separation after the sampled stage
- Uncontrolled oil tank flashing, working and breathing emissions

The gas sample composition is used to estimate emissions from the highest pressure separation equipment that is not sold.

The heater treater pressure and temperature used in the model are the expected average over the course of the year. The heater treater was modelled as adiabatic.

Flash from the oil and water tanks is also modelled and working and breathing losses are estimated using the most current method from EPA AP-42. The total oil production is divided among the number of tanks in service to estimate the emissions from a single tank. Those emissions are then multiplied by the number of tanks in service. Tanks are modelled as adiabatic with no quench. Water tank emissions are assumed to contain 1% VOC for the purposes of estimating emissions. All emissions from storage tanks are controlled by the low pressure flare. The low pressure flare has a 98% destruction efficiency.

Non-Modeled Sources

Emission Source	Emissions Estimation Method
Boiler and/or Heater	Emissions are estimated using the heater or boiler rating and AP-42 emissions factors for small boilers. Gas heating value is assumed to be 1020 BTU/scf.
Engines or Turbines	Emissions are estimated using the engine specific horsepower and maximum fuel consumptions along with manufacturer provided emissions factors or AP-42 emissions factors for the size and type of engine (i.e. stroke and burn type).
Fugitives	Emissions from fugitive components are estimated based on the approach provided in EPA's Mandatory Reporting Rule for Greenhouse Gases (GHG MRR), 40 CFR Part 98, Subpart W, Table W-1B. The count of major equipment and the default component counts along with the oil and gas sample compositions and factors from EPA-453/R-95-017 (November 1995) are used.
Oil Truck Loading	Emissions from oil truck loading are calculated in accordance with AP-42. This site is not connected to an oil pipeline so all produced oil is loaded to trucks.
Water Tanks	Emissions from water tanks, including flashing, working and breathing, are assumed to have the same composition as the oil tanks and 1% VOC.
Pneumatic Controllers (if present)	Emissions from venting gas operated pneumatic controllers are estimated using the count of devices, an assumed bleed rate of 6 scfh and the gas sample composition.
Flare Pilot Gas	Emissions from are estimated using the count of pilots, the pilot flow rate in scfh and the high pressure gas sample composition. Most pilots can also operate using propane so emissions are conservatively estimated with both gas sources for 8760 hours per year.
Tank Sweep and Blanket Gas (if present)	Some sites use sweep gas and/or blanket gas on the tanks to prevent process safety incidents. Emissions are estimated using the sweep or blanket gas flow rate and either the high pressure gas sample composition or in some cases the tank flash composition.

De-Minimus Emissions Sources

De-minimus emissions sources may include the following at some locations:

- Emissions from water tank truck loading
- Emissions from routine maintenance

AIR PERMITTING ANALYSIS

Company Name: Marathon Oil Company

Facility Name: Arvid Bangen Well Pad

Field: East Myrmidon

Date Prepared: 2/1/2024

Prepared By: Marathon Oil Company

	Annual Averaged		Annual Total	
Produced Gas	2,206	mscfd	805,030	mscf/yr
Well Gas Flared			55,100	mscf/yr
Oil Production	484	bbls/day	176,557	bbls/yr
Produced Water Production	462	bbls/day	168,630	bbls/yr
HP Flare Control Efficiency	98%			
LP Flare Control Efficiency	98%			
Operating Period	365	days	8760	hours

Emission Sources	NOx	CO	VOC	HAPs	n-Hexane	PM_{10}	SO_2
Boilers and/or Heaters	0.86	0.72	0.05	--	--	0.07	0.01
Engines and/or Turbines	18.88	1.55	0.16	0.12	0.00E+00	0.05	2.98E-03
Equipment Fugitives	--	--	5.95	0.19	0.10	--	--
Oil Truck Loading	--	--	22.80	0.69	0.50	--	--
Oil Tanks	Emissions represented at LP Flare						
Water Tank	Emissions represented at LP Flare						
High Pressure Flare	2.84	11.81	15.52	0.39	0.28	--	0.00E+00
Low Pressure Flare	7.67	31.97	47.61	1.39	0.91	--	0.00E+00
Pneumatics	--	--	11.45	0.26	0.22	--	--
Total (TPY)	**30.25**	**46.05**	**103.54**	**3.04**	**2.01**	**0.11**	**0.01**

*If emissions from engines are zero, then no engines present.

Engine ID/EPN	COOLER-1	COOLER-2							
Max Rating (Bhp)	68	68							
Unit Type	4 stroke Rich Burn	4 stroke Rich Burn							
Max Fuel Consumption (Btu/bhp-hr)	8,500	8,500							
Fuel Used	Natural Gas	Natural Gas							

Emissions Factors[1] - Manufacturer's Data & AP42, Chapter 3									
Engine ID	**NO_x**		**CO**		**VOC**		**PM_{10}**		**SO_2**	
COOLER-1	0.0317	(lbs/bhp-hr)	0.0026	(lbs/bhp-hr)	0.00009	(lbs/bhp-hr)	0.0095	(lbs/MMBTU)	5.88E-04	(lbs/MMBTU)
COOLER-2	0.0317	(lbs/bhp-hr)	0.0026	(lbs/bhp-hr)	0.00009	(lbs/bhp-hr)	0.0095	(lbs/MMBTU)	5.88E-04	(lbs/MMBTU)

1. NO_x, CO and VOC emission factors were obtain from the engine manufacturer. All other emission factors were obtained from the EPA's AP-42 emission factors from AP-42, Section 3.2, July 2000, Tables 3.2-1, 3.2-2, and 3.2-3.

Emissions Factors[1] - AP42, Chapter 3 (lb/MMBtu)						
Engine ID	**Benzene**	**Toluene**	**Ethylbenzene**	**Xylene**	**n-Hexane**	**Formaldehyde**
COOLER-1	0.0016	5.58E-04	2.48E-05	1.95E-04	0.00E+00	0.021
COOLER-2	0.0016	5.58E-04	2.48E-05	1.95E-04	0.00E+00	0.021

1. NO_x, CO and VOC emission factors were obtain from the engine manufacturer. All other emission factors were obtained from the EPA's AP-42 emission factors from AP-42, Section 3.2, July 2000, Tables 3.2-1, 3.2-2, and 3.2-3.

Engine ID	**Run Time (Hrs)**	**Fuel Usage (MMBtu)[2]**	**Total Engine Emissions (Tons/year)**				
			NO_x[3]	**CO[3]**	**VOC[3]**	**PM_{10}[4]**	**SO_2[4]**
COOLER-1	8,760	5,063	9.44	0.77	0.08	0.02	1.49E-03
COOLER-2	8,760	5,063	9.44	0.77	0.08	0.02	1.49E-03
		Total	**18.88**	**1.55**	**0.16**	**0.05**	**2.98E-03**

(2) (Fuel Usage, MMBtu) = (Engine Horsepower, hp) x (Fuel Consumption, Btu/hp-hr) / (1,000,000 Btu/MMBtu)
(3) (Emissions, tons/year) = (Run Time, hours) X (Max Rating, bhp) X (Emission Factor, lb/bhp-hr) / (2000 lbs/ton)
(4) (Emissions, tons/year) = (Fuel Usage, MMBtu) X (Emissions Factor, lb/MMBtu) / (2000 lbs/ton)

Total Engine Emissions (Tons/year)[4]								
Engine ID	**Run Time (Hrs)**	**Fuel Usage (MMBtu)**	**Benzene**	**Toluene**	**Ethylbenzene**	**Xylene**	**n-Hexane**	**Formaldehyde**
COOLER-1	8,760	5,063	4.00E-03	1.41E-03	6.28E-05	4.94E-04	0.00E+00	0.05
COOLER-2	8,760	5,063	4.00E-03	1.41E-03	6.28E-05	4.94E-04	0.00E+00	0.05
		Total	**0.01**	**2.83E-03**	**1.26E-04**	**9.87E-04**	**0.00E+00**	**0.10**

(2) (Fuel Usage, MMBtu) = (Engine Horsepower, hp) x (Fuel Consumption, Btu/hp-hr) / (1,000,000 Btu/MMBtu)
(4) (Emissions, tons/year) = (Fuel Usage, MMBtu) X (Emissions Factor, lb/MMBtu) / (2000 lbs/ton)

Calculation Basis:
Internal combustion emissions were calculated in accordance with AP-42, according to fuel type and engine type, and vendor specific emission factors.

Arvid Bangen Well Pad
Marathon Oil Company
February 2024

Heater Burner Calculations

Heater ID:	Treater 1	Treater 2	Treater 3	Treater 4
Heater Rating (MMBtu/hr)	1.00	1.00		
Heater Fuel Source	High Pressure Gas	High Pressure Gas		
Fuel Heat Value (Btu/scf)	1,020	1,020		
Operating Hours	8,760	8,760		
Fuel Usage (MMscf/year)[1]	8.59	8.59		

(1) Fuel Usage = (Heater Treater Rating, MMBtu/hr) x (8760 hours/year) / (Fuel Heat Value, Btu/scf)

Emissions Factors (lb/MMscf) - From AP42, Ch.1.4, Tables 1.4-1 & 1.4-2 dated July 1998				
NOx	CO	VOC	PM	SO_2
100	84	5.5	7.6	0.6

Note: If the actual maximum fuel usage is provided, the above emission factors are adjusted by the ratio of the actual fuel heat value to 1020 Btu/scf.

Heater/Boiler Emissions (Tons/year)[2]						
Heater ID:	Fuel Usage (MMscf/yr)	NOx	CO	VOC	PM	SO_2
Treater 1	8.59	0.43	0.36	0.02	0.03	2.58E-03
Treater 2	8.59	0.43	0.36	0.02	0.03	2.58E-03
Total		0.86	0.72	0.05	0.07	0.01

(2) Emissions in TPY = (Fuel Usage MMscf/year) x (Emission Factor lb/MMscf) / (2000 lb/ton)
(3) All PM emissions were assumed to be PM10 based on footnote (c) to Table 1.4-2 of AP-42 (dated 7/98).

Calculation Basis:
Natural gas-fired single-burner heater treaters will be used to heat the oil/water/gas mixture to help promote three phase separation.
External combustion emissions were calculated in accordance with AP-42 Section 1.4 (July 1998), Natural Gas Combustion, Tables 1.4-1, 1.4-2, and 1.4-3., using emission factors for Small Boilers (less than 100 MMBtu/hr rating).
All heaters are assumed to run 8760 hours per year.
Emissions of HAPs are assumed to be deminimis.

Arvid Bangen Well Pad
Marathon Oil Company
February 2024

Pneumatic Calculations

Pneumatic Devices							
Type	Count	Bleed Rate (scf/hr/component)	Total Bleed Rate (MMscf/year)	VOC (TPY)	HAP (TPY)	n-Hexane	H2S
Valves	15	6	0.788	11.45	0.26	0.22	0.00E+00

Total Fugitive Emissions (Tons/year)			
VOC	HAPs	n-Hexane	H2S
11.45	**0.26**	**0.22**	**0.00E+00**

Calculation Basis: Emissions are estimated using the estimated controller count (for those that vent to atmosphere), an emission factor for pneumatics that is the same as what would be considered a covered continuous venting pneumatic device, and a gas composition. Note: devices used are snap acting versus throttling. The gas composition used is that of the high pressure separator gas composition.

Emissions (TPY) = Total Bleed Rate (MMscf/hr) * Gas Molecular Weight (lb/lbmole) * Weight Percent VOC or HAP * 1/molar volume conversion (379.3 scf/lbmole) * 8760 hr/yr * 1 ton/2000 lb

H2S emissions are estimated if H2S is greater than 10 ppm.

Gas Composition (High Pressure Separator Gas)	
Date of Analysis:	4/17/2023
Component	**wt%**
Water	0.00E+00
H2S	0.00E+00
Nitrogen	4.06%
Carbon Dioxide	1.06%
Methane	31.59%
Ethane	22.99%
Propane	19.71%
Isobutane	2.62%
n-Butane	8.71%
Isopentane	1.86%
n-Pentane	2.65%
2-Methylpentane	0.00E+00
3-Methylpentane	0.00E+00
n-Hexane	0.79%
Cyclohexane	1.45%
Heptane	1.83%
Methylcyclohexane	0.35%
Benzene	0.05%
Toluene	0.07%
Ethylbenzene	1.55E-05
o-Xylene	0.01%
2,2,4-Trimethylpentane	0.00E+00
Octane	0.18%
Nonane	0.02%
Decane	0.00E+00
Decanes+	4.54E-05
Gas wt %VOC	**40.30%**
Gas wt %HAPs	**0.92%**
Molecular Weight	**27.33**

Arvid Bangen Well Pad
Marathon Oil Company
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Fugitive Calculations

Default Component Counts - Light Oil Service (per major piece of equipment)[1]				
Equipment	Valves	Flanges	Connectors	Other Components
Wellhead	5	10	4	1
Separators	6	12	10	0
Heater Treater	8	12	20	0
Header	5	10	4	0

(1) From MRR Subpart W Table W-1C.

Default Component Counts - Gas Service (per major piece of equipment)[1]				
Equipment	Valves	Connectors	Open-Ended Lines	Pressure Relief Valves
Wellhead	11	36	1	0
Separators	34	106	6	2
Meters/Piping	14	51	1	1
Compressors	73	179	3	4
In-Line heaters	14	65	2	1

(1) From MRR Subpart W Table W-1B.

