



November 2024

Submitted via STEERS

To: Texas Commission on Environmental Quality (TCEQ)
Air Permits Initial Review Team (APIRT)
Mail Code 161
P.O. Box 13087
Austin, Texas 78711-3087

Air Quality Standard Permit for Oil and Gas Handling and Production Facilities Initial Application
Apache Corporation (CN600126361)
Regulated Entity: Brahaney Unit Tank Battery (RN104925243)
Permit No. 175486

Dear Sir or Madam,

Apache Corporation (Apache) respectfully submits the referenced application for Brahaney Unit Tank Battery in Yoakum County, Texas. This application is being submitted via the STEERS e-Permits Program.

If you need further information or have questions, please contact me at (432) 818-1053.

Sincerely,

Amanda Ellis

Amanda Ellis
EH&S Specialist II
EH&S Department

AIR QUALITY STANDARD PERMIT FOR OIL AND GAS HANDLING AND PRODUCTION FACILITIES INITIAL APPLICATION

**APACHE CORPORATION
BRAHANEY UNIT TANK BATTERY**

NOVEMBER 2024

**SUBMITTED TO:
TEXAS COMMISSION ON ENVIRONMENTAL QUALITY
OFFICE OF AIR**

PREPARED BY:



Project Information

Apache Corporation (Apache) operates the Brahaney Unit Tank Battery (site) in Yoakum County, TX pursuant to the terms and conditions of the Air Quality Standard Permit for Oil and Gas Handling and Production Facilities. This site was previously authorized under permit 78663. Upon issuance of this permit, Apache will void permit 78663. Apache requests authorization for modifications at the site with this Air Quality Standard Permit for Oil and Gas Handling and Production Facilities initial application. Changes at the site consist of the following:

- Removing the burner from one (1) heater treater
- Adding two (2) vapor recovery units (VRUs)
- Adding emissions from low pressure separator (LPSep)
- Updating emissions for existing equipment

Emissions sources at the site will now consist of the following:

- Three (3) 500-bbl crude oil tanks (TK-1 – TK-3)
- Four (4) 750-bbl produced water tanks (WT-1 – WT-4)
- One (1) 3,000-bbl emergency overflow water tank (WT-5)
- One (1) 500-bbl produced water tank (WT-6)
- Vapor Recovery Units (VRUs)(VRU-1 – VRU-2)
- Low Pressure Separator (LPSep)
- Free Water Knockout drum (FWKO)
- Miscellaneous tanks (TK-MISC)
- Flare (FL-1)
- Fugitive emissions (FUG)
- Alternate operating scenarios (AOS)(PG)
- Planned maintenance, startup, and shutdown (MSS) activities (MSS, MSS-PB, MSS-TK, VSSL-BD, and VRU-BD)

This submittal includes the following sections:

Section 1 – TCEQ Forms

Section 2 – Process and Equipment Descriptions

Section 3 – Process Flow Diagram

Section 4 – Area Map

Section 5 – Emissions Calculations

Section 6 – State Regulatory Applicability

Section 7 – Federal Regulatory Applicability

Section 8 – Impacts Evaluation

Apache Corporation (CN600126361)
Braham Unit Tank Battery (RN104925243)
November 2024

Section 1 – TCEQ Forms

Form PI-1S
Registrations for Air Standard Permit
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I. Registrant Information
A. Company or Other Legal Customer Name: Apache Corporation
B. Company Official Contact Information (☒ Mr. ☐ Mrs. ☐ Ms. ☐ Other:) _____
Name: Danny Galvan Jr
Title: Prod Ops Sr Manager
Mailing Address: 303 Veterans Airpark Lane
City: Midland
State: TX
ZIP Code: 79705
Telephone No.: 432-818-1084
Fax No.:
Email Address: danny.galvan@apachecorp.com
<i>All permit correspondence will be sent via email.</i>
C. Technical Contact Information (☐ Mr. ☒ Mrs. ☐ Ms. ☐ Other:) _____
Name: Amanda Ellis
Title: EH&S Specialist II
Company Name: Apache Corporation
Mailing Address: 303 Veterans Airpark Lane
City: Midland
State: TX
ZIP Code: 79705
Telephone No.: 432-818-1053
Fax No.:
Email Address: amanda.ellis@apachecorp.com
II. Facility and Site Information
A. Name and Type of Facility
Facility Name: Brahaney Unit Tank Battery
Type of Facility: Natural Gas & Oil Production ☒ Permanent ☐ Temporary

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II. Facility and Site Information (<i>continued</i>)
For portable units, please provide the serial number of the equipment being authorized below.
Serial No(s):
B. Facility Location Information
Street Address:
If there is no street address, provide written driving directions to the site and provide the closest city or town, county, and ZIP code for the site (attach description if additional space is needed).
FROM INTX HWY 82 & HWY 380 SPLIT GO W ON HWY 82 FOR 3.34 MI TURN L ON FM 1622 GO 0.8 MI TO FACILITY.
City: Plains
County: Yoakum
ZIP Code: 79355
C. Core Data Form (required for Standard Permits 6006, 6007, and 6013).
Is the Core Data Form (TCEQ Form 10400) attached? ☐ Yes ☒ No
Customer Reference Number (CN): CN600126361
Regulated Entity Number (RN): RN104925243
D. TCEQ Account Identification Number (if known):
E. Type of Action
☒ Initial Application ☐ Change to Registration ☐ Renewal ☐ Renewal Certification
For Change to Registration, Renewal, or Renewal Certification actions provide the following:
Registration Number: 175486
Expiration Date:
F. Standard Permit Claimed: 6002 – Oil and Gas Facility
G. Previous Standard Exemption or PBR Registration Number:
Is this authorization for a change to an existing facility previously authorized under a standard exemption or PBR? ☒ Yes ☐ No
If "Yes," enter previous standard exemption number(s) and PBR registration number(s) and associated effective date in the spaces provided below.
78663; upon issuance of this permit, Apache requests that 78663 be voided.

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II. Facility and Site Information (<i>continued</i>)
H. Other Facilities at this Site Authorized by Standard Exemption, PBR, or Standard Permit
Are there any other facilities at this site that are authorized by an Air Standard Exemption, PBR, or Standard Permit? ☐ Yes ☒ No
If "Yes," enter standard exemption number(s), PBR registration number(s), and Standard Permit registration number(s), and associated effective date in the spaces provided below.
Standard Exemption, PBR Registration, and Standard Permit Registration Number(s) and Effective Date(s)
I. Other Air Preconstruction Permits
Are there any other air preconstruction permits at this site? ☐ Yes ☒ No
If "Yes," enter permit number(s) in the spaces provided below.
J. Affected Air Preconstruction Permits
Does the standard permit directly affect any permitted facility? ☐ Yes ☒ No
If "Yes," enter permit number(s) in the spaces provided below.
K. Federal Operating Permit (FOP) Requirements
Is this facility located at a site that is required to obtain a FOP pursuant to 30 TAC Chapter 122? ☐ Yes ☒ No ☐ To Be Determined
Check the requirements of 30 TAC Chapter 122 that will be triggered if this standard permit is approved (<i>check all that apply</i>).
☐ Initial Application for a FOP ☐ Significant Revision for a SOP ☐ Minor Revision for a SOP
☐ Operational Flexibility/Off Permit Notification for a SOP ☐ Revision for a GOP
☐ To be Determined ☒ None
Identify the type(s) of FOP issued and/or FOP application(s) submitted/pending for the site. (<i>check all that apply</i>)
☐ SOP ☐ GOP ☐ GOP application/revision (submitted or under APD review) ☒ N/A
☐ SOP application/revision (submitted or under APD review)

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III. Fee Information (go to www.tceq.texas.gov/epay to pay online)
A. Fee Amount: \$850.00
B. Voucher number from ePay:
IV. Public Notice (if applicable)
A. Responsible Person (☐ Mr. ☐ Mrs. ☐ Ms. ☐ Other:) _____
Name:
Title:
Company:
Mailing Address:
City:
State:
ZIP Code:
Telephone No.:
Fax No.:
Email Address:
B. Technical Contact (☐ Mr. ☐ Mrs. ☐ Ms. ☐ Other:) _____
Name:
Title:
Company:
Mailing Address:
City:
State:
ZIP Code:
Telephone No.:
Fax No.:
Email Address:
C. Bilingual Notice
Is a bilingual program required by the Texas Education Code in the School District? ☐ Yes ☐ No
Are the children who attend either the elementary school or the middle school closest to your facility eligible to be enrolled in a bilingual program provided by the district? ☐ Yes ☐ No

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IV. Public Notice (<i>continued</i>) (if applicable) (continued)
If "Yes," list which language(s) are required by the bilingual program below?
D. Small Business Classification and Alternate Public Notice
Does this company (including parent companies and subsidiary companies) have fewer than 100 employees or less than \$6 million in annual gross receipts? ☐ Yes ☐ No
Is the site a major source under 30 TAC Chapter 122, Federal Operating Permit Program? ☐ Yes ☐ No
Are the site emissions of any individual regulated air contaminant equal to or greater than 50 tpy? ☐ Yes ☐ No
Are the site emissions of all regulated air contaminant combined equal to or greater than 75 tpy? ☐ Yes ☐ No
V. Renewal Certification Option
A. Does the permitted facility emit an air contaminant on the Air Pollutant Watch List, and is the permitted facility located in an area on the watch list? ☐ Yes ☐ No
B. For facilities participating in the Houston/Galveston/Brazoria area (HGB) cap and trade program for highly reactive VOCs (HRVOCs), do the HRVOCs need to be speciated on the maximum allowable emission rates table (MAERT)? ☐ Yes ☐ No
C. Does the company and/or site have an unsatisfactory compliance history? ☐ Yes ☐ No
D. Are there any applications currently under review for this standard permit registration? ☐ Yes ☐ No
E. Are scheduled maintenance, startup, or shutdown emissions required to be included in the standard permit registration at this time? ☐ Yes ☐ No
F. Are any of the following actions being requested at the time of renewal: ☐ Yes ☐ No
1. Are there any facilities that have been permanently shutdown that are proposed to be removed from the standard permit registration? ☐ Yes ☐ No
2. Do changes need to be made to the standard permit registration in order to remain in compliance? ☐ Yes ☐ No
3. Are sources or facilities that have always been present and represented, but never identified in the standard permit registration, proposed to be included with this renewal? ☐ Yes ☐ No
4. Are there any changes to the current emission rates table being proposed? ☐ Yes ☐ No
<i>Note: If answers to all of the questions in Section V. Renewal Certification Option are "No," use the certification option and skip to Section VII. of this form. If the answers to any of the questions in Section V. Renewal Certification Option are "Yes," the certification option cannot be used.</i>
*If notice is applicable and comments are received in response to the public notice, the application does not qualify for the renewal certification option.

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VI. Technical Information Including State and Federal Regulatory Requirements

Place a check next to the appropriate box to indicate what you have included in your submittal.

Note: Any technical or essential information needed to confirm that facilities are meeting the requirements of the standard permit must be provided. Not providing key information could result in an automatic deficiency and voiding of the project.

A. Standard Permit requirements
(Checklists are optional; however, your review will go faster if you provide applicable checklists.)

Did you demonstrate that the general requirements in 30 TAC Sections 116.610 and 116.615 are met? ☒ Yes ☐ No

Did you demonstrate that the individual requirements of the specific standard permit are met? ☒ Yes ☐ No

B. Confidential Information (All pages properly marked "CONFIDENTIAL"). ☐ Yes ☒ No

C. Process Flow Diagram. ☒ Yes ☐ No

D. Process Description. ☒ Yes ☐ No

E. Maximum Emissions Data and Calculations. ☒ Yes ☐ No

F. Plot Plan. ☐ Yes ☒ No

G. Projected Start Of Construction Date, Start Of Operation Date, and Length of Time at Site: ☐ Yes ☒ No

Projected Start of Construction (provide date):

Projected Start of Operation (provide date):

Length of Time at the Site:

VII. Delinquent Fees and Penalties

This form **will not be processed** until all delinquent fees and/or penalties owed to the TCEQ or the Office of the Attorney General on behalf of the TCEQ are paid in accordance with the Delinquent Fee and Penalty Protocol. For more information regarding Delinquent Fees and Penalties, go to the TCEQ website at: www.tceq.texas.gov/agency/financial/fees/delin/index.html.

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VIII. Signature Requirements

The signature below confirms that I have knowledge of the facts included in this application and that these facts are true and correct to the best of my knowledge and belief. I further state that to the best of my knowledge and belief, the project for which application is made will not in any way violate any provision of the Texas Water Code (TWC), Chapter 7; the Texas Health and Safety Code, Chapter 382, the Texas Clean Air Act (TCAA) the air quality rules of the Texas Commission on Environmental Quality; or any local governmental ordinance or resolution enacted pursuant to the TCAA. I further state that I understand my signature indicates that this application meets all applicable nonattainment, prevention of significant deterioration, or major source of hazardous air pollutant permitting requirements. The signature further signifies awareness that intentionally or knowingly making or causing to be made false material statements or representations in the application is a criminal offense subject to criminal penalties.

Name (printed): Signed via e-Permitting on STEERS

Signature (original signature required): Signed via e-Permitting on STEERS

IX. Copies of the Registration

The PI-1S application must be submitted through ePermits. No additional copies need to be sent to the Regional Office or local Air Pollution Control Program(s). The link to ePermits can be found here:

www3.tceq.texas.gov/steers/.

Apache Corporation (CN600126361)
Braham Unit Tank Battery (RN104925243)
November 2024

Section 2 – Process and Equipment Descriptions

Process Description

Fluids from the wellhead(s) enter the site through the inlet separator(s) and free water knock out drum (FWKO). Gas from the inlet separator(s) and FWKO exit the site.

Produced water from the inlet separator(s) and FWKO is routed to and stored in four (4) 750-bbl produced water tanks (WT-1 – WT-4) prior to exiting the site via injection. In addition, there is one (1) 3,000-bbl emergency overflow water tank (WT-5) that can store produced water in an emergency.

Crude oil from the inlet separator(s) and FWKO is routed to a low pressure separator (LPSep) for additional separation prior to being routed to and stored in three (3) 500-bbl crude oil tanks (TK-1 – TK-3) prior to exiting the site via pipeline. Produced water from LPSep is routed to and stored in one (1) 500-bbl produce water tank (WT-6) prior to exiting the site via pipeline.

Vapors from WT-1 – WT-4 and tank forced ventilation 2 emissions are captured by vapor recovery units (VRUs)(VRU-1 – VRU-2).

The one (1) flare (FL-1) controls captured TK-1 – TK-3, WT-6, LPSep, and tank forced ventilation 1 emissions. FL-1 also controls flaring of produced gas (PG) during instances that the sales pipeline is unavailable.

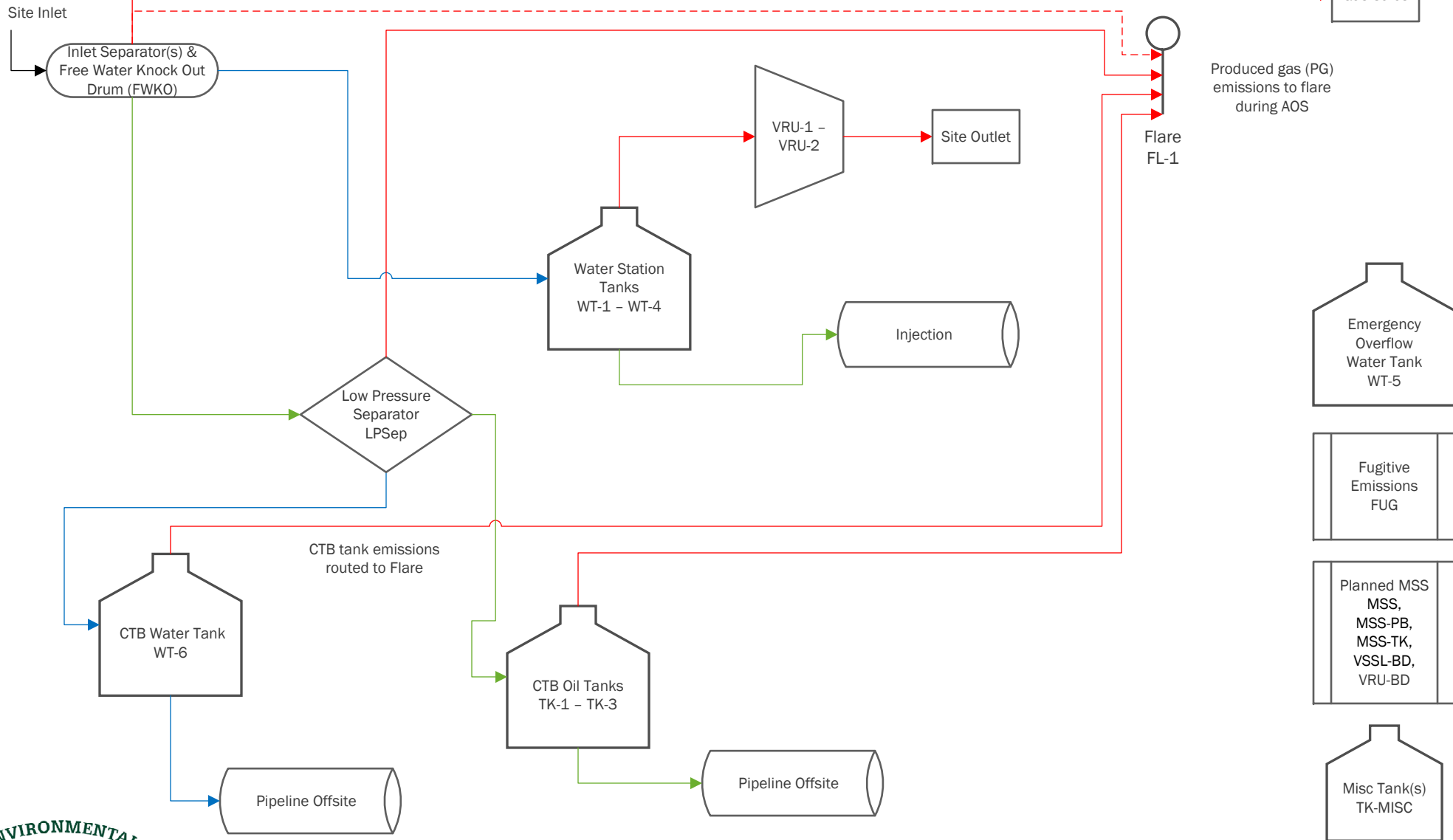
In addition, there are emissions from small miscellaneous tanks (TK-MISC), fugitive emissions (FUG), and planned MSS activities including default MSS (MSS), painting and sandblasting (MSS-PB), tank cleaning and degassing (MSS-TK), vessel blowdowns (VSSL-BD), and VRU compressor blowdowns (VRU-BD).

Apache Corporation (CN600126361)
Brahamney Unit Tank Battery (RN104925243)
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Equipment Descriptions

Equipment Category	Description / Parameters	Emissions Methodology	Controls	Status
Heater Treater (HT-4)	0.50 mmBtu/hr	--	--	HT-1: Burner Removed
Crude Oil Tanks (TK-1 - TK-3)	TK-1 - TK-3: 500-bbl (each)	Emissions calculated using TCEQ guidance (APDG 6250v3.02/2020), AP-42 Chapter 7.1 (06/2020), and ProMax simulation program.	Captured TK-1 - TK-3 emissions are routed to one (1) flare (FL-1).	Existing
Produced Water Tanks (WT-1 - WT-4, WT-6)	WT-1 - WT-4: Four (4) 750-bbl (each) WT-6: One (1) 500-bbl		Captured WT-1 - WT-4 emissions are controlled by vapor recovery units (VRUs)(VRU-1 - VRU-2). WT-6 emissions are routed to FL-1.	Existing
Emergency Overflow Water Tank (WT-5)	WT-5: One (1) 3,000-bbl		WT-5 emissions are vented to the atmosphere.	Existing
Miscellaneous tanks (TK-MISC)	500 gal/hr, 6,000 gal/yr	Emissions are calculated using ProMax simulation program.	TK-MISC emissions are uncontrolled.	Existing
Low Pressure Separator (LPSep)	--	LPSep emissions are based on 1 mcf/100bbl oil rate and process simulation.	LPSep emissions are routed to FL-1.	New
Vapor Recovery Unit(s) (VRU-1 - VRU-2)	VRU-1 - VRU-2: 99% Capture; 8,760 hrs/yr uptime	VRUs are each driven by an electric motor, with no emissions.	Redundant VRUs are installed to ensure zero downtime. VRUs meet additional design and monitoring/recordkeeping requirements to claim greater than 95% capture efficiency.	New
Flare (FL-1)	FL-1: 50 ft, 6 in diameter	FL-1 emissions are calculated using appropriate TCEQ "Air Permit Technical Guidance for Chemical Source: Flares and Vapor Oxidizers, RG-109 (Draft), 10/2000".	FL-1 has a VOC DRE of 98% except for C1-C3 where a 99% reduction is assumed.	Existing
Produced Gas during (AOS) (PG)	PG to FL-1: 0.495 MMSCFD ; 40 MMSCF/yr	Produced gas (PG) AOS flaring emissions are estimated using scientific calculations.	PG to FL-1 during AOS.	Updated
Fugitive Emissions (FUG)	Fugitive emissions consist of equipment leaks from various component categories.	FUG-1 emissions are calculated using 40 CFR, Part 98, Subpart W, Table W-1B and W-1C methods and EPA emission factors, effective date 10/22/2015.	FUG emission are reduced utilizing a leak detection and repair (LDAR) program.	Updated
Planned MSS (MSS, MSS-TK, MSS-PB)	Controlled MSS - FL-1 Tank Forced Ventilation 1 - 3,019 scf/hr 725 mscf/yr Controlled MSS - VRU-1 - VRU-2 Tank Forced Ventilation 2 - 4,529 scf/hr 1,087 mscf/yr Uncontrolled MSS MSS-TK - Non-Forced Ventilation - 3,019 scf/hr 604 mscf/yr 25 gal/yr - Manual Application of Paints, Primer Touch up paint 100 gal/yr - Painting Tanks and Other Immovable Fixed Structures Spray Painting 100 - 16 oz Aerosol Cans/yr - Painting 2,000 lbs/hr - Sandblasting 400,000 lbs/yr - Sandblasting	MSS emissions are estimated using ideal gas law.	Tank forced ventilation emissions are captured by FL-1 and VRU-1 - VRU-2. Uncaptured MSS, MSS-TK and MSS-PB emissions are vented to the atmosphere.	Updated
Vessel Blowdown(s) (VSSL-BD)	VSSL-BD: 189 scf/hr, 37,867 scf/yr	VSSL-BD emissions are estimated using ideal gas law.	VSSL-BD emissions are uncontrolled.	New
VRU Compressor Blowdown(s) (VRU-BD)	VRU-BD: 173 scf/hr, 34,568 scf/yr	VRU-BD emissions are estimated using ideal gas law.	VRU-BD emissions are uncontrolled.	New

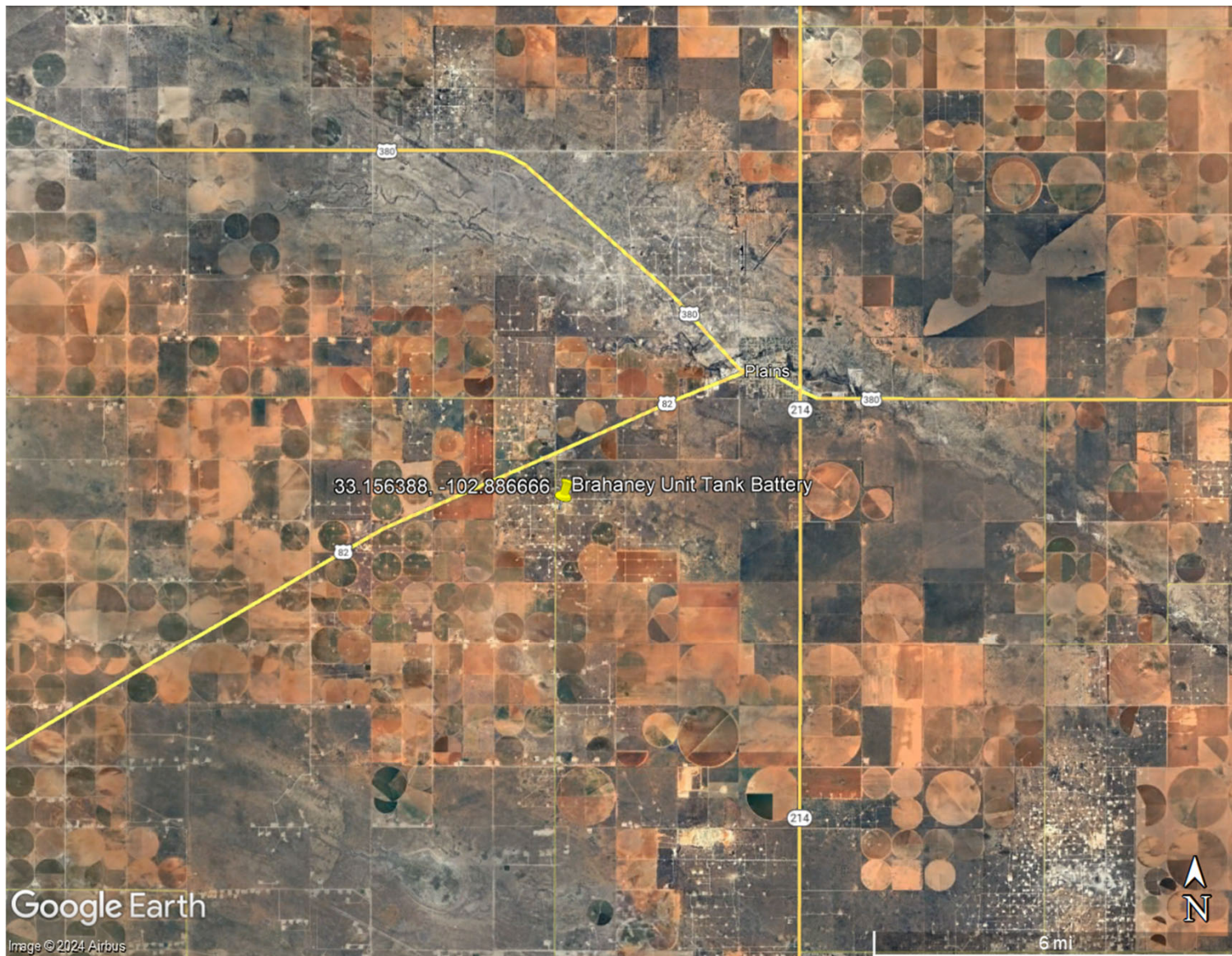
Apache Corporation (CN600126361)
Braham Unit Tank Battery (RN104925243)
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Section 3 – Process Flow Diagram



Apache Corporation (CN600126361)
Braham Unit Tank Battery (RN104925243)
November 2024

Section 4 – Area Map



Brahaney Unit Tank Battery

Prepared for: Apache Corporation

November 2024

Yoakum County, Texas



Apache Corporation (CN600126361)
Braham Unit Tank Battery (RN104925243)
November 2024

Section 5 – Emissions Calculations

Apache Corporation
Brahoney Unit Tank Battery
Emissions Summary

Proposed Maximum Air Pollutant Emission Rates																										
Emission Source	FIN	EPN	VOC ¹		NO _x		CO		PM _{2.5}		PM ₁₀		PM		SO ₂		H ₂ S		Benzene		Formaldehyde		HAP		CH ₄	
			lb/hr	TPY	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY
Fugitives	FUG	FUG	3.17	13.87	--	--	--	--	--	--	--	--	--	--	--	--	0.19	0.81	0.02	0.11	--	--	0.13	0.58	2.28	9.99
Four 750-bbl Produced Water Tanks Controlled by VRUs	WT-1 - WT-4	WT-1 - WT-4 / VRU-1 - VRU-2	0.14	0.42	--	--	--	--	--	--	--	--	--	--	--	--	0.27	0.81	0.05	0.11	--	--	0.08	0.19	0.08	0.31
Tank Forced Ventilation 2 Controlled by VRUs	WT-1 - WT-4	WT-1 - WT-4 / VRU-1 - VRU-2	0.23	0.02	--	--	--	--	--	--	--	--	--	--	--	--	0.71	0.06	0.11	0.01	--	--	0.20	0.01	0.05	0.01
One 3,000-bbl Emergency Overflow Water Tank	WT-5	WT-5	0.01	0.05	--	--	--	--	--	--	--	--	--	--	--	--	0.02	0.10	0.01	0.03	--	--	0.01	0.05	7.96E-04	4.43E-03
Three 500-bbl Crude Oil Tanks Controlled by Flare	TK-1 - TK-3	FL-1	0.79	1.25	0.18	0.32	0.35	0.64	--	--	--	--	--	--	2.80	5.99	0.03	0.06	0.02	0.03	--	--	0.09	0.11	0.03	0.09
One 500-bbl Produced Water Tank Controlled by Flare	WT-6	FL-1	0.01	1.51E-03	3.69E-03	4.44E-04	0.01	8.87E-04	--	--	--	--	--	--	1.89	0.25	0.02	2.63E-03	3.51E-03	8.09E-04	--	--	0.01	1.25E-03	2.86E-03	2.47E-04
Tank Forced Ventilation 1 Controlled by Flare	TK-1 - TK-3, WT-6	FL-1	1.69	0.16	0.90	0.10	1.79	0.20	--	--	--	--	--	--	6.55	0.79	0.07	0.01	0.04	2.79E-03	--	--	0.15	0.01	0.02	3.19E-03
Low Pressure Separator Off Gas Controlled by Flare	LPSep	FL-1	0.37	0.87	0.08	0.22	0.17	0.45	--	--	--	--	--	--	1.43	4.31	0.02	0.05	0.01	0.02	--	--	0.03	0.06	3.89E-03	0.02
Produced Gas (AOS, Sales line down)	PG	FL-1	7.64	7.41	3.54	3.43	7.07	6.86	--	--	--	--	--	--	86.44	83.82	0.92	0.89	0.07	0.07	--	--	0.32	0.31	4.67	4.53
Flare Pilot	FL-1	FL-1	0.03	0.13	0.01	0.06	0.03	0.12	--	--	--	--	--	--	0.33	1.43	3.48E-03	0.02	2.61E-04	1.14E-03	--	--	1.20E-03	0.01	0.02	0.08
Miscellaneous Tanks	TK-MISC	TK-MISC	1.65	0.01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1.65	0.01	--	--
Miscellaneous MSS Activities	MISC-MSS	MISC-MSS	0.03	0.13	--	--	--	--	--	--	--	--	--	--	--	--	7.65E-04	3.35E-03	2.55E-04	1.12E-03	--	--	1.07E-03	4.67E-03	5.84E-04	2.56E-03
Painting and Blasting	MSS-PB	MSS-PB	0.11	0.48	--	--	--	--	0.10	0.01	0.68	0.08	5.73	0.60	--	--	--	--	--	--	--	--	--	--	--	--
Vessel Blowdowns	VSSL-BD	VSSL-BD	4.62	0.46	--	--	--	--	--	--	--	--	--	--	--	--	0.42	0.04	0.03	3.17E-03	--	--	0.15	0.01	--	--
VRU Compressor Blowdowns	VRU-BD	VRU-BD	1.68	0.15	--	--	--	--	--	--	--	--	--	--	--	--	5.19	0.49	0.84	0.07	--	--	1.46	0.11	--	--
Tank Non-Forced Ventilation	MSS-TK	MSS-TK	4.91	0.23	--	--	--	--	--	--	--	--	--	--	--	--	0.20	0.01	0.07	3.05E-03	--	--	0.07	3.05E-03	--	--
TOTAL EMISSIONS:			27.09	25.66	4.72	4.14	9.42	8.26	0.10	0.01	0.68	0.08	5.73	0.60	99.44	96.59	8.05	3.36	1.27	0.45	--	--	4.34	1.48	7.15	15.03

Apache Corporation
Brahaney Unit Tank Battery
Site Information

Oil and Gas Site General Information

Administrative Information

Company Name	Apache Corporation
Site Name	Brahaney Unit Tank Battery
RN Number	RN104925243
Nearest City/Town	Plains, TX
Latitude/Longitude	33.156388, -102.886666
County	Yoakum

Technical Information

Natural Gas Site Throughput (MSCF/day):	500
Natural Gas Site Throughput (MSCF/year):	131,400
Oil Site Throughput (bbl/day):	670
Oil Site Throughput (bbl/year):	164,250
Water Site Throughput (bbl/day):	14,500
Water Site Throughput (bbl/year):	4,566,150
Are there any sour gas streams at this site?	Yes
Gas H ₂ S Concentration (ppmv)	24,834

Equipment/Process Types

How many for this project?

Fugitives	Yes
IC Engines	0
Turbines	0
Compressors	2
Diesel Engines	0
Heaters-Boilers	1
Separators	7
Oil / Condensate Tanks	3
Produced Water Tanks	6
Miscellaneous Tanks	1
Loading Jobs	2
Glycol Units	0
Amine Units	0
Vapor Recovery Units	2
Flares-Vapor Combustors	1
Thermal Oxidizers	0
Other	0

**APACHE CORPORATION
BRAHANEY UNIT TANK BATTERY
OPERATIONS SUMMARY**

Proposed facility Throughputs:	500	MSCFD (Gas Rate - Maximum)
	360	MSCFD (Gas Rate - Average)
	670	BOPD (Live Oil - Maximum)
	450	BOPD (Live Oil - Average)
	14,500	BWPD (Water Rate - Maximum)
	12,510	BWPD (Water Rate - Average)

Federal Regulations	Applicability	
NSPS 0000	N/A	Does not apply.
NSPS 0000a	Yes	Reference regulations summary.
NSPS 0000b	N/A	Does not apply.
NSPS JJJJ	N/A	Does not apply.
NESHAP ZZZZ	N/A	Does not apply.
MACT HH	N/A	Does not apply.

Apache Corporation
Brahaney Unit Tank Battery
Gas Analysis

					VOC Fugitive Calculations	
Component	Mol-Wt (lb/lb-mol)	Mole %	MW*mol%	Weight %	MW*mol%	Speciated Weight %
H2S	34.08	2.4834	0.846	3.0736%		
Nitrogen	28.01	3.5566	0.996	3.62%		
Methane	16.04	53.5925	8.596	31.22%	8.596	37.86%
CO2	44.01	6.7836	2.985	10.84%		
Ethane	30.07	16.1014	4.842	17.58%	4.842	21.32%
Propane	44.1	10.1549	4.478	16.26%	4.478	19.72%
i-Butane	58.12	1.3944	0.810	2.94%	0.810	3.57%
n-Butane	58.12	3.2979	1.917	6.96%	1.917	8.44%
i-Pentane	72.15	0.8161	0.589	2.14%	0.589	2.59%
n-Pentane	72.15	0.7936	0.573	2.08%	0.573	2.52%
iC6	86.18	0.4681	0.403	1.47%	0.403	1.78%
n-Hexane	86.18	0.1732	0.149	0.54%	0.149	0.66%
iC7	100.2	0.0000	0.000	0.00%	0.000	0.00%
n-Heptane	100.2	0.1270	0.127	0.46%	0.127	0.56%
Benzene	78.11	0.0814	0.064	0.23%	0.064	0.28%
Toluene	92.14	0.0307	0.028	0.10%	0.028	0.12%
2,2,4-Trimethylpentane	114.23	0.0341	0.039	0.14%	0.039	0.17%
nC8	114.23	0.0496	0.057	0.21%	0.057	0.25%
Ethylbenzene	106.17	0.0069	0.007	0.03%	0.007	0.03%
m-Xylene	106.17	0.0033	0.004	0.01%	0.004	0.02%
o-Xylene	106.17	0.0011	0.001	0.00%	0.001	0.01%
p-Xylene	106.17	0.0000	0.000	0.00%	0.000	0.00%
Nonane	128.26	0.0143	0.018	0.07%	0.018	0.08%
C10	142.29	0.0039	0.006	0.02%	0.006	0.02%
TOTAL	27.54	99.968	27.536	100.00%	22.708	40.82%

Wt% VOC	33.67%
Wt% HAP	1.06%
Sample Date	5/15/2023
Sample Location	Brahaney Unit Satellite 1
Sample Pressure (psig)	32.9
Sample Temperature(°F)	79.4
High Heating Value (Btu/scf):	1,364
Low Heating Value (Btu/scf):	1,244

SAMPLE ID		COLLECTION DATA	
Operator	Apache Corporation	Pressure	32.9 psig
Location	Brahanney Unit	Sample Temp	79.4 F
Site	Satellite 1	Atm Temp	74 F
Sample Point	Gas Leg of FWKO	Collection Date/Time	05/15/2023 3:05 PM
Spot/Comp	Spot	Collection By	Cody Carson
Meter ID		Base Pressure/Temp	14.650psi/60F
Fluid	Gas	Container(s)	PLS009
Sample Start		Sample Finish	

Onsite Testing by Stain Tube

METHOD	TYPE	MEAS VALUE	MOL%	GRAINS/100	PPMV
GPA2377	H2S	2.20 VOL%	2.4834	1,576.98	25,074.0

Mol%, Grains/100, PPMV are pressure and temperature corrected to base conditions.

GPA 2286 Gas Extended Fractional Analysis

COMPOUND	FORMULA	MOL%	WT%	GPM
NITROGEN	N2	3.5377	3.5999	0.3848
CARBON DIOXIDE	CO2	6.7836	10.8444	1.1447
OXYGEN	O2	0.0189	0.0220	0.0017
HYDROGEN SULFIDE	H2S	2.4834	3.0744	0.3319
METHANE	C1	53.5925	31.2301	8.9832
ETHANE	C2	16.1014	17.5866	4.2576
PROPANE	C3	10.1549	16.2656	2.7662
I-BUTANE	iC4	1.3944	2.9439	0.4512
N-BUTANE	nC4	3.2979	6.9627	1.0280
I-PENTANE	iC5	0.8161	2.1388	0.2951
N-PENTANE	nC5	0.7936	2.0798	0.2844
NEO-PENTANE	neC5	0.0000	0.0000	0.0000
BENZENE	C6H6	0.0814	0.2308	
N-HEXANE	C6H14	0.1732	0.5421	
OTHER HEXANES	C6Hx	0.4681	1.4551	0.3935
2,2,4-TRIMETHYLPENTANE	C7H14	0.0341	0.1214	
TOLUENE	C7H8	0.0307	0.1028	
OTHER HEPTANES	C7Hx	0.1270	0.4605	
ETHYLBENZENE	C8H10	0.0069	0.0267	
M+P XYLENE	C8H10	0.0033	0.0127	
O-XYLENE	C8H10	0.0011	0.0043	
OTHER OCTANES	C8Hx	0.0496	0.2045	
NONANES	C9Hx	0.0143	0.0655	
DECANES PLUS	C10+	0.0039	0.0207	

TOTALS:	100.0000	100.0000	20.3254
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Value of "0.0000" interpreted as below detectable limit. Oxygen includes argon if present.

Hydrocarbon Fractional Calculated Properties

H2O CONTENT	BTU/CF	SPECIFIC GR.	Z FACTOR	MOL WT	LB/SCF	WOBBE IDX
DRY	1,366.4	0.9555	0.9944	27.54	0.0727	1,397.9
SATURATED	1,344.0	0.9502	0.9940	27.05	0.0715	

Apache Corporation
Brahaney Unit Tank Battery
Liquid Analysis

					VOC Fugitive Calculations	
Component	Mol-Wt (lb/lb-mol)	Mole %	MW*mol%	Weight %	MW*mol%	Speciated Weight %
H2S	34.08	0.1722	0.059	0.03%		
Nitrogen	28.01	0.1771	0.050	0.02%		
Methane	16.04	0.5040	0.081	0.04%	0.081	0.04%
CO2	44.01	0.3601	0.158	0.08%		
Ethane	30.07	1.1385	0.342	0.17%	0.342	0.17%
Propane	44.1	2.6062	1.149	0.56%	1.149	0.56%
i-Butane	58.12	0.8443	0.491	0.24%	0.491	0.24%
n-Butane	58.12	2.4979	1.452	0.71%	1.452	0.71%
i-Pentane	72.15	2.1568	1.556	0.76%	1.556	0.76%
n-Pentane	72.15	2.6914	1.942	0.95%	1.942	0.95%
iC6	86.18	6.9345	5.976	2.93%	5.976	2.93%
n-Hexane	86.18	3.1653	2.728	1.34%	2.728	1.34%
iC7	100.2	0.0000	0.000	0.00%	0.000	0.00%
n-Heptane	100.2	6.0245	6.037	2.96%	6.037	2.96%
Benzene	78.11	2.9357	2.293	1.12%	2.293	1.13%
Toluene	92.14	4.0479	3.730	1.83%	3.730	1.83%
2,2,4-Trimethylpentane	114.23	2.4587	2.809	1.38%	2.809	1.38%
nC8	114.23	5.9733	6.823	3.35%	6.823	3.35%
Ethylbenzene	106.17	2.1391	2.271	1.11%	2.271	1.12%
m-Xylene	106.17	1.3745	1.459	0.72%	1.459	0.72%
o-Xylene	106.17	0.4956	0.526	0.26%	0.526	0.26%
p-Xylene	106.17	0.0000	0.000	0.00%	0.000	0.00%
Nonane	128.26	6.0023	7.699	3.78%	7.699	3.78%
C10	142.29	0.0000	0.000	0.00%	0.000	0.00%
C10+ Oil	340.5838	45.3001	154.285	75.66%	154.285	75.76%
TOTAL	203.91	100.000	203.915	100.00%	203.648	99.79%

Wt% VOC	99.66%
Wt% HAP	7.76%
Sample Date	6/15/2023
Sample Location	Brahaney Unit Satellite 1 - FWKO
Sample Pressure (psig)	35
Sample Temperature(°F)	100
Decanes Plus Molecular Weight (lb/lbmol)	340.5838
Decanes Plus Specific Gravity	0.8880

SAMPLE ID		COLLECTION DATA	
Operator	Apache Corporation	Pressure	35 psig
Location	Brahanney Unit	Sample Temp	100 F
Site	Satellite 1	Atm Temp	97 F
Sample Point	Oil Sight Glass on FWKO	Collection Date/Time	06/15/2023 3:08 PM
Spot/Comp	Spot	Collection By	Cody Carson
Meter ID		Base Pressure/Temp	14.650psi/60F
Fluid	Crude Oil	Container(s)	PLBTL250-002 , PLP17778
Sample Start	6/15/2023 2:58:00 PM	Sample Finish	6/15/2023 3:07:00 PM

GPA 2186 Crude Oil Fractional Analysis

COMPOUND	FORMULA	MOL%	VOL%	WT%
NITROGEN	N2	0.1771	0.0240	0.0246
CARBON DIOXIDE	CO2	0.3601	0.0757	0.0786
HYDROGEN SULFIDE	H2S	0.1722	0.0287	0.0291
METHANE	C1	0.5040	0.1052	0.0401
ETHANE	C2	1.1385	0.3749	0.1698
PROPANE	C3	2.6062	0.8841	0.5700
I-BUTANE	iC4	0.8443	0.3402	0.2434
N-BUTANE	nC4	2.4979	0.9696	0.7201
I-PENTANE	iC5	2.1568	0.9712	0.7718
N-PENTANE	nC5	2.6914	1.2013	0.9631
NEO-PENTANE	neC5	0.0000	0.0000	0.0000
BENZENE	C6H6	2.9357	1.0116	1.1373
N-HEXANE	C6H14	3.1653	1.6027	1.3529
OTHER HEXANES	C6Hx	6.9345	3.2421	2.9294
2,2,4-TRIMETHYLPENTANE	C7H14	2.4587	1.2169	1.1973
TOLUENE	C7H8	4.0479	1.6691	1.8498
OTHER HEPTANES	C7Hx	6.0245	3.2811	2.9716
ETHYLBENZENE	C8H10	2.1391	1.0166	1.1264
M+P XYLENE	C8H10	1.3745	0.6553	0.7238
O-XYLENE	C8H10	0.4956	0.2320	0.2610
OTHER OCTANES	C8Hx	5.9733	3.5835	3.3606
NONANES	C9Hx	6.0023	3.7795	3.7290
DECANES PLUS	C10+	45.3001	73.7347	75.7503
TOTALS:		100.0000	100.0000	100.0000

Value of "0.0000" interpreted as below detectable limit. UOP163 H2S value is used in fractional when applicable.