Total Fugitive Emissions (Tons/year)			
VOC	HAPs	n-Hexane	H2S
5.95	0.19	0.10	0.00E+00
Operating Period	8,760	hours	

Major Equipment Counts[2]	
Wellhead	5
Header	0
Separator	2
Heater Treater	2
Meters	1
Compressors	0
In-Line Heaters	0
Pumps	8

(2) Actual count of major equipment at facility. There are 2 operational 2-phase separators on the pad.

Component Type	Number of Components in Gas Service[3]	Gas Emission Factor (lb/hr per Component)[4]	VOC Emissions (TPY) from Gas Components[5]	HAP Emissions (TPY) from Gas Components[5]	n-Hexane Emissions (TPY) from Gas Components[5]	H2S Emissions (TPY) from Gas Components[4]
Valves	137	0.010	2.40	0.05	0.05	0.00E+00
Compressors	0	0.019	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Relief Valves	5	0.019	0.17	3.89E-03	3.36E-03	0.00E+00
Open-ended Lines	18	4.41E-03	0.14	3.18E-03	2.75E-03	0.00E+00
Connectors	443	4.40E-04	0.34	0.01	0.01	0.00E+00

Component Type	Number of Components in Oil Service[3]	Oil Emission Factor (lb/hr per Component)[4]	VOC Emissions (TPY) from Oil Components[5]	HAP Emissions (TPY) from Oil Components[5]	n-Hexane Emissions (TPY) from Oil Components[5]	H2S Emissions (TPY) from Oil Components[4]
Valves	53	0.006	1.27	0.05	0.02	0.00E+00
Pumps	8	0.029	1.00	0.04	0.01	0.00E+00
Flanges	98	2.43E-04	0.10	4.49E-03	1.41E-03	0.00E+00
Connectors	80	4.63E-04	0.16	0.01	2.20E-03	0.00E+00
Other	5	0.017	0.36	0.02	4.89E-03	0.00E+00

(1) The number of components for a particular type of equipment were calculated as follows: (Number of Components) = (Equipment Count) x (Components per Equipment for service)
(2) Factors taken from EPA document EPA-453/R-95-017; November, 1995; pp. 2-15.
(3) Per Service Type and Per Component Type: (VOC or HAP Emissions, TPY) = (Component Count) x (Emission Factor, lb/hr/component) x (8760 hours per year) x (wts%VOC or HAP) x (1 ton per 2000 lb)
(4) H2S emissions are estimated if H2S is greater than 10 ppm.

Calculation Basis:
Site specific component counts are not available so default component counts are used based on the approach provided in EPA's Mandatory Reporting Rule for Greenhouse Gases (GHG MMR), 40 CFR Part 98, Subpart W, Table W-1B. Actual counts were compiled for major equipment (i.e. wellheads, separators, in-line heaters, etc.), and default component counts were applied to each equipment type.
Oil produced at the site will have an API gravity of greater than 20° API; therefore, all hydrocarbon liquids are considered "light oil". There are no "heavy oil" components at this site.

Gas Composition (Inlet Gas)	
Component	wt%
Water	0.00E+00
Hydrogen sulfide	0.00E+00
Nitrogen	4.06%
Carbon dioxide	1.06%
Methane	31.59%
Ethane	22.99%
Propane	19.71%
iso-Butane	2.62%
Butane	8.71%
Iso-pentane	1.86%
Pentane	2.65%
2-Methylpentane	0.00E+00
3-Methylpentane	0.00E+00
n-Hexane	0.79%
Cyclohexane	1.45%
Heptane	1.83%
Methylcyclohexane	0.35%
Benzene	0.05%
Toluene	0.07%
Ethylbenzene	1.55E-05
o-Xylene	0.01%
2,2,4-Trimethylpentane	0.00E+00
Octane	0.18%
Nonane	0.02%
Decane	0.00E+00
Decanes+	4.54E-05
Total (Gas)	**100.00%**
Total VOC (Gas)	**40.30%**
Total HAPs (Gas)	**0.92%**

Light Oil Composition (Inlet Oil)	
Components	wt %
Water	0.00E+00
H2S	0.00E+00
Nitrogen	4.95E-06
Carbon Dioxide	4.66E-05
Methane	0.07%
Ethane	0.39%
Propane	1.25%
Isobutane	0.38%
n-Butane	1.86%
Isopentane	0.89%
n-Pentane	1.70%
2-Methylpentane	0.75%
3-Methylpentane	0.49%
n-Hexane	1.35%
Cyclohexane	0.25%
Heptane	4.41%
Methylcyclohexane	0.00E+00
Benzene	0.14%
Toluene	0.60%
Ethylbenzene	0.15%
o-Xylene	1.39%
2,2,4-Trimethylpentane	0.66%
Octane	3.98%
Nonane	2.31%
Decane	0.00E+00
Decanes+	76.97%
Total (Oil)	**100.00%**
Total VOC (Oil)	**99.53%**
Total HAPs (Oil)	**4.30%**

Arvid Bangen Well Pad
Marathon Oil Company
February 2024

Oil Tank Promax Inputs

Flowsheet Information				
Tank Losses Stencil Name		Oil Tank Losses		
Tank Losses Stencil Reference Stream		Oil Tank Feed		
Separator Name		Oil Tank		
Separator Inlet Stream		Oil Tank Feed		
Separator Pressure [psia]	Inlet | Outlet	86.7	13.7	
Separator Temperature [°F]	Inlet | Outlet	110.0	89.8	

Tank Characteristics				
Tank Type		Vertical Cylinder		
Time Frame		Year		
Material Category		Light Organics		
Number of Tanks		8.0		
Shell Height	[ft]	25.000		
Diameter [ft]	[ft]	13.500		
Maximum Liquid Height	[%] | [ft]	90.000	22.500	
Average Liquid Height	[%] | [ft]	50.000	12.500	
Minimum Liquid Height	[%] | [ft]	10.000	2.500	
Sum of Increases in Liquid Level	[ft/yr]	-		
Tank Volume	[gal] | [bbl]	26768.817	637.353	
Insulation		Uninsulated		
Bolted or Riveted Construction		FALSE		
Vapor Balance Tank		FALSE		
Paint Characteristics				
Shell Color		Tan		
Shell Paint Condition		Average		
Roof Color		Tan		
Roof Paint Condition		Average		
Roof Characteristics				
Type		Cone		
Diameter	[ft]	-		
Slope	[ft/ft]	0.063		
Breather Vent Settings				
Breather Vacuum Pressure	[psig]	-0.030		
Breather Vent Pressure	[psig]	0.030		

Loading Loss Parameters		
Cargo Carrier		
Land Based Mode of Operation		
Marine Based Mode of Operation		
Overall Reduction Efficiency	[%]	
Maximum Hourly Loading Rate	[bbl/h]	

Meteorological Data				
Location		Williston, ND		
Average Atmospheric Pressure	[psia]	13.720		
Maximum Average Temperature	[°F]	53.200		
Minimum Average Temperature	[°F]	29.900		
Solar Insolation	[BTU/ft^2*day]	1193.000		
Average Wind Speed	[mph]	8.900		
Tank Conditions				
Flashing Temperature	[°F]	89.814		
Maximum Liquid Surface Temperature	[°F]	89.814		
Average Liquid Surface Temperature	[°F]	82.563		
Set Bulk Temperature to Stream Temperature?		TRUE		
Bulk Liquid Temperature	[°F]	110.000		
Net Throughput	[bbl/day] | [bbl/yr]	489.188	178553.467	
Net Throughput Per Tank	[bbl/day] | [bbl/yr]	61.148	22319.183	
Turnovers Per Tank	[per day]	43.769		
Residual Liquid	[bbl/day]	481.482		
Residual Liquid Per Tank	[bbl/day]	60.185		
Raoult's Law Used for Vapor Pressure Calc?		FALSE		
VP @ Minimum Liquid Surface Temperature	[psia]	11.633		
VP @ Maximum Liquid Surface Temperature	[psia]	13.720		
True Vapor Pressure	[psia]	12.643		

Arvid Bangen Well Pad
Marathon Oil Company
February 2024

Water Tank Losses Calculations

Produced Water Production	462	BWPD
Oil Production	484	BOPD
Percent Oil in Produced Water	1%	Percent
Number of Water Tanks	4	
Number of Oil Tanks	8	

	Uncontrolled Water Flash			Uncontrolled Water W&B		
Component	**Oil Flash Mass Flow (lb/hr)**	**Ratioed Water Flash Mass Flow (lb/hr)**	**Water Flash Mass Flow 99% Reduction (lb/hr)**	**Oil W&B Mass Flow (lb/hr)**	**Ratioed Water W&B Mass Flow (lb/hr)**	**Water W&B Mass Flow 99% Reduction (lb/hr)**
Water	0.69	0.66	0.01	0.07	0.04	3.53E-04
H2S	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Nitrogen	0.44	0.42	4.21E-03	0.01	2.69E-03	2.69E-05
Carbon Dioxide	0.64	0.61	0.01	0.06	0.03	2.77E-04
Methane	8.76	8.36	0.08	0.30	0.15	1.48E-03
Ethane	25.95	24.77	0.25	3.10	1.55	0.02
Propane	47.42	45.27	0.45	5.49	2.75	0.03
Isobutane	8.11	7.74	0.08	0.92	0.46	4.62E-03
n-Butane	29.08	27.76	0.28	3.29	1.64	0.02
Isopentane	6.61	6.31	0.06	0.73	0.37	3.67E-03
n-Pentane	9.58	9.14	0.09	1.05	0.53	0.01
2-Methylpentane	1.01	0.97	0.01	0.11	0.05	5.50E-04
3-Methylpentane	0.63	0.60	0.01	0.07	0.03	3.39E-04
n-Hexane	2.62	2.50	0.03	0.28	0.14	1.40E-03
Cyclohexane	2.03	1.94	0.02	0.22	0.11	1.09E-03
Heptane	3.48	3.32	0.03	0.36	0.18	1.82E-03
Methylcyclohexane	0.26	0.25	2.46E-03	0.03	0.01	1.36E-04
Benzene	0.29	0.28	2.81E-03	0.03	0.02	1.60E-04
Toluene	0.41	0.39	3.90E-03	0.04	0.02	2.16E-04
Ethylbenzene	0.03	0.03	3.26E-04	3.51E-03	1.76E-03	1.76E-05
o-Xylene	0.26	0.25	2.49E-03	0.03	0.01	1.34E-04
2,2,4-Trimethylpentane	0.35	0.33	3.33E-03	0.04	0.02	1.83E-04
Octane	0.81	0.78	0.01	0.08	0.04	4.16E-04
Nonane	0.16	0.15	1.48E-03	0.02	0.01	7.71E-05
Decane	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Oil 10+	4.11E-04	3.93E-04	3.93E-06	3.28E-05	1.64E-05	1.64E-07
Total	149.63	142.83	1.43	16.33	8.16	0.08
Total VOC	113.15	108.01	1.08	12.80	6.40	0.06
Total HAPs	3.97	3.79	0.04	0.42	0.21	2.12E-03

Calculation Basis:
Flash, working and breathing loss emissions estimates for the oil tanks are used to estimate the same emissions from the water tanks. A reduction factor of 99% is applied due to the tanks having 1% or less oil. The emissions estimates from the water tanks are rationed to the oil emissions also based upon production of each stream.
Uncontrolled Emission, ton = (Oil Tank Flash, lb/hr) X (Ratio of Daily Production (BWPD/BOPD) X (Percent of Oil in Water) X (8760 hours/year) / (2000 lbs/ton)
Controlled Emission, ton = (Uncontrolled Emission, ton) X (1-DRE)

Arvid Bangen Well Pad
Marathon Oil Company
February 2024

Low Pressure Flare Annual Calculations

Maximum Annual Emission Rates and Composition to LP Flare										
ProMax Stream:	Pilot Gas	Propane Pilot	Oil Flash	Oil W&B	Water Flash	Water Tank W&B	Sweep Blanket Gas	Total to Flare	Destruction Efficiency	Flare Exhaust (controlled)
Component	(tpy)	(tpy)	(tpy)	(tpy)	(tpy)	(tpy)	(tpy)	(tpy)	(%)	(tpy)
Water	0.44	0.00E+00	3.01	0.31	0.03	1.55E-03	45.02	**48.80**	0%	**48.80**
H2S	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	**0.00E+00**	98%	**0.00E+00**
Nitrogen	1.79	0.00E+00	1.93	0.02	0.02	1.18E-04	184.51	**188.28**	0%	**188.28**
Carbon Dioxide	0.46	0.00E+00	2.82	0.24	0.03	1.21E-03	47.79	**51.34**	0%	**51.34**
Methane	13.95	0.00E+00	38.36	1.30	0.37	0.01	1,434	**1,488**	98%	**29.75**
Ethane	10.10	0.00E+00	113.67	13.56	1.09	0.07	1,038	**1,177**	98%	**23.54**
Propane	8.55	71.70	207.71	24.07	1.98	0.12	879.15	**1,193**	98%	**23.87**
Isobutane	1.13	0.00E+00	35.52	4.04	0.34	0.02	116.31	**157.36**	98%	**3.15**
n-Butane	3.77	0.00E+00	127.36	14.41	1.22	0.07	387.15	**533.98**	98%	**10.68**
Isopentane	0.78	0.00E+00	28.97	3.21	0.28	0.02	80.25	**113.51**	98%	**2.27**
n-Pentane	1.12	0.00E+00	41.96	4.62	0.40	0.02	115.33	**163.46**	98%	**3.27**
2-Methylpentane	0.12	0.00E+00	4.45	0.48	0.04	2.41E-03	12.23	**17.32**	98%	**0.35**
3-Methylpentane	0.07	0.00E+00	2.75	0.30	0.03	1.49E-03	7.58	**10.72**	98%	**0.21**
n-Hexane	0.31	0.00E+00	11.47	1.23	0.11	0.01	32.25	**45.39**	98%	**0.91**
Cyclohexane	0.24	0.00E+00	8.89	0.96	0.08	4.78E-03	24.65	**34.83**	98%	**0.70**
Heptane	0.44	0.00E+00	15.23	1.59	0.15	0.01	45.66	**63.09**	98%	**1.26**
Methylcyclohexane	0.03	0.00E+00	1.13	0.12	0.01	5.95E-04	3.28	**4.57**	98%	**0.09**
Benzene	0.03	0.00E+00	1.29	0.14	0.01	7.03E-04	3.47	**4.95**	98%	**0.10**
Toluene	0.05	0.00E+00	1.79	0.19	0.02	9.47E-04	5.15	**7.20**	98%	**0.14**
Ethylbenzene	4.57E-03	0.00E+00	0.15	0.02	1.43E-03	7.69E-05	0.47	**0.64**	98%	**0.01**
o-Xylene	0.04	0.00E+00	1.14	0.12	0.01	5.87E-04	3.62	**4.92**	98%	**0.10**
2,2,4-Trimethylpentane	0.04	0.00E+00	1.53	0.16	0.01	8.04E-04	4.54	**6.29**	98%	**0.13**
Octane	0.11	0.00E+00	3.57	0.36	0.03	1.82E-03	11.63	**15.71**	98%	**0.31**
Nonane	0.02	0.00E+00	0.68	0.07	0.01	3.38E-04	2.42	**3.20**	98%	**0.06**
Decane	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	**0.00E+00**	98%	**0.00E+00**
Oil 10+	1.40E-04	0.00E+00	1.80E-03	1.44E-04	1.72E-05	7.19E-07	0.01	**0.02**	98%	**3.31E-04**
Total	**43.62**	**71.70**	**655.38**	**71.52**	**6.26**	**0.36**	**4,485**	**5,333**	--	**389.32**
Total VOC	**16.88**	**71.70**	**495.60**	**56.08**	**4.73**	**0.28**	**1,735**	**2,380**	--	**47.61**
Total HAP	**0.48**	**0.00E+00**	**17.38**	**1.85**	**0.17**	**0.01**	**49.50**	**69.38**	--	**1.39**
Annual Hours (Hrs)	**8,760**	**8,760**	**8,760**	**8,760**	**8,760**	**8,760**	**8,760**	--		
Heating Value HHV (Btu/scf)	1,492	2,557	2,377	2,538	2,377	2,538	1,492	**1,584**		
Heating Value LHV (Btu/scf)	1,361	2,557	2,186	2,336	2,186	2,336	1,361	**1,448**		
Molecular Weight	26.84	44.10	42.14	45.00	42.14	45.00	26.84	--		
Volumetric Flow (scf/hr)	140.80	140.80	1,347	137.71	12.85	0.69	14,475	**16,255**		
Volumetric Flow (MMscf/yr)	1.23	1.23	11.80	1.21	0.11	0.01	126.80	**139.93**		
H2S PPM	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	**0.00E+00**		

Oil Tank Flash GOR (scf/bbl)	**66.85**
Tank Total GOR (scf/bbl)	74.35

Combustion Emissions from Flare								Totals
	(tpy)	(tpy)	(tpy)	(tpy)	(tpy)	(tpy)	(tpy)	(tpy)
Total NOx	0.06	0.11	0.95	0.10	0.01	5.20E-04	6.43	**7.67**
Total CO	0.26	0.49	4.00	0.44	0.04	2.18E-03	26.74	**31.97**
Total SO2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	**0.00E+00**

Criteria Pollutant Emissions from Flare [a]		
Component	Emission Factor	Emission Factor Units
NO_X	0.068	lb/MMBtu
CO	0.31	lb/MMBtu

Constants	
H_2S Molecular Weight	34.08
SO_2 Molecular Weight	64.06
Gas Constant (scf/lb-mol)	379.30

Variables	
Flare Destruction Efficiency	98%
Number of Pilots	8
Volume of Gas/Pilots (scf/hr)	17.60
Operating Hours	8760

Footnotes:

[a] Flare CO and NOx emission factors from AP-42, Table 13.5-1 & 13.5-2, February 2018. SO_2 emissions assume 100% conversion of H_2S to SO_2.

Arvid Bangen Well Pad
Marathon Oil Company
February 2024

High Pressure Flare Annual Calculations

Maximum Annual Emission Rates and Composition to HP Flare						
ProMax Stream:	Pilot Gas	Propane Pilot	Heater Treater Gas	Total to Flare	Destruction Efficiency	Flare Exhaust (controlled)
Component	(tpy)	(tpy)	(tpy)	(tpy)	(%)	(tpy)
Water	0.11	0.00E+00	19.56	19.67	0%	**19.67**
H2S	0.00E+00	0.00E+00	0.00E+00	0.00E+00	98%	**0.00E+00**
Nitrogen	0.45	0.00E+00	80.18	80.63	0%	**80.63**
Carbon Dioxide	0.12	0.00E+00	20.77	20.88	0%	**20.88**
Methane	3.49	0.00E+00	623.03	626.51	98%	**12.53**
Ethane	2.52	0.00E+00	451.17	453.70	98%	**9.07**
Propane	2.14	17.93	382.03	402.09	98%	**8.04**
Isobutane	0.28	0.00E+00	50.54	50.82	98%	**1.02**
n-Butane	0.94	0.00E+00	168.23	169.17	98%	**3.38**
Isopentane	0.20	0.00E+00	34.87	35.07	98%	**0.70**
n-Pentane	0.28	0.00E+00	50.12	50.40	98%	**1.01**
2-Methylpentane	0.03	0.00E+00	5.32	5.35	98%	**0.11**
3-Methylpentane	0.02	0.00E+00	3.29	3.31	98%	**0.07**
n-Hexane	0.08	0.00E+00	14.02	14.09	98%	**0.28**
Cyclohexane	0.06	0.00E+00	10.71	10.77	98%	**0.22**
Heptane	0.11	0.00E+00	19.84	19.95	98%	**0.40**
Methylcyclohexane	0.01	0.00E+00	1.42	1.43	98%	**0.03**
Benzene	0.01	0.00E+00	1.51	1.52	98%	**0.03**
Toluene	0.01	0.00E+00	2.24	2.25	98%	**0.05**
Ethylbenzene	1.14E-03	0.00E+00	0.20	0.21	98%	**4.10E-03**
o-Xylene	0.01	0.00E+00	1.57	1.58	98%	**0.03**
2,2,4-Trimethylpentane	0.01	0.00E+00	1.97	1.98	98%	**0.04**
Octane	0.03	0.00E+00	5.05	5.08	98%	**0.10**
Nonane	0.01	0.00E+00	1.05	1.06	98%	**0.02**
Decane	0.00E+00	0.00E+00	0.00E+00	0.00E+00	98%	**0.00E+00**
Oil 10+	3.51E-05	0.00E+00	0.01	0.01	98%	**1.26E-04**
Total	**10.91**	**17.93**	**1,949**	**1,978**	--	**158.31**
Total VOC	**4.22**	**17.93**	**754.00**	**776.14**	--	**15.52**
Total HAP	**0.11**	**0.00E+00**	**19.54**	**19.65**	--	**0.39**
Annual Hours (Hrs)	**8,760**	**8,760**	**600.00**	--		
Heating Value HHV (Btu/scf)	1,492	2,557	1,492	**1,492**		
Heating Value LHV (Btu/scf)	1,361	2,557	1,361	**1,361**		
Molecular Weight	26.84	44.10	26.84	--		
Volumetric Flow (scf/hr)	35.20	35.20	91,833	**91,904**		
Volumetric Flow (MMscf/yr)	0.31	0.31	55.10	**55.72**		
H2S PPM	0.00E+00	0.00E+00	0.00E+00	**0.00E+00**		

Combustion Emissions from Flare				Totals
	(tpy)	(tpy)	(tpy)	(tpy)
Total NOx	0.02	0.03	2.79	**2.84**
Total CO	0.07	0.12	11.62	**11.81**
Total SO2	0.00E+00	0.00E+00	0.00E+00	**0.00E+00**

Criteria Pollutant Emissions from Flare[a]		
Component	Emission Factor	Emission Factor Units
NO_X	0.068	lb/MMBtu
CO	0.31	lb/MMBtu

Constants	
H_2S Molecular Weight	34.08
SO_2 Molecular Weight	64.06
Gas Constant (scf/lb-mol)	379.30

Variables	
Flare Destruction Efficiency	98%
Number of Pilots	2
Volume of Gas/Pilots (scf/hr)	17.60
Flare Operating Hours	8,760
HT Flared Gas Op Hours	600
HP Flared Gas Op Hours	0

Footnotes:

[a] Flare CO and NOx emission factors from AP-42, Table 13.5-1 & 13.5-2, February 2018. PM_{10} and $PM_{2.5}$ emission factors from AP-42, Table 1.4-1 and 1.4-2, July 1998. SO_2 emissions assume 100% conversion of H_2S to SO_2.

Arvid Bangen Well Pad

Marathon Oil Company

February 2024

Truck Loading Losses Calculations

Promax Stream Speciation	32 - Oil Tool W&B	
Controlled/Uncontrolled	UNCONTROLLED	
Oil Loaded	**176,557**	**bbls / yr**

Promax Report Results		
LL= 12.46 * SPM/T		
Saturation Factor (S) =	0.6	
Average True Vapor Pressure of Liquid Loaded (P)=	12.64	psi
Average Surface Temperature of Liquid Loaded (T)[a]=	542.23	Rankin
Molecular Weight (M)[a]=	45.00	lb/lb-mole
Hydrocarbon Content[a]=	99.20	Weight %
VOC Content[a]=	78.41	Weight %
HAP Conent[a]=	2.37	Weight %
Average Uncontrolled LL[b] =	7.8436	lb/1000 gallons
Average Uncontrolled LL[b] =	0.3294	lb/bbl
Average Uncontrolled LL[b] =	0.2583	lb VOC/bbl
Estimated Throughput=	176,557	bbl/Year

Total Emissions	TPY
	29.08
Total VOC Emissions	TPY
	22.80
Total HAP Emissions	TPY
	0.69

Arvid Bangen Well Pad

Marathon Oil Company

February 2024

Truck Loading Losses Calculations

Component	Total Speciated Vapors Emitted During Loading (Fugitives)	
	Mass Fraction	ton / yr[d]
Water	0.43	0.13
H2S	0.00E+00	0.00E+00
Nitrogen	0.03	0.01
Carbon Dioxide	0.34	0.10
Methane	1.82	0.53
Ethane	18.96	5.51
Propane	33.65	9.79
Isobutane	5.66	1.64
n-Butane	20.14	5.86
Isopentane	4.49	1.31
n-Pentane	6.46	1.88
2-Methylpentane	0.67	0.20
3-Methylpentane	0.42	0.12
n-Hexane	1.72	0.50
Cyclohexane	1.34	0.39
Heptane	2.23	0.65
Methylcyclohexane	0.17	0.05
Benzene	0.20	0.06
Toluene	0.26	0.08
Ethylbenzene	0.02	0.01
o-Xylene	0.16	0.05
2,2,4-Trimethylpentane	0.22	0.07
Octane	0.51	0.15
Nonane	0.09	0.03
Decane	0.00E+00	0.00E+00
Oil 10+	2.01E-04	5.85E-05
Total	100.00	29.08
Total VOC	78.41	22.80
Total HAP	2.37	0.69

Footnotes:

[a]Values were obtained from Promax.

[b]Loading emissions include total hydrocarbons as calculated using AP-42, Section 5.2.

[c]Oil tanks are only trucked out when transfer to pipeline is unavailable.

[d]The component speciation was obtained from Promax Stream 'Oil Tool W&B' and multiplied by the total hydrocarbon emissions.

[e]Loading emissions are uncontrolled.