Hydrocarbon Fractional Calculated Properties

SAMPLE FRACTION	MOLECULAR WT	VP 100F, PSI	REL DEN (60/60)	API GRAVITY, 60F
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TOTAL SAMPLE	201.6590	16.0764	0.8463	35.7
C6+ ONLY	223.8065	1.0215	0.8589	33.24
C10+ ONLY	340.5838	0.0076	0.8880	27.85

Gravity/Density

METHOD	FLUID	REL DEN (60/60)	DEG API (60F)	CONTAINER	TEST DATE
ASTM D5002	Crude Oil	0.8576	33.5	PLBTL250-002	6/16/2023

Vapor Pressure - ASTM D6377

VPCR ₄ (100F)	RVPE	UNITS	CONTAINER	TEST DATE
16.66	15.24	psi	PLP17778	6/16/2023

RVPE - "Reid Vapor Pressure Equivalent" Calculation from Method, factor 0.915

H2S and Mercaptan in Crude Oil - UOP 163

ITEM	VALUE	UNITS
Hydrogen Sulfide	290.6	PPMW
Mercaptan Sulfur	995.9	PPMW

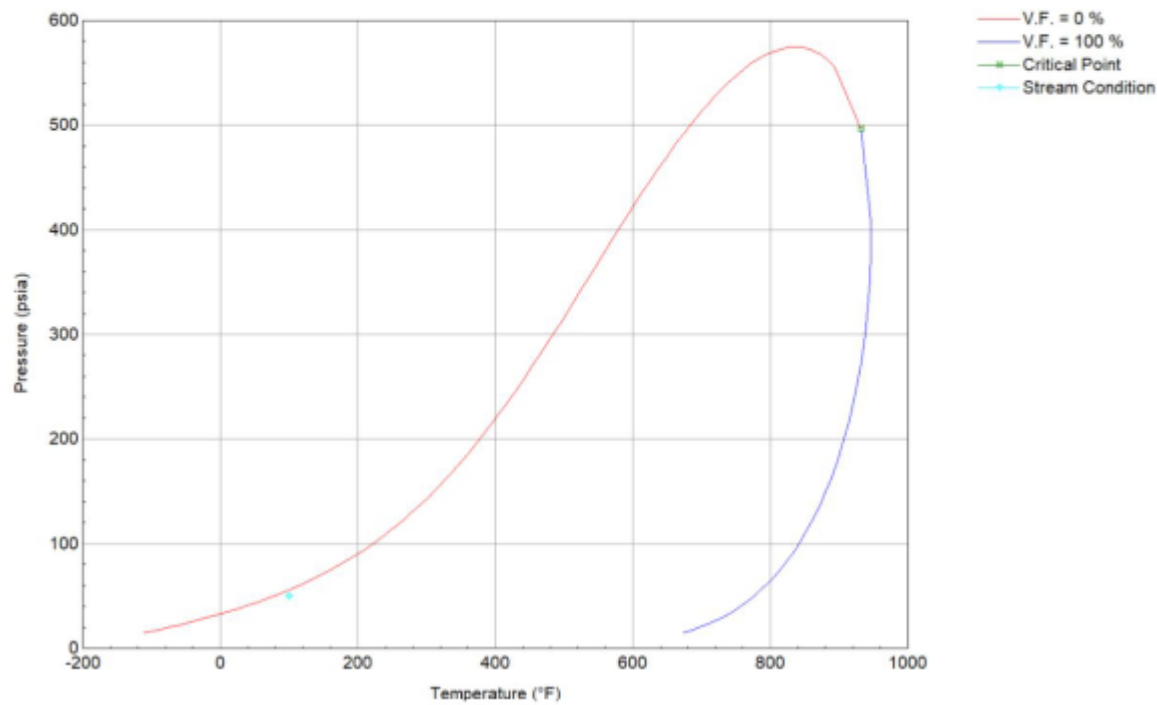
Test Date - 6/16/2023, Lead Acetate Paper Test - Positive

Equation of State Analysis and Phase Envelope

EOS MODEL	SAMPLE CONDITIONS	BUBBLE POINT PRESSURE	PRESSURE VARIANCE
Peng-Robinson	35.00 psig AT 100.00 F	41.50 PSIG At 100.00 F	-18.5700%

Brahanney Unit Sat 1 Oil from Sight Glass on FWKO
06/15/2023

Phase Envelope (PT)



Apache Corporation
Brahaney Unit Tank Battery
Fugitive Emissions

EPN: FUG

FIN: FUG

Background Information

Total fugitive component counts are based on equipment counts at the facility and default average component counts for major crude oil production equipment (40 CFR Part 98, Subpart W, Table W-1C) and major onshore natural gas production equipment (40 CFR Part 98, Subpart W, Table W-1B), effective 10/22/2015.

Component Count for Oil Production (Western US)

Major equipment	Valves	Flanges	Connectors	Open-ended lines	Other components
Wellhead	5	10	4	--	1
Separator	6	12	10	--	--
Meters/piping	--	--	--	--	--
Heater-treater	8	12	20	--	--
Header	5	10	4	--	--
In-line heaters	--	--	--	--	--
Dehydrators	--	--	--	--	--
Compressors	--	--	--	--	--

Component Count for Gas Production (Western US)

Major equipment	Valves	Flanges	Connectors	Open-ended lines	Other components
Wellhead	11	--	36	1	--
Separators	34	--	106	6	2
Meters/piping	14	--	51	1	1
Heater-treater	--	--	--	--	--
Header	--	--	--	--	--
In-line heaters	14	--	65	2	1
Dehydrators	24	--	90	2	2
Compressors	73	--	179	3	4

Facility Equipment Counts

Major equipment	Gas Production	Oil Production
Wellhead	7	7
Separator	7	7
Meters/piping	1	N/A
Heater-treater	N/A	1
Header	N/A	1
In-line heaters	--	N/A
Dehydrators	--	N/A
Compressors	2	N/A

Component Service	Component Counts - MRR Approach				
	Valve	Flanges	Connectors	Open-Ended Line	Other Components
Gas Service	475	--	1,403	56	23
Light Oil Service	90	176	122	--	7

Emissions Estimate

Liquid Equipment/Service	Oil and Gas Production Operations Average Emissions (Light Oil) ¹ (kg/hr/component)	Oil and Gas Production Operations Average Emissions (Gas) ¹ (kg/hr/component)	# Light Oil Components	# Gas Components	Reduction Factor ²	Light Oil Service Hourly Emissions ³ (lb/hr)	Gas Service Hourly Emissions ⁴ (lb/hr)
Valves	2.50E-03	4.50E-03	90	475	0.00%	0.50	4.71
Pump Seals	0.01	2.40E-03	--	--	0.00%	--	--
Flanges	1.10E-04	3.90E-04	176	--	0.00%	0.04	--
Open-Ended Lines	1.40E-03	2.00E-03	--	56	0.00%	--	0.25
Connectors	2.10E-04	2.00E-04	122	1,403	0.00%	0.06	0.62
Other	0.01	0.01	7	23	0.00%	0.12	0.45
Totals TOC						0.71	6.02

¹ Emission factors have been obtained from EPA document EPA-453/R-95-017; November, 1995, Table 2-4.

² No reduction from LDAR monitoring is being claimed.

³ Controlled Short-Term ER (lb/hr) = (100% - Reduction Factor) * Σ(Number of Components * Emissions Factor [kg/hr/component] * 2.20462 lb/kg).

⁴ Controlled Annual ER (tpy) = Controlled Short-Term ER (lb/hr) * 8,760 (hr/yr) / 2,000 (lb/ton).

Apache Corporation
Brahaney Unit Tank Battery
Fugitive Emissions

EPN: FUG

FIN: FUG

Background Information

Total fugitive component counts are based on equipment counts at the facility and default average component counts for major crude oil production equipment (40 CFR Part 98, Subpart W, Table W-1C) and major onshore natural gas production equipment (40 CFR Part 98, Subpart W, Table W-1B), effective 10/22/2015.

Speciated Fugitive Emissions

Component	Light Oil ¹ (lb/hr)	Light Oil ¹ (ton/year)	Gas ^{2,3} (lb/hr)	Gas ^{2,3} (ton/year)	Total (lb/hr)	Total (ton/year)
H2S	2.05E-04	8.96E-04	0.19	0.81	0.19	0.81
Nitrogen	1.73E-04	7.58E-04	0.22	0.95	0.22	0.96
Methane	2.82E-04	1.23E-03	2.28	9.99	2.28	9.99
CO2	5.53E-04	2.42E-03	0.65	2.86	0.65	2.86
Ethane	1.19E-03	0.01	1.28	5.63	1.286	5.63
Propane	4.01E-03	0.02	1.19	5.20	1.192	5.22
i-Butane	1.71E-03	0.01	0.21	0.94	2.17E-01	0.95
n-Butane	0.01	0.02	0.51	2.23	0.51	2.25
i-Pentane	0.01	0.02	0.16	0.68	1.62E-01	0.71
n-Pentane	0.01	0.03	0.15	0.67	1.59E-01	0.69
iC6	0.02	0.09	0.11	0.47	0.13	0.56
n-Hexane	0.01	0.04	0.04	0.17	0.05	0.22
iC7	--	--	--	--	--	--
n-Heptane	0.02	0.09	0.03	0.15	0.05	0.24
Benzene	0.01	0.04	0.02	0.07	0.02	0.11
Toluene	0.01	0.06	0.01	0.03	0.02	0.09
2,2,4-Trimethylpentane	0.01	0.04	0.01	0.05	0.02	0.09
nC8	0.02	0.10	0.02	0.07	0.04	0.17
Ethylbenzene	0.01	0.03	1.94E-03	0.01	0.01	0.04
m-Xylene	0.01	0.02	9.29E-04	4.07E-03	0.01	0.03
o-Xylene	1.83E-03	0.01	3.10E-04	1.36E-03	2.14E-03	0.01
p-Xylene	--	--	--	--	--	--
Nonane	0.03	0.12	4.87E-03	0.02	0.03	0.14
C10	--	--	1.47E-03	0.01	1.47E-03	0.01
C10+ Oil	0.54	2.36	--	--	0.54	2.36
Total	0.71	3.11	7.08	31.01	7.79	34.13
Total CO₂	5.53E-04	2.42E-03	0.65	2.86	0.65	2.86
Total Methane	2.82E-04	1.23E-03	2.28	9.99	2.28	9.99
Total CO₂e	0.01	0.03	57.66	252.57	57.67	252.60
Total TOC	0.71	3.11	6.02	26.39	6.74	29.50
Percent VOC in TOC	99.66%	99.66%	40.82%	40.82%	47.03%	47.03%
VOC	0.709	3.10	2.46	10.77	3.17	13.87
Total HAP	0.055	0.242	0.077	0.34	0.133	0.58

¹ Light Oil Speciated Fugitive Emissions Composition obtained from liquid analysis.

² Gas Speciated Fugitive Emissions Composition obtained from gas analysis.

³ Benzene and VOC emissions calculated in accordance with TCEQ as follows:

Benzene emissions (lb/hr) = Gas Service Hourly Emissions (lb/hr) x Benzene wt% in total sample / TOC wt% in total sample

VOC emissions (lb/hr) = Gas Service Hourly Emissions (lb/hr) x VOC wt% in total sample / TOC wt% in total sample

Apache Corporation
Brahane Unit Tank Battery
Crude Oil Tanks

EPN: FL-1

FINs: TK-1 - TK-3

Identification - Vertical Fixed Roof Tank		
	Tank ID	TK-1 - TK-3
	Maximum Daily Throughput (bbl/day) ⁴	223.3
	Annual Throughput (bbl/yr)	54,750
Tank Dimensions		
	Shell Height (ft)	16.0
	Diameter (ft)	15.5
	Volume (gal)	21,000
	Turnovers ¹	113.12
	Net Throughput (gal/yr)	2,299,500
Other Inputs		
	Shell/Roof Color/Shade ²	Tan/Tan
	Shell/Roof Paint Condition	Good/Good
	Meteorological Data	Midland, TX
Tank Contents		
	Stabilized Oil RVP ³	6.69
	Tank Controlled?	Yes
	Control Strategy	Combustion Control Only
	Control Device EPN	FL-1
	VRU Annual Operating hours	8,760

¹ Turnovers calculated using equation 1-30 of AP-42, Chapter 7, assuming a maximum fill height of 90% of the tank shell height.

² Paint color from ProMax options used to simulate paint color observed in the field.

³ Reid Vapor Pressure from ProMax.

⁴ Throughput represented on a per tank basis

Uncontrolled Speciated Crude Oil Tanks Emissions (EPN: FL-1)

Component	Hourly Emissions, lb/hr				Annual Emissions, TPY			
	Working	Breathing	Flash	Total	Working	Breathing	Flash	Total
H2S	0.32	0.06	1.11	1.49	0.63	0.19	2.37	3.19
Nitrogen	0.03	0.01	1.93	1.96	0.09	0.03	5.56	5.67
Methane	0.15	0.03	2.94	3.12	0.48	0.14	8.23	8.86
CO2	0.97	0.21	5.07	6.24	2.45	0.74	13.25	16.44
Ethane	2.72	0.53	8.11	11.36	5.99	1.80	18.73	26.53
Propane	4.08	0.77	13.63	18.48	7.31	2.20	25.81	35.32
i-Butane	0.79	0.15	2.84	3.77	1.25	0.37	4.74	6.36
n-Butane	1.68	0.31	6.14	8.14	2.56	0.77	9.88	13.20
i-Pentane	0.78	0.14	2.85	3.77	1.07	0.32	4.22	5.61
n-Pentane	0.75	0.13	2.74	3.61	0.99	0.30	3.95	5.24
iC6	1.01	0.18	3.76	4.95	1.24	0.37	5.15	6.76
n-Hexane	0.34	0.06	1.23	1.63	0.40	0.12	1.63	2.15
iC7	--	--	--	--	--	--	--	--
n-Heptane	0.24	0.04	1.01	1.30	0.26	0.08	1.26	1.60
Benzene	0.18	0.03	1.02	1.24	0.21	0.06	1.38	1.65
Toluene	0.10	0.02	0.46	0.57	0.10	0.03	0.57	0.70
2,2,4-Trimethylpentane	0.12	0.02	0.50	0.64	0.13	0.04	0.63	0.80
nC8	0.09	0.01	0.38	0.48	0.08	0.02	0.44	0.54
Ethylbenzene	0.02	3.41E-03	0.09	0.11	0.02	0.01	0.10	0.13
m-Xylene	0.01	1.92E-03	0.05	0.07	0.01	3.32E-03	0.06	0.07
o-Xylene	3.42E-03	5.57E-04	0.02	0.02	3.15E-03	9.48E-04	0.02	0.02
p-Xylene	--	--	--	--	--	--	--	--
Nonane	0.03	4.22E-03	0.14	0.17	0.02	0.01	0.15	0.19
C10	--	--	--	--	--	--	--	--
Water	--	--	--	--	--	--	--	--
C10+ Oil	1.62E-07	1.76E-08	7.13E-07	8.92E-07	3.68E-08	1.11E-08	2.95E-07	3.42E-07
Total	14.40	2.71	56.01	73.13	25.30	7.62	108.11	141.03
Total CO₂	0.97	0.21	5.07	6.24	2.45	0.74	13.25	16.44
Total Methane	0.15	0.03	2.94	3.12	0.48	0.14	8.23	8.86
Total CO₂e	4.66	0.99	78.67	84.33	14.48	4.36	219.06	237.90
VOC	10.21	1.88	36.86	48.95	15.66	4.71	59.97	80.35
Total HAP	0.77	0.13	3.37	4.28	0.88	0.26	4.38	5.53

Apache Corporation
Brahaney Unit Tank Battery
Produced Water Tanks

EPN: VRU-1 - VRU-2

FINs: WT-1 - WT-4

Identification - Vertical Fixed Roof Tank		
	Tank ID	WT-1 - WT-4
	Maximum Daily Throughput (bbl/day) ³	3,500.0
	Annual Throughput (bbl/yr)	1,140,625
Tank Dimensions		
	Shell Height (ft)	24.0
	Diameter (ft)	15.5
	Volume (gal)	31,500
	Turnovers ¹	1,571.12
	Net Throughput (gal/yr)	47,906,250
Other Inputs		
	Shell/Roof Color/Shade ²	Tan/Tan
	Shell/Roof Paint Condition	Good/Good
	Meteorological Data	Midland, TX
Tank Contents		
	Water Weight %	16.70
	Tank Controlled?	Yes
	Control Strategy	VRU Only
	Control Device EPN	VRU-1 - VRU-2
	VRU Capture Efficiency %	99%
	VRU Annual Downtime %	0%
	VRU Annual Operating hours	8,760

¹ Turnovers calculated using equation 1-30 of AP-42, Chapter 7, assuming a maximum fill height of 90% of the tank shell height.

² Paint color from ProMax options used to simulate paint color observed in the field.

³ Throughput represented on a per tank basis

Uncontrolled Speciated Produced Water Tanks Emissions (EPN: VRU-1 - VRU-2)

Component	Hourly Emissions, lb/hr				Annual Emissions, TPY			
	Working	Breathing	Flash	Total	Working	Breathing	Flash	Total
H2S	23.08	0.28	3.19	26.56	71.09	1.05	8.68	80.82
Nitrogen	0.05	5.85E-04	0.43	0.47	0.23	3.32E-03	1.61	1.84
Methane	1.41	0.02	6.48	7.91	6.86	0.10	23.88	30.85
CO2	29.76	0.38	7.47	37.61	122.63	1.81	21.23	145.67
Ethane	1.32	0.02	4.44	5.78	6.73	0.10	15.72	22.54
Propane	0.62	0.01	2.99	3.62	3.26	0.05	10.79	14.11
i-Butane	0.04	5.56E-04	0.33	0.38	0.26	3.77E-03	1.21	1.47
n-Butane	0.20	2.62E-03	1.06	1.26	1.07	0.02	3.84	4.93
i-Pentane	0.03	4.02E-04	0.25	0.28	0.18	2.65E-03	0.91	1.10
n-Pentane	0.01	9.53E-05	0.12	0.13	0.04	5.53E-04	0.48	0.51
iC6	0.01	1.80E-04	0.19	0.20	0.08	1.13E-03	0.71	0.79
n-Hexane	1.31E-03	1.70E-05	0.03	0.04	0.01	1.04E-04	0.13	0.14
iC7	--	--	--	--	--	--	--	--
n-Heptane	5.22E-04	6.75E-06	0.02	0.02	3.02E-03	4.46E-05	0.08	0.08
Benzene	4.03	0.05	0.56	4.63	9.43	0.14	1.25	10.82
Toluene	2.20	0.02	0.30	2.53	5.28	0.08	0.70	6.05
2,2,4-Trimethylpentane	3.29E-04	4.25E-06	0.01	0.01	2.58E-03	3.80E-05	0.04	0.04
nC8	4.33E-05	5.60E-07	3.57E-03	3.61E-03	2.35E-04	3.46E-06	0.01	0.01
Ethylbenzene	0.45	4.98E-03	0.06	0.52	0.98	0.01	0.13	1.13
m-Xylene	0.26	2.96E-03	0.04	0.30	0.64	0.01	0.08	0.74
o-Xylene	0.09	9.57E-04	0.01	0.10	0.19	2.80E-03	0.03	0.22
p-Xylene	--	--	--	--	--	--	--	--
Nonane	9.67E-06	1.25E-07	1.02E-03	1.03E-03	6.79E-05	1.00E-06	3.95E-03	4.02E-03
C10	3.67E-10	4.74E-12	1.22E-07	1.23E-07	2.41E-09	3.56E-11	4.77E-07	4.80E-07
Water	8.49	0.09	1.17	9.75	13.92	0.21	2.03	16.16
C10+ Oil	2.71E-08	3.51E-10	1.10E-07	1.37E-07	2.29E-07	3.38E-09	3.03E-07	5.35E-07
Total	72.07	0.88	29.16	102.11	242.87	3.58	93.57	340.02
Total CO₂	29.76	0.38	7.47	37.61	122.63	1.81	21.23	145.67
Total Methane	1.41	0.02	6.48	7.91	6.86	0.10	23.88	30.85
Total CO₂e	65.03	0.84	169.38	235.25	294.19	4.34	618.30	916.83
VOC	7.96	0.09	5.98	14.03	21.42	0.32	20.41	42.14
Total HAP	7.04	0.08	1.02	8.13	16.54	0.24	2.36	19.14

Apache Corporation
Brahaney Unit Tank Battery
Emergency Overflow Water Tank

EPN: WT-5

FIN: WT-5

Identification - Vertical Fixed Roof Tank		
	Tank ID	WT-5
Tank Dimensions		
	Shell Height (ft)	12.0
	Diameter (ft)	42.0
	Volume (gal)	126,000
Other Inputs		
	Shell/Roof Color/Shade ¹	Tan/Tan
	Shell/Roof Paint Condition	Good/Good
	Meteorological Data	Midland, TX
Tank Contents		
	Water Weight %	5.73
	Tank Controlled?	No

¹ Paint color from ProMax options used to simulate paint color observed in the field.

Uncontrolled Speciated Emergency Overflow Water Tank Emissions (EPN: WT-5)

Component	Hourly Emissions, lb/hr		Annual Emissions, TPY	
	Breathing	Total	Breathing	Total
H2S	0.02	0.02	0.10	0.10
Nitrogen	2.55E-05	2.55E-05	1.45E-04	1.45E-04
Methane	7.96E-04	7.96E-04	4.43E-03	4.43E-03
CO2	0.02	0.02	0.08	0.08
Ethane	7.44E-04	7.44E-04	4.34E-03	4.34E-03
Propane	3.48E-04	3.48E-04	2.10E-03	2.10E-03
i-Butane	2.40E-05	2.40E-05	1.64E-04	1.64E-04
n-Butane	1.14E-04	1.14E-04	6.87E-04	6.87E-04
i-Pentane	1.74E-05	1.74E-05	1.15E-04	1.15E-04
n-Pentane	4.15E-06	4.15E-06	2.42E-05	2.42E-05
iC6	7.80E-06	7.80E-06	4.93E-05	4.93E-05
n-Hexane	7.38E-07	7.38E-07	4.54E-06	4.54E-06
iC7	--	--	--	--
n-Heptane	2.92E-07	2.92E-07	1.94E-06	1.94E-06
Benzene	0.01	0.01	0.03	0.03
Toluene	2.95E-03	2.95E-03	0.01	0.01
2,2,4-Trimethylpentane	1.81E-07	1.81E-07	1.64E-06	1.64E-06
nC8	2.43E-08	2.43E-08	1.51E-07	1.51E-07
Ethylbenzene	5.04E-04	5.04E-04	2.28E-03	2.28E-03
m-Xylene	2.04E-04	2.04E-04	9.30E-04	9.30E-04
o-Xylene	1.45E-04	1.45E-04	6.51E-04	6.51E-04
p-Xylene	--	--	--	--
Nonane	5.35E-09	5.35E-09	4.33E-08	4.33E-08
C10	2.04E-13	2.04E-13	1.54E-12	1.54E-12
Water	0.15	0.15	0.35	0.35
C10+ Oil	1.47E-11	1.47E-11	1.46E-10	1.46E-10
Total	0.20	0.20	0.59	0.59
Total CO₂	0.02	0.02	0.08	0.08
Total Methane	7.96E-04	7.96E-04	4.43E-03	4.43E-03
Total CO₂e	0.04	0.04	0.19	0.19
VOC	0.01	0.01	0.05	0.05
Total HAP	0.01	0.01	0.05	0.05

¹ Only breathing emissions are reported for WT-5, as the tank is only used during emergency situations.

Apache Corporation
Brahaney Unit Tank Battery
Produced Water Tank

EPN: FL-1

FIN: WT-6

Identification - Vertical Fixed Roof Tank		
	Tank ID	WT-6
	Maximum Daily Throughput (bbl/day) ³	500.0
	Annual Throughput (bbl/yr)	3,650
Tank Dimensions		
	Shell Height (ft)	16.0
	Diameter (ft)	15.5
	Volume (gal)	21,000
	Turnovers ¹	7.54
	Net Throughput (gal/yr)	153,300
Other Inputs		
	Shell/Roof Color/Shade ²	Tan/Tan
	Shell/Roof Paint Condition	Good/Good
	Meteorological Data	Midland, TX
Tank Contents		
	Water Weight %	59.41
	Tank Controlled?	Yes
	Control Strategy	Combustion Control Only
	Control Device EPN	FL-1

¹ Turnovers calculated using equation 1-30 of AP-42, Chapter 7, assuming a maximum fill height of 90% of the tank shell height.

² Paint color from ProMax options used to simulate paint color observed in the field.

³ Throughput represented on a per tank basis

Uncontrolled Speciated Produced Water Tank Emissions (EPN: FL-1)

Component	Hourly Emissions, lb/hr				Annual Emissions, TPY			
	Working	Breathing	Flash	Total	Working	Breathing	Flash	Total
H2S	0.83	0.07	0.11	1.01	0.02	0.10	0.01	0.13
Nitrogen	1.61E-03	1.29E-04	0.02	0.02	3.41E-05	1.49E-04	1.29E-03	1.47E-03
Methane	0.05	4.01E-03	0.23	0.29	1.04E-03	4.53E-03	0.02	0.02
CO2	1.06	0.08	0.27	1.41	0.02	0.08	0.02	0.12
Ethane	0.05	3.76E-03	0.16	0.21	1.02E-03	4.44E-03	0.01	0.02
Propane	0.02	1.76E-03	0.11	0.13	4.93E-04	2.15E-03	0.01	0.01
i-Butane	1.52E-03	1.22E-04	0.01	0.01	3.86E-05	1.68E-04	9.73E-04	1.18E-03
n-Butane	0.01	5.76E-04	0.04	0.05	1.61E-04	7.03E-04	3.08E-03	3.94E-03
i-Pentane	1.10E-03	8.83E-05	0.01	0.01	2.71E-05	1.18E-04	7.33E-04	8.78E-04
n-Pentane	2.62E-04	2.10E-05	4.44E-03	4.72E-03	5.67E-06	2.47E-05	3.81E-04	4.12E-04
iC6	4.94E-04	3.95E-05	0.01	0.01	1.16E-05	5.05E-05	5.67E-04	6.29E-04
n-Hexane	4.67E-05	3.74E-06	1.22E-03	1.27E-03	1.06E-06	4.64E-06	1.05E-04	1.11E-04
iC7	--	--	--	--	--	--	--	--
n-Heptane	1.85E-05	1.48E-06	7.06E-04	7.26E-04	4.56E-07	1.99E-06	6.10E-05	6.35E-05
Benzene	0.14	0.01	0.02	0.18	0.01	0.03	1.01E-03	0.04
Toluene	0.08	0.01	0.01	0.10	3.09E-03	0.01	5.60E-04	0.02
2,2,4-Trimethylpentane	1.16E-05	9.30E-07	3.80E-04	3.92E-04	3.88E-07	1.69E-06	3.22E-05	3.43E-05
nC8	1.54E-06	1.23E-07	1.27E-04	1.29E-04	3.54E-08	1.55E-07	1.11E-05	1.13E-05
Ethylbenzene	0.02	1.19E-03	2.26E-03	0.02	5.31E-04	2.32E-03	1.08E-04	2.96E-03
m-Xylene	0.01	7.04E-04	1.29E-03	0.01	2.17E-04	9.46E-04	6.80E-05	1.23E-03
o-Xylene	3.11E-03	2.28E-04	4.32E-04	3.77E-03	1.52E-04	6.61E-04	2.07E-05	8.33E-04
p-Xylene	--	--	--	--	--	--	--	--
Nonane	3.42E-07	2.74E-08	3.64E-05	3.68E-05	1.02E-08	4.47E-08	3.16E-06	3.22E-06
C10	1.30E-11	1.04E-12	4.37E-09	4.38E-09	3.64E-13	1.59E-12	3.82E-10	3.84E-10
Water	0.31	0.02	0.04	0.37	0.01	0.05	1.64E-03	0.06
C10+ Oil	9.56E-10	7.64E-11	3.93E-09	4.96E-09	3.45E-11	1.51E-10	2.43E-10	4.28E-10
Total	2.58	0.20	1.04	3.82	0.07	0.29	0.07	0.44
Total CO₂	1.06	0.08	0.27	1.41	0.02	0.08	0.02	0.12
Total Methane	0.05	4.01E-03	0.23	0.29	1.04E-03	4.53E-03	0.02	0.02
Total CO₂e	2.32	0.19	6.06	8.56	0.04	0.19	0.50	0.73
VOC	0.29	0.02	0.21	0.52	0.01	0.05	0.02	0.08
Total HAP	0.25	0.02	0.04	0.31	0.01	0.05	1.90E-03	0.06

Apache Corporation
 Brahaney Unit Tank Battery
 Miscellaneous Tanks

EPN: TK-MISC
 FIN: TK-MISC

Identification - Horizontal Cylinder		
	Tank ID	TK-MISC
	Throughput (gal/hr)	500.0
	Throughput (gal/yr)	6,000
	Number of Tanks	1
Tank Dimensions		
	Shell Height (ft)	5.50
	Diameter (ft)	4.00
	Volume (gal)	500.00
	Turnovers ¹	12.89
	Net Throughput (gal/yr)	6,000
Other Inputs		
	Shell Color/Shade ²	Light Grey
	Shell Paint Condition	Average
	Meteorological Data	Midland, TX

1 Turnovers calculated using equation 1-30 of AP-42, Chapter 7, assuming a maximum fill height of 90% of the tank shell height.

2 Paint color from ProMax options used to simulate paint color observed in the field.

Component	Hourly Emissions, lb/hr			Annual Emissions, TPY		
	Working	Breathing	Total	Working	Breathing	Total
Methanol	1.65	0.01	1.65	4.38E-03	0.01	0.01
VOC	1.65	0.01	1.65	4.38E-03	0.01	0.01
Total HAP	1.65	0.01	1.65	4.38E-03	0.01	0.01

Apache Corporation
Brahaney Unit Tank Battery
Vapor Recovery Unit - Hourly

Capture Efficiency	99%
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EPN: VRU-1 - VRU-2
FIN(s): WT-1 - WT-4

Controlled Emissions ^{1,2}		
Component	WT-1 - WT-4	Tank Forced Ventilation 2
	(lb/hr)	(lb/hr)
H2S	0.27	0.71
Nitrogen	4.72E-03	1.47E-03
Methane	0.08	0.05
CO2	0.38	0.97
Ethane	0.06	0.04
Propane	0.04	0.02
i-Butane	3.77E-03	1.40E-03
n-Butane	0.01	0.01
i-Pentane	2.81E-03	1.01E-03
n-Pentane	1.32E-03	2.40E-04
iC6	2.01E-03	4.53E-04
n-Hexane	3.54E-04	4.28E-05
iC7	--	--
n-Heptane	2.03E-04	1.70E-05
Benzene	0.05	1.14E-01
Toluene	0.03	0.06
2,2,4-Trimethylpentane	1.10E-04	1.07E-05
nC8	3.61E-05	1.41E-06
Ethylbenzene	0.01	0.01
m-Xylene	2.99E-03	0.01
o-Xylene	9.96E-04	2.41E-03
p-Xylene	--	--
Nonane	1.03E-05	3.15E-07
C10	1.23E-09	1.19E-11
C10+ Oil	1.37E-09	8.83E-10
Total	0.92	2.00
Total VOC	0.14	0.23
Total HAP	0.08	0.20

¹ Feed stream properties determined via ProMax process simulator.

² Emissions are based on process simulation.

Apache Corporation
Brahaney Unit Tank Battery
Vapor Recovery Unit - Annual

Capture Efficiency	99%
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EPN: VRU-1 - VRU-2
FIN(s): WT-1 - WT-4

Controlled Emissions ^{1,2}		
Component	WT-1 - WT-4	Tank Forced Ventilation 2
	TPY	TPY
H2S	0.81	0.06
Nitrogen	0.02	2.02E-04
Methane	0.31	0.01
CO2	1.46	0.11
Ethane	0.23	0.01
Propane	0.14	2.92E-03
i-Butane	0.01	2.29E-04
n-Butane	0.05	9.55E-04
i-Pentane	0.01	1.61E-04
n-Pentane	0.01	3.36E-05
iC6	0.01	6.86E-05
n-Hexane	1.38E-03	6.31E-06
iC7	--	--
n-Heptane	7.93E-04	2.71E-06
Benzene	0.11	0.01
Toluene	0.06	4.72E-03
2,2,4-Trimethylpentane	4.29E-04	2.31E-06
nC8	1.41E-04	2.10E-07
Ethylbenzene	0.01	8.80E-04
m-Xylene	0.01	5.77E-04
o-Xylene	2.18E-03	1.70E-04
p-Xylene	--	--
Nonane	4.02E-05	6.08E-08
C10	4.80E-09	2.16E-12
C10+ Oil	5.35E-09	2.05E-10
Total	3.24	0.20
Total VOC	0.42	0.02
Total HAP	0.19	0.01

¹ Feed stream properties determined via ProMax process simulator.

² VRU can be down 0% or 0 hours/year. This calculation sheet shows emissions based on uptime of 8760 hrs/year.

Apache Corporation
Brahaney Unit Tank Battery
Flare - Hourly

EPN: FL-1
FIN(s): TK-1 - TK-3, WT-6, LPSep, PG

Sales gas

20,625 scf/hr

495 mscfd

Feed Rates and Composition ^{1,2}								DRE%	Controlled Emissions ⁴	Criteria Pollutant Emissions ⁵	
Component	Pilot/Purge	TK-1 - TK-3	WT-6	Tank Forced Ventilation 1	LPSep	PG	Total ³				
	(lb/hr)	(lb/hr)	(lb/hr)	(lb/hr)	(lb/hr)	(lb/hr)	(lb/hr)	(%)	(lb/hr)		
H2S	0.17	1.49	1.01	3.49	0.76	45.98	52.90	98%	1.06	NO _x factor:	0.1380 lb/MMBtu
Nitrogen	0.20	1.96	0.02	0.32	0.07	54.13	56.70	0%	56.70		
Methane	1.77	3.12	0.29	1.78	0.39	467.06	474.41	99%	4.74		
CO2	0.61	6.24	1.41	11.65	2.54	162.21	184.67	0%	184.67		
Ethane	0.99	11.36	0.21	29.72	6.48	263.07	311.83	99%	3.12		
Propane	0.92	18.48	0.13	43.85	9.56	243.32	316.27	99%	3.16		
i-Butane	0.17	3.77	0.01	8.35	1.82	44.03	58.16	98%	1.16	NO _x emissions:	4.72 lb/hr
n-Butane	0.39	8.14	0.05	17.70	3.86	104.14	134.28	98%	2.69		
i-Pentane	0.12	3.77	0.01	8.01	1.75	31.99	45.65	98%	0.91		
n-Pentane	0.12	3.61	4.72E-03	7.60	1.66	31.11	44.11	98%	0.88		
iC6	0.08	4.95	0.01	10.11	2.21	21.92	39.28	98%	0.79		
n-Hexane	0.03	1.63	1.27E-03	3.36	0.73	8.11	13.86	98%	0.28	GHG Pollutant Emissions ^{6,7,8}	
iC7	--	--	--	--	--	--	--	98%	--		
n-Heptane	0.03	1.30	7.26E-04	2.35	0.51	6.91	11.10	98%	0.22		
Benzene	0.01	1.24	0.18	1.81	0.39	3.45	7.08	98%	0.14	GHG CO ₂ Factor:	116.98 lb/MMBTU
Toluene	0.01	0.57	0.10	0.91	0.20	1.54	3.32	98%	0.07		
2,2,4-Trimethylpentane	0.01	0.64	3.92E-04	1.17	0.25	2.12	4.18	98%	0.08		
nC8	0.01	0.48	1.29E-04	0.79	0.17	3.08	4.53	98%	0.09		
Ethylbenzene	1.51E-03	0.11	0.02	0.19	0.04	0.40	0.77	98%	0.02	GWP CO ₂ Equivalent:	1
m-Xylene	7.20E-04	0.07	0.01	0.11	0.02	0.19	0.40	98%	0.01	GWP CH ₄ Equivalent:	25
o-Xylene	2.40E-04	0.02	3.77E-03	0.03	0.01	0.06	0.13	98%	2.54E-03	GWP N ₂ O Equivalent:	298
p-Xylene	--	--	--	--	--	--	--	98%	--		
Nonane	3.77E-03	0.17	3.68E-05	0.24	0.05	1.00	1.47	98%	0.03	CO ₂ emissions:	4,183.41 lb/hr
C10	1.14E-03	--	4.38E-09	--	--	0.30	0.30	98%	0.01	CH ₄ emissions:	4.74 lb/hr
C10+ Oil	--	8.92E-07	4.96E-09	9.94E-07	2.17E-07	--	2.11E-06	98%	4.22E-08	N ₂ O emissions:	0.01 lb/hr
Total	5.66	73.13	3.46	153.54	33.49	1,496.13	1,765.40	--	260.83	CO ₂ e emissions:	4,304.26 lb/hr
Total VOC	1.90	48.95	0.52	106.58	23.25	503.68	684.89	--	10.54		
Total HAP	0.06	4.28	0.31	7.58	1.65	15.87	29.75	--	0.59		
LHV of Stream (Btu/scf)	1,244.36	2,013.28	610.26	2,156.39	2,156.39	1,244.36	1,384.96				
Molecular Weight	27.54	43.32	33.27	45.53	45.53	27.54	30.36				
SO ₂ emissions (lb/hr) ⁹	0.33	2.80	1.89	6.55	1.43	86.44	99.44				
Volumetric Flow (scf/hr)	78.0	637.28	43.84	3,019.07	279.17	20,625	24,682.4				
Heat Release (MMBtu/hr)	0.097	1.28	0.03	6.51	0.60	25.66	34.18				

¹ If applicable, purge gas and pilot fuel share the same source.

² Emissions are based on process simulation. Low Pressure Separator Off Gas (LPSep) is based on 1 mcf/100 bbl oil rate.

³ Pre-Controlled Emissions

⁴ Exhaust (lb/hr) = Total Uncontrolled Emissions (lb/hr) x (100 - DRE (%)).

⁵ CO and NO_x emission factors are based on flare type and heat input from TCEQ Air Permit Technical Guidance for Chemical Sources: Flares and Vapor Oxidizers, October 2000 RG-109 (Draft).

⁶ Emissions Factors from 40 CFR 98 Subpart C, Table C-1 and C-2. Emission Factor (lb/MMBtu) = Emission factor (kg/MMBtu) * (2.20462 lb/kg)

⁷ Global Warming Potentials from Table A-1 of Subpart A of Part 98 for Mandatory Greenhouse Gas Reporting.

⁸ 40 CFR 98.233 (Subpart W), Equation W-40. Mass N₂O = 0.001 x scf x HHV x EF

⁹ SO₂ emissions are based on 100% conversion of H₂S.

Sample Calculations

NO_x or CO Emissions (lb/hr) = lb/MMBtu x MMBtu/hr

VOC and HAP Emissions (lb/hr) = uncontrolled lb/hr x (100% - DRE)

H₂S Emissions (lb/hr) = Uncontrolled Emissions (lb/hr) x 2%

SO₂ Emissions (lb/hr) = Uncontrolled H₂S Emissions (lb/hr) x MW SO₂/MW H₂S

Apache Corporation
Brahaney Unit Tank Battery
Flare - Annual

EPN: FL-1
FIN(s): TK-1 - TK-3, WT-6, LPSep, PG

Sales gas

40 mmscf/yr

Feed Rates and Composition ^{1,2}								DRE%	Controlled Emissions ⁴	Criteria Pollutant Emissions ⁵	
Component	Pilot/Purge	TK-1 - TK-3	WT-6	Tank Forced Ventilation 1	LPSep	PG	Total ³				
	TPY	TPY	TPY	TPY	TPY	TPY	TPY	(%)	TPY		
H2S	0.76	3.19	0.13	0.42	2.29	44.59	51.38	98%	1.03	NO _x factor: 0.1380 lb/MMBtu CO factor: 0.2755 lb/MMBtu	
Nitrogen	0.90	5.67	1.47E-03	0.06	0.32	52.49	59.43	0%	59.43		
Methane	7.74	8.86	0.02	0.32	1.75	452.91	471.60	99%	4.72	NO _x emissions: 4.14 TPY CO emissions: 8.26 TPY	
CO2	2.69	16.44	0.12	1.62	8.92	157.30	187.09	0%	187.09		
Ethane	4.36	26.53	0.02	3.97	21.82	255.09	311.79	99%	3.12		
Propane	4.03	35.32	0.01	4.85	26.63	235.95	306.79	99%	3.07		
i-Butane	0.73	6.36	1.18E-03	0.83	4.53	42.70	55.15	98%	1.10		
n-Butane	1.73	13.20	3.94E-03	1.69	9.31	100.99	126.92	98%	2.54		
i-Pentane	0.53	5.61	8.78E-04	0.71	3.89	31.02	41.76	98%	0.84		
n-Pentane	0.52	5.24	4.12E-04	0.65	3.60	30.17	40.17	98%	0.80		
iC6	0.36	6.76	6.29E-04	0.82	4.53	21.25	33.73	98%	0.67		
n-Hexane	0.13	2.15	1.11E-04	0.27	1.47	7.86	11.88	98%	0.24		
iC7	--	--	--	--	--	--	--	98%	--	GHG Pollutant Emissions ^{6,7,8}	
n-Heptane	0.11	1.60	6.35E-05	0.17	0.95	6.70	9.54	98%	0.19		
Benzene	0.06	1.65	0.04	0.14	0.77	3.35	6.00	98%	0.12	GHG CO ₂ Factor: 116.98 lb/MMBTU GHG N ₂ O Factor: 2.20E-04 lb/MMBTU GWP CO ₂ Equivalent: 1 GWP CH ₄ Equivalent: 25 GWP N ₂ O Equivalent: 298 CO ₂ emissions: 3,694.12 TPY CH ₄ emissions: 4.72 TPY N ₂ O emissions: 0.01 TPY CO ₂ e emissions: 3,813.98 TPY	
Toluene	0.03	0.70	0.02	0.07	0.36	1.49	2.66	98%	0.05		
2,2,4-Trimethylpentane	0.04	0.80	3.43E-05	0.09	0.48	2.05	3.46	98%	0.07		
nC8	0.05	0.54	1.13E-05	0.05	0.29	2.99	3.93	98%	0.08		
Ethylbenzene	0.01	0.13	2.96E-03	0.01	0.07	0.39	0.61	98%	0.01		
m-Xylene	3.15E-03	0.07	1.23E-03	0.01	0.04	0.18	0.31	98%	0.01		
o-Xylene	1.05E-03	0.02	8.33E-04	2.09E-03	0.01	0.06	0.10	98%	2.01E-03		
p-Xylene	--	--	--	--	--	--	--	98%	--		
Nonane	0.02	0.19	3.22E-06	0.02	0.09	0.97	1.27	98%	0.03		
C10	4.99E-03	--	3.84E-10	--	--	0.29	0.30	98%	0.01		
C10+ Oil	--	3.42E-07	4.28E-10	2.44E-08	1.34E-07	--	5.01E-07	98%	1.00E-08		
Total	24.78	141.03	0.37	16.77	92.12	1,450.80	1,725.88	--	265.20		
Total VOC	8.34	80.35	0.08	10.38	57.02	488.42	644.58	--	9.82		
Total HAP	0.26	5.53	0.06	0.58	3.20	15.39	25.02	--	0.50		
LHV of Stream (Btu/scf)	1,244.36	1,727.21	640.68	1,972.61	1,972.61	1,244.36	1,310.37				
Molecular Weight	27.54	39.67	32.84	42.58	42.58	27.54	--				
SO ₂ emissions (TPY) ⁹	1.43E+00	5.99E+00	2.47E-01	7.85E-01	4.31	8.38E+01	96.59				
Volumetric Flow (scf/yr)	683,280	2,698,374.66	10,054.77	724,576.93	1,642,500	40,000,000	45,758,786				
Heat Release (MMBtu/yr)	850.24	4,660.66	6.44	1,429.31	3,240.02	49,774.28	59,960.96				

¹ If applicable, purge gas and pilot fuel share the same source.