Process Streams	Heater Treater Gas	HP Flared Gas	HT Flared Gas	Inlet Gas	Inlet Oil	Inlet Separator Gas	Inlet Water	Oil Flash	Oil Loadout
Composition Status:	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved
Phase: Total From Block:	Heater Treater	SPLT-104	SPLT-105	--	--	HP Separator	--	Oil Tank	Oil Tank
To Block:	SPLT-105	--	MIX-101	Inlet Mixer	Inlet Mixer	SPLT-104	Inlet Mixer	--	--
Std Vapor Volumetric Flow	MMSCFD	MMSCFD	MMSCFD	MMSCFD	MMSCFD	MMSCFD	MMSCFD	MMSCFD	MMSCFD
Water	0.0329909	0	0.0329675	0*	0*	0	3.44063*	0.000346931	4.85273E-05
H2S	0	0	0	0*	0*	0	0*	0	0
N2	0.0869515	0	0.0868900	0.0870965*	8.55189E-06*	0	0*	0.000143302	2.37811E-06
CO2	0.0143349	0	0.0143248	0.0144765*	5.13114E-05*	0	0*	0.000133098	1.55985E-05
C1	1.17985	0	1.17902	1.18313*	0.00214082*	0	0*	0.00497185	0.000229248
C2	0.455840	0	0.455518	0.459520*	0.00630275*	0	0*	0.00786059	0.00201794
C3	0.263202	0	0.263016	0.268654*	0.0137486*	0	0*	0.00979497	0.00936513
iC4	0.0264169	0	0.0263982	0.0271151*	0.00317845*	0	0*	0.00127074	0.00260363
nC4	0.0879346	0	0.0878724	0.0900182*	0.0154675*	0	0*	0.00455655	0.0129824
iC5	0.0146845	0	0.0146741	0.0154548*	0.00597207*	0	0*	0.000834937	0.00590624
nC5	0.0211032	0	0.0210883	0.0220302*	0.0114367*	0	0*	0.00120921	0.0111536
2-Methylpentane	0.00187387	0	0.00187254	0*	0.00418758*	0	0*	0.000107265	0.00220635
3-Methylpentane	0.00116086	0	0.00116003	0*	0.00273090*	0	0*	6.63094E-05	0.00150361
nC6	0.00494093	0	0.00493743	0.00550921*	0.00760263*	0	0*	0.000276861	0.00789392
Cyclohexane	0.00386731	0	0.00386457	0.0103391*	0.00142532*	0	0*	0.000219739	0.00767582
C7	0.00601610	0	0.00601184	0.0109964*	0.0213028*	0	0*	0.000316099	0.0259669
Methylcyclohexane	0.000440438	0	0.000440127	0.00214784*	0*	0	0*	2.38926E-05	0.00168344
Benzene	0.000586421	0	0.000586006	0.000373729*	0.000877994*	0	0*	3.43559E-05	0.000622882
Toluene	0.000737825	0	0.000737302	0.000437483*	0.00314995*	0	0*	4.04268E-05	0.00280158
Ethylbenzene	5.83651E-05	0	5.83238E-05	8.79363E-06*	0.000704106*	0	0*	2.92817E-06	0.000651142
o-Xylene	0.000449672	0	0.000449354	4.61665E-05*	0.00633125*	0	0*	2.24001E-05	0.00589993
2,2,4-Trimethylpentane	0.000524473	0	0.000524102	0*	0.00281642*	0	0*	2.78191E-05	0.00226412
C8	0.00134418	0	0.00134323	0.000945315*	0.0168586*	0	0*	6.49771E-05	0.0163948
C9	0.000249076	0	0.000248899	0.000101127*	0.00872293*	0	0*	1.10277E-05	0.00856395
C10	0	0	0	0*	0*	0	0*	0	0
C10+	7.67010E-07	0	7.66467E-07	1.09920E-05*	0.150046*	0	0*	1.50779E-08	0.150056
Mole Fraction									
Water	0.0149580		0.0149580	0*	0*		1*	0.0107288	0.000174240
H2S	0		0	0*	0*		0*	0	0
N2	0.0394238		0.0394238	0.039618*	3.00000E-05*		0*	0.00443161	8.53873E-06
CO2	0.00649944		0.00649944	0.006585*	0.00018*		0*	0.00411606	5.60071E-05
C1	0.534944		0.534944	0.538174*	0.00751*		0*	0.153755	0.000823127
C2	0.206678		0.206678	0.209024*	0.02211*		0*	0.243089	0.00724550
C3	0.119336		0.119336	0.122204*	0.04823*		0*	0.302909	0.0336259
iC4	0.0119774		0.0119774	0.012334*	0.01115*		0*	0.0392975	0.00934845
nC4	0.0398695		0.0398695	0.040947*	0.05426*		0*	0.140911	0.0466137
iC5	0.00665793		0.00665793	0.00703*	0.02095*		0*	0.0258204	0.0212066
nC5	0.00956819		0.00956819	0.010021*	0.04012*		0*	0.0373949	0.0400475
2-Methylpentane	0.000849610		0.000849610	0*	0.01469*		0*	0.00331716	0.00792200
3-Methylpentane	0.000526331		0.000526331	0*	0.00958*		0*	0.00205062	0.00539877
nC6	0.00224021		0.00224021	0.002506*	0.02667*		0*	0.00856193	0.0283435
Cyclohexane	0.00175344		0.00175344	0.004703*	0.005*		0*	0.00679543	0.0275604
C7	0.00272769		0.00272769	0.005002*	0.07473*		0*	0.00977535	0.0932354
Methylcyclohexane	0.000199695		0.000199695	0.000977*	0*		0*	0.000738879	0.00604446
Benzene	0.000265883		0.000265883	0.00017*	0.00308*		0*	0.00106245	0.00223649
Toluene	0.000334529		0.000334529	0.000199*	0.01105*		0*	0.00125020	0.0100592
Ethylbenzene	2.64627E-05		2.64627E-05	4.00000E-06*	0.00247*		0*	9.05537E-05	0.00233796
o-Xylene	0.000203881		0.000203881	2.10000E-05*	0.02221*		0*	0.000692725	0.0211840
2,2,4-Trimethylpentane	0.000237796		0.000237796	0*	0.00988*		0*	0.000860306	0.00812944
C8	0.000609449		0.000609449	0.00043*	0.05914*		0*	0.00200942	0.0588662
C9	0.000112931		0.000112931	4.60000E-05*	0.0306*		0*	0.000341032	0.0307493
C10	0		0	0*	0*		0*	0	0
C10+	3.47762E-07		3.47762E-07	5.00000E-06*	0.52636*		0*	4.66284E-07	0.538783
Mass Fraction									
Water	0.0100392		0.0100392	0*	0*		1*	0.00458625	1.80125E-05
H2S	0		0	0*	0*		0*	0	0
N2	0.0411440		0.0411440	0.0406034*	4.94754E-06*		0*	0.00294572	1.37260E-06
CO2	0.0106563		0.0106563	0.0106025*	4.66360E-05*		0*	0.00429825	1.41441E-05
C1	0.319714		0.319714	0.315862*	0.000709272*		0*	0.0585279	7.57746E-05
C2	0.231524		0.231524	0.229943*	0.00391390*		0*	0.173440	0.00125018
C3	0.196042		0.196042	0.197145*	0.0125203*		0*	0.316937	0.00850855
iC4	0.0259351		0.0259351	0.0262271*	0.00381521*		0*	0.0541965	0.00311794
nC4	0.0863307		0.0863307	0.0870700*	0.0185662*		0*	0.194336	0.0155468
iC5	0.0178958		0.0178958	0.0185562*	0.00889846*		0*	0.0442035	0.00877984
nC5	0.0257182		0.0257182	0.0264511*	0.0170409*		0*	0.0640185	0.0165802
2-Methylpentane	0.00272763		0.00272763	0*	0.00745258*		0*	0.00678287	0.00391746
3-Methylpentane	0.00168976		0.00168976	0*	0.00486016*		0*	0.00419307	0.00266971
nC6	0.00719208		0.00719208	0.00790075*	0.0135303*		0*	0.0175073	0.0140159
Cyclohexane	0.00549763		0.00549763	0.0144805*	0.00247728*		0*	0.0135701	0.0133099
C7	0.0101825		0.0101825	0.0183368*	0.0440832*		0*	0.0232420	0.0536096
Methylcyclohexane	0.000730463		0.000730463	0.00350953*	0*		0*	0.00172142	0.00340560
Benzene	0.000773731		0.000773731	0.000485814*	0.00141635*		0*	0.00196921	0.00100247
Toluene	0.00114830		0.00114830	0.000670808*	0.00599384*		0*	0.00273328	0.00531851
Ethylbenzene	0.000104664		0.000104664	1.55362E-05*	0.00154376*		0*	0.000228114	0.00142431
o-Xylene	0.000806381		0.000806381	8.15652E-05*	0.0138814*		0*	0.00174504	0.0129055
2,2,4-Trimethylpentane	0.00101195		0.00101195	0*	0.00664406*		0*	0.00233180	0.00532870
C8	0.00259355		0.00259355	0.00179700*	0.0397702*		0*	0.00544639	0.0385857
C9	0.000539597		0.000539597	0.000215842*	0.0231046*		0*	0.00103785	0.0226306
C10	0		0	0*	0*		0*	0	0
C10+	3.21822E-06		3.21822E-06	4.54387E-05*	0.769726*		0*	2.74831E-06	0.767983
Mass Flow	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h
Water	65.2574	0	65.2112	0*	0*	0	6805.71*	0.686244	0.0959892
H2S	0	0	0	0*	0*	0	0*	0	0
N2	267.447	0	267.258	267.893*	0.0263041*	0	0*	0.440770	0.00731465
CO2	69.2686	0	69.2196	69.9529*	0.247945*	0	0*	0.643152	0.0753744
C1	2078.23	0	2076.76	2084.00*	3.77092*	0	0*	8.75759	0.403806
C2	1504.97	0	1503.90	1517.12*	20.8087*	0	0*	25.9519	6.66228
C3	1274.33	0	1273.42	1300.72*	66.5655*	0	0*	47.4235	45.3424
iC4	168.585	0	168.466	173.041*	20.2840*	0	0*	8.10947	16.6156
nC4	561.173	0	560.776	574.470*	98.7093*	0	0*	29.0786	82.8496
iC5	116.328	0	116.245	122.430*	47.3096*	0	0*	6.61421	46.7881
nC5	167.176	0	167.057	174.519*	90.5996*	0	0*	9.57915	88.3567
2-Methylpentane	17.7303	0	17.7178	0*	39.6224*	0	0*	1.01493	20.8763
3-Methylpentane	10.9839	0	10.9761	0*	25.8395*	0	0*	0.627412	14.2270
nC6	46.7505	0	46.7175	52.1276*	71.9354*	0	0*	2.61963	74.6915
Cyclohexane	35.7361	0	35.7108	95.5391*	13.1707*	0	0*	2.03051	70.9289
C7	66.1890	0	66.1422	120.983*	234.373*	0	0*	3.47772	285.688
Methylcyclohexane	4.74821	0	4.74485	23.1552*	0*	0	0*	0.257578	18.1486
Benzene	5.02946	0	5.02590	3.20530*	7.53015*	0	0*	0.294654	5.34218
Toluene	7.46430	0	7.45902	4.42585*	31.8669*	0	0*	0.408983	28.3425
Ethylbenzene	0.680346	0	0.679865	0.102505*	8.20757*	0	0*	0.0341329	7.59018
o-Xylene	5.24170	0	5.23799	0.538151*	73.8017*	0	0*	0.261112	68.7738
2,2,4-Trimethylpentane	6.57798	0	6.57333	0*	35.3238*	0	0*	0.348910	28.3968
C8	16.8588	0	16.8469	11.8562*	211.442*	0	0*	0.814949	205.625
C9	3.50753	0	3.50505	1.42408*	122.838*	0	0*	0.155294	120.599
C10	0	0	0	0*	0*	0	0*	0	0
C10+	0.0209193	0	0.0209045	0.299795*	4092.33*	0	0*	0.000411232	4092.61

Process Streams	Oil Tank Feed	Pilot Gas	Sales	Sales Gas	Sat. Gas	Sweep Blanket Gas	To Flare	VRT to Flare	VRT to Sales	Water Flash	Water Loadout	Water Tank feed
Composition Status:	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved
Phase: Total From Block:	MIX-102	SPLT-102	SPLT-102	MIX-101	Inlet Mixer	SPLT-102	MIX-108	SPLT-103	SPLT-103	Water Tank	Water Tank	MIX-100
To Block:	Oil Tank	--	--	SPLT-102	SPLT-100	--	--	MIX-108	MIX-103	--	--	Water Tank
Std Vapor Volumetric Flow	MMSCFD	MMSCFD	MMSCFD	MMSCFD	MMSCFD	MMSCFD	MMSCFD	MMSCFD	MMSCFD	MMSCFD	MMSCFD	MMSCFD
Water	0.000395458	6.31827E-06	0.0303863	0.0329909	3.44063	0.00259821	0	0	0	1.73251E-05	3.40722	3.40724
H2S	0	0	0	0	0	0	0	0	0	0	0	0
N2	0.000145680	1.66526E-05	0.0800869	0.0869515	0.0871050	0.00684791	0	0	0	7.14043E-06	7.20156E-07	7.86058E-06
CO2	0.000148697	2.74536E-06	0.0132032	0.0143349	0.0145278	0.00112895	0	0	0	9.01511E-06	3.52045E-05	4.42196E-05
C1	0.00520110	0.000225960	1.08671	1.17985	1.18527	0.0929198	0	0	0	0.000176970	3.66258E-05	0.000213596
C2	0.00987853	8.73007E-05	0.419853	0.455840	0.465823	0.0358999	0	0	0	8.02595E-05	2.32945E-05	0.000103554
C3	0.0191601	5.04074E-05	0.242423	0.263202	0.282403	0.0207286	0	0	0	3.35305E-05	6.80094E-06	4.03314E-05
iC4	0.00387436	5.05926E-06	0.0243314	0.0264169	0.0302936	0.00208048	0	0	0	2.03047E-06	2.64572E-07	2.29504E-06
nC4	0.0175389	1.68409E-05	0.0809924	0.0879346	0.105486	0.00692533	0	0	0	1.02493E-05	1.91432E-06	1.21636E-05
iC5	0.00674117	2.81231E-06	0.0135252	0.0146845	0.0214269	0.00115648	0	0	0	1.08941E-06	1.35675E-07	1.22509E-06
nC5	0.0123628	4.04160E-06	0.0194372	0.0211032	0.0334670	0.00166199	0	0	0	8.79322E-07	4.93330E-08	9.28655E-07
2-Methylpentane	0.00231361	3.58875E-07	0.00172593	0.00187387	0.00418758	0.000147577	0	0	0	8.93051E-08	6.45993E-09	9.57650E-08
3-Methylpentane	0.00156992	2.22322E-07	0.00106921	0.00116086	0.00273090	9.14238E-05	0	0	0	1.12616E-07	1.90434E-08	1.31659E-07
nC6	0.00817078	9.46266E-07	0.00455086	0.00494093	0.0131118	0.000389125	0	0	0	1.29008E-07	4.77377E-09	1.33781E-07
Cyclohexane	0.00789556	7.40651E-07	0.00356200	0.00386731	0.0117644	0.000304572	0	0	0	9.48787E-07	6.05570E-07	1.55436E-06
C7	0.0262830	1.15218E-06	0.00554114	0.00601610	0.0322992	0.000473801	0	0	0	1.01126E-07	2.61737E-09	1.03744E-07
Methylcyclohexane	0.00170733	8.43510E-08	0.000405667	0.000440438	0.00214784	3.46869E-05	0	0	0	5.84963E-08	1.59401E-08	7.44364E-08
Benzene	0.000657238	1.12309E-07	0.000540125	0.000586421	0.00125172	4.61839E-05	0	0	0	3.36128E-07	7.72807E-06	8.06420E-06
Toluene	0.00284200	1.41305E-07	0.000679576	0.000737825	0.00358743	5.81077E-05	0	0	0	4.12089E-07	7.19210E-06	7.60419E-06
Ethylbenzene	0.000654070	1.11779E-08	5.37574E-05	5.83651E-05	0.000712900	4.59657E-06	0	0	0	2.93656E-08	4.35169E-07	4.64535E-07
o-Xylene	0.00592233	8.61193E-08	0.000414172	0.000449672	0.00637742	3.54141E-05	0	0	0	2.33088E-07	5.18524E-06	5.41833E-06
2,2,4-Trimethylpentane	0.00229194	1.00445E-07	0.000483067	0.000524473	0.00281642	4.13051E-05	0	0	0	8.80853E-09	2.92885E-10	9.10141E-09
C8	0.0164598	2.57431E-07	0.00123806	0.00134418	0.0178039	0.000105861	0	0	0	1.07310E-08	1.24408E-10	1.08554E-08
C9	0.00857498	4.77020E-08	0.000229412	0.000249076	0.00882406	1.96161E-05	0	0	0	1.28987E-09	1.26966E-11	1.30257E-09
C10	0	0	0	0	0	0	0	0	0	0	0	0
C10+	0.150056	1.46895E-10	7.06457E-07	7.67010E-07	0.150057	6.04062E-08	0	0	0	1.52117E-14	7.93688E-19	1.52125E-14
Mole Fraction												
Water	0.00127220	0.0149580	0.0149580	0.0149580	0.580785	0.0149580				0.0508128	0.999963	0.999868
H2S	0	0	0	0	0	0				0	0	0
N2	0.000468657	0.0394238	0.0394238	0.0394238	0.0147035	0.0394238				0.0209421	2.11354E-07	2.30672E-06
CO2	0.000478362	0.00649944	0.00649944	0.00649944	0.00245233	0.00649944				0.0264404	1.03319E-05	1.29764E-05
C1	0.0167321	0.534944	0.534944	0.534944	0.200075	0.534944				0.519035	1.07491E-05	6.26806E-05
C2	0.0317796	0.206678	0.206678	0.206678	0.0786318	0.206678				0.235392	6.83654E-06	3.03883E-05
C3	0.0616387	0.119336	0.119336	0.119336	0.0476702	0.119336				0.0983414	1.99596E-06	1.18354E-05
iC4	0.0124640	0.0119774	0.0119774	0.0119774	0.00511363	0.0119774				0.00595515	7.76474E-08	6.73489E-07
nC4	0.0564232	0.0398695	0.0398695	0.0398695	0.0178062	0.0398695				0.0300601	5.61822E-07	3.56947E-06
iC5	0.0216866	0.00665793	0.00665793	0.00665793	0.00361690	0.00665793				0.00319514	3.98185E-08	3.59508E-07
nC5	0.0397716	0.00956819	0.00956819	0.00956819	0.00564930	0.00956819				0.00257896	1.44784E-08	2.72518E-07
2-Methylpentane	0.00744297	0.000849610	0.000849610	0.000849610	0.000706872	0.000849610				0.000261922	1.89588E-09	2.81026E-08
3-Methylpentane	0.00505048	0.000526331	0.000526331	0.000526331	0.000460983	0.000526331				0.000330290	5.58892E-09	3.86359E-08
nC6	0.0262857	0.00224021	0.00224021	0.00224021	0.00221331	0.00224021				0.000378366	1.40102E-09	3.92587E-08
Cyclohexane	0.0254003	0.00175344	0.00175344	0.00175344	0.00198586	0.00175344				0.00278269	1.77725E-07	4.56132E-07
C7	0.0845533	0.00272769	0.00272769	0.00272769	0.00545217	0.00272769				0.000296593	7.68155E-10	3.04440E-08
Methylcyclohexane	0.00549254	0.000199695	0.000199695	0.000199695	0.000362561	0.000199695				0.000171563	4.67816E-09	2.18437E-08
Benzene	0.00211436	0.000265883	0.000265883	0.000265883	0.000211294	0.000265883				0.000985827	2.26806E-06	2.36647E-06
Toluene	0.00914281	0.000334529	0.000334529	0.000334529	0.000605566	0.000334529				0.00120861	2.11076E-06	2.23148E-06
Ethylbenzene	0.00210416	2.64627E-05	2.64627E-05	2.64627E-05	0.000120339	2.64627E-05				8.61263E-05	1.27715E-07	1.36320E-07
o-Xylene	0.0190523	0.000203881	0.000203881	0.000203881	0.00107652	0.000203881				0.000683622	1.52178E-06	1.59003E-06
2,2,4-Trimethylpentane	0.00737325	0.000237796	0.000237796	0.000237796	0.000475418	0.000237796				2.58345E-05	8.59570E-11	2.67085E-09
C8	0.0529516	0.000609449	0.000609449	0.000609449	0.00300534	0.000609449				3.14730E-05	3.65117E-11	3.18557E-09
C9	0.0275860	0.000112931	0.000112931	0.000112931	0.00148952	0.000112931				3.78305E-06	3.72625E-12	3.82243E-10
C10	0	0	0	0	0	0				0	0	0
C10+	0.482735	3.47762E-07	3.47762E-07	3.47762E-07	0.0253299	3.47762E-07				4.46143E-11	2.32934E-19	4.46417E-15
Mass Fraction												
Water	0.000142778	0.0100392	0.0100392	0.0100392	0.363551	0.0100392				0.0358166	0.999915	0.999778
H2S	0	0	0	0	0	0				0	0	0
N2	8.17873E-05	0.0411440	0.0411440	0.0411440	0.0143119	0.0411440				0.0229539	3.28635E-07	3.58658E-06
CO2	0.000131150	0.0106563	0.0106563	0.0106563	0.00375002	0.0106563				0.0455287	2.52387E-05	3.16973E-05
C1	0.00167219	0.319714	0.319714	0.319714	0.111525	0.319714				0.325790	9.57149E-06	5.58116E-05
C2	0.00595295	0.231524	0.231524	0.231524	0.0821536	0.231524				0.276938	1.14102E-05	5.07161E-05
C3	0.0169322	0.196042	0.196042	0.196042	0.0730384	0.196042				0.169669	4.88524E-06	2.89667E-05
iC4	0.00451297	0.0259351	0.0259351	0.0259351	0.0103271	0.0259351				0.0135427	2.50500E-07	2.17266E-06
nC4	0.0204298	0.0863307	0.0863307	0.0863307	0.0359602	0.0863307				0.0683602	1.81250E-06	1.15150E-05
iC5	0.00974731	0.0178958	0.0178958	0.0178958	0.00906723	0.0178958				0.00901964	1.59460E-07	1.43965E-06
nC5	0.0178758	0.0257182	0.0257182	0.0257182	0.0141622	0.0257182				0.00728021	5.79814E-08	1.09130E-06
2-Methylpentane	0.00399571	0.00272763	0.00272763	0.00272763	0.00211657	0.00272763				0.000883134	9.06843E-09	1.34416E-07
3-Methylpentane	0.00271132	0.00168976	0.00168976	0.00168976	0.00138031	0.00168976				0.00111365	2.67331E-08	1.84797E-07
nC6	0.0141113	0.00719208	0.00719208	0.00719208	0.00662725	0.00719208				0.00127575	6.70142E-09	1.87776E-07
Cyclohexane	0.0133170	0.00549763	0.00549763	0.00549763	0.00580711	0.00549763				0.00916303	8.30212E-07	2.13066E-06
C7	0.0527802	0.0101825	0.0101825	0.0101825	0.0189826	0.0101825				0.00116281	4.27232E-09	1.69316E-07
Methylcyclohexane	0.00335960	0.000730463	0.000730463	0.000730463	0.00123691	0.000730463				0.000659091	2.54955E-08	1.19041E-07
Benzene	0.00102887	0.000773731	0.000773731	0.000773731	0.000573472	0.000773731				0.00301293	9.83353E-06	1.02598E-05
Toluene	0.00524790	0.00114830	0.00114830	0.00114830	0.00193870	0.00114830				0.00435711	1.07949E-05	1.14118E-05
Ethylbenzene	0.00139164	0.000104664	0.000104664	0.000104664	0.000443912	0.000104664				0.000357757	7.52595E-07	8.03266E-07
o-Xylene	0.0126007	0.000806381	0.000806381	0.000806381	0.00397112	0.000806381				0.00283967	8.96752E-06	9.36930E-06
2,2,4-Trimethylpentane	0.00524685	0.00101195	0.00101195	0.00101195	0.00188695	0.00101195				0.000115464	5.44997E-10	1.69334E-08
C8	0.0376807	0.00259355	0.00259355	0.00259355	0.0119283	0.00259355				0.000140664	2.31497E-10	2.01968E-08
C9	0.0220408	0.000539597	0.000539597	0.000539597	0.00663789	0.000539597				1.89840E-05	2.65268E-11	2.72104E-09
C10	0	0	0	0	0	0				0	0	0
C10+	0.747008	3.21822E-06	3.21822E-06	3.21822E-06	0.218622	3.21822E-06				4.33607E-10	3.21161E-18	6.15477E-14
Mass Flow	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h
Water	0.782234	0.0124978	60.1055	65.2574	6805.71	5.13938	0	0	0	0.0342699	6739.64	6739.67
H2S	0	0	0	0	0	0	0	0	0	0	0	0
N2	0.448085	0.0512204	246.333	267.447	267.919	21.0629	0	0	0	0.0219627	0.00221507	0.0241777
CO2	0.718526	0.0132660	63.8001	69.2686	70.2008	5.45528	0	0	0	0.0435625	0.170114	0.213677
C1	9.16139	0.398014	1914.16	2078.23	2087.77	163.672	0	0	0	0.311721	0.0645139	0.376235
C2	32.6142	0.288226	1386.16	1504.97	1537.93	118.525	0	0	0	0.264979	0.0769073	0.341886
C3	92.7659	0.244054	1173.72	1274.33	1367.29	100.360	0	0	0	0.162342	0.0329275	0.195269
iC4	24.7251	0.0322868	155.276	168.585	193.325	13.2770	0	0	0	0.0129579	0.00168842	0.0146463
nC4	111.928	0.107474	516.870	561.173	673.179	44.1955	0	0	0	0.0654081	0.0122167	0.0776248
iC5	53.4023	0.0222786	107.144	116.328	169.740	9.16143	0	0	0	0.00863013	0.00107479	0.00970492
nC5	97.9358	0.0320168	153.978	167.176	265.119	13.1660	0	0	0	0.00696582	0.000390807	0.00735662
2-Methylpentane	21.8912	0.00339564	16.3306	17.7303	39.6224	1.39636	0	0	0	0.000844996	6.11232E-05	0.000906119
3-Methylpentane	14.8544	0.00210359	10.1168	10.9839	25.8395	0.865042	0	0	0	0.00106556	0.000180187	0.00124575
nC6	77.3111	0.00895347	43.0597	46.7505	124.063	3.68186	0	0	0	0.00122066	4.51690E-05	0.00126583
Cyclohexane	72.9594	0.00684403	32.9149	35.7361	108.710	2.81441	0	0	0	0.00876733	0.00559581	0.0143631
C7	289.165	0.0126763	60.9636	66.1890	355.356	5.21275	0	0	0	0.00111259	2.87963E-05	0.00114139
Methylcyclohexane	18.4061	0.000909358	4.37336	4.74821	23.1552	0.373948	0	0	0	0.000630628	0.000171845	0.000802473
Benzene	5.63683	0.000963222	4.63240	5.02946	10.7355	0.396098	0	0	0	0.00288281	0.0662801	0.0691629
Toluene	28.7515	0.00142953	6.87502	7.46430	36.2927	0.587855	0	0	0	0.00416895	0.0727599	0.0769288
Ethylbenzene	7.62431	0.000130297	0.626635	0.680346	8.31007	0.0535810	0	0	0	0.000342307	0.00507265	0.00541495
o-Xylene	69.0350	0.00100387	4.82788	5.24170	74.3398	0.412813	0	0	0	0.00271704	0.0604430	0.0631600
2,2,4-Trimethylpentane	28.7457	0.00125979	6.05867	6.57798	35.3238	0.518052	0	0	0	0.000110477	3.67339E-06	0.000114151
C8	206.440	0.00322873	15.5278	16.8588	223.299	1.32772	0	0	0	0.000134590	1.56034E-06	0.000136150
C9	120.754	0.000671747	3.23062	3.50753	124.262	0.276237	0	0	0	1.81642E-05	1.78796E-07	1.83430E-05
C10	0	0	0	0	0	0	0	0	0	0	0	0
C10+	4092.61	4.00638E-06	0.0192678	0.0209193	4092.63	0.00164751	0	0	0	4.14882E-10	2.16469E-14	4.14904E-10