² Emissions are based on process simulation. Low Pressure Separator Off Gas (LPSep) is based on 1 mcf/100 bbl oil rate.

³ Pre-Controlled Emissions

⁴ Exhaust (TPY) = Total Uncontrolled Emissions (TPY) x (100 - DRE (%)).

⁵ CO and NO_x emission factors are based on flare type and heat input from TCEQ Air Permit Technical Guidance for Chemical Sources: Flares and Vapor Oxidizers, October 2000 RG-109 (Draft).

⁶ Emissions Factor from 40 CFR 98 Subpart C, Table C-1 and C-2. Emission Factor (lb/MMBtu) = Emission factor (kg/MMBtu) * (2.20462 lb/kg)

⁷ Global Warming Potentials from Table A-1 of Subpart A of Part 98 for Mandatory Greenhouse Gas Reporting.

⁸ 40 CFR 98.233 (Subpart W), Equation W-40. Mass N₂O = 0.001 x scf x HHV x EF

⁹ SO₂ emissions are based on 100% conversion of H₂S.

Apache Corporation
Brahaney Unit Tank Battery
Flare Compliance Demonstration

Flare Type	Air-assisted
Gas to Flare (MSCFD)	592.38
Total Flow (ACFM)	1,785.81
Flare Diameter (ft)	0.50
Tip Velocity (ft/sec)	35.47
Heating Value (Btu/scf)	1,384.96
Volume (mcf/hr)	24.68
Heat Release (Btu/hr)	34,183,983
SO₂ Emission Rate (lb/hr)	99.44

40 CFR 60.18 (c)(3)(ii) Compliance Demonstration

Net Heating Value (Btu/scf)	Is the Net Heating Value greater than or equal to 300 Btu/scf?	Is the flare in compliance with 40 CFR 60.18 (c)(3)(ii)?
1,385	YES	YES

40 CFR 60.18 (c)(5) Compliance Demonstration

Vmax (ft/sec)	Is the tip velocity less than Vmax?	Is the flare in compliance with 40 CFR 60.18 (c)(5)?
148.60	YES	YES

Flare Design Report

Customer - Apache

Job Location - 0

Date - 02/09/24

Flare Equipment - AF-444 Cactus

Notes - 50'

Total Flare Gas Flow Rate (MMscfd) - 0.70

Maximum Radiation from base of Flare (Feet) - 12

HP Flare Gas Flow Rate (MMscfd) - 0.50

Minimum Flare Height (Feet) - 21

Heating Value of the HP Flare Gas (Btu/Ft³) - 1350

Actual Flare Height (Feet) - 50

LP Flare Gas Flow Rate (MMscfd) - 0.20

 ΔP LP Gas Across the Flare Tip (Oz/in²) - 0.12Heating Value of the LP Flare Gas (Btu/Ft³) - 1400

Wind Speed (mph) - 20

Calculated Total Gas Air Exit Velocity (Ft/Sec) - 83

Average Fraction Radiated (F Factor) - 0.25

Allowed Gas and Air Exit Velocity (Ft/Sec) - 147

HP Flare Gas Temperature F° - 80

Maximum Ground Radiation (Btu/Hr/Ft²) - 1500

LP Flare Gas Temperature F° - 80

This flare system will comply 40 CFR 63.11 & 60.18
and therefore carries a destruction efficiency of 98% or greater.

Apache Corporation
Brahanev Unit Tank Battery
MSS Emissions

Planned MSS - Other Emissions	
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Company Name	Apache Corporation
EPN No:	MISC-MSS
Site name:	Brahanev Unit Tank Battery
Type of MSS activity	Miscellaneous MSS Activities

VOC Wt%	61.89
H ₂ S Wt%	2.49091
Benzene Wt%	0.83048
Total HAP Wt %	3.47361
Methane Wt %	1.9016
Type of Control Device	None
Are tank vapors (A) uncontrolled; (B) controlled by a flare, vapor combustor, thermal oxidizer, or vapor recovery unit (VRU); or (C) controlled by another type of control device?	(A) uncontrolled

VOC Type: (pick from list)
Crude Oil or Condensate VOC

Emission Type: (pick from list)
Low Pressure Periodic

Emissions before control and before wt% reduction		
Type of Losses	Max. hourly emissions lb/hr	Avg. Annual emissions tpy
TCEQ Default MSS	0.03	0.13

Planned MSS Emissions		
Air contaminant	Max. hourly emissions lb/hr	Avg. Annual emissions tpy
Total VOC	0.02	0.08
Total H ₂ S	7.65E-04	3.35E-03
Total Benzene	2.55E-04	1.12E-03
Total HAP	1.07E-03	4.67E-03
Total Methane	5.84E-04	2.56E-03

Notes:
Detailed emission calculations for default VOC emissions from miscellaneous MSS activities are provided in the next table. Emissions have been conservatively speciated based on the inlet gas composition and 100% VOC.

Default VOC Emissions for Miscellaneous MSS Activities

Company Name	Apache Corporation
Site Name	Brahoney Unit Tank Battery
Source Name	Miscellaneous MSS Activities
EPN	MISC-MSS
Default VOC emissions (tpy) associated with miscellaneous MSS activities	0.25
Add default VOC emissions from miscellaneous MSS activities to the emissions summary	No

#	Activity	Description / comments	Default parameters	Equation used	Input parameters	Annual emissions (tpy)
1	(b)(1) Engine Oil changes / Filter changes The emissions associated with an engine oil/filter change occur during the draining of the used engine oil into oil pan or container.	-Engine has been isolated and blow down occurs prior to oil change. The emissions associated with the blow down [106.359 (b) (8)] need to be accounted for in the oil and gas emission calculation spreadsheet. -Oil is drained into a 4 ft x 4 ft open pan and transferred to a closed container per Best Management Practice (BMP). -Input parameters based on manufacturer specifications of engine oil SAE 10W (a). -Used a 1380 hp Caterpillar G3516B LE engine (b) as basis for calculation. In order to account for emissions from larger horse power engines, the emissions are doubled. An average engine uses 112 gallons of motor oil and manufacturer recommends changing oil every 1000 hrs. We used 10 changes of oil per year as a conservative estimate. -Emission estimates for 1380 hp engine are being doubled to be conservative and to accommodate engines with higher hp.	Temperature (°F) 212 Vapor pressure (psia) 0.001 Saturation factor 1 Molecular weight (lb/lbmol) 500 Motor oil (gal/activity) 112 U wind speed (m/s) 3.52 Vapor pressure P _v (Pa) 10 Molecular weight (lb/lbmol) 500 Surface Area A _s (m ²) (4ft * 4ft) 1.48 Evaporation time t (hrs) 10 Number of activities per year (Number of oil changes per engine per year) 6 Factor used to account for larger horsepower engines 2	Loading loss L ₁ (lb/1000 gal) 0.009 Loading loss per activity (lb/activity) 0.001 Evaporation Loss (lb/activity) 1.027 Total (lbs/yr/engine) 12.339	Number of engines 0	0.000
2	(b)(1) & (b)(4) Changing Engine Rod Packings Emissions from changing of the rod would be from clingage of lubricant in the casing.	-Engine has been isolated and blow down occurs prior to changing rod packing. The emissions associated with the blow down [106.359 (b) (8)] need to be accounted for in the oil and gas emission calculation spreadsheet. -Emissions from clingage are the evaporation of the lubricant adhered to the rod packing casing. -Casing volume for calculations is based on field observation of casing for a 1380hp G3516B LE engine(b). -Input parameters based on material specifications for AP 101(c) grease.	Temperature (°F) 104 Vapor pressure (psia) 0.001 Molecular weight (lb/lbmole) 500 V _v Casing volume (ft ³) (1ft * 3ft) 2.355 Ideal gas constant (psia-ft ³ /lb-mol-°R) 10.73 Number of activities per year (Number of rod packing changes per year per engine) 6	Clingage loss (lb/activity) 0.0001 Total (lbs/yr/engine) 0.0007	Number of engines 0	0
3	(b)(3) Changing wet and dry seals Emissions from changing seals would be from clingage of lubricant in the casing.	-Engine has been isolated and blow down occurs prior to changing seals. The emissions associated with the blow down [106.359 (b) (8)] need to be accounted for in the oil and gas emission calculation spreadsheet. -Emissions from clingage are the evaporation of the lubricant adhered to the rod packing casing. -Casing volume for calculations is based on field observation of casing for a 1380 hp Caterpillar G3516B LE engine (b). -Input parameters based on material specifications for AP 101(c) grease.	Temperature (°F) 104 Vapor pressure of material stored (psia) 0.001 Molecular weight (lb/lbmole) 500 V _v Casing volume (ft ³) (1ft * 3ft) 2.355 Ideal gas constant (psia-ft ³ /lb-mol-°R) 10.73 Number of activities per year (Number of seal changes per year) 4	Clingage loss (lb/activity) 0.0001 Total (lbs/yr/engine) 0.0005	Number of engines 0	0.000000
4	(b)(2) Glycol dehydration unit Emissions associated with replacement of glycol solution used in dehydration unit. There are two vessels in a dehydration unit: contactor and regenerator.	-Calculations based on physical properties of mono ethylene glycol (MEG)(d) because of its low molecular weight and high vapor pressure which gives the most conservative emissions estimate. -Typically the glycol solution used in dehydration unit is not entirely replaced but it is conservatively assumed that the glycol solution is drained once per year for vessel maintenance. -Per field experience, 4000 gal of glycol solution is used in a large dehydration unit.	Temperature (°F) 68 Vapor pressure (psia) 0.001 Saturation factor 1 Molecular weight (lb/lbmol) 62.07 Glycol solution (gal/activity) 4000 Temperature (°F) 68 Vapor pressure (psia) 0.001 Molecular weight (lb/lbmole) 62.07 V _v Vessel volume (ft ³) (5 ft radii * 30 ft height) 2355 Ideal gas constant (psia-ft ³ /lb-mol-°R) 10.73 Number of activities per year 1	Loading loss L ₁ (lb/1000 gal) 0.0015 Loading loss per activity (lb/activity) 0.0059 Clingage loss (lb/activity) 0.0155 Total (lbs/yr/unit) 0.0213	Number of Dehy units 0	0.000000
5	(b)(2) Amine unit Emissions associated with replacement of solution used in the amine unit. There are two vessels in an amine unit: Contactor and regenerator.	-Calculations based on physical properties of mono ethanol amine (MEA)(c) because of its low molecular weight and high vapor pressure which gives the most conservative emissions estimate. -Typically the solution used in amine unit is not entirely replaced but it is conservatively assumed that the amine solution is drained once per year for vessel maintenance. -Per field experience, 4000 gal of solution is used in a large amine unit.	Temperature (°F) 68 Vapor pressure (psia) 0.004 Saturation factor 1 Molecular weight (lb/lbmol) 61.08 Amine solution (gal/activity) 4000 Temperature (°F) 68 Vapor pressure (psia) 0.004 Molecular weight (lb/lbmole) 61.08 V _v Vessel volume (ft ³) (5 ft radii * 30 ft height) 2355 Ideal gas constant (psia-ft ³ /lb-mol-°R) 10.73 Number of activities per year 0	Loading loss L ₁ (lb/1000 gal) 0.0058 Loading loss per activity (lb/activity) 0.0231 Clingage loss (lb/activity) 0.0609 Total (lbs/yr/unit) 0.0000	Number of Amine units 0	0.000000
6	(b)(2) Heater Treater -Calculations based on condensate (RVP 10) because it has higher vapor pressure than crude oil (RVP 5) and results in a more conservative emission estimate. -Emission estimates are based on a large site that typically has 4 heater treaters.		Temperature (°F) 100 Vapor pressure (psia) 10.5 Molecular weight (lb/lbmole) 66 V _v Vessel volume (ft ³) (2ft radii * 10 ft height) 125.6 Ideal gas constant (psia-ft ³ /lb-mol-°R) 10.73 Number of activities per year 1	Clingage loss (lb/activity) 8.6913 Total (lbs/yr/unit) 8.6913	Number of Heater Treaters 1	0.004
7	(b)(2) Aerosol Lubricants	-45-50% VOC by weight volatiles. -Material specification per Lubricant MSDS (f). -VOC evaporation is based off standard engineering judgment consistent with product specification. - Standard Industrial Size Cans (oz.) 16		Pounds of emissions per can (lb/can) 0.5 Total (lbs/yr/unit) 8.6913	Number of 16 oz cans used 100	0.025

Default VOC Emissions for Miscellaneous MSS Activities

8	(b)(3) Piping Components	-Calculations based on condensate (RVP 10) because it has higher vapor pressure than crude oil (RVP 5) and results in a more conservative emission estimate. -100 foot long pipe sections conservatively assumed for emission calculations.	Temperature (°F)	100	Clingage loss (lb/activity)	5.4321	Number of 100 ft in length of pipes	10	0.027
			Vapor pressure (psia)	10.5					
			Molecular weight (lb/lb-mole)	66					
			V _v Vessel volume (ft ³) (0.5 ft radii * 100 ft height)	78.50					
			Ideal gas constant (psia-ft ³ /lb-mol-°R)	10.73					
			Number of activities per year	1	Total (lbs/yr)	5.4321			
9	(b)(3) Pneumatic controllers	Based on field experience, changing pneumatic controllers of equipment under pressure requires isolation of pipe section or process equipment and a blow down. There are no emissions associated with changing the controller.							
10	(b)(2) Calibration	-Per Monitoring Division's Laboratory and Quality Assurance Section - One cylinder of pentane or other calibration gas used per year and a typical cylinder contains 100 lbs.	Pounds of pentane in one cylinder (lb)	100	Pounds of pentane in one cylinder (lb/cylinder)	100	Number of cylinders	1	0.050
11	(b)(6)	Safety factor to account for MSS activities with the same character and quantity of emissions as those listed in paragraphs (b) (1) - (5) of §106.359.							0.028

		TPV	lbs/hr
	Total VOC emissions	0.13	0.03

Equations used:

1. Loading loss equation: Reference AP-42 Loading equation:

$$L_L = 12.46 \frac{SPM}{T}$$

L_L = Loading loss (lb/1000 gal of liquid loaded)
 S = Saturation factor from AP-42, Table 5.2-1
 P = True vapor pressure of liquid loaded (psia)
 M = Molecular weight of vapors (lb/lb-mol)
 T = Temperature of bulk liquid loaded (deg R)

2. Ideal Gas Law: $n = PV/RT$

Total Emissions = $(PV/RT) * M_w * \text{Concentration}$
 P = vapor pressure of material stored pressure (psia) at t
 V = vessel volume (ft³)
 MW = molecular weight (lb/lb-mole)
 R = (10.73 psia-ft³/lb-mol-R)
 T = 460 + t (deg R)
 t = 95° F or actual, whichever is higher

3. Evaporative loss equation: Reference: Ajay Kumar, N.S. Vatcha, and John Schmelzle, "Estimate Emissions from Atmospheric Releases of Hazardous Substances," Environmental Engineering World, November-December 1996.

$$L_E^L = 4.14 * 10^{-5} U_z^{0.78} P_v M_w^{0.87} A_o^{0.94} t$$

L_E^L = Evaporation loss (lb/activity)
 U is wind speed in m/s
 P_v = VOC vapor pressure, Pa
 M_w = VOC vapor molecular weight
 A_o = liquid surface area, m²
 t = time, hrs

4. Clingage loss equation: AP-42 (2-23) constrained by an upper limit equal to filling loss for IFR with liquid heel.

$$L_{CL, max} = 0.60 (P_v / RT) M_w$$

P = vapor pressure of material stored pressure (psia) at t
 V_v = vessel volume (ft³)
 M_w = molecular weight (lb/lb-mole)
 R = (10.73 psia-ft³/lb-mol-R)
 T = 460 + t (deg R)
 t = Temperature (R)

References

- Engine Oil SAE 10 W: MSDS
- Caterpillar G3516B 1E engine specifications sheet
- AP101 Apeizon grease MSDS
- Mono ethylene glycol (MEG) MSDS
- Mono ethanol amine (MEA)
- WD-40 Aerosol lubricant MSDS

MSS emissions associated with painting and blasting operations

Source Name	Painting and Blasting MSS Activities
EPN	MSS-PB

1. Input variables such as amount of paint used (gallons) or number of hours blasting operation occurs in the yellow box.
2. Default numbers are included for your convenience but may be edited

#	Activity	Description / comments	Default parameters		Input parameters		Annual emissions (tpy)
1	(b)(2) <i>Aerosol Cans</i> Includes spray paints and primers, degreasers, cleaners and other solvents, rust inhibitors	- 90% VOC content is an average obtained from a survey of MSDS sheets (c)(d)(e) for spray paints and primers, degreasers, cleaners and other solvents, rust inhibitors. This does not include lubricants. - VOC is propellant. 100% VOC evaporates.	Standard Industrial Size Cans (oz.)	16	Number of 16 oz cans used	100	0.045
			VOC emissions (lb/can)	0.9			VOC (tpy)
2	(b)(2) <i>Manual application of paints, primer</i> Touch up paint	- 100% VOC evaporates - Survey of MSDS sheets (a) (b) indicates VOC content varies from 2 lb/gallon to 7 lb/gallon. As Chapter 115 limits VOC content to 3.5 lb/gal in nonattainment areas this was used as a conservative amount - Usage of paint based on technical expertise and NSR permit section reviews.	VOC content (lb/gal)	7	Paint used (gallons)	25	0.088 VOC (tpy)
3	(b)(2) <i>Painting Tanks and Other Immovable Fixed Structures</i> Spray Painting	- 100% VOC evaporates - Painting used on 1 tank or 1 vessel per year - Survey of MSDS sheets (a)(b) indicates VOC content varies from 2 lb/gallon to 7 lb/gallon. As Chapter 115 limits VOC content to 3.5 lb/gal in nonattainment areas this was used as a conservative amount. - Input parameters based on TCEQ Surface Coating Guidance Document for Air Quality Permit Applications. - Per field research in 2012, company indicated that a large site uses around 100 gallons to paint pipes and tanks in 6 month period. - Total PM Emissions for Painting assumed to be PM30	VOC content (lb/gal)	7	Paint used (gallons)	100	0.350 VOC (tpy)
			PM _{10 & 2.5} content (lb/gal)	8			0.008
			Transfer Efficiency PM _{10 & 2.5} (%)	65			PM ₁₀ (tpy)
			Droplet factor for PM _{2.5} overspray (%)	99			0.001
			Droplet factor for PM ₁₀ overspray (%)	94			PM _{2.5} (tpy)
			Droplet factor for PM ₅₀ overspray (%)	81			0.027 PM ₃₀ (tpy)
4	(b)(2) <i>Sandblasting</i>	- An application rate of 2,000 lb/hr. - Per industry expertise and BMP, blasting occurs for 5 days per year and 8 hrs per day - Emission factors for PM ₁₀ based on TCEQ Abrasive Blast Cleaning technical guidance document. Emission factor for PM _{2.5} is based on 15% of PM ₁₀ emission factor. - Emission factor for PM based on low dusting abrasive media and was obtained from Mr. Tony Spinelli of the TCEQ via email on 12/14/2020.	Emission factor for PM ₁₀ (lb/lb of usage)	0.00034	Number of hours blasting operation occurs	200	0.068 PM ₁₀ (tpy)
			Application rate (lb/hr)	2000			0.01
			PM ₁₀ Emissions (lb/hr)	0.68			PM _{2.5} (tpy)
			Emission factor for PM _{2.5} (lb/lb of usage)	0.00005			0.572
			Application rate (lb/hr)	2000			PM (tpy)
			PM _{2.5} Emissions (lb/hr)	0.1			
			Emission factor for PM (lb/lb of usage)	0.00286			
			Application rate (lb/hr)	2000			
			PM Emissions (lb/hr)	5.72			

	TPY	lbs/hr
VOC	0.483	0.110
PM _{2.5}	0.011	0.100
PM ₁₀	0.076	0.682
PM	0.599	5.726

VOC Type: (pick from list)
Crude Oil or Condensate VOC

Emission Type: (pick from list)
Steady State (continuous)

References
(a) Industrial Urethane Alkyd Enamel MSDS
(b) Rust Preventive Enamel MSDS
(c) Rust Oleum - Rust Inhibitor MSDS
(d) Rust Oleum - High Performance Industrial Enamel Aerosol MSDS
(e) Hi-Bild Waterbased Catalyzed Epoxy MSDS

Apache Corporation
Brahane Unit Tank Battery
Planned MSS Emissions - Vessel Blowdowns

- A) Enter information into the yellow boxes.
- B) VOC and H₂S control efficiencies may be entered (if applicable).
- C) The vapor VOC, benzene, and H₂S weight percents may be entered. The weight percents from the Analyses tab are displayed below.
- D) Use the box provided below for entering any notes necessary (such as the source/justification for any calculation inputs).
- E) Make sure to answer the control device question.

EPN	VSSL-BD
Identifier	Vessel Blowdowns

Describe this MSS event in detail, include specifically what is being done and how it is being done.	Vessels are blown down for scheduled maintenance.
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<table><tr><td>Actual Volume of the Vented Unit (acf - actual cubic feet)</td><td>50</td></tr><tr><td>Pressure of Gas Inside the Unit Before Venting (psig)</td><td>42</td></tr><tr><td>Final Pressure (psia)</td><td>14.7</td></tr><tr><td>Pressure of Gas Inside the Unit Before Venting (psia)</td><td>56.7</td></tr><tr><td>Temperature of Gas Inside the Unit Before Venting (°F)</td><td>70</td></tr><tr><td>Temperature of Gas Inside the Unit Before Venting (°R)</td><td>529.67</td></tr><tr><td>Duration of Each Event (hours/event)</td><td>1</td></tr><tr><td>Frequency of Events (events/year)</td><td>200</td></tr><tr><td>Venting Gas Molecular Weight (lb/lb-mol)</td><td>27.54</td></tr><tr><td>VOC wt %</td><td>33.67</td></tr><tr><td>benzene wt%</td><td>0.23</td></tr><tr><td>H₂S wt%</td><td>3.07</td></tr><tr><td>Are planned MSS vapors (A) uncontrolled; (B) controlled by a flare, vapor combustor, thermal oxidizer, or vapor recovery unit (VRU); or (C) controlled by another type of control device?</td><td>(A) uncontrolled</td></tr><tr><td>VOC Control Efficiency (%)</td><td></td></tr><tr><td>H₂S Control Efficiency (%)</td><td></td></tr></table>	Actual Volume of the Vented Unit (acf - actual cubic feet)	50	Pressure of Gas Inside the Unit Before Venting (psig)	42	Final Pressure (psia)	14.7	Pressure of Gas Inside the Unit Before Venting (psia)	56.7	Temperature of Gas Inside the Unit Before Venting (°F)	70	Temperature of Gas Inside the Unit Before Venting (°R)	529.67	Duration of Each Event (hours/event)	1	Frequency of Events (events/year)	200	Venting Gas Molecular Weight (lb/lb-mol)	27.54	VOC wt %	33.67	benzene wt%	0.23	H ₂ S wt%	3.07	Are planned MSS vapors (A) uncontrolled; (B) controlled by a flare, vapor combustor, thermal oxidizer, or vapor recovery unit (VRU); or (C) controlled by another type of control device?	(A) uncontrolled	VOC Control Efficiency (%)		H ₂ S Control Efficiency (%)		Ideal Gas Constant, [(ft³*psia)/(R*lb-mol)] 10.73159 Gas Molecular Weight and Weight Percents From Analyses Tab: <table><tr><td>Molecular Weight</td><td>27.5361</td></tr><tr><td>VOC wt %</td><td>33.67</td></tr><tr><td>Benzene wt %</td><td>0.23</td></tr><tr><td>H₂S wt %</td><td>3.07</td></tr><tr><td>HAP wt %</td><td>1.06</td></tr></table> Volume released <table><tr><td>scf/hr</td><td>scf/yr</td></tr><tr><td>189</td><td>37,867</td></tr></table>	Molecular Weight	27.5361	VOC wt %	33.67	Benzene wt %	0.23	H ₂ S wt %	3.07	HAP wt %	1.06	scf/hr	scf/yr	189	37,867
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Vapors Captured by Control Device		
You need to input these values into the appropriate control device emission calculation tab.		
	Hourly Emissions (lb/hr)	Annual Emissions (tpy)
VOC Results:	0.0000	0.0000
Benzene Results:	0.0000	0.0000
H ₂ S Results:	0.0000	0.0000

Planned MSS Emissions		
	Hourly Emissions (lb/hr)	Annual Emissions (tpy)
VOC Results:	4.62	0.46
Benzene Results:	0.03	3.17E-03
H ₂ S Results:	0.42	0.04
HAP Result:	0.15	0.01

VOC Type: (pick from list)
Natural Gas VOC

Emission Type: (pick from list)
High Pressure Periodic

Enter any notes here:	
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Apache Corporation
Braham Unit Tank Battery
Planned MSS Emissions - VRU Blowdowns

A) Enter information into the yellow boxes.

B) VOC and H₂S control efficiencies may be entered (if applicable).

C) The vapor VOC, benzene, and H₂S weight percents may be entered. The weight percents from the Analyses tab are displayed below.

D) Use the box provided below for entering any notes necessary (such as the source/justification for any calculation inputs).

E) Make sure to answer the control device question.

EPN	VRU-BD
Identifier	VRU Compressor Blowdowns

Describe this MSS event in detail, include specifically what is being done and how it is being done.	VRU Compressors are blown down for scheduled maintenance.
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<table><tr><td>Actual Volume of the Vented Unit (acf - actual cubic feet)</td><td>40</td></tr><tr><td>Pressure of Gas Inside the Unit Before Venting (psig)</td><td>50</td></tr><tr><td>Final Pressure (psia)</td><td>14.7</td></tr><tr><td>Pressure of Gas Inside the Unit Before Venting (psia)</td><td>64.7</td></tr><tr><td>Temperature of Gas Inside the Unit Before Venting (°F)</td><td>70</td></tr><tr><td>Temperature of Gas Inside the Unit Before Venting (°R)</td><td>529.67</td></tr><tr><td>Duration of Each Event (hours/event)</td><td>1</td></tr><tr><td>Frequency of Events (events/year)</td><td>200</td></tr><tr><td>Venting Gas Molecular Weight (lb/lb-mol)</td><td>35.61</td><td>36.80</td></tr><tr><td>VOC wt %</td><td>10.36</td><td>8.82</td></tr><tr><td>benzene wt%</td><td>5.16</td><td>3.88</td></tr><tr><td>H₂S wt%</td><td>31.99</td><td>29.27</td></tr><tr><td>Are planned MSS vapors (A) uncontrolled; (B) controlled by a flare, vapor combustor, thermal oxidizer, or vapor recovery unit (VRU); or (C) controlled by another type of control device?</td><td colspan="2">(A) uncontrolled</td></tr><tr><td>VOC Control Efficiency (%)</td><td colspan="2"></td></tr><tr><td>H₂S Control Efficiency (%)</td><td colspan="2"></td></tr></table>	Actual Volume of the Vented Unit (acf - actual cubic feet)	40	Pressure of Gas Inside the Unit Before Venting (psig)	50	Final Pressure (psia)	14.7	Pressure of Gas Inside the Unit Before Venting (psia)	64.7	Temperature of Gas Inside the Unit Before Venting (°F)	70	Temperature of Gas Inside the Unit Before Venting (°R)	529.67	Duration of Each Event (hours/event)	1	Frequency of Events (events/year)	200	Venting Gas Molecular Weight (lb/lb-mol)	35.61	36.80	VOC wt %	10.36	8.82	benzene wt%	5.16	3.88	H ₂ S wt%	31.99	29.27	Are planned MSS vapors (A) uncontrolled; (B) controlled by a flare, vapor combustor, thermal oxidizer, or vapor recovery unit (VRU); or (C) controlled by another type of control device?	(A) uncontrolled		VOC Control Efficiency (%)			H ₂ S Control Efficiency (%)			Ideal Gas Constant, [(ft³*psia)/(R*lb-mol)] 10.73159 Gas Molecular Weight and Weight Percents From Analyses Tab: <table><tr><td></td><td>Max</td><td>Avg</td></tr><tr><td>Molecular Weight</td><td>35.61</td><td>36.80</td></tr><tr><td>VOC wt %</td><td>10.36</td><td>8.82</td></tr><tr><td>Benzene wt %</td><td>5.16</td><td>3.88</td></tr><tr><td>H₂S wt %</td><td>31.99</td><td>29.27</td></tr><tr><td>HAP wt %</td><td>9.01</td><td>6.81</td></tr></table> Volume released <table><tr><td>scf/hr</td><td>scf/yr</td></tr><tr><td>173</td><td>34,568</td></tr></table>		Max	Avg	Molecular Weight	35.61	36.80	VOC wt %	10.36	8.82	Benzene wt %	5.16	3.88	H ₂ S wt %	31.99	29.27	HAP wt %	9.01	6.81	scf/hr	scf/yr	173	34,568
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Enter any notes here:																																																												

Apache Corporation
Brahaney Unit Tank Battery
Planned MSS - Tank Non-Forced Ventilation

Planned MSS - Degassing due to Passive Expansion / Thermal Expansion / Non Forced Ventilation

This section calculates planned MSS emissions due to degassing by passive / thermal expansion for both floating roof and fixed roof tanks.

Note:

1. Enter information into the yellow boxes.
2. The tank calculations are applied to product stored at ambient temperature. For heated tanks or tanks storing hot product, please provide more explanation on the input parameters used such as vapor pressure of heated product, Antoine's constant etc., and how they are derived.
3. Use site specific analysis for input parameters such as weight percents, molecular weight, stock liquid density etc., of the liquid / product stored.
4. VOC and H2S control efficiencies may be entered (if applicable).
5. Use the box provided below for entering any notes necessary (such as the source/justification for any calculation inputs).
6. Make sure to answer the control device question.
7. Make sure to select the correct VOC Type and Emission Type from the pull down menus below.

Company Name:	Apache Corporation
Site Name.:	Brahaney Unit Tank Battery
EPN No:	MSS-TK
Name	Tank Non-Forced Ventilation
Product stored:	Oil
Type of tank roof	Fixed Roof
Tank Capacity (bbl)	500
Tank Diameter (ft) (D)	15.50
Vapor Molecular Wt. (lb/lb mol) (M _v)	42.58
Number of events/yr	200
Height of the roof (ft)	16.00
Saturation factor (S)	1.0

Vapor Space Volume (ft ³) (V _v)	3.019
Height of Vapor Space under roof (ft)* (h _v)	16.00

	Max. hourly emissions lb/hr	Avg. Annual emissions tpy	
Duration of activity (hrs/event)	1	1	
True Vapor Pressure (psia) (P)	11.89	10.66	Max > Avg
Day time temperature (°F)	96.82	88.18	Max > Avg
Night time temperature (°F)	79.54	79.54	
Temperature Expansion %	3.103	1.576	
Emissions (lb/event)	255.903	232.962	
Max. Hourly Emissions (lb/hr)	7.94		
Avg. Hourly Emissions (lb/hr)		3.67	
Avg. Annual emissions (tpy)		0.37	

VOC Wt%	61.89
H ₂ S Wt%	2.4909
Benzene Wt%	0.83

Type of Control Device	
Are tank vapors (A) uncontrolled; (B) controlled by a flare, vapor combustor, thermal oxidizer, or vapor recovery unit (VRU); or (C) controlled by another type of control device?	(A) uncontrolled
VOC Control Efficiency	
H ₂ S Control Efficiency	

VOC Type: (pick from list)
Natural Gas VOC

Emission Type: (pick from list)
Low Pressure Periodic

Emissions before control and before wt% reduction		
Type of Losses	Max. hourly emissions lb/hr	Avg. Annual emissions tpy
Thermal / Passive Expansion	7.94	0.37
Planned MSS Emissions		
Air Contaminant	Max. hourly emissions lb/hr	Avg. Annual emissions tpy
Total VOC	4.91	2.27E-01
Total H ₂ S	1.98E-01	9.14E-03
Total Benzene	6.59E-02	3.05E-03

Apache Corporation
Brahaney Unit Tank Battery
Planned MSS - Tank Forced Ventilation

Planned MSS - Forced Ventilation / Vapor space purge / Degassing for Fixed Roof and Floating Roof Tanks

This section calculates planned MSS emissions due to forced ventilation for both floating roof and fixed roof tanks.

Note:

1. Enter information into the yellow boxes.
2. The tank calculations are applied to product stored at ambient temperature. For heated tanks or tanks storing hot product, please provide more explanation on the input parameters used such as vapor pressure of heated product, Antoine's constant etc., and how they are derived.
3. VOC and H₂S control efficiencies may be entered (if applicable)
4. Use site specific analysis for input parameters such as weight percents, molecular weight, stock liquid density etc., of the liquid / product stored
5. Use the box provided below for entering any notes necessary (such as the source/justification for any calculation inputs
6. Make sure to answer the control device question
7. Make sure to select the correct VOC Type and Emission Type from the pull down menus below.

Hourly emissions		Annual emissions	
Company Name:	Apache Corporation		
Site Name.:	Brahaney Unit Tank Battery		
EPN No:	FL-1		
Name	Tank Forced Ventilation 1		
Tank No.:	TK-1 - TK-3, WT-6		
Product stored:	Oil and PW		
Type of tank roof	Fixed Roof		
Tank Capacity (bbl)	500		
Max. True Vapor Pressure (psia) (P)	11.89	Max > Avg	Avg. True Vapor Pressure (psia) (P) 10.66
Tank Diameter (ft) (D)	16		
Vapor Molecular Wt. (lb/lb mol) (M _v)	42.58		
Max. Temperature (°F) (T)	97	Max > Avg	Avg. Temperature (°F) (T) 88
Height of the tank (ft)	16		
Forced Ventilation Blower rate (ft ³ /hr)	15,000		
Saturation factor (S) Full liquid Heel	0.6		
Duration of activity / Hours of operation per year	240		

scf/hr	scf/yr
3,019	724,577

Vapor Space Volume (ft ³) (V _v)	3,019
Height of Vapor Space under roof (ft)* (h _v)	16.00
Max. Emissions (lb/event)	153.54
Max. Hourly Emissions (lb/hr)	153.54
Avg. Emissions (lb/event)	139.78
Avg. Hourly Emissions (lb/hr)	139.78
Avg. Annual emissions (tpy)	16.77

VOC Wt%	61.89
H ₂ S Wt%	2.4909
Benzene Wt%	0.83

Type of Control Device	
Are tank vapors (A) uncontrolled; (B) controlled by a flare, vapor combustor, thermal oxidizer, or vapor recovery unit (VRU); or (C) controlled by another type of control device?	(B) cont. by flare/ VC/TO/VRU
VOC Control Efficiency	
H ₂ S Control Efficiency	

VOC Type: (pick from list)
Natural Gas VOC

Emission Type: (pick from list)
Low Pressure Periodic

Emissions before control and before wt% reduction		
Type of Losses	Max. hourly emissions lb/hr	Avg. Annual emissions tpy
Vapor Space Purge / Degassing	153.54	16.77
Planned MSS Emissions		
Air Contaminant	Max. hourly emissions lb/hr	Avg. Annual emissions tpy
Total VOC	95.03	1.04E+01
Total H ₂ S	3.82E+00	4.18E-01
Total Benzene	1.28E+00	1.39E-01

Apache Corporation
Brahaney Unit Tank Battery
Planned MSS - Tank Forced Ventilation

Planned MSS - Forced Ventilation / Vapor space purge / Degassing for Fixed Roof and Floating Roof Tanks

This section calculates planned MSS emissions due to forced ventilation for both floating roof and fixed roof tanks.

Note:

1. Enter information into the yellow boxes.
2. The tank calculations are applied to product stored at ambient temperature. For heated tanks or tanks storing hot product, please provide more explanation on the input parameters used such as vapor pressure of heated product, Antoine's constant etc., and how they are derived
3. VOC and H2S control efficiencies may be entered (if applicable)
4. Use site specific analysis for input parameters such as weight percents, molecular weight, stock liquid density etc., of the liquid / product store
5. Use the box provided below for entering any notes necessary (such as the source/justification for any calculation inputs
6. Make sure to answer the control device question
7. Make sure to select the correct VOC Type and Emission Type from the pull down menus below.

Hourly emissions		Annual emissions	
Company Name:	Apache Corporation		
Site Name.:	Brahaney Unit Tank Battery		
EPN No:	VRU-1 - VRU-2		
Name	Tank Forced Ventilation 2		
Tank No.:	WT-1 - WT-4		
Product stored:	PW		
Type of tank roof	Fixed Roof		
Tank Capacity (bbl)	750		
Max. True Vapor Pressure (psia) (P)	13.26	Max > Avg	Avg. True Vapor Pressure (psia) (P) 10.66
Tank Diameter (ft) (D)	16		
Vapor Molecular Wt. (lb/lb mol) (N _v)	36.80		
Max. Temperature (°F) (T)	98	Max > Avg	Avg. Temperature (°F) (T) 88
Height of the tank (ft)	24		
Forced Ventilation Blower rate (ft ³ /hr)	15,000		
Saturation factor (S) Full liquid Heel	0.6		
Duration of activity / Hours of operation per year	240		

scf/hr	scf/yr
4,529	1,086,865

Vapor Space Volume (ft ³) (V _v)	4,529
Height of Vapor Space under roof (ft)* (h _v)	24.00
Max. Emissions (lb/event)	221.49
Max. Hourly Emissions (lb/hr)	221.49
Avg. Emissions (lb/event)	181.18
Avg. Hourly Emissions (lb/hr)	181.18
Avg. Annual emissions (tpy)	21.74

VOC Wt%	8.82
H ₂ S Wt%	29.2685
Benzene Wt%	3.88

Type of Control Device	
Are tank vapors (A) uncontrolled; (B) controlled by a flare, vapor combustor, thermal oxidizer, or vapor recovery unit (VRU); or (C) controlled by another type of control device?	(B) cont. by flare/ VC/TO/VRU
VOC Control Efficiency	
H ₂ S Control Efficiency	

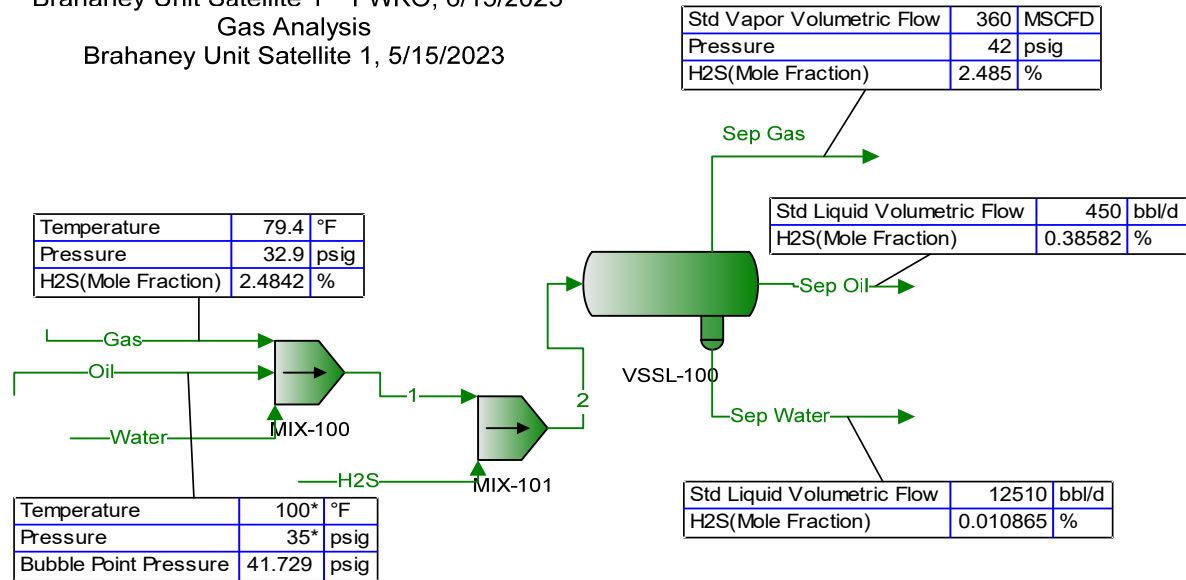
VOC Type: (pick from list)
Natural Gas VOC

Emission Type: (pick from list)
Low Pressure Periodic

Emissions before control and before wt% reduction		
Type of Losses	Max. hourly emissions lb/hr	Avg. Annual emissions tpy
Vapor Space Purge / Degassing	221.49	21.74
Planned MSS Emissions		
Air Contaminant	Max. hourly emissions lb/hr	Avg. Annual emissions tpy
Total VOC	19.53	1.92E+00
Total H ₂ S	6.48E+01	6.36E+00
Total Benzene	8.60E+00	8.44E-01

Brahaney Unit Tank Battery

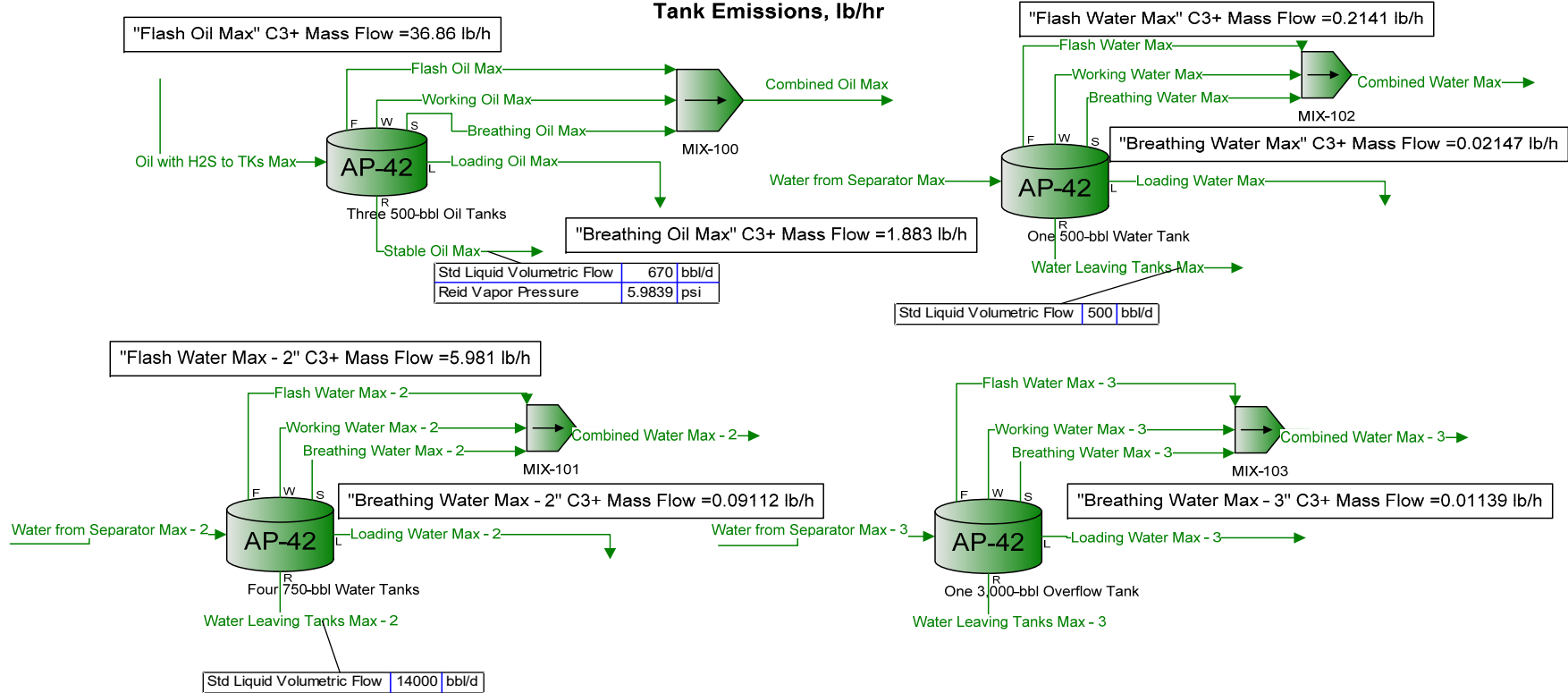
Oil Analysis
Brahaney Unit Satellite 1 – FWKO, 6/15/2023
Gas Analysis
Brahaney Unit Satellite 1, 5/15/2023



Process Streams		Gas	H2S	Oil	Sep Gas	Sep Oil	Sep Water	Water	1	2
Composition		Status: Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved
Phase: Total		From Block: --	--	--	VSSL-100	VSSL-100	VSSL-100	--	MIX-100	MIX-101
		To Block: MIX-100	MIX-101	MIX-100	--	--	--	MIX-100	MIX-101	VSSL-100
Mole Fraction		%	%	%	%	%	%	%	%	%
H2S		2.48419*	100*	0.1722*	2.48498	0.385820	0.0108652	0*	0.0103418	0.0214529
Nitrogen		3.55774*	0*	0.1771*	3.71810	0.0223269	0.000148300	0*	0.0146277	0.0146260
Methane		53.6097*	0*	0.504*	53.6668	0.847415	0.00433610	0*	0.214706	0.214682
CO2		6.78577*	0*	0.3601*	5.16692	0.189475	0.00746423	0*	0.0279586	0.0279555
Ethane		16.1066*	0*	1.1385*	15.8292	1.52400	0.00169077	0*	0.0671105	0.0671030
Propane		10.1582*	0*	2.6062*	9.86224	3.14938	0.000721446	0*	0.0473064	0.0473011
i-Butane		1.39485*	0*	0.8443*	1.30012	1.01213	5.71867E-05	0*	0.00777897	0.00777810
n-Butane		3.29896*	0*	2.4979*	2.87037	3.17178	0.000191090	0*	0.0197198	0.0197176
i-Pentane		0.816361*	0*	2.1568*	0.814941	2.16967	3.42900E-05	0*	0.00893877	0.00893778
n-Pentane		0.793854*	0*	2.6914*	0.782309	2.72318	1.60867E-05	0*	0.0102594	0.0102583
iC6		0.468250*	0*	6.9345*	0.819748	6.40514	2.05746E-05	0*	0.0201565	0.0201543
n-Hexane		0.173255*	0*	3.1653*	0.276997	3.00736	3.61835E-06	0*	0.00903945	0.00903844
iC7		0*	0*	0*	0	0	0	0*	0	0
n-Heptane		0.127041*	0*	6.0245*	0.205455	5.89244	1.78550E-06	0*	0.0163979	0.0163961
Benzene		0.0814261*	0*	2.9357*	0.199161	2.20824	0.00145923	0*	0.00806828	0.00806738
Toluene		0.0307098*	0*	0.4079*	0.0948505	3.74432	0.000523351	0*	0.0108003	0.0107991
2,2,4-Trimethylpentane		0.0341109*	0*	2.4587*	0.0869439	2.37356	8.46262E-07	0*	0.00662166	0.00662093
nC8		0.0496159*	0*	5.9733*	0.0701178	5.92386	2.78844E-07	0*	0.0159547	0.0159529
Ethylbenzene		0.00690221*	0*	2.1391*	0.0176257	2.08661	7.84711E-05	0*	0.00567028	0.00566965
m-Xylene		0.00330106*	0*	1.3745*	0.0102622	1.34729	3.26646E-05	0*	0.00363898	0.00363858
o-Xylene		0.00110035*	0*	0.4956*	0.00329558	0.482364	2.21220E-05	0*	0.00131174	0.00131159
p-Xylene		0*	0*	0*	0	0	0	0*	0	0
Nonane		0.0143046*	0*	6.0023*	0.0241248	5.96713	7.07079E-08	0*	0.0158906	0.0158889
C10		0.00390125*	0*	0*	8.27294E-06	0.00585330	7.60654E-12	0*	1.55277E-05	1.55260E-05
Water		0*	0*	0*	1.69534	0.221346	99.9723	100*	99.3382	99.3271
C10+ Oil		0*	0*	45.3001*	6.32575E-08	45.1393	3.54286E-12	0*	0.119499	0.119485

Process Streams		Gas	H2S	Oil	Sep Gas	Sep Oil	Sep Water	Water	1	2
Properties		Status: Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved
Phase: Total		From Block: --	--	--	VSSL-100	VSSL-100	VSSL-100	--	MIX-100	MIX-101
		To Block: MIX-100	MIX-101	MIX-100	--	--	--	MIX-100	MIX-101	VSSL-100
Property	Units									
Temperature	°F	79.4*	79.4*	100*	99.9262	99.9262	99.9262	100*	99.8821	99.8944
Pressure	psig	32.9*	32.9*	35*	42*	42	42	35*	32.9	32.9
Mole Fraction Vapor	%	100	100	0.173088	100	0	0	0	0.392600	0.398920
Mole Fraction Light Liquid	%	0	0	99.8269	0	100	100	100	0.258267	0.258227
Mole Fraction Heavy Liquid	%	0	0	0	0	0	0	0	99.3491	99.3429
Phase Mole Fraction	%	100	100	100	100	100	100	100	100	100
Molecular Weight	lb/lbmol	27.5458	34.0809	203.914	27.3996	202.431	18.0208	18.0153	18.5436	18.5453
Mass Density	lb/ft^3	0.230620	0.287813	48.5416	0.263573	50.9829	61.9503	61.9526	23.5698	23.3408
Molar Flow	lbmol/h	40.5622	1.13257	26.8833	39.5274	26.9790	10125.6	10123.6	10191.0	10192.2
Mass Flow	lb/h	1117.32	38.5990	5481.87	1083.03	5461.38	182472	182379	188978	189017
Vapor Volumetric Flow	ft^3/h	4844.85	134.112	112.931	4109.04	107.122	2945.46	2943.85	8017.81	8098.14
Liquid Volumetric Flow	gpm	604.033	16.7204	14.0797	512.297	13.3555	367.227	367.026	999.623	1009.64
Std Vapor Volumetric Flow	MMSCFD	0.369425*	0.0103150*	0.244843	0.360000	0.245715	92.2205	92.2017	92.8159	92.8263
Std Liquid Volumetric Flow	sgpm	5.26569	0.0965913	13.1425*	5.09378	13.1250	364.875	364.589*	382.997	383.094
Compressibility		0.982697	0.974231	0.0347582	0.981424	0.0374857	0.00274628	0.00240606	0.00623597	0.00629761
Specific Gravity		0.951085	1.17672		0.946038	0.817443	0.993291	0.993327		
API Gravity						38.0259	9.99971	9.99401		
Enthalpy	Btu/h	-1.76782E+06	-10091.4	-4.23988E+06	-1.67145E+06	-4.25401E+06	-1.24003E+09	-1.23993E+09	-1.24594E+09	-1.24595E+09
Mass Enthalpy	Btu/lb	-1582.19	-261.441	-773.438	-1543.30	-778.926	-6795.69	-6798.66	-6593.04	-6591.75
Mass Cp	Btu/(lb*°F)	0.418161	0.246061	0.472226	0.431916	0.473063	0.977049	0.977015	0.959345	0.959291
Ideal Gas Cp/Cv Ratio		1.21201	1.32056	1.02649	1.20544	1.02665	1.32813	1.32816	1.31788	1.31788
Dynamic Viscosity	cP	0.0107336	0.0129478		0.0110573	1.97486	0.700690	0.700936		
Kinematic Viscosity	cSt	2.90553	2.80843		2.61894	2.41819	0.706092	0.706314		
Thermal Conductivity	Btu/(h*ft^2*°F)	0.0152431	0.00928605		0.0160819	0.0716765	0.359622	0.360083		
Surface Tension	lbf/ft					0.00203418?	0.00480814	0.00480959		
Net Ideal Gas Heating Value	Btu/ft^3	1244.36	586.790	9889.85	1253.86	9823.42	0.239185	0	31.0416	31.1033
Net Liquid Heating Value	Btu/lb	17047.9	6332	18254.8	17259.3	18265.1	-1054.18	-1059.76	-392.422	-391.049
Gross Ideal Gas Heating Value	Btu/ft^3	1364.36	637.100	10537.7	1375.04	10468.4	50.5535	50.3100	83.2051	83.2667
Gross Liquid Heating Value	Btu/lb	18701.5	6892.4	19460.4	18938.1	19474.2	5.33988	0	675.077	676.347

Brahaney Unit Tank Battery **Tank Emissions, lb/hr**



Process Streams	Breathing Oil Max	Breathing Water Max	Breathing Water Max - 2	Breathing Water Max - 3	Combined Oil Max	Combined Water Max
Composition	Status: Solved	Solved	Solved	Solved	Solved	Solved
Phase: Total	From Block: Three 500-bbl Oil Tanks	One 500-bbl Water Tank	Four 750-bbl Water Tanks	One 3,000-bbl Overflow Tank	MIX-100	MIX-102
	To Block:					
Mole Fraction	%	%	%	%	--	--
H2S	3.03262	34.4366	33.4253	6.82819	2.57703	25.9991
Nitrogen	0.342169	0.0807726	0.0845831	0.00956110	4.41000	0.560025
Methane	3.29380	4.39775	4.60393	0.520999	12.1713	16.3744
CO2	7.84878	33.9043	35.4060	4.04686	8.64704	28.1872
Ethane	29.3143	2.19727	2.30200	0.259720	22.1422	6.38485
Propane	29.4929	0.701993	0.735791	0.0828615	24.6669	2.72440
i-Butane	4.25939	0.0368748	0.0387194	0.00432913	3.82473	0.215954
n-Butane	9.03264	0.174080	0.182456	0.0205497	8.24668	0.721614
i-Pentane	3.29228	0.0215018	0.0225668	0.00252793	3.06651	0.129489
n-Pentane	3.12452	0.00510670	0.00534888	0.000604059	2.93968	0.0607484
IC6	3.47969	0.00806231	0.00845472	0.000950235	3.36558	0.0776961
n-Hexane	1.15536	0.000761826	0.000798536	8.99169E-05	1.10407	0.0136640
IC7	0	0	0	0	0	0
n-Heptane	0.694950	0.000259859	0.000272685	3.05675E-05	0.760283	0.00674258
Benzene	0.685820	2.42987	2.35171	0.949974	0.946670	1.85287
Toluene	0.294404	1.13215	1.09606	0.336077	0.365816	0.862721
2,2,4-Trimethylpentane	0.302976	0.000143049	0.000150696	1.66317E-05	0.327327	0.00319574
nC8	0.205020	1.89340E-05	1.98479E-05	2.23426E-06	0.246150	0.00105300
Ethylbenzene	0.0538971	0.196182	0.189753	0.0497947	0.0633698	0.150076
m-Xylene	0.0304111	0.116570	0.112911	0.0201595	0.0366020	0.0887589
o-Xylene	0.00881056	0.0377305	0.0364933	0.0143705	0.0116503	0.0288442
p-Xylene	0	0	0	0	0	0
Nonane	0.0552849	3.75253E-06	3.94865E-06	4.37746E-07	0.0803654	0.000267015
C10	0	1.28314E-10	1.34883E-10	1.50143E-11	0	2.87246E-08
Water	0	20.1220	19.3967	86.8523	0	15.5563
C10+ Oil	8.65567E-08	3.94458E-09	4.16892E-09	4.54004E-10	1.47372E-07	1.33789E-08
Molar Flow	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h
H2S	0.00180688	0.00195948	0.00825688	0.000650563	0.0407758	0.0278835
Nitrogen	0.000203869	4.59603E-06	2.08941E-05	9.10944E-07	0.0697785	0.000600613
Methane	0.00196249	0.000250236	0.00113729	4.96387E-05	0.192584	0.0175612
CO2	0.00467641	0.00192918	0.00874616	0.000385569	0.136820	0.0302301
Ethane	0.0174658	0.000125027	0.000568652	2.47451E-05	0.350352	0.00684760
Propane	0.0175723	3.99440E-05	0.000181759	7.89472E-06	0.390300	0.00292185
i-Butane	0.00253780	2.09821E-06	9.56464E-06	4.12463E-07	0.0605179	0.000231606
n-Butane	0.00538178	9.90529E-06	4.50712E-05	1.95790E-06	0.130486	0.000773913
i-Pentane	0.00196159	1.22347E-06	5.57457E-06	2.40852E-07	0.0485208	0.000138874
n-Pentane	0.00186163	2.90576E-07	1.32131E-06	5.75524E-08	0.0465140	6.51512E-05
IC6	0.00207325	4.58753E-07	2.08853E-06	9.05347E-08	0.0532528	8.33272E-05
n-Hexane	0.000688380	4.33486E-08	1.97258E-07	8.56693E-09	0.0174695	1.46543E-05
IC7	0	0	0	0	0	0
n-Heptane	0.000414061	1.47862E-08	6.73599E-08	2.91236E-09	0.0120298	7.23125E-06
Benzene	0.000408621	0.000138262	0.000580931	9.05098E-05	0.0149790	0.00198716
Toluene	0.000175410	6.44206E-05	0.000270754	3.20201E-05	0.00578823	0.000925247
2,2,4-Trimethylpentane	0.000180517	8.13964E-09	3.72257E-08	1.58461E-09	0.00517922	3.42736E-06
nC8	0.000122154	1.07736E-09	4.90292E-09	2.12871E-10	0.00389479	1.12932E-06
Ethylbenzene	3.21126E-05	1.11629E-05	4.68738E-05	4.74424E-06	0.00100269	0.000160953
m-Xylene	1.81193E-05	6.63293E-06	2.78917E-05	1.92072E-06	0.000579145	9.51917E-05
o-Xylene	5.24945E-06	2.14690E-06	9.01475E-06	1.36917E-06	0.000184340	3.09347E-05
p-Xylene	0	0	0	0	0	0
Nonane	3.29395E-05	2.13522E-10	9.75414E-10	4.17068E-11	0.00127161	2.86367E-07
C10	0	7.30115E-15	3.33194E-14	1.43050E-15	0	3.08065E-11
Water	0	0.00114496	0.00479146	0.00827495	0	0.0166837
C10+ Oil	5.15717E-11	2.24450E-13	1.02983E-12	4.32558E-14	2.33183E-09	1.43486E-11

Process Streams	Breathing Oil Max	Breathing Water Max	Breathing Water Max - 2	Breathing Water Max - 3	Combined Oil Max	Combined Water Max
Composition	Status: Solved	Solved	Solved	Solved	Solved	Solved
Phase: Total	From Block: Three 500-bbl Oil Tanks	One 500-bbl Water Tank	Four 750-bbl Water Tanks	One 3,000-bbl Overflow Tank	MIX-100	MIX-102
	To Block:					
Mass Fraction	%	%	%	%	--	--
H2S	2.26980	33.1123	31.9891	11.0213	2.02727	26.6308
Nitrogen	0.210506	0.0638393	0.0665373	0.0126850	2.85158	0.471507
Methane	1.16045	1.99049	2.07403	0.395845	4.50702	7.89500
CO2	7.58592	42.0978	43.7562	8.43493	8.78405	37.2832
Ethane	19.3579	1.86407	1.94375	0.369865	15.3682	5.77012
Propane	28.5609	0.873346	0.911100	0.173048	25.1068	3.61061
i-Butane	5.43686	0.0604685	0.0631955	0.0119168	5.13126	0.377241
n-Butane	11.5297	0.285462	0.297794	0.0565673	11.0638	1.26055
i-Pentane	5.21657	0.0437686	0.0457210	0.00863798	5.10687	0.280788
n-Pentane	4.95076	0.0103951	0.0108370	0.00206408	4.89565	0.131728
IC6	6.58542	0.0196020	0.0204597	0.00387821	6.69459	0.201232
n-Hexane	2.18655	0.00185224	0.00193238	0.000366980	2.19614	0.0353896
IC7	0	0	0	0	0	0
n-Heptane	1.52929	0.000734635	0.000767278	0.000145062	1.75846	0.0203056
Benzene	1.17648	5.35498	5.15842	3.51436	1.70686	4.34987
Toluene	0.595722	2.94309	2.83590	1.46655	0.778009	2.38905
2,2,4-Trimethylpentane	0.760049	0.000461019	0.000483385	8.99767E-05	0.863052	0.0109714
nC8	0.514316	6.10203E-05	6.36655E-05	1.20872E-05	0.649018	0.00361507
Ethylbenzene	0.125663	0.587623	0.565701	0.250370	0.155290	0.478859
m-Xylene	0.0709043	0.349161	0.336614	0.101363	0.0896947	0.283210
o-Xylene	0.0205421	0.113014	0.108795	0.0722555	0.0285496	0.0920353
p-Xylene	0	0	0	0	0	0
Nonane	0.155719	1.35787E-05	1.42213E-05	2.65898E-06	0.237917	0.00102926
C10	0	5.15086E-10	5.38917E-10	1.01175E-10	0	1.22834E-07
Water	0	10.2275	9.81261	74.1037	0	8.42289
C10+ Oil	6.47417E-07	3.79038E-08	3.98716E-08	7.32321E-09	1.15856E-06	1.36949E-07
Mass Flow	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h
H2S	0.0615800	0.0667806	0.281402	0.0221718	1.38967	0.950293
Nitrogen	0.00571106	0.000128751	0.000585315	2.55186E-05	1.95473	0.0168252
Methane	0.0314832	0.00401440	0.0182449	0.000796327	3.08953	0.281725
CO2	0.205807	0.0849024	0.384914	0.0169687	6.02139	1.33041
Ethane	0.525181	0.00375944	0.0170988	0.000744063	10.5347	0.205901
Propane	0.774861	0.00176136	0.00801477	0.000348123	17.2105	0.128841
i-Butane	0.147503	0.000121952	0.000555918	2.39732E-05	3.51744	0.0134614
n-Butane	0.312801	0.000575717	0.00261964	0.000113797	7.58411	0.0449815
i-Pentane	0.141526	8.82721E-05	0.000402198	1.73772E-05	3.50071	0.0100196
n-Pentane	0.134315	2.09647E-05	9.53307E-05	4.15234E-06	3.35593	0.00470058
IC6	0.178663	3.95332E-05	0.000179980	7.80186E-06	4.58908	0.00718075
n-Hexane	0.0593214	3.73558E-06	1.69988E-05	7.38259E-07	1.50544	0.00126284
IC7	0	0	0	0	0	0
n-Heptane	0.0414897	1.48161E-06	6.74959E-06	2.91824E-07	1.20541	0.000724586
Benzene	0.0319182	0.0107999	0.0453776	0.00706989	1.17004	0.155221
Toluene	0.0161620	0.00593561	0.0249468	0.00295028	0.533318	0.0852508
2,2,4-Trimethylpentane	0.0206202	9.29778E-07	4.25224E-06	1.81007E-07	0.591615	0.000391502
nC8	0.0139534	1.23065E-07	5.60053E-07	2.43160E-08	0.444896	0.000129000
Ethylbenzene	0.00340924	0.00118511	0.00497636	0.000503672	0.106450	0.0170876
m-Xylene	0.00192364	0.000704185	0.00296112	0.000203913	0.0614850	0.0101060
o-Xylene	0.000557308	0.000227925	0.000957051	0.000145358	0.0195705	0.00328418
p-Xylene	0	0	0	0	0	0
Nonane	0.00422466	2.73853E-08	1.25102E-07	5.34910E-09	0.163090	3.67280E-05
C10	0	1.03882E-12	4.74074E-12	2.03534E-13	0	4.38320E-09
Water	0	0.0206267	0.0863196	0.149076	0	0.300562
C10+ Oil	1.75645E-08	7.64440E-11	3.50743E-10	1.47322E-11	7.94184E-07	4.88689E-09

Process Streams		Breathing Oil Max	Breathing Water Max	Breathing Water Max - 2	Breathing Water Max - 3	Combined Oil Max	Combined Water Max
Properties		Status: Solved	Solved	Solved	Solved	Solved	Solved
Phase: Total		From Block: Three 500-bbl Oil Tanks	One 500-bbl Water Tank	Four 750-bbl Water Tanks	One 3,000-bbl Overflow Tank	MIX-100	MIX-102
		To Block: MIX-100	MIX-102	MIX-101	MIX-103	--	--
Property	Units						
Temperature	°F	96.8152	96.8152	96.4992	97.7745	96.8127	96.8066
Pressure	psig	-1.43595	-1.43595	-1.43595	-1.43595	-1.43595	-1.43595
Mole Fraction Vapor	%	100	85.4736	86.1924	14.0261	100	90.3567
Mole Fraction Light Liquid	%	0	14.5264	13.8076	85.9739	0	9.64335
Mole Fraction Heavy Liquid	%	0	0	0	0	0	0
Phase Mole Fraction	%	100	100	100	100	100	100
Molecular Weight	lb/lbmol	45.5345	35.4439	35.6110	21.1146	43.3230	33.2725
Mass Density	lb/ft^3	0.102430	0.0926296	0.0923363	0.334849	0.0972659	0.0821995
Molar Flow	lbmol/h	0.0595814	0.00569009	0.0247025	0.00952761	1.58228	0.107248
Mass Flow	lb/h	2.71301	0.201679	0.879680	0.201172	68.5491	3.56839
Vapor Volumetric Flow	ft^3/h	26.4866	2.17726	9.52692	0.600783	704.761	43.4114
Liquid Volumetric Flow	gpm	3.30222	0.271451	1.18777	0.0749028	87.8663	5.41233
Std Vapor Volumetric Flow	MMSCFD	0.000542645	5.18232E-05	0.000224981	8.67738E-05	0.0144108	0.000976770
Std Liquid Volumetric Flow	sgpm	0.0104301	0.000516930	0.00226230	0.000431194	0.260553	0.0107106
Compressibility		0.987056	0.849608	0.856810	0.139769	0.988978	0.898771
Specific Gravity		1.57219				1.49583	
API Gravity							
Enthalpy	Btu/h	-3209.69	-485.912	-2152.19	-1081.97	-82662.8	-8195.87
Mass Enthalpy	Btu/lb	-1183.07	-2409.33	-2446.56	-5378.34	-1205.89	-2296.80
Mass Cp	Btu/(lb*°F)	0.395013	0.301460	0.298215	0.784537	0.390893	0.320240
Ideal Gas CpCv Ratio		1.12495	1.27343	1.27329	1.31380	1.13368	1.25779
Dynamic Viscosity	cP	0.00911118				0.00954463	
Kinematic Viscosity	cSt	5.55301				6.12601	
Thermal Conductivity	Btu/(h*ft*°F)	0.0110095				0.0117310	
Surface Tension	lbf/ft						
Net Ideal Gas Heating Value	Btu/ft^3	2156.39	454.606	448.491	104.492	1969.50	624.425
Net Liquid Heating Value	Btu/lb	17820.6	4638.41	4556.26	1053.12	17111.2	6918.57
Gross Ideal Gas Heating Value	Btu/ft^3	2341.08	498.674	491.931	155.103	2138.76	685.413
Gross Liquid Heating Value	Btu/lb	19360.2	5110.32	5019.26	1962.75	18594.2	7614.33

Process Streams	Combined Water Max - 2		Flash Oil Max	Flash Water Max	Flash Water Max - 2	Loading Oil Max	Loading Water Max
Composition	Status:	Solved	Solved	Solved	Solved	Solved	Solved
Phase: Total	From Block:	MIX-101	Three 500-bbl Oil Tanks	One 500-bbl Water Tank	Four 750-bbl Water Tanks	Three 500-bbl Oil Tanks	One 500-bbl Water Tank
	To Block:	--	MIX-100	MIX-102	MIX-101	--	--
Mole Fraction	%	%	%	%	%	%	%
H2S	25.1065	2.48105	9.33332	9.30916	2.68195	38.9808	
Nitrogen	0.576365	5.26699	1.50665	1.51026	5.45449	0	
Methane	16.8522	14.0416	40.0309	40.1116	11.8465	0	
CO2	29.0096	8.81521	16.8947	16.8629	3.77065	0	
Ethane	6.57115	20.6313	14.6562	14.6782	16.8684	0	
Propane	2.80389	23.6502	6.71908	6.73121	28.5176	0	
i-Butane	0.222255	3.73316	0.569674	0.570790	4.68949	0	
n-Butane	0.742669	8.08110	1.80311	1.80651	10.1643	0	
i-Pentane	0.133268	3.01894	0.342788	0.343488	3.74110	0	
n-Pentane	0.0625209	2.90074	0.170652	0.171090	3.56199	0	
nC6	0.0799631	3.34153	0.215237	0.215757	4.01526	0	
n-Hexane	0.0140627	1.09326	0.0391485	0.0392512	1.29182	0	
nC7	0	0	0	0	0	0	
n-Heptane	0.00693931	0.774047	0.0195473	0.0195992	0.884339	0	
Benzene	1.78516	1.00163	0.713177	0.709278	1.19721	4.62936	
Toluene	0.831405	0.380861	0.330534	0.328829	0.435266	1.85271	
2,2,4-Trimethylpentane	0.00328899	0.332457	0.00922545	0.00924859	0.383150	0	
nC8	0.00108372	0.254816	0.00309549	0.00310402	0.279731	0	
Ethylbenzene	0.144530	0.0653655	0.0590072	0.0586514	0.0716565	0.280414	
m-Xylene	0.0855765	0.0379062	0.0338261	0.0336694	0.0414742	0.0984999	
o-Xylene	0.0277765	0.0122486	0.0112919	0.0112234	0.0133625	0.0700297	
p-Xylene	0	0	0	0	0	0	
Nonane	0.000274805	0.0856493	0.000787012	0.000789161	0.0901504	0	
C10	2.95627E-08	0	8.52083E-08	8.54461E-08	0	9.67302E-23	
Water	14.9395	0	6.53802	6.47531	0	54.0882	
C10+ Oil	1.37693E-08	1.60184E-07	3.20137E-08	3.20003E-08	9.66325E-08	0	
Molar Flow	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h
H2S	0.732546	0.0324258	0.00336439	0.0936939	0.00344807	0.00524208	
Nitrogen	0.0168169	0.0688364	0.000543103	0.0152003	0.00701262	0	
Methane	0.491706	0.183515	0.0144300	0.403712	0.0152306	0	
CO2	0.846429	0.115209	0.00609005	0.169720	0.00484777	0	
Ethane	0.191730	0.269638	0.00528313	0.147732	0.0216871	0	
Propane	0.0818106	0.309094	0.00242203	0.0677476	0.0366640	0	
i-Butane	0.00648486	0.0487901	0.000205351	0.00574483	0.00602909	0	
n-Butane	0.0216692	0.105615	0.000649968	0.0181820	0.0130679	0	
i-Pentane	0.00388842	0.0394558	0.000123565	0.00345711	0.00480978	0	
n-Pentane	0.00182421	0.0379109	6.15152E-05	0.00172197	0.00457950	0	
nC6	0.00233312	0.0436718	7.75868E-05	0.00217153	0.00516226	0	
n-Hexane	0.000410314	0.0142883	1.41119E-05	0.000395052	0.00166085	0	
nC7	0	0	0	0	0	0	
n-Heptane	0.000202472	0.0101163	7.04623E-06	0.000197260	0.00113696	0	
Benzene	0.0520865	0.0130906	0.000257079	0.00713867	0.00153921	0.000622550	
Toluene	0.0242584	0.00497762	0.000119148	0.00330957	0.000559604	0.000249150	
2,2,4-Trimethylpentane	9.59645E-05	0.00434501	3.32550E-06	9.30842E-05	0.000492601	0	
nC8	3.16203E-05	0.00333029	1.11583E-06	3.12410E-05	0.000359639	0	
Ethylbenzene	0.00421703	0.000854287	2.12704E-05	0.000590309	9.21260E-05	3.77097E-05	
m-Xylene	0.00249691	0.000495411	1.21933E-05	0.000338872	5.33217E-05	1.32461E-05	
o-Xylene	0.000810450	0.000160081	4.07040E-06	0.000112960	1.71797E-05	9.41749E-06	
p-Xylene	0	0	0	0	0	0	
Nonane	8.01814E-06	0.00111938	2.83695E-07	7.94267E-06	0.000115903	0	
C10	8.62568E-10	0	3.07151E-11	8.59990E-10	0	1.30081E-26	
Water	0.435897	0	0.00235677	0.0651720	0	0.00727370	
C10+ Oil	4.01754E-10	2.09351E-09	1.15400E-11	3.22074E-10	1.24237E-10	0	

Process Streams	Combined Water Max - 2	Flash Oil Max	Flash Water Max	Flash Water Max - 2	Loading Oil Max	Loading Water Max
Composition	Status: Solved	Solved	Solved	Solved	Solved	Solved
Phase: Total	From Block:	MIX-101	Three 500-bbl Oil Tanks	One 500-bbl Water Tank	Four 750-bbl Water Tanks	Three 500-bbl Oil Tanks
	To Block:	--	MIX-100	MIX-102	MIX-101	--
Mass Fraction	%	%	%	%	%	%
H2S	25.6784	1.97298	10.9748	10.9497	2.01531	46.0822
Nitrogen	0.484546	3.44275	1.45622	1.46015	3.36899	0
Methane	8.11333	5.25611	22.1573	22.2087	4.19028	0
CO2	38.3142	9.05224	25.6536	25.6130	3.65883	0
Ethane	5.92969	14.4751	15.2052	15.2326	11.1834	0
Propane	3.71046	24.3336	10.2225	10.2440	27.7261	0
i-Butane	0.387673	5.06286	1.14240	1.14498	6.00963	0
n-Butane	1.29541	10.9595	3.61588	3.62380	13.0257	0
i-Pentane	0.288553	5.08231	0.853306	0.855307	5.95125	0
n-Pentane	0.135371	4.88331	0.424807	0.426026	5.66632	0
IC6	0.206797	6.71902	0.639958	0.641697	7.62916	0
n-Hexane	0.0363683	2.19829	0.116399	0.116740	2.45452	0
IC7	0	0	0	0	0	0
n-Heptane	0.0208672	1.80976	0.0675793	0.0677792	1.95378	0
Benzene	4.18470	1.82557	1.92205	1.91212	2.06190	12.5433
Toluene	2.29893	0.818811	1.05077	1.04567	0.884251	5.92135
2,2,4-Trimethylpentane	0.0112748	0.886108	0.0363591	0.0364612	0.964992	0
nC8	0.00371504	0.679169	0.0121999	0.0122371	0.704523	0
Ethylbenzene	0.460481	0.161922	0.216141	0.214902	0.167733	1.03265
m-Xylene	0.272651	0.0939007	0.123904	0.123367	0.0970821	0.362735
o-Xylene	0.0884974	0.0303419	0.0413618	0.0411232	0.0312788	0.257890
p-Xylene	0	0	0	0	0	0
Nonane	0.00105772	0.256316	0.00348262	0.00349319	0.254931	0
C10	1.26231E-07	0	4.18294E-07	4.19588E-07	0	4.77401E-22
Water	8.07697	0	4.06385	4.02608	0	33.7999
C10+ Oil	1.40737E-07	1.27297E-06	3.76193E-07	3.76149E-07	7.25650E-07	0
Mass Flow	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h
H2S	24.9658	1.10510	0.114661	3.19317	0.117513	0.178655
Nitrogen	0.471099	1.92834	0.0152142	0.425812	0.196447	0
Methane	7.88817	2.94403	0.231492	6.47653	0.244337	0
CO2	37.2509	5.07031	0.268020	7.46931	0.213348	0
Ethane	5.76513	8.10776	0.158859	4.44216	0.652110	0
Propane	3.60749	13.6297	0.106801	2.98737	1.61672	0
i-Butane	0.376914	2.83579	0.0119354	0.333902	0.350424	0
n-Butane	1.25946	6.13858	0.0377776	1.05678	0.759535	0
i-Pentane	0.280545	2.84669	0.00891506	0.249426	0.347020	0
n-Pentane	0.131614	2.73523	0.00443825	0.124238	0.330406	0
IC6	0.201058	3.76344	0.00668607	0.187132	0.444859	0
n-Hexane	0.0353590	1.23130	0.00121610	0.0340437	0.143124	0
IC7	0	0	0	0	0	0
n-Heptane	0.0202881	1.01368	0.000706046	0.0197659	0.113926	0
Benzene	4.06857	1.02253	0.0200809	0.557615	0.120230	0.0486286
Toluene	2.23513	0.458630	0.0109781	0.304938	0.0515610	0.0229563
2,2,4-Trimethylpentane	0.0109619	0.496324	0.000379867	0.0106329	0.0562691	0
nC8	0.00361194	0.380414	0.000127460	0.00356861	0.0410810	0
Ethylbenzene	0.447701	0.0906954	0.00225817	0.0626701	0.00978055	0.00400345
m-Xylene	0.265085	0.0525953	0.00129450	0.0359764	0.00566090	0.00140627
o-Xylene	0.0860414	0.0169950	0.000432134	0.0119924	0.00182388	0.000999808
p-Xylene	0	0	0	0	0	0
Nonane	0.00102837	0.143567	3.63853E-05	0.00101869	0.0148651	0
C10	1.22728E-07	0	4.37020E-09	1.22361E-07	0	1.85082E-24
Water	7.85281	0	0.0424578	1.17409	0	0.131038
C10+ Oil	1.36831E-07	7.13014E-07	3.93034E-09	1.09693E-07	4.23130E-08	0

Process Streams		Combined Water Max - 2	Flash Oil Max	Flash Water Max	Flash Water Max - 2	Loading Oil Max	Loading Water Max
Properties		Status: Solved	Solved	Solved	Solved	Solved	Solved
Phase: Total		From Block: MIX-101	Three 500-bbl Oil Tanks	One 500-bbl Water Tank	Four 750-bbl Water Tanks	Three 500-bbl Oil Tanks	One 500-bbl Water Tank
		To Block: --	MIX-100	MIX-102	MIX-101	--	--
Property	Units						
Temperature	°F	96.4908	96.8152	96.8152	96.4992	96.8152	96.8152
Pressure	psig	-1.43595	-1.43595	-1.43595	-1.43595	-1.43595	-1.43595
Mole Fraction Vapor	%	90.9558	100	100	100	100	47.7748
Mole Fraction Light Liquid	%	9.04419	0	0	0	0	1.21763
Mole Fraction Heavy Liquid	%	0	0	0	0	0	51.0076
Phase Mole Fraction	%	100	100	100	100	100	100
Molecular Weight	lb/lbmol	33.3218	42.8571	28.9834	28.9747	45.3544	28.8289
Mass Density	lb/ft^3	0.0818214	0.0961820	0.0646346	0.0646521	0.101984	0.135129
Molar Flow	lbmol/h	2.91775	1.30694	0.0360471	1.00647	0.128566	0.0134479
Mass Flow	lb/h	97.2248	56.0117	1.04477	29.1621	5.83104	0.387687
Vapor Volumetric Flow	ft^3/h	1188.26	582.351	16.1642	451.062	57.1763	2.86902
Liquid Volumetric Flow	gpm	148.146	72.6048	2.01528	56.2363	7.12847	0.357696
Std Vapor Volumetric Flow	MMSCFD	0.0265738	0.0119031	0.000328303	0.00916655	0.00117093	0.000122478
Std Liquid Volumetric Flow	sgpm	0.293559	0.212353	0.00424226	0.118520	0.0218255	0.000886249
Compressibility		0.904776	0.989363	0.995659	0.995654	0.987452	0.473704
Specific Gravity			1.47975	1.00072	1.00042	1.56597	
API Gravity							
Enthalpy	Btu/h	-225516	-67830.0	-2115.62	-58996.8	-6016.39	-903.104
Mass Enthalpy	Btu/lb	-2319.54	-1211.00	-2024.97	-2023.06	-1031.79	-2329.47
Mass Cp	Btu/(lb*°F)	0.318461	0.389975	0.365708	0.365809	0.399007	0.491745
Ideal Gas CpCv Ratio		1.25733	1.13568	1.23162	1.23163	1.12408	1.27850
Dynamic Viscosity	cP		0.00964084	0.0119293	0.0119197	0.00916812	
Kinematic Viscosity	cSt		6.25749	11.5220	11.5097	5.61215	
Thermal Conductivity	Btu/(h*ft*°F)		0.0118868	0.0146242	0.0146200	0.0115579	
Surface Tension	lbf/ft						
Net Ideal Gas Heating Value	Btu/ft^3	625.297	1930.13	959.852	961.051	2164.26	496.385
Net Liquid Heating Value	Btu/lb	6922.80	16952.4	12426.3	12446.2	17963.7	6045.65
Gross Ideal Gas Heating Value	Btu/ft^3	686.354	2096.13	1054.26	1055.56	2348.41	555.055
Gross Liquid Heating Value	Btu/lb	7618.32	18422.7	13662.8	13684.4	19504.7	6817.99

Process Streams		Loading Water Max - 2	Oil with H2S to TKs Max	Stable Oil Max	Water from Separator Max	Water from Separator Max - 2
Composition	Status:	Solved	Solved	Solved	Solved	Solved
Phase: Total	From Block:	Four 750-bbl Water Tanks	--	Three 500-bbl Oil Tanks	--	--
	To Block:	--	Three 500-bbl Oil Tanks	--	One 500-bbl Water Tank	Four 750-bbl Water Tanks
Mole Fraction		%	%	%	%	%
H2S		41.3066	0.1722*	0.0744414	0.0108652*	0.0108652*
Nitrogen		0	0.1771*	0.00502862	0.000148300*	0.000148300*
Methane		0	0.504*	0.0297122	0.00433610*	0.00433610*
CO2		0	0.3601*	0.0232279	0.00746423*	0.00746423*
Ethane		0	1.1385*	0.284678	0.00169077*	0.00169077*
Propane		0	2.6062*	1.70941	0.000721446*	0.000721446*
i-Butane		0	0.8443*	0.723143	5.71867E-05*	5.71867E-05*
n-Butane		0	2.4979*	2.26421	0.000191090*	0.000191090*
i-Pentane		0	2.1568*	2.11982	3.42900E-05*	3.42900E-05*
n-Pentane		0	2.6914*	2.68131	1.60867E-05*	1.60867E-05*
nC6		0	6.9345*	7.07958	2.05746E-05*	2.05746E-05*
n-Hexane		0	3.1653*	3.24909	3.61835E-06*	3.61835E-06*
nC7		0	0*	0	0*	0*
n-Heptane		0	6.0245*	6.23850	1.78550E-06*	1.78550E-06*
Benzene		4.57583	2.9357*	3.01656	0.00145923*	0.00145923*
Toluene		1.86132	4.0479*	4.19758	0.000523351*	0.000523351*
2,2,4-Trimethylpentane		0	2.4587*	2.54534	8.46262E-07*	8.46262E-07*
nC8		0	5.9733*	6.20611	2.78844E-07*	2.78844E-07*
Ethylbenzene		0.286186	2.1391*	2.22348	7.84711E-05*	7.84711E-05*
m-Xylene		0.109599	1.3745*	1.42889	3.26646E-05*	3.26646E-05*
o-Xylene		0.0693246	0.4956*	0.515273	2.21220E-05*	2.21220E-05*
p-Xylene		0	0*	0	0*	0*
Nonane		0	6.0023*	6.24303	7.07079E-08*	7.07079E-08*
nC10		0	0*	0	7.60654E-12*	7.60654E-12*
Water		51.7911	0*	0	99.9723*	99.9723*
nC10+ Oil		0	45.3001*	47.1416	3.54286E-12*	3.54286E-12*
Molar Flow		lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h
H2S		0.162429	0.0697510*	0.0289752	0.0440039*	1.23209*
Nitrogen		0	0.0717358*	0.00195732	0.000600613*	0.0168169*
Methane		0	0.204149*	0.0115650	0.0175612*	0.491706*
CO2		0	0.145861*	0.00904112	0.0302301*	0.846429*
Ethane		0	0.461159*	0.110807	0.00684760*	0.191730*
Propane		0	1.05566*	0.665363	0.00292185*	0.0818106*
i-Butane		0	0.341991*	0.281473	0.000231606*	0.00648486*
n-Butane		0	1.01179*	0.881309	0.000773913*	0.0216692*
i-Pentane		0	0.873630*	0.825109	0.000138874*	0.00388842*
n-Pentane		0	1.09017*	1.04366	6.51512E-05*	0.00182421*
nC6		0	2.80888*	2.75562	8.33272E-05*	0.00233312*
n-Hexane		0	1.28213*	1.26466	1.46543E-05*	0.000410314*
nC7		0	0*	0	0*	0*
n-Heptane		0	2.44027*	2.42824	7.23125E-06*	0.000202472*
Benzene		0.0179934	1.18913*	1.17415	0.00590988*	0.165474*
Toluene		0.00731922	1.63964*	1.63385	0.00211957*	0.0593470*
2,2,4-Trimethylpentane		0	0.995917*	0.990737	3.42736E-06*	9.59645E-05*
nC8		0	2.41953*	2.41564	1.12932E-06*	3.16203E-05*
Ethylbenzene		0.00112536	0.866460*	0.865457	0.000317808*	0.00889848*
m-Xylene		0.000430972	0.556753*	0.556173	0.000132291*	0.00370410*
o-Xylene		0.000272603	0.200747*	0.200563	8.95941E-05*	0.00250860*
p-Xylene		0	0*	0	0*	0*
Nonane		0	2.43128*	2.43001	2.86367E-07*	8.01814E-06*
nC10		0	0*	0	3.08065E-11*	8.62568E-10*
Water		0.203656	0*	0	404.887*	11336.7*
nC10+ Oil		0	18.3492*	18.3492	1.43486E-11*	4.01754E-10*