Process Streams	1	2	3	6	8	9	10	11	12	14	15	18	21
Composition Status:	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved
Phase: Total From Block:	SPLT-104	SPLT-105	Heater Treater	MIX-103	VRU	--	Heater Treater	SPLT-101	SPLT-101	VRT	VRT	--	SPLT-100
To Block:	MIX-101	MIX-103	MIX-100	VRU	MIX-101	--	SPLT-101	MIX-102	VRT	MIX-102	SPLT-103	--	HP Separator
Std Vapor Volumetric Flow	MMSCFD	MMSCFD	MMSCFD	MMSCFD	MMSCFD	MMSCFD	MMSCFD	MMSCFD	MMSCFD	MMSCFD	MMSCFD	MMSCFD	MMSCFD
Water	0	2.33482E-05	3.40724	2.33482E-05	2.33482E-05	1.28387E-05*	0.000395458	0.000395458	0	0	0	1.28387E-05*	0
H2S	0	0	0	0	0	0*	0	0	0	0	0	0*	0
N2	0	6.15372E-05	7.86058E-06	6.15372E-05	6.15372E-05	6.29169E-07*	0.000145680	0.000145680	0	0	0	6.29169E-07*	0
CO2	0	1.01451E-05	4.42196E-05	1.01451E-05	1.01451E-05	4.12684E-06*	0.000148697	0.000148697	0	0	0	4.12684E-06*	0
C1	0	0.000835003	0.000213596	0.000835003	0.000835003	6.06515E-05*	0.00520110	0.00520110	0	0	0	6.06515E-05*	0
C2	0	0.000322607	0.000103554	0.000322607	0.000322607	0.00108009*	0.00987853	0.00987853	0	0	0	0.000337385*	0
C3	0	0.000186273	4.03314E-05	0.000186273	0.000186273	0.00823021*	0.0191601	0.0191601	0	0	0	0.000408277*	0
iC4	0	1.86958E-05	2.29504E-06	1.86958E-05	1.86958E-05	0.00245892*	0.00387436	0.00387436	0	0	0	5.20592E-05*	0
nC4	0	6.22330E-05	1.21636E-05	6.22330E-05	6.22330E-05	0.0124670*	0.0175389	0.0175389	0	0	0	0.000185401*	0
iC5	0	1.03925E-05	1.22509E-06	1.03925E-05	1.03925E-05	0.00581366*	0.00674117	0.00674117	0	0	0	3.33038E-05*	0
nC5	0	1.49351E-05	9.28655E-07	1.49351E-05	1.49351E-05	0.0110205*	0.0123628	0.0123628	0	0	0	4.78877E-05*	0
2-Methylpentane	0	1.32617E-06	9.57650E-08	1.32617E-06	1.32617E-06	0.00219473*	0.00231361	0.00231361	0	0	0	4.18015E-06*	0
3-Methylpentane	0	8.21559E-07	1.31659E-07	8.21559E-07	8.21559E-07	0.00149644*	0.00156992	0.00156992	0	0	0	2.57831E-06*	0
nC6	0	3.49679E-06	1.33781E-07	3.49679E-06	3.49679E-06	0.00786425*	0.00817078	0.00817078	0	0	0	1.06743E-05*	0
Cyclohexane	0	2.73697E-06	1.55436E-06	2.73697E-06	2.73697E-06	0.00765222*	0.00789556	0.00789556	0	0	0	8.49119E-06*	0
C7	0	4.25770E-06	1.03744E-07	4.25770E-06	4.25770E-06	0.0259338*	0.0262830	0.0262830	0	0	0	1.19067E-05*	0
Methylcyclohexane	0	3.11707E-07	7.44364E-08	3.11707E-07	3.11707E-07	0.00168092*	0.00170733	0.00170733	0	0	0	9.07315E-07*	0
Benzene	0	4.15021E-07	8.06420E-06	4.15021E-07	4.15021E-07	0.000619141*	0.000657238	0.000657238	0	0	0	1.34603E-06*	0
Toluene	0	5.22172E-07	7.60419E-06	5.22172E-07	5.22172E-07	0.00279730*	0.00284200	0.00284200	0	0	0	1.53770E-06*	0
Ethylbenzene	0	4.13061E-08	4.64535E-07	4.13061E-08	4.13061E-08	0.000650840*	0.000654070	0.000654070	0	0	0	1.08421E-07*	0
o-Xylene	0	3.18241E-07	5.41833E-06	3.18241E-07	3.18241E-07	0.00589763*	0.00592233	0.00592233	0	0	0	8.27504E-07*	0
2,2,4-Trimethylpentane	0	3.71179E-07	9.10141E-09	3.71179E-07	3.71179E-07	0.00226120*	0.00229194	0.00229194	0	0	0	1.05248E-06*	0
C8	0	9.51299E-07	1.08554E-08	9.51299E-07	9.51299E-07	0.0163882*	0.0164598	0.0164598	0	0	0	2.38590E-06*	0
C9	0	1.76275E-07	1.30257E-09	1.76275E-07	1.76275E-07	0.00856286*	0.00857498	0.00857498	0	0	0	3.94145E-07*	0
C10	0	0	0	0	0	0*	0	0	0	0	0	0*	0
C10+	0	5.42827E-10	1.52125E-14	5.42827E-10	5.42827E-10	0.150056*	0.150056	0.150056	0	0	0	4.33034E-10*	0
Mole Fraction													
Water		0.0149580	0.999868	0.0149580	0.0149580	4.66516E-05*	0.00127220	0.00127220	0.00127220			0.0107983*	0.580785
H2S		0	0	0	0	0*	0	0	0			0*	0
N2		0.0394238	2.30672E-06	0.0394238	0.0394238	2.28619E-06*	0.000468657	0.000468657	0.000468657			0.000529180*	0.0147035
CO2		0.00649944	1.29764E-05	0.00649944	0.00649944	1.49956E-05*	0.000478362	0.000478362	0.000478362			0.00347099*	0.00245233
C1		0.534944	6.26806E-05	0.534944	0.534944	0.000220387*	0.0167321	0.0167321	0.0167321			0.0510126*	0.200075
C2		0.206678	3.03883E-05	0.206678	0.206678	0.00392468*	0.0317796	0.0317796	0.0317796			0.283767*	0.0786318
C3		0.119336	1.18354E-05	0.119336	0.119336	0.0299059*	0.0616387	0.0616387	0.0616387			0.343393*	0.0476702
iC4		0.0119774	6.73489E-07	0.0119774	0.0119774	0.00893488*	0.0124640	0.0124640	0.0124640			0.0437858*	0.00511363
nC4		0.0398695	3.56947E-06	0.0398695	0.0398695	0.0453008*	0.0564232	0.0564232	0.0564232			0.155937*	0.0178062
iC5		0.00665793	3.59508E-07	0.00665793	0.00665793	0.0211249*	0.0216866	0.0216866	0.0216866			0.0280111*	0.00361690
nC5		0.00956819	2.72518E-07	0.00956819	0.00956819	0.0400448*	0.0397716	0.0397716	0.0397716			0.0402772*	0.00564930
2-Methylpentane		0.000849610	2.81026E-08	0.000849610	0.000849610	0.00797492*	0.00744297	0.00744297	0.00744297			0.00351582*	0.000706872
3-Methylpentane		0.000526331	3.86359E-08	0.000526331	0.000526331	0.00543757*	0.00505048	0.00505048	0.00505048			0.00216856*	0.000460983
nC6		0.00224021	3.92587E-08	0.00224021	0.00224021	0.0285761*	0.0262857	0.0262857	0.0262857			0.00897790*	0.00221331
Cyclohexane		0.00175344	4.56132E-07	0.00175344	0.00175344	0.0278056*	0.0254003	0.0254003	0.0254003			0.00714174*	0.00198586
C7		0.00272769	3.04440E-08	0.00272769	0.00272769	0.0942348*	0.0845533	0.0845533	0.0845533			0.0100144*	0.00545217
Methylcyclohexane		0.000199695	2.18437E-08	0.000199695	0.000199695	0.00610789*	0.00549254	0.00549254	0.00549254			0.000763122*	0.000362561
Benzene		0.000265883	2.36647E-06	0.000265883	0.000265883	0.00224975*	0.00211436	0.00211436	0.00211436			0.00113211*	0.000211294
Toluene		0.000334529	2.23148E-06	0.000334529	0.000334529	0.0101645*	0.00914281	0.00914281	0.00914281			0.00129332*	0.000605566
Ethylbenzene		2.64627E-05	1.36320E-07	2.64627E-05	2.64627E-05	0.00236494*	0.00210416	0.00210416	0.00210416			9.11903E-05*	0.000120339
o-Xylene		0.000203881	1.59003E-06	0.000203881	0.000203881	0.0214300*	0.0190523	0.0190523	0.0190523			0.000695995*	0.00107652
2,2,4-Trimethylpentane		0.000237796	2.67085E-09	0.000237796	0.000237796	0.00821644*	0.00737325	0.00737325	0.00737325			0.000885213*	0.000475418
C8		0.000609449	3.18557E-09	0.000609449	0.000609449	0.0595491*	0.0529516	0.0529516	0.0529516			0.00200673*	0.00300534
C9		0.000112931	3.82243E-10	0.000112931	0.000112931	0.0311146*	0.0275860	0.0275860	0.0275860			0.000331506*	0.00148952
C10		0	0	0	0	0*	0	0	0			0*	0
C10+		3.47762E-07	4.46417E-15	3.47762E-07	3.47762E-07	0.545254*	0.482735	0.482735	0.482735			3.64215E-07*	0.0253299
Mass Fraction													
Water		0.0100392	0.999778	0.0100392	0.0100392	4.78015E-06	0.000142778	0.000142778	0.000142778			0.00432324	0.363551
H2S		0	0	0	0	0	0	0	0			0	0
N2		0.0411440	3.58658E-06	0.0411440	0.0411440	3.64261E-07	8.17873E-05	8.17873E-05	8.17873E-05			0.000329443	0.0143119
CO2		0.0106563	3.16973E-05	0.0106563	0.0106563	3.75356E-06	0.000131150	0.000131150	0.000131150			0.00339477	0.00375002
C1		0.319714	5.58116E-05	0.319714	0.319714	2.01091E-05	0.00167219	0.00167219	0.00167219			0.0181869	0.111525
C2		0.231524	5.07161E-05	0.231524	0.231524	0.000671209	0.00595295	0.00595295	0.00595295			0.189624	0.0821536
C3		0.196042	2.89667E-05	0.196042	0.196042	0.00750043	0.0169322	0.0169322	0.0169322			0.336510	0.0730384
iC4		0.0259351	2.17266E-06	0.0259351	0.0259351	0.00295369	0.00451297	0.00451297	0.00451297			0.0565570	0.0103271
nC4		0.0863307	1.15150E-05	0.0863307	0.0863307	0.0149755	0.0204298	0.0204298	0.0204298			0.201420	0.0359602
iC5		0.0178958	1.43965E-06	0.0178958	0.0178958	0.00866878	0.00974731	0.00974731	0.00974731			0.0449128	0.00906723
nC5		0.0257182	1.09130E-06	0.0257182	0.0257182	0.0164327	0.0178758	0.0178758	0.0178758			0.0645803	0.0141622
2-Methylpentane		0.00272763	1.34416E-07	0.00272763	0.00272763	0.00390880	0.00399571	0.00399571	0.00399571			0.00673320	0.00211657
3-Methylpentane		0.00168976	1.84797E-07	0.00168976	0.00168976	0.00266515	0.00271132	0.00271132	0.00271132			0.00415304	0.00138031
nC6		0.00719208	1.87776E-07	0.00719208	0.00719208	0.0140062	0.0141113	0.0141113	0.0141113			0.0171937	0.00662725
Cyclohexane		0.00549763	2.13066E-06	0.00549763	0.00549763	0.0133097	0.0133170	0.0133170	0.0133170			0.0133573	0.00580711
C7		0.0101825	1.69316E-07	0.0101825	0.0101825	0.0537059	0.0527802	0.0527802	0.0527802			0.0223005	0.0189826
Methylcyclohexane		0.000730463	1.19041E-07	0.000730463	0.000730463	0.00341095	0.00335960	0.00335960	0.00335960			0.00166516	0.00123691
Benzene		0.000773731	1.02598E-05	0.000773731	0.000773731	0.000999507	0.00102887	0.00102887	0.00102887			0.00196525	0.000573472
Toluene		0.00114830	1.14118E-05	0.00114830	0.00114830	0.00532671	0.00524790	0.00524790	0.00524790			0.00264825	0.00193870
Ethylbenzene		0.000104664	8.03266E-07	0.000104664	0.000104664	0.00142802	0.00139164	0.00139164	0.00139164			0.000215150	0.000443912
o-Xylene		0.000806381	9.36930E-06	0.000806381	0.000806381	0.0129401	0.0126007	0.0126007	0.0126007			0.00164210	0.00397112
2,2,4-Trimethylpentane		0.00101195	1.69334E-08	0.00101195	0.00101195	0.00533817	0.00524685	0.00524685	0.00524685			0.00224716	0.00188695
C8		0.00259355	2.01968E-08	0.00259355	0.00259355	0.0386887	0.0376807	0.0376807	0.0376807			0.00509418	0.0119283
C9		0.000539597	2.72104E-09	0.000539597	0.000539597	0.0226972	0.0220408	0.0220408	0.0220408			0.000944882	0.00663789
C10		0	0	0	0	0	0	0	0			0	0
C10+		3.21822E-06	6.15477E-14	3.21822E-06	3.21822E-06	0.770344	0.747008	0.747008	0.747008			2.01058E-06	0.218622
Mass Flow	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h
Water	0	0.0461839	6739.67	0.0461839	0.0461839	0.0253956*	0.782234	0.782234	0	0	0	0.0253956*	0
H2S	0	0	0	0	0	0*	0	0	0	0	0	0*	0
N2	0	0.189277	0.0241777	0.189277	0.189277	0.00193521*	0.448085	0.448085	0	0	0	0.00193521*	0
CO2	0	0.0490227	0.213677	0.0490227	0.0490227	0.0199416*	0.718526	0.718526	0	0	0	0.0199416*	0
C1	0	1.47080	0.376235	1.47080	1.47080	0.106834*	9.16139	9.16139	0	0	0	0.106834*	0
C2	0	1.06509	0.341886	1.06509	1.06509	3.56593*	32.6142	32.6142	0	0	0	1.11389*	0
C3	0	0.901864	0.195269	0.901864	0.901864	39.8476*	92.7659	92.7659	0	0	0	1.97672*	0
iC4	0	0.119311	0.0146463	0.119311	0.119311	15.6921*	24.7251	24.7251	0	0	0	0.332227*	0
nC4	0	0.397153	0.0776248	0.397153	0.397153	79.5607*	111.928	111.928	0	0	0	1.18318*	0
iC5	0	0.0823272	0.00970492	0.0823272	0.0823272	46.0547*	53.4023	53.4023	0	0	0	0.263827*	0
nC5	0	0.118313	0.00735662	0.118313	0.118313	87.3021*	97.9358	97.9358	0	0	0	0.379357*	0
2-Methylpentane	0	0.0125481	0.000906119	0.0125481	0.0125481	20.7663*	21.8912	21.8912	0	0	0	0.0395521*	0
3-Methylpentane	0	0.00777351	0.00124575	0.00777351	0.00777351	14.1592*	14.8544	14.8544	0	0	0	0.0243957*	0
nC6	0	0.0330862	0.00126583	0.0330862	0.0330862	74.4107*	77.3111	77.3111	0	0	0	0.100999*	0
Cyclohexane	0	0.0252911	0.0143631	0.0252911	0.0252911	70.7107*	72.9594	72.9594	0	0	0	0.0784633*	0
C7	0	0.0468432	0.00114139	0.0468432	0.0468432	285.323*	289.165	289.165	0	0	0	0.130997*	0
Methylcyclohexane	0	0.00336040	0.000802473	0.00336040	0.00336040	18.1214*	18.4061	18.4061	0	0	0	0.00978145*	0
Benzene	0	0.00355945	0.0691629	0.00355945	0.00355945	5.31009*	5.63683	5.63683	0	0	0	0.0115443*	0
Toluene	0	0.00528262	0.0769288	0.00528262	0.00528262	28.2993*	28.7515	28.7515	0	0	0	0.0155563*	0
Ethylbenzene	0	0.000481494	0.00541495	0.000481494	0.000481494	7.58667*	7.62431	7.62431	0	0	0	0.00126383*	0
o-Xylene	0	0.00370965	0.0631600	0.00370965	0.00370965	68.7470*	69.0350	69.0350	0	0	0	0.00964598*	0
2,2,4-Trimethylpentane	0	0.00465536	0.000114151	0.00465536	0.00465536	28.3601*	28.7457	28.7457	0	0	0	0.0132002*	0
C8	0	0.0119313	0.000136150	0.0119313	0.0119313	205.542*	206.440	206.440	0	0	0	0.0299242*	0
C9	0	0.00248234	1.83430E-05	0.00248234	0.00248234	120.584*	120.754	120.754	0	0	0	0.00555041*	0
C10	0	0	0	0	0	0*	0	0	0	0	0	0*	0
C10+	0	1.48050E-05	4.14904E-10	1.48050E-05	1.48050E-05	4092.61*	4092.61	4092.61	0	0	0	1.18105E-05*	0