Process Streams		Loading Water Max - 2	Oil with H2S to TKs Max	Stable Oil Max	Water from Separator Max	Water from Separator Max - 2
Composition	Status:	Solved	Solved	Solved	Solved	Solved
Phase: Total	From Block:	Four 750-bbl Water Tanks	--	Three 500-bbl Oil Tanks	--	--
	To Block:	--	Three 500-bbl Oil Tanks	--	One 500-bbl Water Tank	Four 750-bbl Water Tanks
Mass Fraction		%	%	%	%	%
H2S		48.2260	0.0287804*	0.0120557	0.0205482*	0.0205482*
Nitrogen		0	0.0243298*	0.000669395	0.000230532*	0.000230532*
Methane		0	0.0396511*	0.00226503	0.00386008*	0.00386008*
CO2		0	0.0777182*	0.00485763	0.0182287*	0.0182287*
Ethane		0	0.167883*	0.0406762	0.00282117*	0.00282117*
Propane		0	0.563581*	0.358187	0.00176533*	0.00176533*
i-Butane		0	0.240653*	0.199726	0.000184443*	0.000184443*
n-Butane		0	0.711984*	0.625354	0.000616319*	0.000616319*
i-Pentane		0	0.763119*	0.726767	0.000137285*	0.000137285*
n-Pentane		0	0.952271*	0.919270	6.44054E-05*	6.44054E-05*
C6		0	2.93057*	2.89907	9.83877E-05*	9.83877E-05*
n-Hexane		0	1.33768*	1.33049	1.73029E-05*	1.73029E-05*
C7		0	0*	0	0*	0*
n-Heptane		0	2.96040*	2.97046	9.92798E-06*	9.92798E-06*
Benzene		12.2444	1.12456*	1.11968	0.00632509*	0.00632509*
Toluene		5.87507	1.82904*	1.83784	0.00267584*	0.00267584*
2,2,4-Trimethylpentane		0	1.37732*	1.38162	5.36420E-06*	5.36420E-06*
nC8		0	3.34613*	3.36870	1.76751E-06*	1.76751E-06*
Ethylbenzene		1.04083	1.11369*	1.12171	0.000462293*	0.000462293*
m-Xylene		0.398601	0.715615*	0.720853	0.000192435*	0.000192435*
o-Xylene		0.252127	0.258027*	0.259948	0.000130326*	0.000130326*
p-Xylene		0	0*	0	0*	0*
Nonane		0	3.77525*	3.80485	5.03232E-07*	5.03232E-07*
C10		0	0*	0	6.00568E-11*	6.00568E-11*
Water		31.9629	0*	0	99.9416*	99.9416*
C10+ Oil		0	75.6618*	76.2949	6.69582E-11*	6.69582E-11*
Mass Flow		lb/h	lb/h	lb/h	lb/h	lb/h
H2S		5.53572	2.37718*	0.987502	1.49969*	41.9907*
Nitrogen		0	2.00956*	0.0548312	0.0168252*	0.471099*
Methane		0	3.27506*	0.185532	0.281725*	7.88817*
CO2		0	6.41929*	0.397895	1.33041*	37.2509*
Ethane		0	13.8666*	3.33185	0.205901*	5.76513*
Propane		0	46.5501*	29.3396	0.128841*	3.60749*
i-Butane		0	19.8772*	16.3598	0.0134614*	0.376914*
n-Butane		0	58.8077*	51.2236	0.0449815*	1.25946*
i-Pentane		0	63.0313*	59.5306	0.0100196*	0.280545*
n-Pentane		0	78.6547*	75.2988	0.00470058*	0.131614*
C6		0	242.056*	237.467	0.00718075*	0.201058*
n-Hexane		0	110.488*	108.983	0.00126284*	0.0353590*
C7		0	0*	0	0*	0*
n-Heptane		0	244.520*	243.315	0.000724586*	0.0202881*
Benzene		1.40550	92.8851*	91.7150	0.461632*	12.9255*
Toluene		0.674382	151.073*	150.540	0.195294*	5.46814*
2,2,4-Trimethylpentane		0	113.762*	113.170	0.000391502*	0.0109619*
nC8		0	276.380*	275.935	0.000129000*	0.00361194*
Ethylbenzene		0.119474	91.9877*	91.8813	0.0337401*	0.944707*
m-Xylene		0.0457542	59.1076*	59.0461	0.0140447*	0.393246*
o-Xylene		0.0289409	21.3123*	21.2927	0.00951176*	0.266325*
p-Xylene		0	0*	0	0*	0*
Nonane		0	311.824*	311.661	3.67280E-05*	0.00102837*
C10		0	0*	0	4.38320E-09*	1.22728E-07*
Water		3.66893	0*	0	7294.16*	204233*
C10+ Oil		0	6249.43*	6249.43	4.88689E-09*	1.36831E-07*

Process Streams		Loading Water Max - 2	Oil with H2S to TKs Max	Stable Oil Max	Water from Separator Max	Water from Separator Max - 2
Properties	Status:	Solved	Solved	Solved	Solved	Solved
Phase: Total	From Block:	Four 750-bbl Water Tanks	--	Three 500-bbl Oil Tanks	--	--
	To Block:	--	Three 500-bbl Oil Tanks	--	One 500-bbl Water Tank	Four 750-bbl Water Tanks
Property	Units					
Temperature	°F	96.4992	100*	96.8152	100*	100*
Pressure	psig	-1.43595	35*	-1.43595	35*	35*
Mole Fraction Vapor	%	50.3532	0.173088	0	0.00100414	0.00100414
Mole Fraction Light Liquid	%	1.07584	99.8269	100	99.9990	99.9990
Mole Fraction Heavy Liquid	%	48.5709	0	0	0	0
Phase Mole Fraction	%	100	100	100	100	100
Molecular Weight	lb/lbmol	29.1910	203.914	210.442	18.0208	18.0208
Mass Density	lb/ft^3	0.129895	48.5416	51.2258	61.6972	61.6972
Molar Flow	lbmol/h	0.393227	40.5058	38.9235	404.999	11339.8
Mass Flow	lb/h	11.4787	8259.70	8191.15	7298.42	204353
Vapor Volumetric Flow	ft^3/h	88.3691	170.157	159.903	118.294	3312.19
Liquid Volumetric Flow	gpm	11.0175	21.2144	19.9359	14.7484	412.948
Std Vapor Volumetric Flow	MMSCFD	0.00358136	0.368912	0.354501	3.68858	103.279
Std Liquid Volumetric Flow	sgpm	0.0263549	19.8022*	19.5417	14.5940*	408.627*
Compressibility		0.499264	0.0347582	0.00912157	0.00241676	0.00241676
Specific Gravity				0.821338		
API Gravity				37.5600		
Enthalpy	Btu/h	-25369.9	-6.38836E+06	-6.30944E+06	-4.95974E+07	-1.38871E+09
Mass Enthalpy	Btu/lb	-2210.17	-773.438	-770.275	-6795.64	-6795.64
Mass Cp	Btu/(lb*°F)	0.477222	0.472226	0.469759	0.977046	0.977046
Ideal Gas CpCv Ratio		1.27845	1.02649	1.02579	1.32813	1.32813
Dynamic Viscosity	cP			2.31852		
Kinematic Viscosity	cSt			2.82554		
Thermal Conductivity	Btu/(h*ft*°F)			0.0722080		
Surface Tension	lbf/ft			0.00186555		
Net Ideal Gas Heating Value	Btu/ft^3	509.275	9889.85	10211.8	0.239185	0.239185
Net Liquid Heating Value	Btu/lb	6147.88	18254.8	18264.4	-1054.18	-1054.18
Gross Ideal Gas Heating Value	Btu/ft^3	567.936	10537.7	10879.1	50.5535	50.5535
Gross Liquid Heating Value	Btu/lb	6910.54	19460.4	19467.6	5.33988	5.33988

Process Streams		Water Leaving Tanks Max	Water Leaving Tanks Max - 2	Working Oil Max	Working Water Max	Working Water Max - 2
Composition	Status:	Solved	Solved	Solved	Solved	Solved
Phase: Total	From Block:	One 500-bbl Water Tank	Four 750-bbl Water Tanks	Three 500-bbl Oil Tanks	One 500-bbl Water Tank	Four 750-bbl Water Tanks
	To Block:	--	--	MIX-100	MIX-102	MIX-101
Mole Fraction		%	%	%	%	%
H2S		0.00398142	0.00440637	3.03262	34.4366	33.4253
Nitrogen		0	0	0.342169	0.0807726	0.0845831
Methane		0	0	3.29380	4.39775	4.60393
CO2		0	0	7.84878	33.9043	35.4060
Ethane		0	0	29.3143	2.19727	2.30200
Propane		0	0	29.4929	0.701993	0.735791
i-Butane		0	0	4.25939	0.0368748	0.0387194
n-Butane		0	0	9.03264	0.174080	0.182456
i-Pentane		0	0	3.29228	0.0215018	0.0225668
n-Pentane		0	0	3.12452	0.00510670	0.00534888
iC6		0	0	3.47969	0.00806231	0.00845472
n-Hexane		0	0	1.15536	0.000761826	0.000798536
iC7		0	0	0	0	0
n-Heptane		0	0	0.694950	0.000259859	0.000272685
Benzene		0.000968832	0.00100017	0.685820	2.42987	2.35171
Toluene		0.000294973	0.000309509	0.294404	1.13215	1.09606
2,2,4-Trimethylpentane		0	0	0.302976	0.000143049	0.000150696
nC8		0	0	0.205020	1.89340E-05	1.98479E-05
Ethylbenzene		3.87398E-05	4.12939E-05	0.0538971	0.196182	0.189753
m-Xylene		9.16284E-06	1.06483E-05	0.0304111	0.116570	0.112911
o-Xylene		1.44877E-05	1.49789E-05	0.00881056	0.0377305	0.0364933
p-Xylene		0	0	0	0	0
Nonane		0	0	0.0552849	3.75253E-06	3.94865E-06
C10		2.71699E-30	0	0	1.28314E-10	1.34883E-10
Water		99.9947	99.9942	0	20.1220	19.3967
C10+ Oil		0	0	8.65567E-08	3.94458E-09	4.16892E-09
Molar Flow		lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h
H2S		0.0161205	0.499545	0.00654315	0.0225596	0.630595
Nitrogen		0	0	0.000738260	5.29145E-05	0.00159573
Methane		0	0	0.00710667	0.00288099	0.0868569
CO2		0	0	0.0169345	0.0222108	0.667962
Ethane		0	0	0.0632481	0.00143944	0.0434291
Propane		0	0	0.0636336	0.000459879	0.0138813
i-Butane		0	0	0.00919001	2.41568E-05	0.000730471
n-Butane		0	0	0.0194887	0.000114040	0.00344218
i-Pentane		0	0	0.00710339	1.40859E-05	0.000425741
n-Pentane		0	0	0.00674143	3.34542E-06	0.000100911
iC6		0	0	0.00750775	5.28166E-06	0.000159505
n-Hexane		0	0	0.00249279	4.99075E-07	1.50650E-05
iC7		0	0	0	0	0
n-Heptane		0	0	0.00149942	1.70235E-07	5.14441E-06
Benzene		0.00392273	0.113388	0.00147972	0.00159182	0.0443669
Toluene		0.00119432	0.0350887	0.000635202	0.000741679	0.0206780
2,2,4-Trimethylpentane		0	0	0.000653697	9.37123E-08	2.84301E-06
nC8		0	0	0.000442349	1.24037E-08	3.74446E-07
Ethylbenzene		0.000156855	0.00468144	0.000116288	0.000128520	0.00357985
m-Xylene		3.70996E-05	0.00120719	6.56146E-05	7.63655E-05	0.00213015
o-Xylene		5.86594E-05	0.00169815	1.90096E-05	2.47174E-05	0.000688475
p-Xylene		0	0	0	0	0
Nonane		0	0	0.000119282	2.45830E-09	7.44944E-08
C10		1.10009E-29	0	0	8.40588E-14	2.54467E-12
Water		404.871	11336.2	0	0.0131820	0.365934
C10+ Oil		0	0	1.86754E-10	2.58411E-12	7.86500E-11

Process Streams		Water Leaving Tanks Max	Water Leaving Tanks Max - 2	Working Oil Max	Working Water Max	Working Water Max - 2
Composition	Status:	Solved	Solved	Solved	Solved	Solved
Phase: Total	From Block:	One 500-bbl Water Tank	Four 750-bbl Water Tanks	Three 500-bbl Oil Tanks	One 500-bbl Water Tank	Four 750-bbl Water Tanks
	To Block:	--	--	MIX-100	MIX-102	MIX-101
Mass Fraction		%	%	%	%	%
H2S		0.00753134	0.00833512	2.26980	33.1123	31.9891
Nitrogen		0	0	0.210506	0.0638393	0.0665373
Methane		0	0	1.16045	1.99049	2.07403
CO2		0	0	7.58592	42.0978	43.7562
Ethane		0	0	19.3579	1.86407	1.94375
Propane		0	0	28.5609	0.873346	0.911100
i-Butane		0	0	5.43686	0.0604685	0.0631955
n-Butane		0	0	11.5297	0.285462	0.297794
i-Pentane		0	0	5.21657	0.0437686	0.0457210
n-Pentane		0	0	4.95076	0.0103951	0.0108370
iC6		0	0	6.58542	0.0196020	0.0204597
n-Hexane		0	0	2.18655	0.00185224	0.00193238
iC7		0	0	0	0	0
n-Heptane		0	0	1.52929	0.000734635	0.000767278
Benzene		0.00420038	0.00433620	1.17648	5.35498	5.15842
Toluene		0.00150850	0.00158283	0.595722	2.94309	2.83590
2,2,4-Trimethylpentane		0	0	0.760049	0.000461019	0.000483385
nC8		0	0	0.514316	6.10203E-05	6.36655E-05
Ethylbenzene		0.000228277	0.000243326	0.125663	0.587623	0.565701
m-Xylene		5.39926E-05	6.27456E-05	0.0709043	0.349161	0.336614
o-Xylene		8.53695E-05	8.82639E-05	0.0205421	0.113014	0.108795
p-Xylene		0	0	0	0	0
Nonane		0	0	0.155719	1.35787E-05	1.42213E-05
C10		2.14566E-29	0	0	5.15086E-10	5.38917E-10
Water		99.9864	99.9854	0	10.2275	9.81261
C10+ Oil		0	0	6.47417E-07	3.79038E-08	3.98716E-08
Mass Flow		lb/h	lb/h	lb/h	lb/h	lb/h
H2S		0.549400	17.0249	0.222996	0.768851	21.4912
Nitrogen		0	0	0.0206812	0.00148231	0.0447017
Methane		0	0	0.114009	0.0462181	1.39340
CO2		0	0	0.745277	0.977488	29.3967
Ethane		0	0	1.90181	0.0432827	1.30587
Propane		0	0	2.80596	0.0202786	0.612104
i-Butane		0	0	0.534144	0.00140405	0.0424566
n-Butane		0	0	1.13273	0.00662828	0.200067
i-Pentane		0	0	0.512501	0.00101628	0.0307167
n-Pentane		0	0	0.486386	0.000241368	0.00728060
iC6		0	0	0.646983	0.000455149	0.0137454
n-Hexane		0	0	0.214817	4.30080E-05	0.00129823
iC7		0	0	0	0	0
n-Heptane		0	0	0.150244	1.70578E-05	0.000515480
Benzene		0.306411	8.85692	0.115584	0.124340	3.46558
Toluene		0.110043	3.23302	0.0585266	0.0683371	1.90524
2,2,4-Trimethylpentane		0	0	0.0746708	1.07046E-05	0.000324752
nC8		0	0	0.0505288	1.41686E-06	4.27724E-05
Ethylbenzene		0.0166525	0.497005	0.0123457	0.0136443	0.380055
m-Xylene		0.00393868	0.128161	0.00696598	0.00810734	0.226147
o-Xylene		0.00622758	0.180284	0.00201815	0.00262412	0.0730920
p-Xylene		0	0	0	0	0
Nonane		0	0	0.0152985	3.15290E-07	9.55428E-06
C10		1.56523E-27	0	0	1.19600E-11	3.62060E-10
Water		7293.86	204225	0	0.237477	6.59240
C10+ Oil		0	0	6.36053E-08	8.80105E-10	2.67869E-08

Process Streams		Water Leaving Tanks Max	Water Leaving Tanks Max - 2	Working Oil Max	Working Water Max	Working Water Max - 2
Properties	Status:	Solved	Solved	Solved	Solved	Solved
Phase: Total	From Block:	One 500-bbl Water Tank	Four 750-bbl Water Tanks	Three 500-bbl Oil Tanks	One 500-bbl Water Tank	Four 750-bbl Water Tanks
	To Block:	--	--	MIX-100	MIX-102	MIX-101
Property	Units					
Temperature	°F	96.8152	96.4992	96.8152	96.8152	96.4992
Pressure	psig	-1.43595	-1.43595	-1.43595	-1.43595	-1.43595
Mole Fraction Vapor	%	0	0	100	85.4736	86.1924
Mole Fraction Light Liquid	%	100	100	0	14.5264	13.8076
Mole Fraction Heavy Liquid	%	0	0	0	0	0
Phase Mole Fraction	%	100	100	100	100	100
Molecular Weight	lb/lbmol	18.0168	18.0169	45.5345	35.4439	35.6110
Mass Density	lb/ft^3	61.9903	61.9942	0.102430	0.0926296	0.0923363
Molar Flow	lbmol/h	404.892	11336.9	0.215759	0.0655104	1.88658
Mass Flow	lb/h	7294.85	204255	9.82448	2.32195	67.1830
Vapor Volumetric Flow	ft^3/h	117.677	3294.75	95.9145	25.0670	727.590
Liquid Volumetric Flow	gpm	14.6714	410.774	11.9582	3.12524	90.7125
Std Vapor Volumetric Flow	MMSCFD	3.68760	103.252	0.00196505	0.000596644	0.0171822
Std Liquid Volumetric Flow	sgpm	14.5833	408.333	0.0377700	0.00595145	0.172777
Compressibility		0.000645326	0.000645656	0.987056	0.849608	0.856810
Specific Gravity		0.993933	0.993995	1.57219		
API Gravity		9.99828	9.99831			
Enthalpy	Btu/h	-4.96121E+07	-1.38918E+09	-11623.1	-5594.34	-164367
Mass Enthalpy	Btu/lb	-6800.97	-6801.21	-1183.07	-2409.33	-2446.56
Mass Cp	Btu/(lb*°F)	0.977149	0.977157	0.395013	0.301460	0.298215
Ideal Gas CpCv Ratio		1.32827	1.32829	1.12495	1.27343	1.27329
Dynamic Viscosity	cP	0.725213	0.727728	0.00911118		
Kinematic Viscosity	cSt	0.730332	0.732819	5.55301		
Thermal Conductivity	Btu/(h*ft*°F)	0.358720	0.358586	0.0110095		
Surface Tension	lbf/ft	0.00483261	0.00483490			
Net Ideal Gas Heating Value	Btu/ft^3	0.0738510	0.0783150	2156.39	454.606	448.491
Net Liquid Heating Value	Btu/lb	-1058.08	-1057.98	17820.6	4638.41	4556.26
Gross Ideal Gas Heating Value	Btu/ft^3	50.3854	50.3899	2341.08	498.674	491.931
Gross Liquid Heating Value	Btu/lb	1.61782	1.71613	19360.2	5110.32	5019.26

Tank Losses Report Three 500-bbl Oil Tanks					
Client Name:		Apache Corporation		Job:	
Location:		Brahmney Unit Tank Battery		Modified:	
Flow sheet:		Emissions pph		Status:	
				10/10/2024 16:37	
				Solved 4:38 PM, 10/10/2024	
Stream Connections					
Stream	Connection Type	Other Block	Stream	Connection Type	Other Block
Oil with H2S to Tks Max	Inlet		Flash Oil Max	Flashing Losses Stream	MIX-100
Working Oil Max	Working Losses Stream	MIX-100	Breathing Oil Max	Standing Losses Stream	MIX-100
Loading Oil Max	Loading Losses Stream		Stable Oil Max	Residual Liquid Stream	
Working and Standing Properties : Scalar Data					
Tank Geometry	Vertical Cylinder		Roof Type	Cone	
Shell Length	10' ft		Slope of Coned Roof	0.0625	
Shell Diameter	15.5' ft		Breather Vent Pressure	0.0300000 psig	
Number of Storage Tanks	3*		Breather Vacuum Pressure	-0.0300000 psig	
Maximum Fraction Fill of Tank	90 %		Location	Midland, TX*	
Average Fraction Fill of Tank	50 %		Time Frame	July*	
Minimum Fraction Fill of Tank	10 %		Known Liquid Bulk Temperature?	FALSE	
Material Category	Heavy Crude*		Liquid Bulk Temperature	85.3309 °F	
Insulation	Uninsulated		Use AP 42 Raoult's Vapor Pressure?	TRUE	
Boiled or Riveted Construction?	FALSE		Flashing Temperature	98.8152 °F	
Vapor Balanced Tank?	FALSE		Average Daily Maximum Ambient Temperature	93.8 °F	
Known Sum of Increases in Liquid Level?	FALSE		Average Daily Minimum Ambient Temperature	71 °F	
Sum of Increases in Liquid Level	2468.03 ft/yr		Atmospheric Pressure at Tank Location	13.26 psia	
Shell Color	Tan*		Daily Solar Insolation	2272 Btu/(day*ft²)	
Shell Paint Condition	New*		Average Wind Speed	10.7 mph	
Roof Color	Tan*		Include Short Term Emissions	TRUE	
Roof Paint Condition	New*				
Composition Subset Properties : Scalar Data					
Component Subset	All Selected*		Species in Results	Selected Species	
Atomic Basis	FALSE		Fraction Denominator	Selected Species	
Details Properties : Scalar Data					
Vapor Space Volume	1540.00 ft³		Roof Outage	0.161458 ft	
Vapor Density	0.0821349 lb/ft³		Tank Roof Height	0.484375 ft	
Vapor Space Expansion Factor	0.962810 1/day		Tank Shell Radius	7.75 ft	
Vented Vapor Saturation Factor	0.176218		Vapor Molecular Weight	45.5345 lb/lbmol	
Vapor Space Outage	8.16146 ft		Average Vapor Temperature	550.694 °R	
Average Daily Vapor Temperature Range	34.5509 °R		Average Daily Ambient Temperature	542.07 °R	
Average Daily Vapor Pressure Range	2.39625 psi		Net Working Loss Throughput	465957 ft³/yr	
Breather Vent Pressure Setting Range	0.0600000 psi		Working Loss Turnover (Saturation) Factor	1	
Vapor Pressure at Average Daily Liquid Surface Temperature	10.6601 psia		Number of Turnovers per Year	192.815	
Average Daily Liquid Surface Temperature	547.848 °R		Annual Net Throughput	248858 bbl/yr	
Average Daily Ambient Temperature Range	22.8 °R		Maximum Liquid Height	14.4 ft	
Tank Roof Surface Solar Absorbance	0.43		Minimum Liquid Height	1.6 ft	
Tank Shell Surface Solar Absorbance	0.43		Working Loss Product Factor	0.75	
Vapor Pressure at Maximum Liquid Surface Temperature	11.8944 psia		Vent Setting Correction Factor	1	
Vapor Pressure at Minimum Liquid Surface Temperature	9.49515 psia		Saturation Factor	0.6	
Maximum Liquid Surface Temperature	556.485 °R		Vapor Pressure of Liquid Loaded	7.85519 psia	
Minimum Liquid Surface Temperature	539.210 °R		Collection Efficiency	70 %	
Liquid Height	8 ft		Annual Net Throughput Per Tank	82952.8 bbl/yr	
Loading Properties : Scalar Data					
Cargo Carrier	Tank Truck or Rail Tank Car		Truck Annual Leak Test Passed	None*	
Land Based Mode of Operation	Submerged Loading: Dedicated Normal Service*		Overall Reduction Efficiency	0 %	
Control Efficiency	0 %				
Results Properties : Scalar Data					
Flashing Losses	1344.28 lb/d		Standing Losses per Tank	21.7041 lb/d	
Working Losses	235.788 lb/d		Flashing Losses per Tank	448.093 lb/d	
Standing Losses	65.1122 lb/d		Working and Standing Losses	300.900 lb/d	
Loading Losses	139.945 lb/d		Working and Standing Losses per Tank	100.300 lb/d	
Working Losses per Tank	78.5958 lb/d		Loading Losses per Tank	46.6483 lb/d	
Results Properties : Tabulated Data					
Index	Flashing Losses Mass Flows lb/d	Working Losses Mass Flows lb/d	Standing Losses Mass Flows lb/d	Loading Losses Mass Flows lb/d	Working and Standing Losses Mass Flows lb/d
H2S	26.5224	5.35191	1.47792	3.17647	6.82983
Nitrogen	46.2802	0.496348	0.137066	0.294593	0.633414
Methane	70.6568	2.73620	0.755597	1.62400	3.49186
CO2	121.687	17.8966	4.93936	10.6161	22.8268
Ethane	194.586	45.6435	12.6043	27.0904	58.2478
Propane	327.112	67.3431	18.5967	39.9696	85.0398
i-Butane	68.0590	12.8194	3.54006	7.60862	16.3595
n-Butane	147.326	27.1955	7.50722	16.1352	34.6027
i-Pentane	68.3205	12.3000	3.39663	7.30033	15.6967
n-Pentane	65.8454	11.6733	3.22355	6.92833	14.8968
iC6	90.3225	15.3276	4.28791	9.21596	19.8155
n-Hexane	29.5512	5.15562	1.42371	3.05997	6.57933
iC7	0	0	0	0	0
n-Heptane	24.3282	3.60587	0.995753	2.14016	4.60162
Benzene	24.5408	2.77400	0.76036	1.64643	3.54094
Toluene	11.0071	1.4064	0.387888	0.833682	1.79253
2,2,4-Trimethylpentane	11.9118	1.79210	0.494885	1.06365	2.28698
nC8	9.12953	1.21269	0.343883	0.719759	1.54757
Ethylbenzene	2.17669	0.296297	0.0816217	0.175858	0.378118
m-Xylene	1.26229	0.167183	0.0461674	0.0992269	0.213351
o-Xylene	0.407881	0.0484356	0.0133754	0.0287476	0.0618110
p-Xylene	0	0	0	0	0
Nonane	3.44560	0.367165	0.101392	0.217920	0.468557
C10	0	0	0	0	0
Water	0	0	0	0	0
C10+ Oil	1.71123E-05	1.52653E-06	4.21548E-07	9.06027E-07	1.94808E-06
Short Term Properties : Scalar Data					
Maximum Battery Filling Rate	27.9167 bbl/hr		Short-Term Working Losses per Tank	4.80084 lb/h	
Short-Term Number of Storage Tanks	3		Short-Term Loading Losses per Tank	15.8183 lb/h	
Worst-Case Liquid Surface Temperature	96.8152 °F		Short-Term Vapor Molecular Weight	46.1352 lb/lbmol	
Maximum Loading Rate	200 bbl/hr		Vapor Pressure at Worst-Case Temperature	11.8944 psia	
Worst-Case Flashing Losses	55.2747 lb/h		Short-Term Control Efficiency	0 %	
Short-Term Working Losses	14.4025 lb/h		Short-Term Truck Annual Leak Test Passed	None	
Short-Term Loading Losses	47.4550 lb/h		Short-Term Overall Reduction Efficiency	0 %	
Worst-Case Flashing Losses per Tank	18.4249 lb/h		Short-Term Collection Efficiency	70 %	
Short Term Properties : Tabulated Data					
Index	Worst-Case Flashing Losses Mass Flows lb/h	Short-Term Working Losses Mass Flows lb/h	Short-Term Loading Losses Mass Flows lb/h		
H2S	1.09056	0.323144	1.06473		
Nitrogen	1.90297	0.0268183	0.0883640		
Methane	2.90530	0.147841	0.487122		
CO2	5.00360	0.966438	3.16433		
Ethane	8.00108	2.72467	8.97755		
Propane	13.4503	4.07627	13.4309		
i-Butane	2.79848	0.789921	2.60272		
n-Butane	6.05781	1.68500	5.55193		
i-Pentane	2.80923	0.778694	2.56573		
n-Pentane	2.69924	2.45219	2.45543		
iC6	3.71392	1.00962	3.32727		
n-Hexane	1.21510	0.338378	1.11463		
iC7	0	0	0		
n-Heptane	1.00034	0.243575	0.802558		
Benzene	1.00908	0.184312	0.607291		
Toluene	0.452595	0.0695960	0.315310		
2,2,4-Trimethylpentane	0.489793	0.120037	0.395511		
nC8	0.375408	0.0850179	0.280127		
Ethylbenzene	0.0895020	0.0207362	0.0683239		
m-Xylene	0.0519033	0.0117296	0.0396480		
o-Xylene	0.0167714	0.00341613	0.0112559		
p-Xylene	0	0	0		
Nonane	0.141678	0.0257839	0.0849557		
C10	0	0	0		
Water	0	0	0		
C10+ Oil	7.03633E-07	1.61882E-07	5.33386E-07		
Notes:					

Tank Losses Report Four 750-bbl Water Tanks					
Client Name:	Apache Corporation			Job:	
Location:	Brahmney Unit Tank Battery			Modified:	9/13/2024 9:41
Flowsheet:	Emissions pph			Status:	Solved 11:06 AM @13/2024
Stream Connections					
Stream	Connection Type	Other Block	Stream	Connection Type	Other Block
Water from Separator Max - 2	Inlet		Flash Water Max - 2	Flashing Losses Stream	MIX-101
Working Water Max - 2	Working Losses Stream	MIX-101	Breathing Water Max - 2	Standing Losses Stream	MIX-101
Loading Water Max - 2	Loading Losses Stream		Water Leaving Tanks Max - 2	Residual Liquid Stream	
Working and Standing Properties : Scalar Data					
Tank Geometry	Vertical Cylinder		Roof Type		
Shell Length	24' ft		Slope of Coned Roof		
Shell Diameter	15.5' ft		Breather Vent Pressure		
Number of Storage Tanks	4		Breather Vacuum Pressure		
Maximum Fraction Fill of Tank	90 %		Location		
Average Fraction Fill of Tank	50 %		Time Frame		
Minimum Fraction Fill of Tank	10 %		Know Liquid Bulk Temperature?		
Material Category	Light Organics*		Liquid Bulk Temperature		
Insulation	Uninsulated		Use AP 42 Raoult's Vapor Pressure?		
Bolted or Riveted Construction?	FALSE		Flashing Temperature		
Vapor Balanced Tank?	FALSE		Average Daily Maximum Ambient Temperature		
Known Sum of Increases in Liquid Level?	FALSE		Average Daily Minimum Ambient Temperature		
Sum of Increases in Liquid Level	38185.0 lbf/yr		Atmospheric Pressure at Tank Location		
Shell Color	Tan*		Daily Solar Insolation		
Shell Paint Condition	New*		Average Wind Speed		
Roof Color	Tan*		Include Short Term Emissions		
Roof Paint Condition	New*				
Composition Subset Properties : Scalar Data					
Component Subset	All Selected*		Species in Results		Selected Species
Atomic Basis	FALSE		Fraction Denominator		Selected Species
Details Properties : Scalar Data					
Vapor Space Volume	2294.77 ft ³		Roof Outage		0.161458 ft
Vapor Density	0.0596766 lbf/ft ³		Tank Roof Height		0.484375 ft
Vapor Space Expansion Factor	1		Tank Shell Radius		7.75 ft
Vented Vapor Saturation Factor	0.112637		Vapor Molecular Weight		28.8228 lbf/lbmol
Vapor Space Outage	12.1615 ft		Average Vapor Temperature		550.084 °R
Average Daily Vapor Temperature Range	34.5070 °R		Average Daily Ambient Temperature		542.07 °R
Average Daily Vapor Pressure Range	2.03283 psi		Net Working Loss Throughput		7.20520E+06 ft ³ /yr
Breather Vent Pressure Setting Range	0.050000 psi		Working Loss Turnover (Saturation) Factor		1
Vapor Pressure at Average Daily Liquid Surface Temperature	12.2225 psia		Number of Turnovers per Year		1988.80
Average Daily Liquid Surface Temperature	547.542 °R		Annual Net Throughput		5.13373E+06 bbl/yr
Average Daily Ambient Temperature Range	22.2 °R		Maximum Liquid Height		21.6 ft
Tank Roof Surface Solar Absorptance	0.43		Minimum Liquid Height		2.4 ft
Tank Shell Surface Solar Absorptance	0.43		Working Loss Product Factor		1
Vapor Pressure at Maximum Liquid Surface Temperature	13.2600 psia		Vent Setting Correction Factor		1
Vapor Pressure at Minimum Liquid Surface Temperature	11.2272 psia		Saturation Factor		0.6
Maximum Liquid Surface Temperature	556.169 °R		Vapor Pressure of Liquid Loaded		1.16464 psia
Minimum Liquid Surface Temperature	538.916 °R		Collection Efficiency		70 %
Liquid Height	12 ft		Annual Net Throughput Per Tank		1.28343E+06 bbl/yr
Loading Properties : Scalar Data					
Cargo Carrier	Tank Truck or Rail Tank Car*			Truck Annual Leak Test Passed	
Land Based Mode of Operation	Submerged Loading- Dedicated Normal Service*			Overall Reduction Efficiency	
Control Efficiency	0 %				

Tank Losses Report

One 500-bbl Water Tank

Client Name:

Apache Corporation

Job:

Location:

Brahmney Unit Tank Battery

Modified:

9/13/2024 9:38

Flowsheet:

Emissions pph

Status:

Solved 9:42 AM, 9/13/2024

Stream

Connection Type

Other Block

Stream

Connection Type

Other Block

Water from Separator Max

Inlet

MIX-102

Flash Water Max

Flashing Losses Stream

MIX-102

Working Water Max

Working Losses Stream

Breathing Water Max

Standing Losses Stream

MIX-102

Loading Water Max

Loading Losses Stream

Water Leaving Tanks Max

Residual Liquid Stream

Working and Standing Properties : Scalar Data

Tank Geometry

Vertical Cylinder

Roof Type

Cone

Shell Length

10' ft

Slope of Coned Roof

0.0625

Shell Diameter

15.5' ft

Breather Vent Pressure

0.0300000 psig

Number of Storage Tanks

1*

Breather Vacuum Pressure

-0.0300000 psig

Maximum Fraction Fill of Tank

90 %

Location

Midland, TX*

Average Fraction Fill of Tank

50 %

Time Frame

July*

Minimum Fraction Fill of Tank

10 %

Known Liquid Bulk Temperature?

FALSE

Material Category

Light Organics*

Liquid Bulk Temperature

85.3309 °F

Insulation

Uninsulated

Use AP 42 Raoult's Vapor Pressure?

FALSE

Boiled or Riveted Construction?

FALSE

Flashing Temperature

98.8152 °F

Vapor Balanced Tank?

FALSE

Average Daily Maximum Ambient Temperature

93.8 °F

Known Sum of Increases in Liquid Level?

FALSE

Average Daily Minimum Ambient Temperature

71 °F

Sum of Increases in Liquid Level

5455.38 lb/yr

Atmospheric Pressure at Tank Location

13.26 psia

Shell Color

Tan*

Daily Solar Insolation

2272 Btu/(day*ft²)

Shell Paint Condition

New*

Average Wind Speed

10.7 mph

Roof Color

Tan*

Include Short Term Emissions

TRUE

Roof Paint Condition

New*

Composition Subset Properties : Scalar Data

Component Subset

All Selected*

Species in Results

Selected Species

Atomic Basis

FALSE

Fraction Denominator

Selected Species

Details Properties : Scalar Data

Vapor Space Volume

1540.00 ft³

Roof Outage

0.161458 ft

Vapor Density

0.0596298 lb/ft³

Tank Roof Height

0.484375 ft

Vapor Space Expansion Factor

1 1/day

Tank Shell Radius

7.75 ft

Vented Vapor Saturation Factor

0.159494

Vapor Molecular Weight

28.8331 lb/lbmol

Vapor Space Outage

8.16146 ft

Average Vapor Temperature

550.694 °R

Average Daily Vapor Temperature Range

34.5509 °R

Average Daily Ambient Temperature

542.07 °R

Average Daily Vapor Pressure Range

2.03542 psi

Net Working Loss Throughput

1.02939E+06 ft³/3yr

Breather Vent Pressure Setting Range

0.0600000 psi

Working Loss Turnover (Saturation) Factor

1

Vapor Pressure at Average Daily Liquid Surface Temperature

12.2221 psia

Number of Turnovers per Year

426.202

Average Daily Liquid Surface Temperature

547.848 °R

Annual Net Throughput

183361 bbl/yr

Average Daily Ambient Temperature Range

22.8 °R

Maximum Liquid Height

14.4 ft

Tank Roof Surface Solar Absorptance

0.43

Minimum Liquid Height

1.6 ft

Tank Shell Surface Solar Absorptance

0.43

Working Loss Product Factor

1

Vapor Pressure at Maximum Liquid Surface Temperature

13.2600 psia

Vent Setting Correction Factor

1

Vapor Pressure at Minimum Liquid Surface Temperature

11.2266 psia

Saturation Factor

0.6

Maximum Liquid Surface Temperature

556.485 °R

Vapor Pressure of Liquid Loaded

1.11514 psia

Minimum Liquid Surface Temperature

539.210 °R

Collection Efficiency

70 %

Liquid Height

8 ft

Annual Net Throughput Per Tank

183361 bbl/yr

Loading Properties : Scalar Data

Cargo Carrier

Tank Truck or Rail Tank Car*

Truck Annual Leak Test Passed

None

Land Based Mode of Operation

Submerged Loading: Dedicated Normal Service*

Overall Reduction Efficiency

0 %

Control Efficiency

0 %

Results Properties : Scalar Data

Flashing Losses

25.0744 lb/d

Standing Losses per Tank

4.84030 lb/d

Working Losses

55.7267 lb/d

Flashing Losses per Tank

25.0744 lb/d

Standing Losses

4.84030 lb/d

Working and Standing Losses

60.5670 lb/d

Loading Losses

9.30449 lb/d

Working and Standing Losses per Tank

60.5670 lb/d

Working Losses per Tank

55.7267 lb/d

Loading Losses per Tank

9.30449 lb/d

Results Properties : Tabulated Data

Index

Flashing Losses Mass Flows

Working Losses Mass Flows

Standing Losses Mass Flows

Loading Losses Mass Flows

Working and Standing Losses Mass Flows

lb/d

lb/d

lb/d

lb/d

lb/d

H2S

2.75187

18.4524

1.60274

3.08093

20.0552

Nitrogen

0.365140

0.0355756

0.00309001

0.00593992

0.0386656

Methane

5.55581

1.10923

0.0963457

0.185205

1.20558

CO2

6.45248

23.4507

2.03766

3.91698

25.4074

Ethane

3.81261

1.03878

0.0602265

0.173442

1.12901

Propane

2.56322

0.486687

0.0422726

0.0812603

0.528960

i-Butane

0.286451

0.0336971

0.00262686

0.00562628

0.0368244

n-Butane

0.906661

0.159079

0.0138172

0.0265608

0.172964

i-Pentane

0.213961

0.0243908

0.00211853

0.00407244

0.0265093

n-Pentane

0.106518

0.00679284

0.000503153

0.000967208

0.00629599

iC6

0.160466

0.0109236

0.000949796

0.00182387

0.0118724

n-Hexane

0.0291863

0.00103219

8.96539E-05

0.000172341

0.00112185

iC7

0

0

0

0

0

n-Heptane

0.0169451

0.000409388

3.55985E-05

6.83540E-05

0.000444947

Benzene

0.491943

2.39415

0.259197

0.469253

3.24335

Toluene

0.263474

1.64009

0.142455

0.273840

1.72555

2,2,4-Trimethylpentane

0.00911682

0.000256911

2.23147E-05

4.28954E-05

0.000279225

nC8

0.00305904

3.40048E-05

2.95357E-06

5.67763E-06

3.69582E-05

Ethylbenzene

0.0541960

0.327463

0.0284457

0.0546753

0.355906

m-Xylene

0.0310681

0.194576

0.0169004

0.0324877

0.211477

o-Xylene

0.0103712

0.0629789

0.00547021

0.0105154

0.0684491

p-Xylene

0

0

0

0

0

Nonane

0.000873247

7.56695E-06

6.57248E-07

1.26343E-06

8.22420E-06

C10

1.04895E-07

2.87041E-10

2.49317E-11

4.79261E-11

3.11972E-10

Water

1.01899

5.69945

0.495042

0.951617

6.19450

C10+ Oil

9.43282E-08

2.11225E-08

1.83466E-09

3.52679E-09

2.29572E-08

Short Term Properties : Scalar Data

Maximum Battery Filling Rate

20.8333 bbl/hr

Short-Term Working Losses per Tank

2.57764 lb/h

Short-Term Number of Storage Tanks

1

Short-Term Loading Losses per Tank

4.53914 lb/h

Worst-Case Liquid Surface Temperature

96.8152 °F

Short-Term Vapor Molecular Weight

28.9834 lb/lbmol

Maximum Loading Rate

220' bbl/hr

Vapor Pressure at Worst-Case Temperature

13.2600 psia

Worst-Case Flashing Losses

1.04400 lb/h

Short-Term Control Efficiency

0 %

Short-Term Working Losses

2.57764 lb/h

Short-Term Truck Annual Leak Test Passed

None

Short-Term Loading Losses

4.53914 lb/h

Short-Term Overall Reduction Efficiency

0 %

Worst-Case Flashing Losses per Tank

1.04400 lb/h

Short-Term Collection Efficiency

70 %

Short Term Properties : Tabulated Data

Index

Worst-Case Flashing Losses Mass Flows

Short-Term Working Losses Mass Flows

Short-Term Loading Losses Mass Flows

lb/h

lb/h

lb/h

H2S

0.114577

0.828132

1.45479

Nitrogen

0.0152030

0.00160988

0.00283495

Methane

0.231322

0.0501957

0.0883929

CO2

0.267923

1.06161

1.86946

Ethane

0.158742

0.0470076

0.0827788

Propane

0.106723

0.0220238

0.0387832

i-Butane

0.0119267

0.00152488

0.00268526

n-Butane

0.0371498

0.00719871

0.0126767

i-Pentane

0.00890852

0.00110375

0.00194366

n-Pentane

0.0043499

0.000262140

0.000461620

iC6

0.00688116

0.000494319

0.000870478

n-Hexane

0.00121520

4.67093E-05

8.22934E-05

iC7

0

0

0

n-Heptane

0.000705528

1.85258E-05

3.26234E-05

Benzene

0.0200662

0.144683

0.254781

Toluene

0.0109700

0.0790969

0.139287

2,2,4-Trimethylpentane

0.000379589

1.16259E-05

2.04277E-05

nC8

0.000127367

1.53880E-06

2.70977E-06

Ethylbenzene

0.00226651

0.0166201

0.0286510

m-Xylene

0.00129355

0.00632988

0.0164243

o-Xylene

0.000431817

0.00311352

0.00548280

p-Xylene

0

0

0

Nonane

3.63696E-05

3.42423E-07

6.02996E-07

C10

4.36699E-09

1.29893E-11

2.28737E-11

Water

0.0424266

0.305907

0.538693

C10+ Oil

3.92746E-09

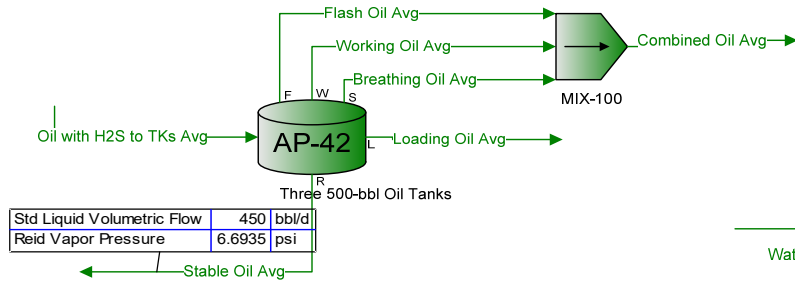
9.55847E-10

1.68321E-09

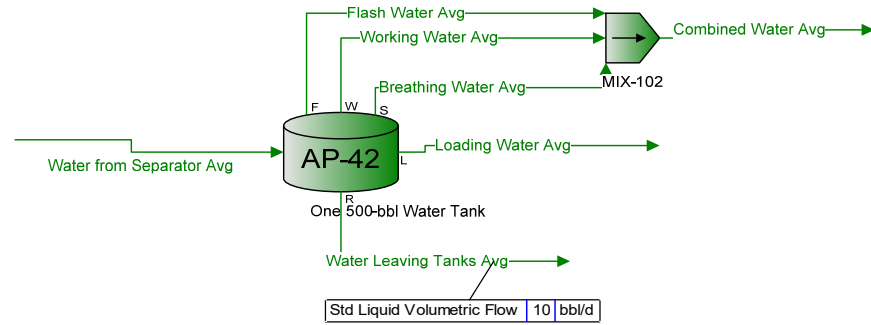
Notes:

Brahane Unit Tank Battery Tank Emissions, tpy

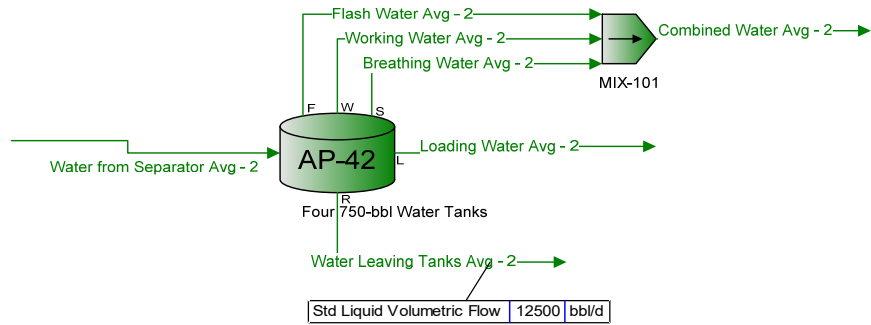
"Combined Oil Avg" C3+ Mass Flow =80.35 ton/yr



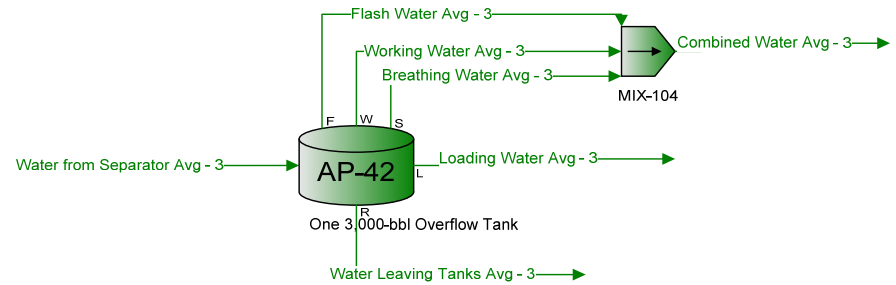
"Combined Water Avg" C3+ Mass Flow =0.08113 ton/yr



"Combined Water Avg - 2" C3+ Mass Flow =42.14 ton/yr



"Breathing Water Avg - 3" C3+ Mass Flow =0.05184 ton/yr



Process Streams		Breathing Oil Avg	Breathing Water Avg	Breathing Water Avg - 2	Breathing Water Avg - 3	Combined Oil Avg	Combined Water Avg
Composition		Status: Solved	Solved	Solved	Solved	Solved	Solved
Phase: Total		From Block: Three 500-bbl Oil Tanks	One 500-bbl Water Tank	Four 750-bbl Water Tanks	One 3,000-bbl Overflow Tank	MIX-100	MIX-102
To Block:		MIX-100	MIX-102	MIX-101	MIX-104	--	--
Mole Fraction		%	%	%	%	%	%
H2S		3.11214	34.4503	31.6000	11.5513	2.63009	29.1033
Nitrogen		0.522889	0.0615136	0.121873	0.0205124	5.69180	0.397233
Methane		5.04732	3.27187	6.48093	1.09177	15.5310	11.6146
CO2		9.36923	21.3399	42.2143	7.14932	10.5080	19.9935
Ethane		33.5436	1.71115	3.39051	0.570430	24.8166	4.52886
Propane		27.9132	0.565973	1.12177	0.188505	22.5316	1.93245
i-Butane		3.60645	0.0335765	0.0666125	0.0111509	3.07773	0.153179
n-Butane		7.40296	0.140318	0.278116	0.0467332	6.38876	0.511850
i-Pentane		2.49075	0.0190037	0.0376934	0.00631531	2.18639	0.0918486
n-Pentane		2.30451	0.00397638	0.00787992	0.00132508	2.04145	0.0430896
C6		2.42784	0.00679111	0.0134658	0.00225896	2.20728	0.0551108
n-Hexane		0.786324	0.000625028	0.00123914	0.000208010	0.702352	0.00969205
C7		0	0	0	0	0	0
n-Heptane		0.438763	0.000230352	0.000456966	7.65173E-05	0.448285	0.00478260
Benzene		0.452717	4.76452	1.82964	1.59780	0.593944	3.90867
Toluene		0.182068	1.69502	0.867469	0.568378	0.213056	1.40184
2,2,4-Trimethylpentane		0.195401	0.000172010	0.000342143	5.66778E-05	0.196520	0.00226678
nC8		0.118631	1.56982E-05	3.11262E-05	5.22239E-06	0.134009	0.000746905
Ethylbenzene		0.0311257	0.253158	0.140262	0.0848793	0.0344385	0.210191
m-Xylene		0.0174615	0.103326	0.0919605	0.0346376	0.0197917	0.0874947
o-Xylene		0.00499278	0.0722326	0.0270693	0.0242228	0.00622732	0.0592557
p-Xylene		0	0	0	0	0	0
Nonane		0.0316764	4.03882E-06	8.02472E-06	1.33521E-06	0.0406612	0.000189397
C10		0	1.29446E-10	2.57074E-10	4.28559E-11	0	2.03747E-08
Water		0	31.5063	11.7083	77.0501	0	25.8898
C10+ Oil		1.81943E-08	5.12712E-09	1.01911E-08	1.69278E-09	2.82843E-08	9.48984E-09
Molar Flow		lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h
H2S		0.00127096	0.000678110	0.00702148	0.000667297	0.0213489	0.000880271
Nitrogen		0.000213542	1.21082E-06	2.70801E-05	1.18496E-06	0.0462013	1.20149E-05
Methane		0.00206127	6.44026E-05	0.00144005	6.30693E-05	0.126068	0.000351301
CO2		0.00382629	0.000420049	0.00937997	0.000413003	0.0852950	0.000604734
Ethane		0.0136988	3.36817E-05	0.000753368	3.29527E-05	0.201441	0.000136982
Propane		0.0113994	1.11405E-05	0.000249255	1.08896E-05	0.182893	5.84499E-05
i-Butane		0.00147284	6.60911E-07	1.48012E-05	6.44165E-07	0.0249825	4.63313E-06
n-Butane		0.00302329	2.76199E-06	6.17970E-05	2.69969E-06	0.0518587	1.54817E-05
i-Pentane		0.00101720	3.74064E-07	8.37543E-06	3.64823E-07	0.0177473	2.77809E-06
n-Pentane		0.000941138	7.82701E-08	1.75091E-06	7.65472E-08	0.0165708	1.30331E-06
C6		0.000991502	1.33674E-07	2.99209E-06	1.30496E-07	0.0179169	1.66691E-06
n-Hexane		0.000321126	1.23029E-08	2.75336E-07	1.20163E-08	0.00570111	2.93150E-07
C7		0	0	0	0	0	0
n-Heptane		0.000179186	4.53419E-09	1.01537E-07	4.42026E-09	0.00363880	1.44657E-07
Benzene		0.000184885	9.37836E-05	0.000406544	9.23021E-05	0.00482114	0.000118224
Toluene		7.43544E-05	3.33644E-05	0.000192750	3.28341E-05	0.00172941	4.24007E-05
2,2,4-Trimethylpentane		7.97998E-05	3.38581E-09	7.60237E-08	3.27417E-09	0.00159519	6.85621E-08
nC8		4.84477E-05	3.08999E-10	6.91619E-09	3.01687E-10	0.00108778	2.25912E-08
Ethylbenzene		1.27114E-05	4.98309E-06	3.11660E-05	4.90331E-06	0.000279543	6.35754E-06
m-Xylene		7.13111E-06	2.03385E-06	2.04335E-05	2.00095E-06	0.000160652	2.64641E-06
o-Xylene		2.03900E-06	1.42181E-06	6.01476E-06	1.39931E-06	5.05482E-05	1.79227E-06
p-Xylene		0	0	0	0	0	0
Nonane		1.29363E-05	7.94990E-11	1.78308E-09	7.71327E-11	0.000330054	5.72859E-09
C10		0	2.54798E-15	5.71214E-14	2.47570E-15	0	6.16264E-13
Water		0	0.000620162	0.00260158	0.00445104	0	0.000783076
C10+ Oil		7.43037E-12	1.00921E-13	2.26444E-12	9.77887E-14	2.29589E-10	2.87034E-13

Process Streams	Breathing Oil Avg	Breathing Water Avg	Breathing Water Avg - 2	Breathing Water Avg - 3	Combined Oil Avg	Combined Water Avg
Composition	Status: Solved	Solved	Solved	Solved	Solved	Solved
Phase: Total	From Block: Three 500-bbl Oil Tanks	One 500-bbl Water Tank	Four 750-bbl Water Tanks	One 3,000-bbl Overflow Tank	MIX-100	MIX-102
	To Block: MIX-100	MIX-102	MIX-101	MIX-104	--	--
Mass Fraction	%	%	%	%	%	%
H2S	2.49091	34.5548	29.2685	16.8489	2.25967	30.2009
Nitrogen	0.344004	0.0507156	0.0927848	0.0245929	4.01957	0.338828
Methane	1.90160	1.54480	2.82560	0.749600	6.28108	5.67339
CO2	9.68363	27.6404	50.4905	13.4660	11.6581	26.7919
Ethane	23.6874	1.51430	2.77069	0.734093	18.8116	4.14644
Propane	28.9063	0.734508	1.34432	0.355751	25.0467	2.59461
i-Butane	4.92278	0.0574358	0.105221	0.0277383	4.50958	0.271087
n-Butane	10.1050	0.240027	0.439310	0.116251	9.36100	0.905842
i-Pentane	4.22034	0.0403527	0.0739091	0.0195008	3.97668	0.201776
n-Pentane	3.90478	0.00844349	0.0154509	0.00409166	3.71306	0.0946606
i-C6	4.91350	0.0172238	0.0315369	0.00833145	4.79517	0.144606
n-Hexane	1.59138	0.00158521	0.00290207	0.000767178	1.52581	0.0254312
i-C7	0	0	0	0	0	0
n-Heptane	1.03251	0.000679319	0.00124441	0.000328144	1.13238	0.0145918
Benzene	0.830485	10.9532	3.88406	5.34157	1.16957	9.29638
Toluene	0.393968	4.59644	2.17219	2.24133	0.494878	3.93284
2,2,4-Trimethylpentane	0.524191	0.000578275	0.00106215	0.000277087	0.565908	0.00788409
nC8	0.318245	5.27750E-05	9.66281E-05	2.55313E-05	0.385898	0.00259781
Ethylbenzene	0.0776048	0.791002	0.404691	0.385666	0.0921700	0.679460
m-Xylene	0.0435364	0.322848	0.265330	0.157383	0.0529697	0.282834
o-Xylene	0.0124484	0.225694	0.0781018	0.110061	0.0166666	0.191549
p-Xylene	0	0	0	0	0	0
Nonane	0.0954111	1.52452E-05	2.79710E-05	7.32915E-06	0.131468	0.000739631
C10	0	5.42053E-10	9.94053E-10	2.60969E-10	0	8.82691E-08
Water	0	16.7049	5.73244	59.4077	0	14.2016
C10+ Oil	1.45529E-07	5.13928E-08	9.43292E-08	2.46748E-08	2.42847E-07	9.84125E-08
Mass Flow	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h
H2S	0.0433155	0.0231106	0.239298	0.0227421	0.727588	0.0300004
Nitrogen	0.00598204	3.39191E-05	0.000758605	3.31948E-05	1.29426	0.000336578
Methane	0.0330679	0.00103318	0.0231020	0.00101179	2.02244	0.00563573
CO2	0.168393	0.0184862	0.412808	0.0181760	3.75379	0.0266140
Ethane	0.411911	0.00101278	0.0226531	0.000990855	6.05713	0.00411892
Propane	0.502665	0.000491246	0.0109911	0.000480182	8.06477	0.00257738
i-Butane	0.0856045	3.84136E-05	0.000860279	3.74403E-05	1.45204	0.000269288
n-Butane	0.175720	0.000160533	0.00359178	0.000156912	3.01414	0.000899828
i-Pentane	0.0733894	2.69882E-05	0.000604277	2.63216E-05	1.28045	0.000200436
n-Pentane	0.0679020	5.64709E-06	0.000126326	5.52279E-06	1.19556	9.40322E-05
i-C6	0.0854431	1.15194E-05	0.000257844	1.12455E-05	1.54399	0.000143646
n-Hexane	0.0276732	1.06021E-06	2.37272E-05	1.03551E-06	0.491295	2.52623E-05
i-C7	0	0	0	0	0	0
n-Heptane	0.0179548	4.54335E-07	1.01742E-05	4.42919E-07	0.364615	1.44949E-05
Benzene	0.0144417	0.00732561	0.0317559	0.00720989	0.376588	0.00923466
Toluene	0.00685090	0.00307414	0.0177597	0.00302528	0.159345	0.00390673
2,2,4-Trimethylpentane	0.00911541	3.86756E-07	8.68408E-06	3.74003E-07	0.182216	7.83175E-06
nC8	0.00553411	3.52964E-08	7.90027E-07	3.44613E-08	0.124255	2.58056E-06
Ethylbenzene	0.00134951	0.000529030	0.00330874	0.000520560	0.0296777	0.000674949
m-Xylene	0.000757074	0.000215924	0.00216932	0.000212431	0.0170557	0.000280956
o-Xylene	0.000216470	0.000150946	0.000638557	0.000148557	0.00536645	0.000190277
p-Xylene	0	0	0	0	0	0
Nonane	0.00165915	1.01962E-08	2.28689E-07	9.89266E-09	0.0423311	7.34720E-07
C10	0	3.62530E-13	8.12733E-12	3.52247E-13	0	8.76831E-11
Water	0	0.0111724	0.0468682	0.0801867	0	0.0141073
C10+ Oil	2.53066E-09	3.43720E-11	7.71231E-10	3.33052E-11	7.81942E-08	9.77592E-11

Process Streams		Breathing Oil Avg	Breathing Water Avg	Breathing Water Avg - 2	Breathing Water Avg - 3	Combined Oil Avg	Combined Water Avg
Properties		Status: Solved	Solved	Solved	Solved	Solved	Solved
Phase: Total		From Block: Three 500-bbl Oil Tanks	One 500-bbl Water Tank	Four 750-bbl Water Tanks	One 3,000-bbl Overflow Tank	MIX-100	MIX-102
		To Block: MIX-100	MIX-102	MIX-101	MIX-104	--	--
Property	Units						
Temperature	°F	76.4923	76.4923	76.3409	76.9520	76.4857	73.5136
Pressure	psig	-1.43595	-1.43595	-1.43595	-1.43595	-1.43595	-1.43595
Mole Fraction Vapor	%	100	69.2298	91.4127	23.1604	100	75.6785
Mole Fraction Light Liquid	%	0	1.61900	8.58734	0.521789	0	0.767552
Mole Fraction Heavy Liquid	%	0	29.1512	0	76.3178	0	23.5539
Phase Mole Fraction	%	100	100	100	100	100	100
Molecular Weight	lb/lbmol	42.5806	33.9778	36.7957	23.3653	39.6676	32.8422
Mass Density	lb/ft^3	0.0993598	0.113930	0.0933591	0.233532	0.0923297	0.101249
Molar Flow	lbmol/h	0.0408389	0.00196837	0.0222199	0.00577681	0.811717	0.00302465
Mass Flow	lb/h	1.73895	0.0668810	0.817595	0.134977	32.1989	0.0993361
Vapor Volumetric Flow	ft^3/h	17.5015	0.587038	8.75753	0.577979	348.738	0.981109
Liquid Volumetric Flow	gpm	2.18201	0.0731891	1.09185	0.0720597	43.4791	0.122320
Std Vapor Volumetric Flow	MMSCFD	0.000371945	1.79272E-05	0.000202370	5.26130E-05	0.00739281	2.75473E-05
Std Liquid Volumetric Flow	sgpm	0.00689851	0.000166469	0.00217382	0.000302016	0.126380	0.000278073
Compressibility		0.987608	0.687294	0.908545	0.230375	0.990112	0.751703
Specific Gravity		1.47020				1.36962	
API Gravity							
Enthalpy	Btu/h	-2226.63	-152.794	-2026.67	-622.248	-42788.1	-220.670
Mass Enthalpy	Btu/lb	-1280.45	-2284.57	-2478.82	-4610.03	-1328.87	-2221.45
Mass Cp	Btu/(lb*°F)	0.382232	0.364731	0.273782	0.680093	0.377119	0.364536
Ideal Gas CpCv Ratio		1.13998	1.26889	1.27530	1.30604	1.15408	1.26156
Dynamic Viscosity	cP	0.00909651				0.00969063	
Kinematic Viscosity	cSt	5.71535				6.55225	
Thermal Conductivity	Btu/(h*ft*°F)	0.0106651				0.0116047	
Surface Tension	lbf/ft						
Net Ideal Gas Heating Value	Btu/ft^3	1972.61	543.898	453.569	182.233	1727.21	640.676
Net Liquid Heating Value	Btu/lb	17432.8	5771.74	4500.18	2268.81	16390.4	7131.55
Gross Ideal Gas Heating Value	Btu/ft^3	2143.96	596.305	495.463	233.241	1878.67	702.699
Gross Liquid Heating Value	Btu/lb	18960.4	6357.13	4932.35	3097.28	17839.8	7848.35

Process Streams	Combined Water Avg - 2	Flash Oil Avg	Flash Water Avg	Flash Water Avg - 2	Loading Oil Avg	Loading Water Avg
Composition	Status: Solved	Solved	Solved	Solved	Solved	Solved
Phase: Total	From Block:	MIX-101	Three 500-bbl Oil Tanks	One 500-bbl Water Tank	Four 750-bbl Water Tanks	Three 500-bbl Oil Tanks
	To Block:	--	MIX-100	MIX-102	MIX-101	--
Mole Fraction	%	%	%	%	%	%
H2S	23.7018	2.49614	7.71725	7.70490	2.85264	3.32757E-14
Nitrogen	0.657306	7.12815	1.73999	1.74177	7.19956	0
Methane	19.2188	18.4443	44.9824	45.0180	15.0006	0
CO2	33.0835	10.8244	14.6085	14.5900	6.67926	0
Ethane	7.49395	22.3915	15.7987	15.8050	20.3437	0
Propane	3.19765	21.0362	7.39786	7.40212	25.9955	0
i-Butane	0.253467	2.93081	0.631545	0.631921	3.71883	0
n-Butane	0.846964	6.10694	1.99784	1.99910	7.74240	0
i-Pentane	0.151983	2.10182	0.383201	0.383463	2.61729	0
n-Pentane	0.0713009	1.96835	0.199528	0.199753	2.42791	0
C6	0.0911925	2.14599	0.248372	0.248619	2.58964	0
n-Hexane	0.0160375	0.679017	0.0459567	0.0460101	0.805548	0
C7	0	0	0	0	0	0
n-Heptane	0.00791382	0.450931	0.0229899	0.0230168	0.517537	0
Benzene	1.38489	0.633188	0.485599	0.484091	0.759914	0
Toluene	0.656275	0.221667	0.229207	0.228524	0.254646	0
2,2,4-Trimethylpentane	0.00375087	0.196831	0.0106451	0.0106549	0.227868	0
nC8	0.00123591	0.138283	0.00367146	0.00367607	0.152652	0
Ethylbenzene	0.106529	0.0353591	0.0383419	0.0382066	0.0390015	0
m-Xylene	0.0695324	0.0204392	0.0241741	0.0241068	0.0225069	0
o-Xylene	0.0205439	0.00657037	0.00735306	0.00732747	0.00721457	3.25533E-17
p-Xylene	0	0	0	0	0	0
Nonane	0.000313397	0.0431580	0.000930760	0.000931895	0.0457260	0
C10	3.37143E-08	0	1.01348E-07	1.01478E-07	0	0
Water	8.96505	0	3.42599	3.40882	0	100
C10+ Oil	1.57029E-08	3.10881E-08	2.69391E-08	2.68667E-08	1.91864E-08	0
Molar Flow	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h
H2S	0.541399	0.0158556	4.66874E-05	0.0581730	0.00234599	2.64852E-20
Nitrogen	0.0150142	0.0452784	1.05265E-05	0.0131506	0.00592087	0
Methane	0.438998	0.117159	0.000272132	0.339892	0.0123364	0
CO2	0.755697	0.0687572	8.83777E-05	0.110156	0.00549298	0
Ethane	0.171178	0.142232	9.55778E-05	0.119330	0.0167305	0
Propane	0.0730410	0.133623	4.47552E-05	0.0558870	0.0213786	0
i-Butane	0.00578972	0.0186166	3.82069E-06	0.00477109	0.00305834	0
n-Butane	0.0193464	0.0387916	1.20864E-05	0.0150935	0.00636729	0
i-Pentane	0.00347161	0.0133508	2.31827E-06	0.00289520	0.00215244	0
n-Pentane	0.00162866	0.0125031	1.20709E-06	0.00150816	0.00199669	0
C6	0.00208303	0.0136314	1.50259E-06	0.00187711	0.00212970	0
n-Hexane	0.000366331	0.00431315	2.78027E-07	0.000347382	0.000662477	0
C7	0	0	0	0	0	0
n-Heptane	0.000180768	0.00286434	1.39083E-07	0.000173780	0.000425619	0
Benzene	0.0316337	0.00402204	2.93775E-06	0.00365495	0.000624948	0
Toluene	0.0149907	0.00140804	1.38665E-06	0.00172539	0.000209419	0
2,2,4-Trimethylpentane	8.56777E-05	0.00125028	6.44000E-08	8.04456E-05	0.000187397	0
nC8	2.82308E-05	0.000878377	2.22114E-08	2.77549E-05	0.000125540	0
Ethylbenzene	0.00243334	0.000224603	2.31959E-07	0.000288465	3.20746E-05	0
m-Xylene	0.00158827	0.000129831	1.46247E-07	0.000182010	1.85095E-05	0
o-Xylene	0.000469266	4.17353E-05	4.44842E-08	5.53234E-05	5.93321E-06	2.59101E-23
p-Xylene	0	0	0	0	0	0
Nonane	7.15865E-06	0.000274142	5.63086E-09	7.03593E-06	3.76047E-05	0
C10	7.70106E-10	0	6.13132E-13	7.66174E-10	0	0
Water	0.204781	0	2.07264E-05	0.0257371	0	7.95930E-05
C10+ Oil	3.58688E-10	1.97473E-10	1.62975E-13	2.02847E-10	1.57787E-11	0

Process Streams	Combined Water Avg - 2	Flash Oil Avg	Flash Water Avg	Flash Water Avg - 2	Loading Oil Avg	Loading Water Avg
Composition	Status: Solved	Solved	Solved	Solved	Solved	Solved
Phase: Total	From Block:	MIX-101	Three 500-bbl Oil Tanks	One 500-bbl Water Tank	Four 750-bbl Water Tanks	Three 500-bbl Oil Tanks
	To Block:	--	MIX-100	MIX-102	MIX-101	--
Mass Fraction	%	%	%	%	%	%
H2S	23.7682	2.18926	9.29354	9.28060	2.36803	6.29503E-14
Nitrogen	0.541797	5.13878	1.72234	1.72446	4.91248	0
Methane	9.07195	7.61464	25.4989	25.5244	5.86150	0
CO2	42.8412	12.2594	22.7175	22.6934	7.15984	0
Ethane	6.63031	17.3269	16.7860	16.7963	14.8997	0
Propane	4.14887	23.8715	11.5268	11.5359	27.9205	0
i-Butane	0.433478	4.38376	1.29704	1.29809	5.26474	0
n-Butane	1.44847	9.13446	4.10308	4.10653	10.9609	0
i-Pentane	0.322646	3.90249	0.976930	0.977803	4.59948	0
n-Pentane	0.151366	3.65468	0.508675	0.509355	4.26667	0
IC6	0.231231	4.75914	0.756298	0.757210	5.43565	0
n-Hexane	0.0406653	1.50585	0.139939	0.140131	1.69084	0
IC7	0	0	0	0	0	0
n-Heptane	0.0233327	1.16280	0.0813993	0.0815118	1.26312	0
Benzene	3.18299	1.27282	1.34030	1.33642	1.44581	0
Toluene	1.77922	0.525606	0.746238	0.744168	0.571486	0
2,2,4-Trimethylpentane	0.0126069	0.578611	0.0429666	0.0430151	0.633995	0
nC8	0.00415399	0.406499	0.0148191	0.0148408	0.424723	0
Ethylbenzene	0.332776	0.0966051	0.143835	0.143357	0.100854	0
m-Xylene	0.217206	0.0558422	0.0906859	0.0904522	0.0582004	0
o-Xylene	0.0641753	0.0179510	0.0275840	0.0274937	0.0186561	1.91838E-16
p-Xylene	0	0	0	0	0	0
Nonane	0.00118270	0.142447	0.00421813	0.00422416	0.142845	0
C10	1.41145E-07	0	5.09535E-07	5.10294E-07	0	0
Water	4.75223	0	2.18090	2.17042	0	100
C10+ Oil	1.57365E-07	2.72481E-07	3.24201E-07	3.23397E-07	1.59164E-07	0
Mass Flow	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h
H2S	18.4514	0.540372	0.00159115	1.98259	0.0799535	9.02638E-19
Nitrogen	0.420600	1.26840	0.000294882	0.368392	0.165864	0
Methane	7.04261	1.87951	0.00436567	5.45270	0.197906	0
CO2	33.2578	3.02597	0.00388946	4.84793	0.241743	0
Ethane	5.14714	4.27678	0.00287393	3.58814	0.503071	0
Propane	3.22079	5.89218	0.00197351	2.46437	0.942701	0
i-Butane	0.336512	1.08204	0.000222067	0.277306	0.177758	0
n-Butane	1.12446	2.25465	0.000702489	0.877267	0.370081	0
i-Pentane	0.250472	0.963247	0.000167260	0.208885	0.155296	0
n-Pentane	0.117506	0.902082	8.70903E-05	0.108812	0.144059	0
IC6	0.179506	1.17469	0.000129486	0.161761	0.183528	0
n-Hexane	0.0315687	0.371687	2.39590E-05	0.0299358	0.0570892	0
IC7	0	0	0	0	0	0
n-Heptane	0.0181133	0.287012	1.39364E-05	0.0174131	0.0426479	0
Benzene	2.47097	0.314169	0.000229473	0.285495	0.0488158	0
Toluene	1.38122	0.129735	0.000127763	0.158974	0.0192955	0
2,2,4-Trimethylpentane	0.00978683	0.142818	7.35632E-06	0.00918919	0.0214061	0
nC8	0.00322477	0.100336	2.53718E-06	0.00317040	0.0143403	0
Ethylbenzene	0.258336	0.0238450	2.46259E-05	0.0306249	0.00340520	0
m-Xylene	0.168618	0.0137835	1.55263E-05	0.0193230	0.00196507	0
o-Xylene	0.0498196	0.00443083	4.72266E-06	0.00587341	0.000629899	2.75075E-21
p-Xylene	0	0	0	0	0	0
Nonane	0.000918133	0.0351601	7.22186E-07	0.000902394	0.00482300	0
C10	1.09572E-07	0	8.72374E-11	1.09013E-07	0	0
Water	3.68918	0	0.000373392	0.463661	0	0.00143389
C10+ Oil	1.22163E-07	6.72562E-08	5.55065E-11	6.90863E-08	5.37398E-09	0

Process Streams		Combined Water Avg - 2	Flash Oil Avg	Flash Water Avg	Flash Water Avg - 2	Loading Oil Avg	Loading Water Avg
Properties		Status: Solved	Solved	Solved	Solved	Solved	Solved
Phase: Total	From Block:	MIX-101	Three 500-bbl Oil Tanks	One 500-bbl Water Tank	Four 750-bbl Water Tanks	Three 500-bbl Oil Tanks	One 500-bbl Water Tank
	To Block:	--	MIX-100	MIX-102	MIX-101	--	--
Property	Units						
Temperature	°F	76.3298	76.4923	76.4923	76.3409	76.4923	76.4923
Pressure	psig	-1.43595	-1.43595	-1.43595	-1.43595	-1.43595	-1.43595
Mole Fraction Vapor	%	94.2513	100	100	100	100	0
Mole Fraction Light Liquid	%	5.74872	0	0	0	0	100
Mole Fraction Heavy Liquid	%	0	0	0	0	0	0
Phase Mole Fraction	%	100	100	100	100	100	100
Molecular Weight	lb/lbmol	33.9857	38.8582	28.3004	28.2945	41.0555	18.0153
Mass Density	lb/ft^3	0.0835855	0.0903856	0.0655261	0.0655311	0.0956536	62.2186
Molar Flow	lbmol/h	2.28421	0.635205	0.000604975	0.755013	0.0822393	7.95930E-05
Mass Flow	lb/h	77.6305	24.6829	0.0171210	21.3627	3.37638	0.00143389
Vapor Volumetric Flow	ft^3/h	928.756	273.085	0.261285	325.993	35.2980	2.30460E-05
Liquid Volumetric Flow	gpm	115.793	34.0469	0.0325758	40.6433	4.40079	2.87327E-06
Std Vapor Volumetric Flow	MMSCFD	0.0208037	0.00578520	5.50988E-06	0.00687637	0.000749004	7.24903E-07
Std Liquid Volumetric Flow	sgpm	0.241270	0.0965633	7.34365E-05	0.0916655	0.0130482	2.86645E-06
Compressibility		0.937305	0.990757	0.995318	0.995315	0.989131	0.000667275
Specific Gravity			1.34167	0.977138	0.976935	1.41754	0.997592
API Gravity							9.99843
Enthalpy	Btu/h	-180445	-33164.2	-32.8445	-40966.9	-3952.78	-9.78164
Mass Enthalpy	Btu/lb	-2324.40	-1343.61	-1918.37	-1917.68	-1170.72	-6821.74
Mass Cp	Btu/(lb*°F)	0.300974	0.375576	0.372642	0.372697	0.382801	0.978124
Ideal Gas CpCv Ratio		1.25979	1.15851	1.23316	1.23318	1.14562	1.32902
Dynamic Viscosity	cP		0.00986854	0.0113268	0.0113224	0.00942796	0.918381
Kinematic Viscosity	cSt		6.81605	10.7913	10.7863	6.15312	0.921472
Thermal Conductivity	Btu/(h*ft*°F)		0.0118745	0.0143350	0.0143328	0.0114728	0.350084
Surface Tension	lbf/ft						0.00498374
Net Ideal Gas Heating Value	Btu/ft^3	643.503	1659.02	1027.75	1028.19	1857.96	1.96873E-13
Net Liquid Heating Value	Btu/lb	7023.64	16072.9	13661.3	13670.2	17036.8	-1059.76
Gross Ideal Gas Heating Value	Btu/ft^3	704.776	1804.95	1128.23	1128.72	2019.30	50.3100
Gross Liquid Heating Value	Btu/lb	7708.01	17498.5	15009.1	15018.9	18528.5	4.37417E-12

Process Streams	Loading Water Avg - 2		Oil with H2S to TKs Avg	Stable Oil Avg	Water from Separator Avg	Water from Separator Avg - 2
Composition	Status:	Solved	Solved	Solved	Solved	Solved
Phase: Total	From Block:	Four 750-bbl Water Tanks	--	Three 500-bbl Oil Tanks	--	--
	To Block:	--	Three 500-bbl Oil Tanks	--	One 500-bbl Water Tank	Four 750-bbl Water Tanks
Mole Fraction		%	%	%	%	%
H2S		55.7284	0.1722*	0.0963237	0.0108652*	0.0108652*
Nitrogen		0	0.1771*	0.00685819	0.000148300*	0.000148300*
Methane		0	0.504*	0.0401080	0.00433610*	0.00433610*
CO2		0	0.3601*	0.0468299	0.00746423*	0.00746423*
Ethane		0	1.1385*	0.407544	0.00169077*	0.00169077*
Propane		0	2.6062*	1.99109	0.000721446*	0.000721446*
i-Butane		0	0.8443*	0.775353	5.71867E-05*	5.71867E-05*
n-Butane		0	2.4979*	2.37779	0.000191090*	0.000191090*
i-Pentane		0	2.1568*	2.15589	3.42900E-05*	3.42900E-05*
n-Pentane		0	2.6914*	2.71146	1.60867E-05*	1.60867E-05*
iC6		0	6.9345*	7.08043	2.05746E-05*	2.05746E-05*
n-Hexane		0	3.1653*	3.24133	3.61835E-06*	3.61835E-06*
iC7		0	0*	0	0*	0*
n-Heptane		0	6.0245*	6.19664	1.78550E-06*	1.78550E-06*
Benzene	4.69286		2.9357*	3.00799	0.00145923*	0.00145923*
Toluene	2.04075		4.0479*	4.16628	0.000523351*	0.000523351*
2,2,4-Trimethylpentane	0		2.4587*	2.52853	8.46262E-07*	8.46262E-07*
nC8	0		5.9733*	6.15356	2.78844E-07*	2.78844E-07*
Ethylbenzene	0.316423		2.1391*	2.20407	7.84711E-05*	7.84711E-05*
m-Xylene	0.159968		1.3745*	1.41632	3.26646E-05*	3.26646E-05*
o-Xylene	0.0688368		0.4956*	0.510707	2.21220E-05*	2.21220E-05*
p-Xylene	0		0*	0	0*	0*
Nonane	0		6.0023*	6.18634	7.07079E-08*	7.07079E-08*
C10	0		0*	0	7.60654E-12*	7.60654E-12*
Water	36.9928		0*	0	99.9723*	99.9723*
C10+ Oil	0		45.3001*	46.6985	3.54286E-12*	3.54286E-12*
Molar Flow		lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h
H2S		0.149896	0.0466764*	0.0253276	0.000880271*	1.10002*
Nitrogen		0	0.0480046*	0.00180331	1.20149E-05*	0.0150142*
Methane		0	0.136614*	0.0105461	0.000351301*	0.438998*
CO2		0	0.0976085*	0.0123136	0.000604734*	0.755697*
Ethane		0	0.308601*	0.107161	0.000136982*	0.171178*
Propane		0	0.706435*	0.523542	5.84499E-05*	0.0730410*
i-Butane		0	0.228856*	0.203873	4.63313E-06*	0.00578972*
n-Butane		0	0.677080*	0.625221	1.54817E-05*	0.0193464*
i-Pentane		0	0.584621*	0.566874	2.77809E-06*	0.00347161*
n-Pentane		0	0.729530*	0.712959	1.30331E-06*	0.00162866*
iC6		0	1.87966*	1.86175	1.66691E-06*	0.00208303*
n-Hexane		0	0.857985*	0.852284	2.93150E-07*	0.000366331*
iC7		0	0*	0	0*	0*
n-Heptane		0	1.63300*	1.62936	1.44657E-07*	0.000180768*
Benzene	0.0126227		0.795749*	0.790928	0.000118224*	0.147736*
Toluene	0.00548912		1.09722*	1.09549	4.24007E-05*	0.0529854*
2,2,4-Trimethylpentane	0		0.666454*	0.664859	6.85621E-08*	8.56777E-05*
nC8	0		1.61912*	1.61803	2.25912E-08*	2.82308E-05*
Ethylbenzene	0.000851100		0.579823*	0.579544	6.35754E-06*	0.00794461*
m-Xylene	0.000430275		0.372571*	0.372411	2.64641E-06*	0.00330704*
o-Xylene	0.000185154		0.134337*	0.134287	1.79227E-06*	0.00223969*
p-Xylene	0		0*	0	0*	0*
Nonane	0		1.62698*	1.62665	5.72859E-09*	7.15865E-06*
C10	0		0*	0	6.16264E-13*	7.70106E-10*
Water	0.0995016		0*	0	8.09952*	10121.4*
C10+ Oil	0		12.2790*	12.2790	2.87034E-13*	3.58688E-10*

Process Streams		Loading Water Avg - 2		Oil with H2S to TKs Avg	Stable Oil Avg	Water from Separator Avg	Water from Separator Avg - 2
Composition		Status:	Solved	Solved	Solved	Solved	Solved
Phase: Total	From Block:	Four 750-bbl Water Tanks		--	Three 500-bbl Oil Tanks	--	--
	To Block:	--	Three 500-bbl Oil Tanks	--	One 500-bbl Water Tank	--	Four 750-bbl Water Tanks
Mass Fraction		%	%	%	%	%	%
H2S		59.7595	0.0287804*	0.0157083	0.0205482*	0.0205482*	
Nitrogen		0	0.0243298*	0.000919310	0.000230532*	0.000230532*	
Methane		0	0.0396511*	0.00307885	0.00386008*	0.00386008*	
CO2		0	0.0777182*	0.00986181	0.0182287*	0.0182287*	
Ethane		0	0.167883*	0.0586382	0.00282117*	0.00282117*	
Propane		0	0.563581*	0.420120	0.00176533*	0.00176533*	
i-Butane		0	0.240653*	0.215639	0.000184443*	0.000184443*	
n-Butane		0	0.711984*	0.661305	0.000616319*	0.000616319*	
i-Pentane		0	0.763119*	0.744289	0.000137285*	0.000137285*	
n-Pentane		0	0.952271*	0.936094	6.44054E-05*	6.44054E-05*	
i-C6		0	2.93057*	2.91964	9.83877E-05*	9.83877E-05*	
n-Hexane		0	1.33768*	1.33657	1.73029E-05*	1.73029E-05*	
i-C7		0	0*	0	0*	0*	
n-Heptane		0	2.96040*	2.97111	9.92798E-06*	9.92798E-06*	
Benzene	11.5339		1.12456*	1.12429	0.00632509*	0.00632509*	
Toluene	5.91631		1.82904*	1.83686	0.00267584*	0.00267584*	
2,2,4-Trimethylpentane	0		1.37732*	1.38207	5.36420E-06*	5.36420E-06*	
n-C8	0		3.34613*	3.36347	1.76751E-06*	1.76751E-06*	
Ethylbenzene	1.05699		1.11369*	1.11968	0.000462293*	0.000462293*	
m-Xylene	0.534361		0.715615*	0.719498	0.000192435*	0.000192435*	
o-Xylene	0.229944		0.258027*	0.259442	0.000130326*	0.000130326*	
p-Xylene	0		0*	0	0*	0*	
Nonane	0		3.77525*	3.79660	5.03232E-07*	5.03232E-07*	
C10	0		0*	0	6.00568E-11*	6.00568E-11*	
Water	20.9690		0*	0	99.9416*	99.9416*	
C10+ Oil	0		75.6618*	76.1051	6.69582E-11*	6.69582E-11*	
Mass Flow		lb/h	lb/h	lb/h	lb/h	lb/h	
H2S		5.10858	1.59077*	0.863186	0.0300004*	37.4896*	
Nitrogen		0	1.34477*	0.0505168	0.000336578*	0.420600*	
Methane		0	2.19162*	0.169185	0.00563573*	7.04261*	
CO2		0	4.29570*	0.541914	0.0266140*	33.2578*	
Ethane		0	9.27934*	3.22222	0.00411892*	5.14714*	
Propane		0	31.1507*	23.0859	0.00257738*	3.22079*	
i-Butane		0	13.3016*	11.8496	0.000269288*	0.336512*	
n-Butane		0	39.3534*	36.3392	0.000899828*	1.12446*	
i-Pentane		0	42.1797*	40.8993	0.000200436*	0.250472*	
n-Pentane		0	52.6347*	51.4391	9.40322E-05*	0.117506*	
i-C6		0	161.981*	160.437	0.000143646*	0.179506*	
n-Hexane		0	73.9371*	73.4458	2.52623E-05*	0.0315687*	
i-C7		0	0*	0	0*	0*	
n-Heptane		0	163.630*	163.265	1.44949E-05*	0.0181133*	
Benzene	0.985979		62.1575*	61.7809	0.00923466*	11.5400*	
Toluene	0.505759		101.096*	100.937	0.00390673*	4.88199*	
2,2,4-Trimethylpentane	0		76.1281*	75.9458	7.83175E-06*	0.00978683*	
n-C8	0		184.950*	184.825	2.58056E-06*	0.00322477*	
Ethylbenzene	0.0903570		61.5570*	61.5273	0.000674949*	0.843440*	
m-Xylene	0.0456802		39.5540*	39.5370	0.000280956*	0.351092*	
o-Xylene	0.0196569		14.2619*	14.2565	0.000190277*	0.237777*	
p-Xylene	0		0*	0	0*	0*	
Nonane	0		208.669*	208.626	7.34720E-07*	0.000918133*	
C10	0		0*	0	8.76831E-11*	1.09572E-07*	
Water	1.79255		0*	0	145.915*	182341*	
C10+ Oil	0		4182.04*	4182.04	9.77592E-11*	1.22163E-07*	

Process Streams		Loading Water Avg - 2		Oil with H2S to TKs Avg	Stable Oil Avg	Water from Separator Avg	Water from Separator Avg - 2
Properties		Status:	Solved	Solved	Solved	Solved	Solved
Phase: Total		From Block:	Four 750-bbl Water Tanks	--	Three 500-bbl Oil Tanks	--	--
		To Block:	--	Three 500-bbl Oil Tanks	--	One 500-bbl Water Tank	Four 750-bbl Water Tanks
Property	Units						
Temperature	°F		76.3409	100*	76.4923	100*	100*
Pressure	psig		-1.43595	35*	-1.43595	35*	35*
Mole Fraction Vapor	%		62.3986	0.173088	0	0.00100414	0.00100414
Mole Fraction Light Liquid	%		2.70182	99.8269	100	99.9990	99.9990
Mole Fraction Heavy Liquid	%		34.8996	0	0	0	0
Phase Mole Fraction	%		100	100	100	100	100
Molecular Weight	lb/lbmol		31.7819	203.914	208.984	18.0208	18.0208
Mass Density	lb/ft^3		0.118413	48.5416	51.7271	61.6972	61.6972
Molar Flow	lbmol/h		0.268976	27.1060	26.2942	8.10176	10124.3
Mass Flow	lb/h		8.54856	5527.28	5495.08	146.000	182447
Vapor Volumetric Flow	ft^3/h		72.1925	113.867	106.232	2.36640	2957.14
Liquid Volumetric Flow	gpm		9.00063	14.1964	13.2445	0.295032	368.682
Std Vapor Volumetric Flow	MMSCFD		0.00244973	0.246871	0.239478	0.0737877	92.2078
Std Liquid Volumetric Flow	sgpm		0.0201122	13.2514*	13.125	0.291945*	364.825*
Compressibility			0.618708	0.0347582	0.00931063	0.00241676	0.00241676
Specific Gravity					0.829376		
API Gravity					37.6821		
Enthalpy	Btu/h		-12981.5	-4.27500E+06	-4.28892E+06	-992165	-1.23985E+09
Mass Enthalpy	Btu/lb		-1518.56	-773.438	-780.501	-6795.64	-6795.64
Mass Cp	Btu/(lb*°F)		0.403108	0.472226	0.458351	0.977046	0.977046
Ideal Gas CpCv Ratio			1.27840	1.02649	1.02688	1.32813	1.32813
Dynamic Viscosity	cP				2.89909		
Kinematic Viscosity	cSt				3.49883		
Thermal Conductivity	Btu/(h*ft*°F)				0.0733457		
Surface Tension	lbf/ft				0.00193521?		
Net Ideal Gas Heating Value	Btu/ft^3		609.719	9889.85	10141.8	0.239185	0.239185
Net Liquid Heating Value	Btu/lb		6901.78	18254.8	18265.7	-1054.18	-1054.18
Gross Ideal Gas Heating Value	Btu/ft^3		668.931	10537.7	10805.0	50.5535	50.5535
Gross Liquid Heating Value	Btu/lb		7608.86	19460.4	19469.9	5.33988	5.33988