Process Streams		Heater Treater Gas	HP Flared Gas	HT Flared Gas	Inlet Gas	Inlet Oil	Inlet Separator Gas	Inlet Water	Oil Flash	Oil Loadout
Properties	Status:	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved
Phase: Total	From Block:	Heater Treater	SPLT-104	SPLT-105	--	--	HP Separator	--	Oil Tank	Oil Tank
	To Block:	SPLT-105	--	MIX-101	Inlet Mixer	Inlet Mixer	SPLT-104	Inlet Mixer	--	--
Property	Units									
Temperature	°F	110*	89	110	114*	114*	89*	114*	89.8136*	89.8136
Pressure	psig	73*	102	73	68*	68*	102*	68*	0*	0
Molecular Weight	lb/lbmol	26.8422		26.8422	27.3335	169.863		18.0153	42.1440	174.267
Mass Flow	lb/h	6500.28	0	6495.68	6597.80	5316.60	0	6805.71	149.631	5329.04
Std Vapor Volumetric Flow	MMSCFD	2.20556	0*	2.204*	2.19841*	0.285063	0	3.44063	0.0323363	0.278509
Std Liquid Volumetric Flow	sgpm	32.3467	0	32.3238	32.7614	14.1780*	0	13.6051*	0.609576	14.1084
Net Ideal Gas Heating Value	Btu/ft^3	1360.71		1360.71	1399.57	8489.93		0	2185.93	8705.47
Gross Ideal Gas Heating Value	Btu/ft^3	1491.94		1491.94	1533.28	9089.79		50.3100	2377.10	9319.36

Process Streams	Oil Tank Feed	Pilot Gas	Sales	Sales Gas	Sat. Gas	Sweep Blanket Gas	To Flare	VRT to Flare	VRT to Sales	Water Flash	Water Loadout	Water Tank feed
Status:	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved
From Block:	MIX-102	SPLT-102	SPLT-102	MIX-101	Inlet Mixer	SPLT-102	MIX-108	SPLT-103	SPLT-103	Water Tank	Water Tank	MIX-100
To Block:	Oil Tank	--	--	SPLT-102	SPLT-100	--	--	MIX-108	MIX-103	--	--	Water Tank
Temperature	110	110.025	110.025	110.025	109.792	110.025				89.8136*	89.8136	110
Pressure	73	73	73	73	68	73	8	8	8	0*	0	73
Molecular Weight	160.522	26.8422	26.8422	26.8422	28.7800	26.8422				25.5581	18.0161	18.0169
Mass Flow	5478.67	1.24491	5987.10	6500.28	18720.1	511.932	0	0	0	0.956815	6740.21	6741.17
Std Vapor Volumetric Flow	0.310845	0.0004224*	2.03144	2.20556	5.92410	0.1737*	0	0	0	0.000340960	3.40735	3.40769
Std Liquid Volumetric Flow	14.7180	0.00619490	29.7930	32.3467	60.5445	2.54748	0	0	0	0.00481419	13.4750	13.4798
Net Ideal Gas Heating Value	8027.27	1360.71	1360.71	1360.71	927.903	1360.71				1241.65	0.0537429	0.177972
Gross Ideal Gas Heating Value	8597.17	1491.94	1491.94	1491.94	1035.61	1491.94				1364.45	50.3658	50.4973

Process Streams	1	2	3	6	8	9	10	11	12	14	15	18	21
Status:	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved
From Block:	SPLT-104	SPLT-105	Heater Treater	MIX-103	VRU	--	Heater Treater	SPLT-101	SPLT-101	VRT	VRT	--	SPLT-100
To Block:	MIX-101	MIX-103	MIX-100	VRU	MIX-101	--	SPLT-101	MIX-102	VRT	MIX-102	SPLT-103	--	HP Separator
Temperature	89	110	110	110	146.655	89.8136	110	110	110			89.8136	
Pressure	102	73	73	73	102*	-3.85757	73	73	73	8	8*	1.74326	68
Molecular Weight		26.8422	18.0169	26.8422	26.8422	175.819	160.522	160.522	160.522			44.9975	28.7800
Mass Flow	0	4.60037	6741.17	4.60037	4.60037	5312.71	5478.67	5478.67	0	0	0	5.87419	0
Std Vapor Volumetric Flow	0	0.00156092	3.40769	0.00156092	0.00156092	0.275204	0.310845	0.310845	0	0	0	0.00118895	0
Std Liquid Volumetric Flow	0	0.0228923	13.4798	0.0228923	0.0228923	14.0432	14.7180	14.7180	0	0	0	0.0234600	0
Net Ideal Gas Heating Value		1360.71	0.177972	1360.71	1360.71	8781.97	8027.27	8027.27	8027.27			2336.09	927.903
Gross Ideal Gas Heating Value		1491.94	50.4973	1491.94	1491.94	9400.79	8597.17	8597.17	8597.17			2538.14	1035.61

22	25	26	27	28	31	32 - Oil Tool W&B
Pipe #1	Pipe #2	Pipe #3	Pipe #4	Pipe #5	Pipe #6	Pipe #7
SPLT-100	--	--	--	HP Separator	MIX-104	MIX-105
MIX-104	MIX-105	--	MIX-105	MIX-104	Heater Treater	--
MMSCFD	MMSCFD	MMSCFD	MMSCFD	MMSCFD	MMSCFD	MMSCFD
3.44063	2.29278E-05*	0.000346931*	1.27608E-05*	0	3.44063	3.56886E-05
0	0*	0*	0*	0	0	0
0.0871050	1.12359E-06*	0.000143302*	6.25350E-07*	0	0.0871050	1.74894E-06
0.0145278	7.36985E-06*	0.000133098*	4.10179E-06*	0	0.0145278	1.14716E-05
1.18527	0.000108314*	0.00497185*	6.02833E-05*	0	1.18527	0.000168597
0.465823	0.000692515*	0.00786059*	0.000335337*	0	0.465823	0.000937852
0.282403	0.000729116*	0.00979497*	0.000405799*	0	0.282403	0.00113492
0.0302936	9.29691E-05*	0.00127074*	5.17431E-05*	0	0.0302936	0.000144712
0.105486	0.000331096*	0.00456655*	0.000184276*	0	0.105486	0.000515772
0.0214269	5.94752E-05*	0.000834937*	3.31017E-05*	0	0.0214269	9.25769E-05
0.0334670	8.55196E-05*	0.00120921*	4.75970E-05*	0	0.0334670	0.000133117
0.00418758	7.46505E-06*	0.000107265*	4.15477E-06*	0	0.00418758	1.16198E-05
0.00273090	4.60445E-06*	6.63094E-05*	2.56266E-06*	0	0.00273090	7.16711E-06
0.0131118	1.90625E-05*	0.000276861*	1.06095E-05*	0	0.0131118	2.96720E-05
0.0117644	1.51639E-05*	0.000219739*	8.43964E-06*	0	0.0117644	2.36035E-05
0.0322992	2.12634E-05*	0.000316099*	1.18344E-05*	0	0.0322992	3.30978E-05
0.00214784	1.62032E-06*	2.38926E-05*	9.01807E-07*	0	0.00214784	2.52212E-06
0.00125172	2.40379E-06*	3.43559E-05*	1.33786E-06*	0	0.00125172	3.74164E-06
0.00358743	2.74608E-06*	4.04268E-05*	1.52836E-06*	0	0.00358743	4.27444E-06
0.000712900	1.93622E-07*	2.92817E-06*	1.07763E-07*	0	0.000712900	3.01385E-07
0.00637742	1.47779E-06*	2.24001E-05*	8.22481E-07*	0	0.00637742	2.30027E-06
0.00281642	1.87955E-06*	2.78191E-05*	1.04609E-06*	0	0.00281642	2.92563E-06
0.0178039	4.26083E-06*	6.49771E-05*	2.37142E-06*	0	0.0178039	6.63225E-06
0.00882406	7.03878E-07*	1.10277E-05*	3.91752E-07*	0	0.00882406	1.09563E-06
0	0*	0*	0*	0	0	0
0.150057	7.73328E-10*	1.50779E-08*	4.30405E-10*	0	0.150057	1.20373E-09
lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h
0.580785	0.0107983*	0.0107288*	0.0107983*		0.580785	0.0107983
0	0*	0*	0*		0	0
0.0147035	0.000529180*	0.00443161*	0.000529180*		0.0147035	0.000529180
0.00245233	0.00347099*	0.00411606*	0.00347099*		0.00245233	0.00347099
0.200075	0.0510126*	0.153755*	0.0510126*		0.200075	0.0510126
0.0786318	0.283767*	0.243089*	0.283767*		0.0786318	0.283767
0.0476702	0.343393*	0.302909*	0.343393*		0.0476702	0.343393
0.00511363	0.0437858*	0.0392975*	0.0437858*		0.00511363	0.0437858
0.0178062	0.155937*	0.140911*	0.155937*		0.0178062	0.155937
0.00361690	0.0280111*	0.0258204*	0.0280111*		0.00361690	0.0280111
0.00564930	0.0402772*	0.0373949*	0.0402772*		0.00564930	0.0402772
0.000706872	0.00351582*	0.00331716*	0.00351582*		0.000706872	0.00351582
0.000460983	0.00216856*	0.00205062*	0.00216856*		0.000460983	0.00216856
0.00221331	0.00897790*	0.00856193*	0.00897790*		0.00221331	0.00897790
0.00198586	0.00714174*	0.00679543*	0.00714174*		0.00198586	0.00714174
0.00545217	0.0100144*	0.00977535*	0.0100144*		0.00545217	0.0100144
0.000362561	0.000763122*	0.000738879*	0.000763122*		0.000362561	0.000763122
0.000211294	0.00113211*	0.00106245*	0.00113211*		0.000211294	0.00113211
0.000605566	0.00129332*	0.00125020*	0.00129332*		0.000605566	0.00129332
0.000120339	9.11903E-05*	9.05537E-05*	9.11903E-05*		0.000120339	9.11903E-05
0.00107652	0.000695995*	0.000692725*	0.000695995*		0.00107652	0.000695995
0.000475418	0.000885213*	0.000860306*	0.000885213*		0.000475418	0.000885213
0.00300534	0.00200673*	0.00200942*	0.00200673*		0.00300534	0.00200673
0.00148952	0.000331506*	0.000341032*	0.000331506*		0.00148952	0.000331506
0	0*	0*	0*		0	0
0.0253299	3.64215E-07*	4.66284E-07*	3.64215E-07*		0.0253299	3.64215E-07
lb/h	lb/h	lb/h	lb/h		lb/h	lb/h
0.363551	0.00432324	0.00458625	0.00432324		0.363551	0.00432324
0	0	0	0		0	0
0.0143119	0.000329443	0.00294572	0.000329443		0.0143119	0.000329443
0.00375002	0.00339477	0.00428825	0.00339477		0.00375002	0.00339477
0.111525	0.0181869	0.0585279	0.0181869		0.111525	0.0181869
0.0821536	0.189624	0.173440	0.189624		0.0821536	0.189624
0.0730384	0.336510	0.316937	0.336510		0.0730384	0.336510
0.0103271	0.0565570	0.0541965	0.0565570		0.0103271	0.0565570
0.0359602	0.201420	0.194336	0.201420		0.0359602	0.201420
0.00906723	0.0449128	0.0442035	0.0449128		0.00906723	0.0449128
0.0141622	0.0645803	0.0640185	0.0645803		0.0141622	0.0645803
0.00211657	0.00673320	0.00678287	0.00673320		0.00211657	0.00673320
0.00138031	0.00415304	0.00419307	0.00415304		0.00138031	0.00415304
0.00662725	0.0171937	0.0175073	0.0171937		0.00662725	0.0171937
0.00580711	0.0133573	0.0135701	0.0133573		0.00580711	0.0133573
0.0189826	0.0223005	0.0232420	0.0223005		0.0189826	0.0223005
0.00123691	0.00166516	0.00172142	0.00166516		0.00123691	0.00166516
0.000573472	0.00196525	0.00196921	0.00196525		0.000573472	0.00196525
0.00193870	0.00264825	0.00273328	0.00264825		0.00193870	0.00264825
0.000443912	0.000215150	0.000228114	0.000215150		0.000443912	0.000215150
0.00397112	0.00164210	0.00174504	0.00164210		0.00397112	0.00164210
0.00188695	0.00224716	0.00233180	0.00224716		0.00188695	0.00224716
0.0119283	0.00509418	0.00544639	0.00509418		0.0119283	0.00509418
0.00663789	0.000944882	0.00103785	0.000944882		0.00663789	0.000944882
0	0	0	0		0	0
0.218622	2.01058E-06	2.74831E-06	2.01058E-06		0.218622	2.01058E-06
lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h
6805.71	0.0453523*	0.686244*	0.0252414*	0	6805.71	0.0705932
0	0*	0*	0*	0	0	0
267.919	0.00345597*	0.440770*	0.00192346*	0	267.919	0.00537944
70.2008	0.0356123*	0.643152*	0.0198205*	0	70.2008	0.0554328
2087.77	0.190787*	8.75759*	0.106185*	0	2087.77	0.296972
1537.93	1.98922*	25.9519*	1.10712*	0	1537.93	3.09634
1367.29	3.53010*	47.4235*	1.96472*	0	1367.29	5.49483
193.325	0.593302*	8.10947*	0.330210*	0	193.325	0.923512
673.179	2.11296*	29.0786*	1.17600*	0	673.179	3.28896
169.740	0.471151*	6.61421*	0.262225*	0	169.740	0.733376
265.119	0.677469*	9.57915*	0.377054*	0	265.119	1.05452
39.6224	0.0706336*	1.01493*	0.0393120*	0	39.6224	0.109946
25.8395	0.0435668*	0.627412*	0.0242477*	0	25.8395	0.0678144
124.063	0.180368*	2.61963*	0.100386*	0	124.063	0.280753
108.710	0.140123*	2.03051*	0.0779870*	0	108.710	0.218110
355.356	0.233940*	3.47772*	0.130202*	0	355.356	0.364141
23.1552	0.0174681*	0.257578*	0.00972207*	0	23.1552	0.0271901
10.7355	0.0206162*	0.294654*	0.0114742*	0	10.7355	0.0320904
36.2927	0.0277810*	0.408983*	0.0154619*	0	36.2927	0.0432429
8.31007	0.00225700*	0.0341329*	0.00125616*	0	8.31007	0.00351316
74.3398	0.0172261*	0.261112*	0.00958743*	0	74.3398	0.0268136
35.3238	0.0235734*	0.348910*	0.0131201*	0	35.3238	0.0366935
223.299	0.0534397*	0.814949*	0.0297425*	0	223.299	0.0831822
124.262	0.00991213*	0.155294*	0.00551672*	0	124.262	0.0154289
0	0*	0*	0*	0	0	0
4092.63	2.10916E-05*	0.000411232*	1.17388E-05*	0	4092.63	3.28305E-05

22	25	26	27	28	31	32 - Oil Tool W&B
Pipe #1	Pipe #2	Pipe #3	Pipe #4	Pipe #5	Pipe #6	Pipe #7
SPLT-100	--	--	--	HP Separator	MIX-104	MIX-105
MIX-104	MIX-105	--	MIX-105	MIX-104	Heater Treater	--
109.792	89.8136	89.8136	89.8136	89	109.792	89.8136
68	1.74326	-2.92782E-07	1.74326	102	68	1.74326
28.7800	44.9975	42.1440	44.9975		28.7800	44.9975
18720.1	10.4903	149.631	5.83853	0	18720.1	16.3285
5.92410	0.00212327	0.0323363	0.00118173	0	5.92410	0.00330501
60.5445	0.0418956	0.609576	0.0233175	0	60.5445	0.0652132
927.903	2336.09	2185.93	2336.09		927.903	2336.09
1035.61	2538.14	2377.10	2538.14		1035.61	2538.14

Attachment 3

Production Data

Arvid Bangen Production

Row Labels	Sum of Oil	Sum of Water	Sum of Gas Prod
12/2/2023	571.54	528.09	2411.50
12/3/2023	563.09	485.89	2423.87
12/4/2023	559.26	504.66	2403.13
12/5/2023	550.32	502.03	2404.35
12/6/2023	535.77	484.08	2404.35
12/7/2023	518.60	458.33	2378.44
12/8/2023	462.03	427.54	2123.00
12/9/2023	456.03	442.17	2178.72
12/10/2023	463.70	442.17	2181.40
12/11/2023	503.51	483.81	2284.21
12/12/2023	503.23	493.23	2279.87
12/13/2023	497.66	481.20	2239.48
12/14/2023	480.22	475.60	2231.22
12/15/2023	452.29	472.88	2131.65
12/16/2023	478.95	513.52	2170.68
12/17/2023	472.12	477.16	2145.42
12/18/2023	467.71	434.35	2124.19
12/19/2023	461.62	445.78	2111.52
12/20/2023	456.48	467.94	2066.49
12/21/2023	450.43	431.24	2059.94
12/22/2023	449.78	430.70	2094.84
12/23/2023	452.03	440.59	2128.17
12/24/2023	368.85	356.23	1877.54
12/25/2023	405.44	409.35	1793.09
12/26/2023	500.47	478.82	2263.03
12/27/2023	482.47	482.78	2258.60
12/28/2023	471.23	450.62	2195.30
12/29/2023	487.44	447.27	2246.34
12/30/2023	489.97	473.45	2245.57
12/31/2023	485.12	437.67	2239.77
Grand Total	**14497.36**	**13859.15**	**66095.65**
Average	483.25	461.97	2203.19

Attachment 4

Sampling Data

SPL, Inc.
3111 1st Ave W
Williston, ND 58801
713-299-2234

EXTENDED HYDROCARBON LIQUID STUDY
CERTIFICATE OF ANALYSIS

Company:	Marathon Oil	Sample Name:	**Baker Pressurized Liquid**
Sample Date:	4/17/2023	Lab ID Number:	23040167-002A
Sample Facility:	Baker	Date Tested:	4/19/2023
Sample Equipment:	Heater Treater	Test Method:	GPA 2186M
Sample Location:	ND	Date Reported:	4/19/2023
Sample Pressure:	68 PSIG		
Sample Temperature:	114°F		
Sampling Method:	GPA-2174		
Type Sample:	Spot		

Components	Mole %	Weight %	Liq. Vol. %
Nitrogen	0.003	0.001	0.001
Methane	0.751	0.073	0.183
Carbon Dioxide	0.018	0.005	0.005
Ethane	2.211	0.400	0.845
Propane	4.823	1.280	1.899
Isobutane	1.115	0.390	0.521
n-Butane	5.426	1.899	2.446
Isopentane	2.095	0.910	1.095
n-Pentane	4.012	1.743	2.079
2-Methylpentane	1.469	0.762	0.872
3-Methylpentane	0.958	0.497	0.559
Other Hexanes	0.500	0.213	0.216
n-Hexane	2.667	1.384	1.568
Benzene	0.308	0.145	0.123
2,2,4-Trimethylpentane	0.988	0.679	0.734
Heptanes	7.473	4.220	4.435
Toluene	1.105	0.613	0.529
Octanes	5.914	3.887	3.983
Ethylbenzene	0.247	0.158	0.136
m-Xylene	1.422	0.909	0.787
p-Xylene	0.230	0.147	0.127
o-Xylene	0.569	0.364	0.310
Nonanes	3.060	2.167	2.140
Decanes+	52.636	77.154	74.407
Totals	**100.000**	**100.000**	**100.000**

CALCULATED SAMPLE CHARACTERISTICS

	Total	C10+
RELATIVE SPECIFIC GRAVITY	**0.7517**	**0.7805**
API GRAVITY AT 60/60 F	**56.75**	**49.79**
TRUE VAPOR PRESSURE AT 100 F, PSIA	**69.7**	**0.0012**
AVERAGE MOLECULAR WEIGHT	**166.10**	**248.4**
AVERAGE BOILING POINT, F	**206.43**	**282.4**
BTU / GALLON OF LIQUID AT 14.73 PSIA	**126,439**	**130,206**
LBS / GALLON OF LIQUID	**6.267**	**6.508**

NOTATION: ALL CALCULATIONS PERFORMED USING PHYSICAL CONSTANTS FROM GPA 2145-16, THE TABLES OF PHYSICAL CONSTANTS FOR HYDROCARBONS AND OTHER COMPOUNDS OF INTEREST TO THE NATURAL GAS INDUSTRY.

Williston Laboratory
3111 1st Ave W
Williston, ND 58801

Certificate of Analysis

Number: 172-23040167-001A

Apr. 21, 2023

Michelle McCracken
Marathon
Houston, TX 77024

Station Name: Baker
Method: GPA 2286
Cylinder No: 1111-001183
Analyzed: 04/20/2023 11:46:04

Sampled By: Greg Buske
Sample Of: Gas Spot
Sample Date: 04/17/2023 16:00
Sample Conditions: 68 psig, @ 114 °F

Analytical Data

Components	Mol. %	Wt. %	GPM at 14.696 psia
Hydrogen Sulfide	0.0000	0.0000	
Nitrogen	3.9618	4.0594	
Methane	53.8174	31.5788	
Carbon Dioxide	0.6585	1.0600	
Ethane	20.9024	22.9888	5.6102
Propane	12.2204	19.7098	3.3788
Iso-Butane	1.2334	2.6221	0.4051
n-Butane	4.0947	8.7050	1.2955
Iso-Pentane	0.7030	1.8552	0.2580
n-Pentane	1.0021	2.6445	0.3646
Hexanes	0.3403	1.0727	0.1402
n-Hexane	0.2506	0.7899	0.1034
Benzene	0.0170	0.0486	0.0048
Cyclohexane	0.1300	0.4002	0.0444
Heptanes	0.5002	1.8333	0.2316
Methylcyclohexane	0.0977	0.3509	0.0394
Toluene	0.0199	0.0671	0.0067
Octanes	0.0430	0.1797	0.0221
Ethylbenzene	0.0004	0.0016	0.0002
Xylenes	0.0021	0.0082	0.0008
Nonanes	0.0046	0.0216	0.0026
Decanes Plus	0.0005	0.0026	0.0003
	100.0000	100.0000	11.9087

GPM TOTAL C2+ 11.910

Calculated Physical Properties	Total	C10+
Calculated Molecular Weight	27.34	142.28
GPA 2172 Calculation:		
Calculated Gross BTU per ft³ @ 14.696 psia & 60°F		
Higher Heating Value, Real Gas Dry BTU	1543.6	7742.9
Water Sat. Gas Base BTU	1517.4	7607.8
Relative Density Real Gas	0.9494	4.9126
Compressibility Factor	0.9939	

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.