Process Streams		Water Leaving Tanks Avg	Water Leaving Tanks Avg - 2	Working Oil Avg	Working Water Avg	Working Water Avg - 2
Composition	Status:	Solved	Solved	Solved	Solved	Solved
Phase: Total	From Block:	One 500-bbl Water Tank	Four 750-bbl Water Tanks	Three 500-bbl Oil Tanks	One 500-bbl Water Tank	Four 750-bbl Water Tanks
	To Block:	--	--	MIX-100	MIX-102	MIX-101
Mole Fraction		%	%	%	%	%
H2S		1.21781E-18	0.00551888	3.11214	34.4503	31.6000
Nitrogen		0	0	0.522889	0.0615136	0.121873
Methane		0	0	5.04732	3.27187	6.48093
CO2		0	0	9.36923	21.3399	42.2143
Ethane		0	0	33.5436	1.71115	3.39051
Propane		0	0	27.9132	0.565973	1.12177
i-Butane		0	0	3.60645	0.0335765	0.0666125
n-Butane		0	0	7.40296	0.140318	0.278116
i-Pentane		0	0	2.49075	0.0190037	0.0376934
n-Pentane		0	0	2.30451	0.00397638	0.00787992
IC6		0	0	2.42784	0.00679111	0.0134658
n-Hexane		0	0	0.786324	0.000625028	0.00123914
IC7		0	0	0	0	0
n-Heptane		0	0	0.438763	0.000230352	0.000456966
Benzene		0	0.00114704	0.452717	4.76452	1.82964
Toluene		0	0.000375369	0.182068	1.69502	0.867469
2,2,4-Trimethylpentane		0	0	0.195401	0.000172010	0.000342143
nC8		0	0	0.118631	1.56982E-05	3.11262E-05
Ethylbenzene		0	5.44486E-05	0.0311257	0.253158	0.140262
m-Xylene		0	1.69807E-05	0.0174615	0.103326	0.0919605
o-Xylene		3.05421E-21	1.74909E-05	0.00499278	0.0722326	0.0270693
p-Xylene		0	0	0	0	0
Nonane		0	0	0.0316764	4.03882E-06	8.02472E-06
C10		0	0	0	1.29446E-10	2.57074E-10
Water		100	99.9929	0	31.5063	11.7083
C10+ Oil		0	0	1.81943E-08	5.12712E-09	1.01911E-08
Molar Flow		lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h
H2S		9.86271E-20	0.558619	0.00422233	0.000155474	0.476204
Nitrogen		0	0	0.000709419	2.77610E-07	0.00183660
Methane		0	0	0.00684786	1.47659E-05	0.0976661
CO2		0	0	0.0127115	9.63067E-05	0.636160
Ethane		0	0	0.0455096	7.72238E-06	0.0510943
Propane		0	0	0.0378706	2.55423E-06	0.0169048
i-Butane		0	0	0.00489299	1.51530E-07	0.00100383
n-Butane		0	0	0.0100438	6.33254E-07	0.00419115
i-Pentane		0	0	0.00337928	8.57634E-08	0.000568031
n-Pentane		0	0	0.00312660	1.79454E-08	0.000118749
IC6		0	0	0.00329392	3.06482E-08	0.000202927
n-Hexane		0	0	0.00106683	2.82074E-09	1.86736E-05
IC7		0	0	0	0	0
n-Heptane		0	0	0.000595283	1.03958E-09	6.88638E-06
Benzene		0	0.116103	0.000614215	2.15022E-05	0.0275722
Toluene		0	0.0379947	0.000247017	7.64962E-06	0.0130726
2,2,4-Trimethylpentane		0	0	0.000265107	7.76281E-10	5.15602E-06
nC8		0	0	0.000160951	7.08456E-11	4.69064E-07
Ethylbenzene		0	0.00551127	4.22292E-05	1.14250E-06	0.00211371
m-Xylene		0	0.00171878	2.36906E-05	4.66310E-07	0.00138582
o-Xylene		2.47352E-22	0.00177043	6.77386E-06	3.25984E-07	0.000407928
p-Xylene		0	0	0	0	0
Nonane		0	0	4.29764E-05	1.82271E-11	1.20931E-07
C10		0	0	0	5.84187E-16	3.87404E-12
Water		8.09874	10121.2	0	0.000142188	0.176442
C10+ Oil		0	0	2.46848E-11	2.31386E-14	1.53577E-10

Process Streams		Water Leaving Tanks Avg	Water Leaving Tanks Avg - 2	Working Oil Avg	Working Water Avg	Working Water Avg - 2
Composition	Status:	Solved	Solved	Solved	Solved	Solved
Phase: Total	From Block:	One 500-bbl Water Tank	Four 750-bbl Water Tanks	Three 500-bbl Oil Tanks	One 500-bbl Water Tank	Four 750-bbl Water Tanks
	To Block:	--	--	MIX-100	MIX-102	MIX-101
Mass Fraction		%	%	%	%	%
H2S		2.30382E-18	0.0104394	2.49091	34.5548	29.2685
Nitrogen		0	0	0.344004	0.0507156	0.0927848
Methane		0	0	1.90160	1.54480	2.82560
CO2		0	0	9.68363	27.6404	50.4905
Ethane		0	0	23.6874	1.51430	2.77069
Propane		0	0	28.9063	0.734508	1.34432
i-Butane		0	0	4.92278	0.0574358	0.105221
n-Butane		0	0	10.1050	0.240027	0.439310
i-Pentane		0	0	4.22034	0.0403527	0.0739091
n-Pentane		0	0	3.90478	0.00844349	0.0154509
IC6		0	0	4.91350	0.0172238	0.0315369
n-Hexane		0	0	1.59138	0.00158521	0.00290207
IC7		0	0	0	0	0
n-Heptane		0	0	1.03251	0.000679319	0.00124441
Benzene		0	0.00497286	0.830485	10.9532	3.88406
Toluene		0	0.00191960	0.393968	4.59644	2.17219
2,2,4-Trimethylpentane		0	0	0.524191	0.000578275	0.00106215
nC8		0	0	0.318245	5.27750E-05	9.66281E-05
Ethylbenzene		0	0.000320834	0.0776048	0.791002	0.404691
m-Xylene		0	0.000100057	0.0435364	0.322848	0.265330
o-Xylene		1.79986E-20	0.000103064	0.0124484	0.225694	0.0781018
p-Xylene		0	0	0	0	0
Nonane		0	0	0.0954111	1.52452E-05	2.79710E-05
C10		0	0	0	5.42053E-10	9.94053E-10
Water		100	99.9821	0	16.7049	5.73244
C10+ Oil		0	0	1.45529E-07	5.13928E-08	9.43292E-08
Mass Flow		lb/h	lb/h	lb/h	lb/h	lb/h
H2S		3.36130E-18	19.0382	0.143901	0.00529868	16.2295
Nitrogen		0	0	0.0198733	7.77680E-06	0.0514494
Methane		0	0	0.109856	0.000236881	1.56680
CO2		0	0	0.559427	0.00423841	27.9971
Ethane		0	0	1.36843	0.000232204	1.53636
Propane		0	0	1.66993	0.000112630	0.745427
i-Butane		0	0	0.284391	8.80727E-06	0.0583451
n-Butane		0	0	0.583769	3.68061E-05	0.243599
i-Pentane		0	0	0.243811	6.18773E-06	0.0409828
n-Pentane		0	0	0.225581	1.29474E-06	0.00856757
IC6		0	0	0.283855	2.64112E-06	0.0174873
n-Hexane		0	0	0.0919344	2.43079E-07	0.00160920
IC7		0	0	0	0	0
n-Heptane		0	0	0.0596485	1.04168E-07	0.000690029
Benzene		0	9.06899	0.0479775	0.00167958	2.15372
Toluene		0	3.50077	0.0227597	0.000704824	1.20448
2,2,4-Trimethylpentane		0	0	0.0302828	8.86734E-08	0.000588964
nC8		0	0	0.0183852	8.09259E-09	5.35805E-05
Ethylbenzene		0	0.585104	0.00448326	0.000121293	0.224402
m-Xylene		0	0.182474	0.00251511	4.95058E-05	0.147126
o-Xylene		2.62601E-20	0.187957	0.000719147	3.46081E-05	0.0433076
p-Xylene		0	0	0	0	0
Nonane		0	0	0.00551194	2.33772E-09	1.55100E-05
C10		0	0	0	8.31191E-14	5.51205E-10
Water		145.901	182337	0	0.00256155	3.17865
C10+ Oil		0	0	8.40725E-09	7.88063E-12	5.23058E-08

Process Streams		Water Leaving Tanks Avg	Water Leaving Tanks Avg - 2	Working Oil Avg	Working Water Avg	Working Water Avg - 2
Properties		Solved	Solved	Solved	Solved	Solved
Phase: Total	Status: From Block: To Block:	One 500-bbl Water Tank	Four 750-bbl Water Tanks	Three 500-bbl Oil Tanks	One 500-bbl Water Tank	Four 750-bbl Water Tanks
		--	--	MIX-100	MIX-102	MIX-101
Property	Units					
Temperature	°F	76.4923	76.3409	76.4923	76.4923	76.3409
Pressure	psig	-1.43595	-1.43595	-1.43595	-1.43595	-1.43595
Mole Fraction Vapor	%	0	0	100	69.2298	91.4127
Mole Fraction Light Liquid	%	100	100	0	1.61900	8.58734
Mole Fraction Heavy Liquid	%	0	0	0	29.1512	0
Phase Mole Fraction	%	100	100	100	100	100
Molecular Weight	lb/lbmol	18.0153	18.0172	42.5806	33.9778	36.7957
Mass Density	lb/ft^3	62.2186	62.2201	0.0993598	0.113930	0.0933591
Molar Flow	lbmol/h	8.09874	10122.0	0.135673	0.000451298	1.50698
Mass Flow	lb/h	145.901	182370	5.77704	0.0153341	55.4502
Vapor Volumetric Flow	ft^3/h	2.34498	2931.04	58.1426	0.134593	593.946
Liquid Volumetric Flow	gpm	0.292361	365.429	7.24895	0.0167804	74.0503
Std Vapor Volumetric Flow	MMSCFD	0.0737602	92.1870	0.00123566	4.11025E-06	0.0137250
Std Liquid Volumetric Flow	sgpm	0.291667	364.583	0.0229179	3.81672E-05	0.147431
Compressibility		0.000667275	0.000667519	0.987608	0.687294	0.908545
Specific Gravity		0.997592	0.997616	1.47020		
API Gravity		9.99843	9.99832			
Enthalpy	Btu/h	-995299	-1.24389E+09	-7397.19	-35.0318	-137451
Mass Enthalpy	Btu/lb	-6821.74	-6820.70	-1280.45	-2284.57	-2478.82
Mass Cp	Btu/(lb*°F)	0.978124	0.978155	0.382232	0.364731	0.273782
Ideal Gas CpCv Ratio		1.32902	1.32901	1.13998	1.26889	1.27530
Dynamic Viscosity	cP	0.918381	0.919876	0.00909651		
Kinematic Viscosity	cSt	0.921472	0.922950	5.71535		
Thermal Conductivity	Btu/(h*ft*°F)	0.350084	0.349918	0.0106651		
Surface Tension	lbf/ft	0.00498374	0.00498427			
Net Ideal Gas Heating Value	Btu/ft^3	7.29740E-18	0.0940205	1972.61	543.898	453.569
Net Liquid Heating Value	Btu/lb	-1059.76	-1057.62	17432.8	5771.74	4500.18
Gross Ideal Gas Heating Value	Btu/ft^3	50.3100	50.4059	2143.96	596.305	495.463
Gross Liquid Heating Value	Btu/lb	1.62108E-16	2.06103	18960.4	6357.13	4932.35

Tank Losses Report
Four 750-bbl Water Tanks

Client Name:Apache Corporation

Location:Brahmney Unit Tank Battery

Flowsheet:Emissions Ipy

Job:

Modified:9/13/2024 9:40

Status:Solved 11:06 AM, 9/13/2024

StreamConnections

Stream	Connection Type	Other Block	Stream	Connection Type	Other Block
Water from Separator Avg - 2	Inlet		Flash Water Avg - 2	Flashing Losses Stream	MIX-101
Working Water Avg - 2	Working Losses Stream	MIX-101	Breathing Water Avg - 2	Standing Losses Stream	MIX-101
Loading Water Avg - 2	Loading Losses Stream		Water Leaving Tanks Avg - 2	Residual Liquid Stream	

Working and Standing Properties : Scalar Data

Tank Geometry	Vertical Cylinder	Roof Type	Cone
Shell Length	24" ft	Slope of Coned Roof	0.0625
Shell Diameter	15.5" ft	Breather Vent Pressure	0.0300000 psig
Number of Storage Tanks	4"	Breather Vacuum Pressure	-0.0300000 psig
Maximum Fraction Fill of Tank	90 %	Location	Midland, TX
Average Fraction Fill of Tank	50 %	Time Frame	Year
Minimum Fraction Fill of Tank	10 %	Known Liquid Bulk Temperature?	FALSE
Material Category	Light Organics*	Liquid Bulk Temperature	66.2404 °F
Insulation	Uninsulated	Use AP 42 Raoult's Vapor Pressure?	FALSE
Botled or Riveted Construction?	FALSE	Flashing Temperature	76.3409 °F
Vapor Balanced Tank?	FALSE	Average Daily Maximum Ambient Temperature	76.7 °F
Known Sum of Increases in Liquid Level?	FALSE	Average Daily Minimum Ambient Temperature	51.4 °F
Sum of Increases in Liquid Level	33981.9 ft/yr	Atmospheric Pressure at Tank Location	13.26 psia
Shell Color	Tan*	Daily Solar Insolation	1698 Btu/(day/ft^2)
Shell Paint Condition	New*	Average Wind Speed	11 mph
Roof Color	Tan*	Include Short Term Emissions	FALSE
Roof Paint Condition	New*		

Composition Subset Properties : Scalar Data

Component Subset	All Selected*	Species in Results	Selected Species
Atomic Basis	FALSE	Fraction Denominator	Selected Species

Composition Subset Properties : Tabulated Data

Index	Selected Components
H2S	TRUE
Nitrogen	TRUE
Methane	TRUE
CO2	TRUE
Ethane	TRUE
Propane	TRUE
i-Butane	TRUE
n-Butane	TRUE
i-Pentane	TRUE
n-Pentane	TRUE
iC6	TRUE
n-Hexane	TRUE
IC7	TRUE
n-Heptane	TRUE
Benzene	TRUE
Toluene	TRUE
2,2,4-Trimethylpentane	TRUE
nC8	TRUE
Ethylbenzene	TRUE
m-Xylene	TRUE
o-Xylene	TRUE
p-Xylene	TRUE
Nonane	TRUE
C10	TRUE
Water	TRUE
C10+ Oil	TRUE

Details Properties : Scalar Data

Vapor Space Volume	2294.77 ft^3	Roof Outage	0.161458 ft
Vapor Density	0.0601831 lb/ft^3	Tank Roof Height	0.484375 ft
Vapor Space Expansion Factor	1 1/day	Tank Shell Radius	7.75 ft
Vented Vapor Saturation Factor	0.112877	Vapor Molecular Weight	28.0580 lb/lbmol
Vapor Space Outage	12.1615 ft	Average Vapor Temperature	529.709 °R
Average Daily Vapor Temperature Range	32.8041 °R	Average Daily Ambient Temperature	523.72 °R
Average Daily Vapor Pressure Range	2.09548 psi	Net Working Loss Throughput	6.41211E+06 ft^3/yr
Breather Vent Pressure Setting Range	0.0600000 psi	Working Loss Turnover (Saturation) Factor	1
Vapor Pressure at Average Daily Liquid Surface Temperature	12.1932 psia	Number of Turnovers per Year	1769.89
Average Daily Liquid Surface Temperature	527.810 °R	Annual Net Throughput	4.56866E+06 bbl/yr
Average Daily Ambient Temperature Range	25.3 °R	Maximum Liquid Height	21.6 ft
Tank Roof Surface Solar Absorptance	0.43	Minimum Liquid Height	2.4 ft
Tank Shell Surface Solar Absorptance	0.43	Working Loss Product Factor	1
Vapor Pressure at Maximum Liquid Surface Temperature	13.2600 psia	Vent Setting Correction Factor	1
Vapor Pressure at Minimum Liquid Surface Temperature	11.1645 psia	Saturation Factor	0.6
Maximum Liquid Surface Temperature	536.011 °R	Vapor Pressure of Liquid Loaded	0.863817 psia
Minimum Liquid Surface Temperature	519.609 °R	Collection Efficiency	70 %
Liquid Height	12 ft	Annual Net Throughput Per Tank	1.14216E+06 bbl/yr

Loading Properties : Scalar Data

Cargo Carrier	Tank Truck or Rail Tank Car	Truck Annual Leak Test Passed	None
Land Based Mode of Operation	Submerged Loading: Dedicated Normal Service*	Overall Reduction Efficiency	0 %
Control Efficiency	0* %		

Results Properties : Scalar Data

Flashing Losses	93.5687 ton/yr	Standing Losses per Tank	0.895267 ton/yr
Working Losses	242.872 ton/yr	Flashing Losses per Tank	23.3922 ton/yr
Standing Losses	3.58107 ton/yr	Working and Standing Losses	246.453 ton/yr
Loading Losses	37.4427 ton/yr	Working and Standing Losses per Tank	6.16133 ton/yr
Working Losses per Tank	60.7180 ton/yr	Loading Losses per Tank	9.36067 ton/yr

Results Properties : Tabulated Data

Index	Flashing Losses Mass Flows ton/yr	Working Losses Mass Flows ton/yr	Standing Losses Mass Flows ton/yr	Loading Losses Mass Flows ton/yr	Working and Standing Losses Mass Flows ton/yr
H2S	8.68374	71.0851	1.04813	10.9589	72.1332
Nitrogen	1.61356	0.225348	0.00332269	0.0347411	0.228671
Methane	23.8828	6.86260	0.101187	1.05708	6.96379
CO2	21.2339	122.627	1.80810	18.9050	124.435
Ethane	15.7160	6.72924	0.0992204	1.03742	6.82846
Propane	10.7939	3.26497	0.0481409	0.503348	3.31311
i-Butane	1.21460	0.255551	0.00376802	0.0393974	0.259319
n-Butane	3.84243	1.06696	0.0157320	0.164490	1.08269
i-Pentane	0.914917	0.179505	0.00264673	0.0276735	0.182151
n-Pentane	0.476597	0.0375260	0.000553308	0.00578524	0.0380793
iC6	0.708511	0.0765944	0.00112936	0.0118083	0.0777237
n-Hexane	0.131119	0.00704832	0.000103925	0.00108661	0.00715224
IC7	0	0	0	0	0
n-Heptane	0.0762695	0.00302232	4.45632E-05	0.000465941	0.00306689
Benzene	1.25047	9.43329	0.139091	1.45429	9.57238
Toluene	0.696308	5.27564	0.0777876	0.813326	5.35343
2,2,4-Trimethylpentane	0.0402486	0.00257966	3.80363E-05	0.000397697	0.00261770
nC8	0.0138863	0.000234683	3.46032E-06	3.61801E-05	0.000238143
Ethylbenzene	0.134137	0.982882	0.0144923	0.151527	0.997374
m-Xylene	0.0846349	0.644412	0.00950164	0.0993466	0.653913
o-Xylene	0.0257255	0.189687	0.00279688	0.0292434	0.192484
p-Xylene	0	0	0	0	0
Nonane	0.00395249	6.79337E-05	1.00166E-06	1.04731E-05	6.89353E-05
C10	4.77475E-07	2.41426E-09	3.55977E-11	3.72206E-10	2.44987E-09
Water	2.03083	13.9225	0.205283	2.14638	14.1278
C10+ Oil	3.02598E-07	2.29099E-07	3.37799E-09	3.53194E-08	2.32477E-07

Short Term Properties : Scalar Data

Short-Term Collection Efficiency	%
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Notes:

Tank Losses Report

One 500-bbl Water Tank

Client Name:

Apache Corporation

Job:

Location:

Brahaney Unit Tank Battery

Modified:

9/13/2024 9:38

Flowsheet:

Emissions Ipy

Status:

Solved 9:53 AM, 9/13/2024

StreamConnections

Stream	Connection Type	Other Block	Stream	Connection Type	Other Block
Water from Separator Avg	Inlet		Flash Water Avg	Flashing Losses Stream	MIX-102
Working Water Avg	Working Losses Stream	MIX-102	Breathing Water Avg	Standing Losses Stream	MIX-102
Loading Water Avg	Loading Losses Stream		Water Leaving Tanks Avg	Residual Liquid Stream	

Working and Standing Properties : Scalar Data

Tank Geometry	Vertical Cylinder	Roof Type	Cone
Shell Length	16" ft	Slope of Coned Roof	0.0625
Shell Diameter	15.5" ft	Breather Vent Pressure	0.0300000 psig
Number of Storage Tanks	1*	Breather Vacuum Pressure	-0.0300000 psig
Maximum Fraction Fill of Tank	90 %	Location	Midland, TX
Average Fraction Fill of Tank	50 %	Time Frame	Year
Minimum Fraction Fill of Tank	10 %	Known Liquid Bulk Temperature?	FALSE
Material Category	Light Organics*	Liquid Bulk Temperature	66.2404 °F
Insulation	Uninsulated	Use AP 42 Raoult's Vapor Pressure?	FALSE
Botled or Riveted Construction?	FALSE	Flashing Temperature	76.4923 °F
Vapor Balanced Tank?	FALSE	Average Daily Maximum Ambient Temperature	76.7 °F
Known Sum of Increases in Liquid Level?	FALSE	Average Daily Minimum Ambient Temperature	51.4 °F
Sum of Increases in Liquid Level	108.777 ft/yr	Atmospheric Pressure at Tank Location	13.26 psia
Shell Color	Tan*	Daily Solar Insolation	1698 Btu/(day/ft^2)
Shell Paint Condition	New*	Average Wind Speed	11 mph
Roof Color	Tan*	Include Short Term Emissions	FALSE
Roof Paint Condition	New*		

Composition Subset Properties : Scalar Data

Component Subset	All Selected*	Species in Results	Selected Species
Atomic Basis	FALSE	Fraction Denominator	Selected Species

Composition Subset Properties : Tabulated Data

Index	Selected Components
H2S	TRUE
Nitrogen	TRUE
Methane	TRUE
CO2	TRUE
Ethane	TRUE
Propane	TRUE
i-Butane	TRUE
n-Butane	TRUE
i-Pentane	TRUE
n-Pentane	TRUE
iC6	TRUE
n-Hexane	TRUE
IC7	TRUE
n-Heptane	TRUE
Benzene	TRUE
Toluene	TRUE
2,2,4-Trimethylpentane	TRUE
nC8	TRUE
Ethylbenzene	TRUE
m-Xylene	TRUE
o-Xylene	TRUE
p-Xylene	TRUE
Nonane	TRUE
C10	TRUE
Water	TRUE
C10+ Oil	TRUE

Details Properties : Scalar Data

Vapor Space Volume	1540.00 ft^3	Roof Outlage	0.161458 ft
Vapor Density	0.0602022 lb/ft^3	Tank Roof Height	0.484375 ft
Vapor Space Expansion Factor	1 1/day	Tank Shell Radius	7.75 ft
Vented Vapor Saturation Factor	0.159265	Vapor Molecular Weight	28.0669 lb/bmol
Vapor Space Outlage	8.16146 ft	Average Vapor Temperature	530.165 °R
Average Daily Vapor Temperature Range	32.4978 °R	Average Daily Ambient Temperature	523.72 °R
Average Daily Vapor Pressure Range	2.07519 psi	Net Working Loss Throughput	20525.4 ft^3/yr
Breather Vent Pressure Setting Range	0.0600000 psi	Working Loss Turnover (Saturation) Factor	1
Vapor Pressure at Average Daily Liquid Surface Temperature	12.2038 psia	Number of Turnovers per Year	8.49823
Average Daily Liquid Surface Temperature	528.038 °R	Annual Net Throughput	3656.11 bbl/yr
Average Daily Ambient Temperature Range	25.3 °R	Maximum Liquid Height	14.4 ft
Tank Roof Surface Solar Absorptance	0.43	Minimum Liquid Height	1.6 ft
Tank Shell Surface Solar Absorptance	0.43	Working Loss Product Factor	1
Vapor Pressure at Maximum Liquid Surface Temperature	13.2600 psia	Vent Settling Correction Factor	1
Vapor Pressure at Minimum Liquid Surface Temperature	11.1848 psia	Saturation Factor	0.6
Maximum Liquid Surface Temperature	536.162 °R	Vapor Pressure of Liquid Loaded	0.319413 psia
Minimum Liquid Surface Temperature	519.913 °R	Collection Efficiency	70 %
Liquid Height	8 ft	Annual Net Throughput Per Tank	3656.11 bbl/yr

Loading Properties : Scalar Data

Cargo Carrier	Tank Truck or Rail Tank Car	Truck Annual Leak Test Passed	None
Land Based Mode of Operation	Submerged Loading: Dedicated Normal Service*	Overall Reduction Efficiency	0 %
Control Efficiency	0* %		

Results Properties : Scalar Data

Flashing Losses	0.0749900 ton/yr	Standing Losses per Tank	0.292939 ton/yr
Working Losses	0.0671635 ton/yr	Flashing Losses per Tank	0.0749900 ton/yr
Standing Losses	0.292939 ton/yr	Working and Standing Losses	0.360102 ton/yr
Loading Losses	0.00628044 ton/yr	Working and Standing Losses per Tank	0.360102 ton/yr
Working Losses per Tank	0.0671635 ton/yr	Loading Losses per Tank	0.00628044 ton/yr

Results Properties : Tabulated Data

	Flashing Losses Mass Flows	Working Losses Mass Flows	Standing Losses Mass Flows	Loading Losses Mass Flows	Working and Standing Losses Mass Flows
Index	ton/yr	ton/yr	ton/yr	ton/yr	ton/yr
H2S	0.00696922	0.0232082	0.101224	0.00217019	0.124433
Nitrogen	0.00129158	3.40624E-05	0.000148566	3.18517E-06	0.000182628
Methane	0.0191216	0.00103754	0.00452531	9.70202E-05	0.00556285
CO2	0.0170358	0.0185642	0.0809694	0.00173594	0.0995336
Ethane	0.0125878	0.00101706	0.00443597	9.51047E-05	0.00545302
Propane	0.00864396	0.00049321	0.00215166	4.61303E-05	0.00264498
i-Butane	0.000972653	3.85759E-05	0.000168251	3.60722E-06	0.000206927
n-Butane	0.00307690	0.000161211	0.000703133	1.50748E-05	0.000864344
i-Pentane	0.000732599	2.71022E-05	0.000118209	2.53433E-06	0.000145311
n-Pentane	0.000381456	5.67094E-06	2.47342E-05	5.30289E-07	3.04052E-05
iC6	0.000507148	1.15891E-05	5.04551E-05	1.08173E-06	6.20232E-05
n-Hexane	0.000104941	1.06468E-06	4.64370E-06	9.95584E-08	5.70839E-06
IC7	0	0	0	0	0
n-Heptane	6.10413E-05	4.56254E-07	1.98999E-06	4.26642E-08	2.44624E-06
Benzene	0.00100509	0.00735655	0.0320862	0.000687910	0.0394427
Toluene	0.000559604	0.00308713	0.0134648	0.000286877	0.0165019
2,2,4-Trimethylpentane	3.22207E-05	3.88389E-07	1.69399E-06	3.63182E-08	2.08238E-06
nC8	1.11128E-05	3.54455E-08	1.54598E-07	3.31451E-09	1.90044E-07
Ethylbenzene	0.000107862	0.000531264	0.00231715	4.96784E-05	0.00284841
m-Xylene	6.80054E-05	0.000216836	0.000845745	2.02763E-05	0.00116268
o-Xylene	2.06853E-05	0.000151584	0.000661144	1.41746E-05	0.000812727
p-Xylene	0	0	0	0	0
Nonane	3.16318E-06	1.02392E-08	4.46591E-08	9.57467E-10	5.48984E-08
C10	3.82100E-10	3.64962E-13	1.58786E-12	3.40433E-14	1.85194E-12
Water	0.00163546	0.0121196	0.0489351	0.00104914	0.0601547
C10+ Oil	2.43119E-10	3.45172E-11	1.50549E-10	3.22769E-12	1.85086E-10

Notes:

Tank Losses Report
Three 500-bbl Oil Tanks

Client Name:Apache Corporation

Location:Brahmney Unit Tank Battery

Flowsheet:Emissions Ipy

Job:

Modified:9/13/2024 9:32

Status:Solved 9:53 AM, 9/13/2024

StreamConnections

Stream	Connection Type	Other Block	Stream	Connection Type	Other Block
Oil with H2S to TKs Avg	Inlet		Flash Oil Avg	Flashing Losses Stream	MIX-100
Working Oil Avg	Working Losses Stream	MIX-100	Breathing Oil Avg	Standing Losses Stream	MIX-100
Loading Oil Avg	Loading Losses Stream		Stable Oil Avg	Residual Liquid Stream	

Working and Standing Properties : Scalar Data

Tank Geometry	Vertical Cylinder	Roof Type	Cone
Shell Length	16" ft	Slope of Coned Roof	0.0625
Shell Diameter	15.5" ft	Breather Vent Pressure	0.0300000 psig
Number of Storage Tanks	3	Breather Vacuum Pressure	-0.0300000 psig
Maximum Fraction Fill of Tank	90 %	Location	Midland, TX
Average Fraction Fill of Tank	50 %	Time Frame	Year
Minimum Fraction Fill of Tank	10 %	Known Liquid Bulk Temperature?	FALSE
Material Category	Heavy Crude*	Liquid Bulk Temperature	66.2404 °F
Insulation	Uninsulated	Use AP 42 Raoult's Vapor Pressure?	TRUE
Bolted or Riveted Construction?	FALSE	Flashing Temperature	76.4923 °F
Vapor Balanced Tank?	FALSE	Average Daily Maximum Ambient Temperature	76.7 °F
Known Sum of Increases in Liquid Level?	FALSE	Average Daily Minimum Ambient Temperature	51.4 °F
Sum of Increases in Liquid Level	1639.77 ft/yr	Atmospheric Pressure at Tank Location	13.26 psia
Shell Color	Tan*	Daily Solar Insolation	1698 Btu/(day/ft^2)
Shell Paint Condition	New*	Average Wind Speed	11 mph
Roof Color	Tan*	Include Short Term Emissions	FALSE
Roof Paint Condition	New*		

Composition Subset Properties : Scalar Data

Component Subset	All Selected*	Species in Results	Selected Species
Atomic Basis	FALSE	Fraction Denominator	Selected Species

Composition Subset Properties : Tabulated Data

Index	Selected Components
H2S	TRUE
Nitrogen	TRUE
Methane	TRUE
CO2	TRUE
Ethane	TRUE
Propane	TRUE
i-Butane	TRUE
n-Butane	TRUE
i-Pentane	TRUE
n-Pentane	TRUE
iC6	TRUE
n-Hexane	TRUE
IC7	TRUE
n-Heptane	TRUE
Benzene	TRUE
Toluene	TRUE
2,2,4-Trimethylpentane	TRUE
nC8	TRUE
Ethylbenzene	TRUE
m-Xylene	TRUE
o-Xylene	TRUE
p-Xylene	TRUE
Nonane	TRUE
C10	TRUE
Water	TRUE
C10+ Oil	TRUE

Details Properties : Scalar Data

Vapor Space Volume	1540.00 ft^3	Roof Outage	0.161458 ft
Vapor Density	0.0726926 lb/ft^3	Tank Roof Height	0.484375 ft
Vapor Space Expansion Factor	0.646379 1/day	Tank Shell Radius	7.75 ft
Vented Vapor Saturation Factor	0.192255	Vapor Molecular Weight	42.5806 lb/lbmol
Vapor Space Outage	8.16146 ft	Average Vapor Temperature	530.165 °R
Average Daily Vapor Temperature Range	32.4978 °R	Average Daily Ambient Temperature	523.72 °R
Average Daily Vapor Pressure Range	2.13441 psi	Net Working Loss Throughput	3094.12 ft^3/yr
Breather Vent Pressure Setting Range	0.0600000 psi	Working Loss Turnover (Saturation) Factor	1
Vapor Pressure at Average Daily Liquid Surface Temperature	9.71300 psia	Number of Turnovers per Year	128.107
Average Daily Liquid Surface Temperature	528.038 °R	Annual Net Throughput	165343 bbl/yr
Average Daily Ambient Temperature Range	26.3 °R	Maximum Liquid Height	14.4 ft
Tank Roof Surface Solar Absorptance	0.43	Minimum Liquid Height	1.6 ft
Tank Shell Surface Solar Absorptance	0.43	Working Loss Product Factor	0.75
Vapor Pressure at Maximum Liquid Surface Temperature	10.8289 psia	Vent Setting Correction Factor	1
Vapor Pressure at Minimum Liquid Surface Temperature	8.69453 psia	Saturation Factor	0.6
Maximum Liquid Surface Temperature	536.162 °R	Vapor Pressure of Liquid Loaded	7.29779 psia
Minimum Liquid Surface Temperature	519.913 °R	Collection Efficiency	70 %
Liquid Height	8 ft	Annual Net Throughput Per Tank	55114.3 bbl/yr

Loading Properties : Scalar Data

Cargo Carrier	Tank Truck or Rail Tank Car	Truck Annual Leak Test Passed	None
Land Based Mode of Operation	Submerged Loading: Dedicated Normal Service*	Overall Reduction Efficiency	0 %
Control Efficiency	0* %		

Results Properties : Scalar Data

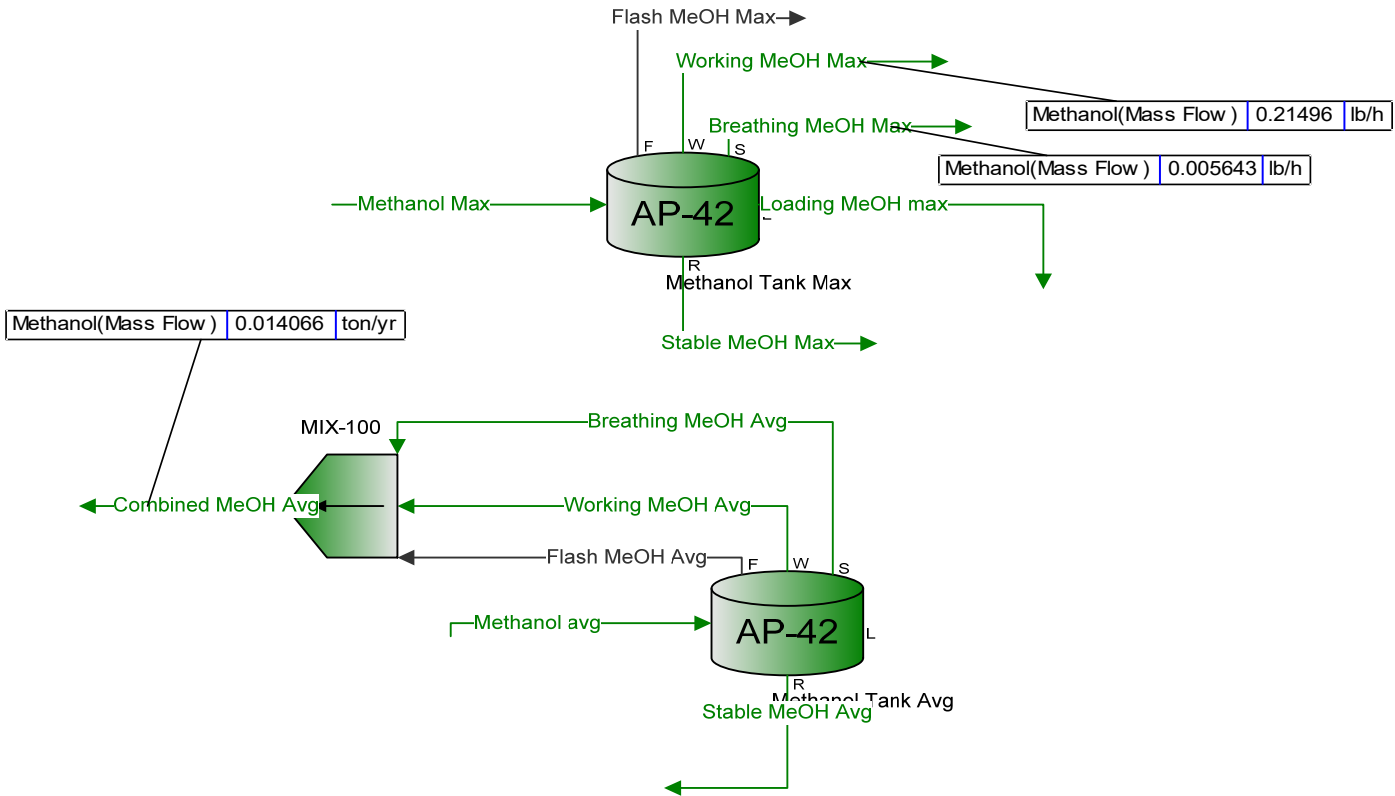
Flashing Losses	108.111 ton/yr	Standing Losses per Tank	2.53886 ton/yr
Working Losses	25.3034 ton/yr	Flashing Losses per Tank	36.0370 ton/yr
Standing Losses	7.61658 ton/yr	Working and Standing Losses	32.9200 ton/yr
Loading Losses	14.7885 ton/yr	Working and Standing Losses per Tank	10.9733 ton/yr
Working Losses per Tank	8.43448 ton/yr	Loading Losses per Tank	4.92951 ton/yr

Results Properties : Tabulated Data

Index	Flashing Losses Mass Flows ton/yr	Working Losses Mass Flows ton/yr	Standing Losses Mass Flows ton/yr	Loading Losses Mass Flows ton/yr	Working and Standing Losses Mass Flows ton/yr
H2S	2.36683	0.630285	0.189722	0.368369	0.820008
Nitrogen	5.55560	0.0870448	0.0262013	0.0508731	0.113246
Methane	8.23228	0.461171	0.144837	0.281219	0.626009
CO2	13.2537	2.45029	0.737562	1.43207	3.18785
Ethane	18.7323	5.99373	1.80417	3.50302	7.79790
Propane	25.8077	7.31429	2.20167	4.27482	9.51596
i-Butane	4.73933	1.24563	0.374948	0.728007	1.62058
n-Butane	9.87537	2.55691	0.769654	1.49438	3.32656
i-Pentane	4.21902	1.06789	0.321446	0.624126	1.38934
n-Pentane	3.95112	0.988043	0.297411	0.577459	1.28545
iC6	5.14516	1.24328	0.374241	0.726834	1.61752
n-Hexane	1.62799	0.402673	0.121208	0.235341	0.523881
IC7	0	0	0	0	0
n-Heptane	1.25711	0.261260	0.0786419	0.152693	0.339902
Benzene	1.37606	0.210141	0.0632546	0.122817	0.273396
Toluene	0.568238	0.0966676	0.0300069	0.0562621	0.129695
2,2,4-Trimethylpentane	0.625543	0.132638	0.0399255	0.0775202	0.172564
nC8	0.439471	0.0805270	0.0242394	0.0470638	0.104766
Ethylbenzene	0.104441	0.0196367	0.00591083	0.0114766	0.0255475
m-Xylene	0.0603716	0.0110162	0.00331598	0.00643639	0.0143322
o-Xylene	0.0194070	0.00314987	0.000948140	0.00184003	0.00409801
p-Xylene	0	0	0	0	0
Nonane	0.154001	0.0241423	0.00728707	0.0141099	0.0314094
C10	0	0	0	0	0
Water	0	0	0	0	0
C10+ Oil	2.94582E-07	3.68238E-08	1.10843E-08	2.15215E-08	4.79081E-08

Notes:

Brahaney Unit Tank Battery
Miscellaneous Tanks



Process Streams	Breathing MeOH Avg		Breathing MeOH Max		Combined MeOH Avg		Flash MeOH Avg		Flash MeOH Max		Loading MeOH max		Methanol avg		Methanol Max		Stable MeOH Avg		Stable MeOH Max		Working MeOH Avg		Working MeOH Max		
Properties	Status:	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved		
Phase: Total	From Block:	Methanol Tank Avg	Methanol Tank Avg	MIX-100	Methanol Tank Avg	Methanol Tank Max	Methanol Tank Max	Methanol Tank Max	Methanol Tank Max	Methanol Tank Max	Methanol Tank Max	Methanol Tank Max	Methanol Tank Max	Methanol Tank Max	Methanol Tank Max	Methanol Tank Max	Methanol Tank Max	Methanol Tank Max	Methanol Tank Max	Methanol Tank Max	Methanol Tank Avg	Methanol Tank Max	Methanol Tank Max		
Property	Units	MIX-100	--	--	MIX-100	--	--	--	MIX-100	--	--	--	Methanol Tank Avg	--	--	Methanol Tank Avg	--	--	Methanol Tank Avg	--	Methanol Tank Avg	MIX-100	--	--	
Temperature	°F	78.8385		99.8734	78.8385		78.8385		78.8385		99.8734		99.8734		70°		70°		78.8385		99.8734		78.8385		99.8734
Pressure	psig	-1.43595		-1.43595	-1.43595		-1.43595		-1.43595		-1.43595		-1.43595		0°		0°		-1.43595		-1.43595		-1.43595		-1.43595
Mole Fraction Vapor	%	0		0	0		0		0		0		0		0		0		0		0		0		0
Mole Fraction Light Liquid	%	100		100	100		100		100		100		100		100		100		100		100		100		100
Mole Fraction Heavy Liquid	%	0		0	0		0		0		0		0		0		0		0		0		0		0
Phase Mole Fraction	%	100		100	100		100		100		100		100		100		100		100		100		100		100
Molecular Weight	lb/mol	32.0419		32.0419	32.0419		32.0419		32.0419		32.0419		32.0419		32.0419		32.0419		32.0419		32.0419		32.0419		32.0419
Mass Density	lbm/ft³	50.0868		49.2151	50.0868		50.0868		49.2151		50.4487		50.4487		50.0868		50.0868		49.2151		50.0868		49.2151		50.0868
Molar Flow	lbmol/h	6.89871E-05		0.00017614	0.000100228		0		0		0.0219229		0.141852		0.103552		0.141752		3.12410E-05		0.00670859		0.00670859		0.00670859
Mass Flow	lb/h	0.00221047		0.00564302	0.00321149		0		0		0.702452		4.045521		3.318		4.54198		3317.78		0.00100102		0.00100102		0.00100102
Vapor Volumetric Flow	ft³/h	4.41328E-05		0.000114860	0.00141860		0		0		0.0142731		0.0090596		66.7989		0.00906824		67.4139		1.98957E-05		0.00436768		0.00436768
Water Flow	gpm	5.50228E-06		0.00000006	0.00000006		0		0		0.0117950		0.013327		9.19887		0.0130584		2.49173E-06		0.000044543		0.000044543		0.000044543
Std Vapor Volumetric Flow	MMSCFD	6.28308E-07		0.160398E-06	9.12839E-07		0		0		0.000195666		0.00129193		0.943112		0.00129102		0.943050		2.84531E-07		0.16993E-05		0.16993E-05
Std Liquid Volumetric Flow	sgpm	5.55172E-06		1.41727E-05	0.06584E-06		0		0		0.00176425		0.0114155°		8.33333°		0.0114075		2.54112E-06		0.000539873		0.000539873		0.000539873
Compressibility		0.00146785		0.00143769	0.00146785		0		0		0.00164209		0.00164209		0.00164209		0.00146785		0.00143769		0.00146785		0.00143769		0.00143769
Specific Gravity		0.803076		0.789099	0.803076		0		0		0.789099		0.808878		0.803076		0.789099		0.803076		0.803076		0.789099		0.789099
API Gravity		42.0370		42.0370	42.0370		0		0		42.0370		42.0364		42.0370		42.0370		42.0370		42.0370		42.0370		42.0370
Enthalpy	Btu/h	-7.11378		-18.0824	-10.3353		0		0		-2250.93		-14653.5		-1.06971E+07		-14617.1		-1.06315E+07		-3.22150		-688.802		-688.802
Mass Enthalpy	Btu/lb	-3218.21		-3204.39	-3218.21		0		0		-3204.39		-3223.96		-3223.96		-3204.39		-3204.39		-3204.39		-3204.39		-3204.39
Mass Cp	Btu/(lb**°F)	0.652241		0.662700	0.652241		0		0		0.662700		0.648511		0.648511		0.652241		0.662700		0.652241		0.662700		0.662700
Ideal Gas Cp/Cv Ratio		1.22303		1.22707	1.22303		0		0		1.22707		1.33333		1.33333		1.2303		1.22707		1.2303		1.22707		1.22707
Dynamic Viscosity	cP	0.67026		0.460966	0.537906		0		0		0.460966		0.575846		0.575846		0.460966		0.460966		0.537906		0.460966		0.460966
Kinematic Viscosity	cSt	0.670443		0.584722	0.670443		0		0		0.584722		0.712583		0.712583		0.670443		0.584722		0.670443		0.584722		0.584722
Thermal Conductivity	Btu/(h**ft**°F)	0.115346		0.113448	0.115346		0		0		0.113448		0.116143		0.116143		0.115346		0.113448		0.115346		0.113448		0.113448
Surface Tension	lb/ft	0.00152040		0.00144125	0.00152040		0		0		0.00144125		0.00155359		0.00155359		0.00152040		0.00144125		0.00152040		0.00144125		0.00144125
Net Ideal Gas Heating Value	Btu/ft³	766.100		766.100	766.100		0		0		766.100		766.100		766.100		766.100		766.100		766.100		766.100		766.100
Net Liquid Heating Value	Btu/lb	8557		8557	8557		0		0		8557		8557		8557		8557		8557		8557		8557		8557
Gross Ideal Gas Heating Value	Btu/ft³	866.700		866.700	866.700		0		0		866.700		866.700		866.700		866.700		866.700		866.700		866.700		866.700
Gross Liquid Heating Value	Btu/lb	9749		9749	9749		0		0		9749		9749		9749		9749		9749		9749		9749		9749

Process Streams		Breathing MEOH Avg		Breathing MEOH Max		Combined MEOH Avg		Flash MEOH Avg		Flash MEOH Max		Loading MEOH max		Methanol avg		Methanol Max		Stable MEOH Avg		Stable MEOH Max		Working MEOH Avg		Working MEOH Max	
Properties		Solved		Solved		Solved		Solved		Solved		Solved		Solved		Solved		Solved		Solved		Solved		Solved	
Phase:	Status:	From Block:	Methanol Tank Avg	Methanol Tank Max	MIX--	Methanol Tank Avg	Methanol Tank Max	MIX--	Methanol Tank Avg	Methanol Tank Max	MIX--	Methanol Tank Avg	Methanol Tank Max	MIX--	Methanol Tank Avg	Methanol Tank Max	MIX--	Methanol Tank Avg	Methanol Tank Max	MIX--	Methanol Tank Avg	Methanol Tank Max	MIX--	Methanol Tank Avg	Methanol Tank Max
Phase:	Aqueous Liquid	To Block:	MIX-100	--	MIX-100	MIX-100	--	MIX-100	MIX-100	--	MIX-100	MIX-100	--	MIX-100	MIX-100	--	MIX-100	MIX-100	--	MIX-100	MIX-100	--	MIX-100	MIX-100	
Property	Units																								
Temperature	°F		78.8385	99.8734	78.8385		99.8734	78.8385		99.8734	78.8385		99.8734	78.8385		99.8734	78.8385		99.8734	78.8385		99.8734	78.8385		99.8734
Pressure	psig		-1.43595	-1.43595	-1.43595		-1.43595	-1.43595		-1.43595	-1.43595		-1.43595	-1.43595		-1.43595	-1.43595		-1.43595	-1.43595		-1.43595	-1.43595		-1.43595
Mole Fraction Vapor	%		0	0	0		0	0		0	0		0	0		0	0		0	0		0	0		0
Mole Fraction Light Liquid	%		100	100	100		100	100		100	100		100	100		100	100		100	100		100	100		100
Mole Fraction Heavy Liquid	%		0	0	0		0	0		0	0		0	0		0	0		0	0		0	0		0
Phase Mole Fraction	%		100	100	100		100	100		100	100		100	100		100	100		100	100		100	100		100
Molecular Weight	lb/mol		32.0419	32.0419	32.0419		32.0419	32.0419		32.0419	32.0419		32.0419	32.0419		32.0419	32.0419		32.0419	32.0419		32.0419	32.0419		32.0419
Mass Density	lb/ft³		50.0868	49.2151	50.0868		50.0868	49.2151		50.4487	50.4487		50.4487	50.0868		50.0868	49.2151		50.0868	49.2151		50.0868	49.2151		50.0868
Molar Flow	lbmol/h		6.89871E-05	0.00017614	0.000100228		0.00017614	0.000100228		0.0219229	0.0141852		0.0141852	0.03552		0.014872	3.12410E-05		0.03552	3.12410E-05		0.00670859	0.00670859		0.00670859
Mass Flow	lb/h		0.00221047	0.00564302	0.00362149		0.00564302	0.00362149		0.74521	0.454521		0.454521	0.3318		0.3318	0.00100102		0.3318	0.00100102		0.0214955	0.0214955		0.0214955
Vapor Volumetric Flow	ft³/h		4.41328E-05	0.000114660	0.0000118605		0.000114660	0.0000118605		0.0142731	0.0090056		0.0090056	65.798		65.798	0.0098824		65.798	0.0098824		0.00436768	0.00436768		0.00436768
Liquid Volumetric Flow	ft³/h		5.50228E-06	1.42635E-06	7.99400E-06		1.42635E-06	7.99400E-06		0.0123765	0.0113987		0.0113987	9.43045		9.43045	2.49173E-06		9.43045	2.49173E-06		0.00064545	0.00064545		0.00064545
Std Vapor Volumetric Flow	MMSCFD		6.28305E-07	1.60398E-06	9.12839E-07		1.60398E-06	9.12839E-07		0.00019666	0.000129193		0.000129193	0.943112		0.943112	0.00129102		0.943112	0.00129102		0.00004545	0.00004545		0.00004545
Std Liquid Volumetric Flow	sgpm		5.51772E-06	1.40177E-05	8.65846E-06		1.40177E-05	8.65846E-06		0.00176425	0.0111455		0.0111455	8.33333		8.33333	2.51412E-07		8.33333	2.51412E-07		0.000539873	0.000539873		0.000539873
Compressibility			0.00146785	0.00143769	0.00146785		0.00143769	0.00146785		0.00164209	0.00164209		0.00164209	0.00146785		0.00146785	0.00143769		0.00146785	0.00143769		0.00143769	0.00143769		0.00143769
Specific Gravity			0.803076	0.789099	0.803076		0.789099	0.803076		0.808878	0.808878		0.808878	0.803076		0.803076	0.789099		0.803076	0.789099		0.789099	0.789099		0.789099
API Gravity			42.0370	42.0370	42.0370		42.0370	42.0370		42.0364	42.0364		42.0364	42.0370		42.0370	42.0370		42.0370	42.0370		42.0370	42.0370		42.0370
Enthalpy	Btu/h		-7.11378	-18.0824	-10.3353		-10.3353	-7.11378		-2250.93	-14653.5		-14653.5	-1.06971E+07		-14617.1	-1.06315E+07		-14617.1	-1.06315E+07		-3.22150	-688.802		-688.802
Mass Enthalpy	Btu/lb		-3218.21	-3204.39	-3218.21		-3204.39	-3218.21		-3204.39	-3223.96		-3223.96	-3204.39		-3204.39	-3204.39		-3204.39	-3204.39		-3204.39	-3204.39		-3204.39
Mass Cp	Btu/(lb**F)		0.652241	0.662700	0.652241		0.662700	0.652241		0.648511	0.648511		0.648511	0.652241		0.652241	0.662700		0.652241	0.662700		0.662700	0.662700		0.662700
Ideal Gas Cp/Cv Ratio			1.22303	1.22707	1.22303		1.22707	1.22303		1.23410	1.23410		1.23410	1.2303		1.2303	1.22707		1.2303	1.22707		1.22707	1.22707		1.22707
Dynamic Viscosity	cP		0.537006	0.460966	0.537006		0.537006	0.460966		0.575846	0.575846		0.575846	0.460966		0.460966	0.537006		0.460966	0.537006		0.460966	0.460966		0.460966
Kinematic Viscosity	cSt		0.670443	0.584722	0.670443		0.670443	0.584722		0.584722	0.712583		0.712583	0.670443		0.670443	0.584722		0.670443	0.584722		0.584722	0.584722		0.584722
Thermal Conductivity	Btu/(h**ft**F)		0.115346	0.113448	0.115346		0.113448	0.115346		0.116143	0.116143		0.116143	0.115346		0.115346	0.113448		0.115346	0.113448		0.113448	0.113448		0.113448
Surface Tension	lb/ft		0.00152040	0.00144125	0.00152040		0.00152040	0.00152040		0.00155359	0.00155359		0.00155359	0.00152040		0.00152040	0.00144125		0.00152040	0.00144125		0.00144125	0.00144125		0.00144125
Net Ideal Gas Heating Value	Btu/ft³		766.100	766.100	766.100		766.100	766.100		766.100	766.100		766.100	766.100		766.100	766.100		766.100	766.100		766.100	766.100		766.100
Net Liquid Heating Value	Btu/lb		8557	8557	8557		8557	8557		8557	8557		8557	8557		8557	8557		8557	8557		8557	8557		8557
Gross Ideal Gas Heating Value	Btu/ft³		866.700	866.700	866.700		866.700	866.700		866.700	866.700		866.700	866.700		866.700	866.700		866.700	866.700		866.700	866.700		866.700
Gross Liquid Heating Value	Btu/lb		9749	9749	9749		9749	9749		9749	9749		9749	9749		9749	9749		9749	9749		9749	9749		9749

Tank Losses Report Methanol Tank Avg					
Client Name:		Apache Corporation		Job:	
Location:		Brahanev Unit Tank Battery		Modified:	
Flowsheet:		Misc Tanks		Status:	
				4/16/2023 10:30	
				Solved 10:25 AM, 9/13/2024	
Stream Connections					
Stream	Connection Type	Other Block	Stream	Connection Type	Other Block
Methanol avg	Inlet		Flash MeOH Avg	Flashing Losses Stream	MIX-100
Working MeOH Avg	Working Losses Stream	MIX-100	Breathing MeOH Avg	Standing Losses Stream	MIX-100
Stable MeOH Avg	Residual Liquid Stream				
Working and Standing Properties : Scalar Data					
Tank Geometry	Horizontal Cylinder*		Shell Paint Condition	Average	
Shell Length	5.5* ft		Breather Vent Pressure	0.0300000 psig	
Shell Diameter	4* ft		Breather Vacuum Pressure	-0.0300000 psig	
Number of Storage Tanks	1		Location	Midland, TX*	
Maximum Fraction Fill of Tank	90 %		Time Frame	Year*	
Average Fraction Fill of Tank	50 %		Known Liquid Bulk Temperature?	FALSE	
Minimum Fraction Fill of Tank	10 %		Liquid Bulk Temperature	67.0045 °F	
Material Category	Light Organics*		Use AP 42 Raoult's Vapor Pressure?	TRUE	
Insulation	Uninsulated		Flashing Temperature	78.8385 °F	
Underground Tank?	FALSE		Average Daily Maximum Ambient Temperature	76.7 °F	
Bolted or Riveted Construction?	FALSE		Average Daily Minimum Ambient Temperature	51.4 °F	
Vapor Balanced Tank?	FALSE		Atmospheric Pressure at Tank Location	13.26 psia	
Known Sum of Increases in Liquid Level?	FALSE		Daily Solar Insolation	1698 Btu/(day*ft^2)	
Sum of Increases in Liquid Level	62.7817 ft/yr		Average Wind Speed	11 mph	
Shell Color	Light Grey*		Include Short Term Emissions	FALSE	
Composition Subset Properties : Scalar Data					
Component Subset	All Selected*		Species in Results	Selected Species	
Atomic Basis	FALSE		Fraction Denominator	Selected Species	
Composition Subset Properties : Tabulated Data					
Index	Selected Components				
Methanol	TRUE				
Details Properties : Scalar Data					
Vapor Space Volume	34.5575 ft^3		Minimum Liquid Surface Temperature	520.140 °R	
Vapor Density	0.0111149 lb/ft^3		Effective Height	3.14159 ft	
Vapor Space Expansion Factor	0.160889 1/day		Liquid Height	2 ft	
Vented Vapor Saturation Factor	0.858466		Roof Outage	0 ft	
Effective Shell Diameter	5.29257 ft		Vapor Molecular Weight	32.0419 lb/lbmol	
Vapor Space Outage	1.57080 ft		Average Vapor Temperature	531.974 °R	
Average Daily Vapor Temperature Range	36.7378 °R		Average Daily Ambient Temperature	523.72 °R	
Average Daily Vapor Pressure Range	1.09191 psi		Net Working Loss Throughput	788.938 ft^3/yr	
Breather Vent Pressure Setting Range	0.0600000 psi		Working Loss Turnover (Saturation) Factor	1	
Vapor Pressure at Average Daily Liquid Surface Temperature	1.98034 psia		Number of Turnovers per Year	19.6193	
Average Daily Liquid Surface Temperature	529.324 °R		Annual Net Throughput	140.530 bbl/yr	
Average Daily Ambient Temperature Range	25.3 °R		Maximum Liquid Height	3.6 ft	
Tank Roof Surface Solar Absorptance	0.58		Minimum Liquid Height	0.4 ft	
Tank Shell Surface Solar Absorptance	0.58		Working Loss Product Factor	1	
Vapor Pressure at Maximum Liquid Surface Temperature	2.58997 psia		Vent Setting Correction Factor	1	
Vapor Pressure at Minimum Liquid Surface Temperature	1.49806 psia		Annual Net Throughput Per Tank	140.530 bbl/yr	
Maximum Liquid Surface Temperature	538.509 °R				
Results Properties : Scalar Data					
Flashing Losses	0 ton/yr		Standing Losses per Tank	0.00968187 ton/yr	
Working Losses	0.00438447 ton/yr		Flashing Losses per Tank	0 ton/yr	
Standing Losses	0.00968187 ton/yr		Working and Standing Losses	0.0140663 ton/yr	
Working Losses per Tank	0.00438447 ton/yr		Working and Standing Losses per Tank	0.0140663 ton/yr	
Results Properties : Tabulated Data					
Index	Flashing Losses Mass Flows ton/yr	Working Losses Mass Flows ton/yr	Standing Losses Mass Flows ton/yr	Working and Standing Losses Mass Flows ton/yr	
Methanol	0	0.00438447	0.00968187	0.0140663	
Notes:					

Tank Losses Report Methanol Tank Max					
Client Name:		Apache Corporation		Job:	
Location:		Brahmney Unit Tank Battery		Modified:	
Flowsheet:		Misc Tanks		Status: Solved 10:25 AM, 9/13/2024	
Stream Connections					
Stream		Connection Type		Other Block	
Methanol Max		Inlet			
Working MeOH Max		Working Losses Stream		Flash MeOH Max	
Loading MeOH max		Loading Losses Stream		Breathing MeOH Max	
				Stable MeOH Max	
				Flashing Losses Stream	
				Standing Losses Stream	
				Residual Liquid Stream	
Working and Standing Properties : Scalar Data					
Tank Geometry		Horizontal Cylinder*		Average	
Shell Length		5.5' ft		Breather Vent Pressure	
Shell Diameter		4' ft		Breather Vacuum Pressure	
Number of Storage Tanks		1		Location	
Maximum Fraction Fill of Tank		90 %		Time Frame	
Average Fraction Fill of Tank		50 %		Known Liquid Bulk Temperature?	
Minimum Fraction Fill of Tank		10 %		Liquid Bulk Temperature	
Material Category		Light Organics*		Use AP 42 Raoult's Vapor Pressure?	
Insulation		Uninsulated		Flashing Temperature	
Underground Tank?		FALSE		Average Daily Maximum Ambient Temperature	
Bolted or Riveted Construction?		FALSE		Average Daily Minimum Ambient Temperature	
Vapor Balanced Tank?		FALSE		Atmospheric Pressure at Tank Location	
Known Sum of Increases in Liquid Level?		FALSE		Daily Solar Insolation	
Sum of Increases in Liquid Level		46599.1 ft/yr		Average Wind Speed	
Shell Color		Light Grey*		Include Short Term Emissions	
				TRUE	
Composition Subset Properties : Scalar Data					
Component Subset		All Selected*		Species in Results	
Atomic Basis		FALSE		Fraction Denominator	
				Selected Species	
				Selected Species	
Composition Subset Properties : Tabulated Data					
Index		Selected Components			
Methanol		TRUE			
Details Properties : Scalar Data					
Vapor Space Volume		34.5575 ft^3		Effective Height	
Vapor Density		0.0190582 lb/ft^3		Liquid Height	
Vapor Space Expansion Factor		0.266077 1/day		Roof Outage	
Vented Vapor Saturation Factor		0.772842		Vapor Molecular Weight	
Effective Shell Diameter		5.29257 ft		Average Vapor Temperature	
Vapor Space Outage		1.57080 ft		Average Daily Ambient Temperature	
Average Daily Vapor Temperature Range		39.8997 °R		Net Working Loss Throughput	
Average Daily Vapor Pressure Range		1.94241 psi		Working Loss Turnover (Saturation) Factor	
Breather Vent Pressure Setting Range		0.0600000 psi		Number of Turnovers per Year	
Vapor Pressure at Average Daily Liquid Surface Temperature		3.53055 psia		Annual Net Throughput	
Average Daily Liquid Surface Temperature		549.569 °R		Maximum Liquid Height	
Average Daily Ambient Temperature Range		22.8 °R		Minimum Liquid Height	
Tank Roof Surface Solar Absorptance		0.58		Working Loss Product Factor	
Tank Shell Surface Solar Absorptance		0.58		Vent Setting Correction Factor	
Vapor Pressure at Maximum Liquid Surface Temperature		4.61400 psia		Saturation Factor	
Vapor Pressure at Minimum Liquid Surface Temperature		2.67159 psia		Vapor Pressure of Liquid Loaded	
Maximum Liquid Surface Temperature		559.543 °R		Collection Efficiency	
Minimum Liquid Surface Temperature		539.594 °R		Annual Net Throughput Per Tank	
				104307 bbl/yr	
Loading Properties : Scalar Data					
Cargo Carrier		Tank Truck or Rail Tank Car		Truck Annual Leak Test Passed	
Land Based Mode of Operation		Submerged Loading: Dedicated Normal Service*		Overall Reduction Efficiency	
Control Efficiency		0 %		None	
				0 %	
Results Properties : Scalar Data					
Flashing Losses		0 lb/d		Standing Losses per Tank	
Working Losses		5.15894 lb/d		Flashing Losses per Tank	
Standing Losses		0.135432 lb/d		Working and Standing Losses	
Loading Losses		16.8588 lb/d		Working and Standing Losses per Tank	
Working Losses per Tank		5.15894 lb/d		Loading Losses per Tank	
				16.8588 lb/d	
Results Properties : Tabulated Data					
Index		Flashing Losses Mass Flows		Working Losses Mass Flows	
		lb/d		lb/d	
Methanol		0		5.15894	
				0.135432	
				16.8588	
				5.29437	
Short Term Properties : Scalar Data					
Maximum Battery Filling Rate		11.9048 bbl/hr		Short Term Working Losses per Tank	
Short-Term Number of Storage Tanks		1		Short-Term Loading Losses per Tank	
Worst-Case Liquid Surface Temperature		99.8734 °F		Short-Term Vapor Molecular Weight	
Maximum Loading Rate		11.9048 bbl/hr		Vapor Pressure at Worst-Case Temperature	
Worst-Case Flashing Losses		0 lb/h		Short-Term Control Efficiency	
Short-Term Working Losses		1.64564 lb/h		Short-Term Truck Annual Leak Test Passed	
Short-Term Loading Losses		0.987644 lb/h		Short-Term Overall Reduction Efficiency	
Worst-Case Flashing Losses per Tank		0 lb/h		Short-Term Collection Efficiency	
				70 %	
Short Term Properties : Tabulated Data					
Index		Worst-Case Flashing Losses Mass Flows		Short-Term Working Losses Mass Flows	
		lb/h		lb/h	
Methanol		0		1.64564	
				0.987644	
Notes:					

Apache Corporation (CN600126361)
Braham Unit Tank Battery (RN104925243)
November 2024

Section 6 – State Regulatory Applicability

Apache Corporation (CN600126361)
Brahaney Unit Tank Battery (RN104925243)
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Texas Administrative Code (TAC)	
30 TAC §101	Apache will comply with all general air quality rules.
30 TAC §111	Apache will comply with all applicable visible emissions and particulate matter requirements.
30 TAC §112	Apache will comply with all applicable requirements.
30 TAC §113	Refer to Section 7 - Federal Regulatory Applicability.
30 TAC §115	The site is not located in an applicable county.
30 TAC §117	The site is not located in an applicable county.
30 TAC §122	The site is not subject to Chapter 122.

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Air Quality Standard Permit for Oil and Gas Handling and Production Facilities	
(a)(1)	Yoakum County is not a Barnett Shale county; therefore, Apache is registering under this standard permit voluntarily.
(a)(2)	The site was previously authorized under permit-by-rule registration number 78663; with this registration, Apache requests that permit 78663 be voided.
(a)(3)	Apache will comply with any other applicable provisions of the Texas Health and Safety Code, Texas Water Code, rules of the Texas Commission on Environmental Quality (TCEQ), or any additional local, state or federal regulations.
(a)(4)	Emissions from upsets, emergencies, or malfunctions are not authorized by this standard permit. The standard permit does not regulate methane, ethane, or carbon dioxide.
(b)(1)- (b)(8)	The definitions and scope from this standard permit are utilized as appropriate.
(c)(1)	All project(s) are incorporated into the registration with this application.
(c)(2)	New, changed, or replacement facilities shall not exceed the thresholds for major source or major modification as defined in 30 TAC §116.12, Nonattainment and Prevention of Signification Deterioration Review Definitions, and in Federal Clean Air Act §112(g) or §112(j); All facilities shall comply with all applicable 40 CFR, Parts 60, 61, and 63 requirements; and All facilities shall comply with all applicable requirements of 30 TAC Chapters §111, §112, §113, §115, and §117.
(c)(3)	Apache shall meet all applicable requirements in this standard permit; shall not misrepresent or fail to fully disclose all relevant facts in obtaining the permit, and shall not be indebted to the state for failure to make payment of penalties or taxes imposed by the statutes or rules within the commission's jurisdiction.
(c)(4)	All facilities are included in this registration and meet all applicable requirements specified in this standard permit.
(d)(1)	The site consists of specific facilities and groups of facilities that have been evaluated for this standard permit.
(d)(2)	The site does not consist of any facilities that are not authorized under this standard permit.
(e)(1)	All facilities which have the potential to emit air contaminants will be maintained in good working order and operated properly during facility operations. Apache will establish and maintain a program to replace, repair, and/or maintain facilities to keep them in good working order. This program meets the requirements of this standard permit.
(e)(2)	All new facilities are operated at least 50 feet from any property line or receptor, whichever is closer.
(e)(3)	This site does not have engines.
(e)(4)	This site does not have open-topped tanks or ponds.
(e)(5)	All process equipment and storage facilities meet the BACT requirements listed in Table 10 in paragraph (m) of this standard permit.
(e)(6)	Fugitive components associated with this project will meet the applicable requirements of this standard permit.
(e)(7)	Tanks and vessels utilize a paint color that minimizes the effects of solar heating. Paint shall be applied according to paint producers recommended application requirements if provided and in sufficient quantity as to be considered solar resistant. Paint shall be maintained in good condition and will not compromise tank integrity.

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Air Quality Standard Permit for Oil and Gas Handling and Production Facilities	
(e)(8)	All emission estimation methods used in this application were used with monitoring data generated in accordance with Table 8 in subsection (m) of this section where monitoring is required. All emission estimation methods are used in a way that is consistent with protocols established by the commission or promulgated in federal regulations (NSPS, NESHAPS). Where control of emissions is relied upon to meet subsection (k) of this section, control monitoring is implemented as required.
(e)(9)	There are no process reboilers, heaters, or furnaces used for control of waste gas streams.
(e)(10)	The vapor recovery units (VRUs) meet the appropriate design, monitoring and record-keeping in Table 7 and Table 8 in paragraph (m) of this standard permit.
(e)(11)	Flare is designed and operated in accordance with the requirements in this standard permit.
(e)(12)	The site does not have thermal oxidation or vapor combustion control devices.
(f)(1)	This paragraph is not applicable, as all previous claims under this standard permit were submitted after December 31, 2015.
(f)(2)	This paragraph is not applicable, as all previous claims under this standard permit were submitted after December 31, 2015.
(f)(3)	Facilities, groups of facilities or planned MSS from facilities registered under this standard permit are not also authorized by a permit under 30 TAC §116.111, General Application.
(f)(4)	Prior to construction or implementation of changes, a notification and the appropriate \$50 fee was submitted through the ePermits system on 02/27/2024.
(f)(5)	This registration meets the requirements of this paragraph and includes the appropriate \$850 registration fee.
(f)(6)	This paragraph is not applicable, as the site is not changing authorization.
(f)(7)	This application is being submitted to the commission via the ePermits system and includes the PI-1S Standard Permit Registration Form and associated backup.
(g)	The site complies with all applicable requirements of 30 TAC §116.610 (except the emission limitations of §116.610(a)(1)); §116.611; §116.614; and §116.615 (except the notification requirements).
(h)(1)	Total maximum estimated annual emissions of any air contaminant does not exceed the limits for a major stationary source or major modification for PSD and NNSR as specified in 30 TAC §116.12.
(h)(2)	Emissions meet the limitations established in paragraph (k) of this standard permit.
(h)(3)	Maximum emissions after any operator limitations or controls are less than the values stated in the table found in this paragraph.
(i)(1)	Planned MSS emissions are included in this registration.
(i)(2)	Releases of air contaminants during, or as result of, planned MSS are quantified and meet the emission limits of this standard permit, as applicable.
(i)(3)	Other planned MSS activities that are listed in this paragraph are authorized by this standard permit and only require recordkeeping of the activity.
(i)(4)	Engine/compressor start-ups associated with preventative system shutdown activities have the option to be authorized as part of typical operations if: (A) Prior to operation, alternative operating scenarios to divert gas or liquid streams are registered and certified with all supporting documentation; (B) Engine/compressor shutdowns shall result in no greater than 4 lbs/hr of natural gas emissions; and (C) Emissions which result from subsequent compressor start-up activities are controlled to a minimum 98% efficiency for VOC and H ₂ S.

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Air Quality Standard Permit for Oil and Gas Handling and Production Facilities	
(j)(1)	Sampling and demonstrations of compliance include the requirements listed in Table 7 in paragraph (m) of this standard permit.
(j)(2)	Monitoring and records for demonstrations of compliance include the requirements listed in Table 8 in paragraph (m) of this standard permit.
(k)(1)	See 'Section 8 - Impacts Evaluation' of this application for impacts evaluations required under this standard permit.
(k)(2)	Distance measurements were determined as required by this standard permit.
(k)(3)	See 'Section 8 - Impacts Evaluation' of this application for impacts evaluations required under this standard permit.
(k)(4)	Evaluations of emissions meet the following: (A) For all evaluations of NO_x to NO₂ a conversion factor of 0.20 for 4 stroke rich and lean burn engines and 0.50 for 2-stroke engines may be used. (B) The maximum predicted concentration or rate at the property boundary or receptor, whichever is appropriate, must not exceed a state or federal ambient air standard or ESL.
(k)(5)	See 'Section 8 - Impacts Evaluation' of this application for impacts evaluations required under this standard permit.
(k)(6)	Impacts evaluation comply with the methods listed in this standard permit.
(l)	The site complies with the requirements in paragraphs (a)-(k) of this standard permit; therefore, this paragraph does not apply.
(m)	Tables 1 - 10 are used as required by this standard permit.

Apache Corporation
Brahaney Unit Tank Battery
Emission Limitations - Non-Rule Standard Permit

Air Quality Standard Permit for Oil and Gas Handling and Production Facilities: (h) Emission Limitations. Total maximum estimated registered or certified emissions shall meet the most stringent of the following. All emissions estimates must be based on representative worst-case operations and planned MSS activities.

NRSP(h): Emission Limitations

Air Contaminant	Steady-state or <30 psig periodic releases lb/hr			≥ 30 psig periodic lb/hr up to 600 hr/yr			Total tpy		
	Emission Limit	Facility Emissions	Exceed?	Emission Limit	Facility Emissions	Exceed?	Emission Limit	Facility Emissions	Exceed?
Total VOC							250	25.66	No
Total crude oil or condensate VOC	145	6.84	No	318	0.00	No			
Total natural gas VOC	750	7.64	No	1635	6.30	No			
Benzene	7	0.29	No	15.4	0.87	No	10.2	0.45	No
Hydrogen Sulfide	10.8	1.90	No	9.8	5.61	No	47	3.36	No
Sulfur Dioxide	93.2	92.99	No				250	96.59	No
Nitrogen Oxides	121	4.44	No				250	4.14	No
Carbon Monoxide	104	8.86	No				250	8.26	No
PM ₁₀ and PM _{2.5}	28	0.68	No				15	0.08	No

NRSP(k): Emission Limits Based on Impacts Evaluation

Distance to Nearest Property Line (mi)	Distance to Nearest Receptor (mi)	Air Contaminant	De Minimis Limits (lb/hr)	Project Emissions (lb/hr)	Impact Evaluation required?
0.0095	2.0	Benzene	0.039	1.27E+00	No
		H2S	0.025	8.05E+00	Yes
		SO2	2	9.94E+01	Yes
		NOx	4	4.72E+00	Yes

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Section 7 – Federal Regulatory Applicability

Apache Corporation (CN600126361)
Brahamney Unit Tank Battery (RN104925243)
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Federal Subpart	Summary of Requirement	Site Applicability
NSPS A	General provisions for the Standards of Performance for New Stationary Sources.	Apache will comply with all general provisions for each stationary source that contains an affected facility.
NSPS Kb	Except as provided in §60.110b(b),(d) of this section, the affected facility to which this subpart applies is each storage vessel with a capacity greater than or equal to 75 cubic meters (m ³) that is used to store volatile organic liquids (VOL) for which construction, reconstruction, or modification is commenced after July 23, 1984.	TK-1 - TK-3, WT-1 - WT-4, WT-5, and WT-6 each exceed 75 m ³ but have a design capacity less than 1,589.874 m ³ and are used for petroleum or condensate stored, processed, or treated prior to custody transfer; therefore, this subpart does not apply.
NSPS IIII	The provisions of this subpart are applicable to manufacturers, owners, and operators of stationary compression ignition (CI) internal combustion engines (ICE) and other persons as specified in §60.4200(a)(1)-(4).	This site does not have any stationary CI-ICE; therefore, this subpart does not apply.
NSPS JJJJ	The provisions of this subpart are applicable to manufacturers, owners, and operators of stationary spark ignition (SI) internal combustion engines (ICE) as specified in §60.4230(a)(1)-(6).	This site does not have any stationary SI-ICE; therefore, this subpart does not apply.
NSPS OOOO	This subpart establishes emission standards and compliance schedules for the control of volatile organic compounds (VOC) and sulfur dioxide (SO ₂) emissions from affected facilities in the crude oil and natural gas production source category that commence construction, modification, or reconstruction after August 23, 2011, and on or before September 18, 2015.	Reciprocating compressors constructed, modified or reconstructed after August 23, 2011, and on or before September 18, 2015 are located at a well site and therefore are not subject to the requirements of this subpart. The site does not have centrifugal compressors with wet gas seals, storage tanks, natural gas processing, or pneumatic controllers constructed, modified or reconstructed after August 23, 2011, and on or before September 18, 2015. Therefore, this subpart does not apply.
NSPS OOOOa	This subpart establishes emission standards and compliance schedules for the control of volatile organic compounds (VOC) and sulfur dioxide (SO ₂) emissions from affected facilities in the crude oil and natural gas production source category that commence construction, modification, or reconstruction after September 18, 2015, and on or before December 6, 2022.	The storage vessels have potential emissions less than six (6) tons per year (tpy) VOC and are not subject to the requirements of this subpart. New wells have been added to the well site after September 18, 2015 and on or before December 6, 2022; therefore, the well site is subject to the fugitive source monitoring requirements of this subpart. Reciprocating compressors constructed after September 18, 2015 and on or before December 6, 2022, are located at a well site and therefore are not subject to the requirements of this subpart. The site does not have centrifugal compressors with wet gas seals, pneumatic pumps, or natural gas processing or sweetening units constructed, modified or reconstructed after September 18, 2015, and on or before December 6, 2022 and will not be subject to the requirements of this subpart for those affected facilities. Apache will comply with all applicable requirements.
NSPS OOOOb	This subpart establishes emission standards and compliance schedules for the control of the pollutant greenhouse gases (GHG). The GHG standard in this subpart is in the form of a limitation on emissions of methane from affected facilities in the crude oil and natural gas source category that commence construction, modification, or reconstruction after December 6, 2022. This subpart also establishes emission standards and compliance schedules for the control of volatile organic compounds (VOC) and sulfur dioxide (SO ₂) emissions from affected facilities in the crude oil and natural gas source category that commence construction, modification, or reconstruction after December 6, 2022.	The site does not have affected facilities under this subpart. Therefore, this subpart does not apply.
MACT A	General provisions for the National Emission Standards for Hazardous Air Pollutants for Source Categories.	Apache will comply with all general provisions for each relevant source category.
MACT HH	This subpart applies to the owners and operators of the emission points, specified in §63.760(b) that are located at oil and natural gas production facilities that meet the specified criteria in §63.760(a)(1) and either §63.760(a)(2) or (a)(3).	The site is an area source of hazardous air pollutants (HAPs) and does not contain an affected facility under this subpart.
MACT ZZZZ	This subpart establishes national emission limitations and operating limitations for hazardous air pollutants (HAP) emitted from stationary reciprocating internal combustion engines (RICE) located at major and area sources of HAP emissions. This subpart also establishes requirements to demonstrate initial and continuous compliance with the emission limitations and operating limitations.	This site does not have any stationary RICE; therefore, this subpart does not apply.

Apache Corporation (CN600126361)
Braham Unit Tank Battery (RN104925243)
November 2024

Section 8 – Impacts Evaluation

Apache Corporation
Brahoney Unit Tank Battery
H2S Impact Analysis

Full Impacts Review

A full impacts review must be done for all of the following as applicable:

- H₂S Hourly Steady State
- H₂S Hourly Low Pressure Periodic
- H₂S Hourly High Pressure Periodic

The maximum acceptable emission rate can be found on an hourly steady state basis, hourly periodic (low pressure) basis, hourly periodic (high pressure) basis, and annual basis, which can be expressed as $E_{\text{max,hourly,steadystate}}$, $E_{\text{max,hourly,periodic(low pressure)}}$, $E_{\text{max,hourly,periodic(high pressure)}}$, and $E_{\text{max,annual}}$, respectively.

The equations for $E_{\text{max,hourly}}$ and $E_{\text{max,annual}}$ are:

$$E_{\text{max,hourly}} = (WR_{\text{EPN}_1}) \times \left(\frac{P \text{ or } \text{ESL}}{G_{\text{hourly,EPN}_1}} \right) + \dots + (WR_{\text{EPN}_x}) \times \left(\frac{P \text{ or } \text{ESL}}{G_{\text{hourly,EPN}_x}} \right)$$

$$E_{\text{max,annual}} = \left(\frac{8.760}{2.000} \right) \times (WR_{\text{EPN}_1}) \times \left(\frac{P \text{ or } \text{ESL}}{0.08 \times G_{\text{hourly,EPN}_1}} \right) + \dots + \left(\frac{8.760}{2.000} \right) \times (WR_{\text{EPN}_x}) \times \left(\frac{P \text{ or } \text{ESL}}{0.08 \times G_{\text{hourly,EPN}_x}} \right)$$

H ₂ S Hourly SAAQS (µg/m ³):	162
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H ₂ S Hourly Steady State - Impact Review										
FIN	EPN	Source Name	Which impacts table corresponds to this EPN?	Steady state hourly estimated emissions for each EPN (lbs/hr)	WR _{EPNx}	AAQS _{H2S, hourly} (µg/m ³)	Distance from emission point to nearest property line (ft)	Height of emission release point (ft)	G _{EPNx}	E _{max,EPNx, hourly,steadystate} (lb/hr)
WT-1 - WT-4	WT-1 - WT-4 / VRU-1 - VRU-2	Four 750-bbl Produced Water Tanks Controlled by VRUs	Tank Hatch	2.66E-01	4.90E-01	162	50	24	305	0.260
WT-5	WT-5	One 3,000-bbl Emergency Overflow Water Tank	Tank Hatch	2.22E-02	4.09E-02	162	50	20	305	0.022
TK-1 - TK-3	FL-1	Three 500-bbl Crude Oil Tanks Controlled by Flare	Flare/Therm. Dest. Dev.	2.98E-02	5.50E-02	162	50	50	25	0.356
WT-6	FL-1	One 500-bbl Produced Water Tank Controlled by Flare	Flare/Therm. Dest. Dev.	2.02E-02	3.72E-02	162	50	50	25	0.241
LPSep	FL-1	Low Pressure Separator Off Gas Controlled by Flare	Flare/Therm. Dest. Dev.	1.52E-02	2.81E-02	162	50	50	25	0.182
FL-1	FL-1	Flare Pilot	Flare/Therm. Dest. Dev.	3.48E-03	6.42E-03	162	50	50	25	0.042
FUG	FUG	Fugitive (gas service)	Fugitive	1.85E-01	3.42E-01	162	50	3	2625	0.021
				E _{estimated, total, hourly,steadystate} (lb/hr)	Total		Passed			E _{max, total, hourly,steadystate} (lb/hr)
				5.42E-01	1.0					1.12

H ₂ S Hourly Low Pressure Periodic - Impact Review										
FIN	EPN	Source Name	Which impacts table corresponds to this EPN?	Periodic (low P) hourly estimated emissions for each EPN (lbs/hr)	WR _{EPNx}	AAQS _{H2S, hourly} (µg/m ³)	Distance from emission point to nearest property line (ft)	Height of emission release point (ft)	G _{EPNx}	E _{max,EPNx, hourly,periodic(low pressure)} (lb/hr)
WT-1 - WT-4	WT-1 - WT-4 / VRU-1 - VRU-2	Tank Forced Ventilation 2 Controlled by VRUs	Tank Hatch	7.09E-01	3.74E-01	162	50	20	305	1.98E-01
TK-1 - TK-3, WT-6	FL-1	Tank Forced Ventilation 1 Controlled by Flare	Flare/Therm. Dest. Dev.	6.97E-02	3.68E-02	162	50	50	25	2.38E-01
PG	FL-1	Produced Gas (AOS, Sales line down)	Flare/Therm. Dest. Dev.	9.20E-01	4.85E-01	162	50	50	25	3.14E+00
MISC-MSS	MISC-MSS	Miscellaneous MSS Activities	Low P. Blowd./Purg./Pig.	7.65E-04	4.03E-04	162	50	3	2582.4	2.53E-05
MSS-TK	MSS-TK	Tank Non-Forced Ventilation	Tank Hatch	1.98E-01	1.04E-01	162	50	20	183	9.23E-02
				E _{estimated, total, hourly,periodic (low pressure)} (lb/hr)	Total		Passed			E _{max, total, hourly,periodic(low pressure)} (lb/hr)
				1.90E+00	1.0					3.67

H ₂ S Hourly High Pressure Periodic - Impact Review										
FIN	EPN	Source Name	Which impacts table corresponds to this EPN?	Periodic (high P) hourly estimated emissions for each EPN (lbs/hr)	WR _{EPNx}	AAQS _{H2S, hourly} (µg/m ³)	Distance from emission point to nearest property line (ft)	Height of emission release point (ft)	G _{EPNx}	E _{max,EPNx, hourly,periodic(high pressure)} (lb/hr)
VSSL-BD	VSSL-BD	Vessel Blowdowns	High P. Blowd./Purg./Pig.	4.22E-01	7.53E-02	162	50	6	51	0.24
VRU-BD	VRU-BD	VRU Compressor Blowdowns	High P. Blowd./Purg./Pig.	5.19E+00	9.25E-01	162	50	10	25	5.99
				E _{estimated, total, hourly,periodic (high pressure)} (lb/hr)	Total		Passed			E _{max, total, hourly,periodic(high pressure)} (lb/hr)
				5.61E+00	1.0					6.23

Apache Corporation
Brahoney Unit Tank Battery
NO₂ Compliance Demonstration

Source	EPN	NO _x Emission Rate		Emission Source Parameters												Demonstration of Compliance with NAAQS			
				1-hr NO ₂ :NO _x Ratio ^a	Annual NO ₂ :NO _x Ratio ^a	Distance to Property Line ^b		Stack Height ^b		Stack Diameter ^b		Stack Gas Exit Velocity ^b		Stack Gas Exit Temperature ^c		Distance to Maximum Concentration ^d	Modeling Result 1-hr NO _x Concentration ^d	1-hr NO ₂ Concentration ^e	Annual NO ₂ Concentration ^f
		(lb/hr)	(tpy)			(ft)	(m)	(ft)	(m)	(ft)	(m)	(ft/s)	(m/s)	(F)	(K)	(m)	(µg/m ³)/(lb/hr)	(µg/m ³)	(µg/m ³)
Flare	FL-1	4.72	4.14	1.0	1.0	50	15.24	50	15.24	4.35	1.33	65.62	20.00	1,832	1,273	5,541.00	0.68	3.20	0.05
Totals		4.72	4.14															3.20	0.05
																Background Concentration ^g (µg/m ³):		70	20
																Maximum Concentration (µg/m ³):		73.20	20.05
																NAAQS (µg/m ³):		188	100
																Meets NAAQS?:		Yes	Yes

^a NO₂:NO_x ratio of 0.20 for 4-stroke engines from Air Quality Standard Permit for Oil and Gas Handling Production Facilities, (k)(4)(A). NO₂:NO_x ratio for all other sources from EPA's Clarification Memo dated September 2014.

^b Converted from feet: Length (m) = Length (ft) * 0.3048 m/ft

^c Temperature (K) = [Temperature (F) + 459.67] * 5/9

^d Modeled in SCREEN3, based on 1 lb/hr (0.126 g/s) emission rate.

^e 1-hr NO₂ Concentration = NO_x Emission Rate (lb/hr) * 1-hr NO_x concentration (ug/m3) * 1-hr NO₂:NO_x Ratio

^f Annual NO2 Concentration = NOx Emission Rate (lb/hr) / Annual Hours of Operation (hr/yr) * 2,000 lb/ton * 1-hr NOx concentration (ug/m3)* Annual NO2:NOx ratio * 0.08 (Annual Averaging Factor)

^g Background NO2 concentration for Yoakum County (Region 2) from "Interim 1-Hour NO2 Screening Background Concentrations in micrograms per cubic meter" (TCEQ, July 2010).

Apache Corporation
Brahaney Unit Tank Battery
SO₂ Compliance Demonstration

Source	EPN	SO ₂ Emission Rate	Emission Source Parameters										Demonstration of Compliance with NAAQS			
			Distance to Property Line ^a		Stack Height ^a		Stack Diameter ^a		Stack Gas Exit Velocity ^a		Stack Gas Exit Temperature ^b		Distance to Maximum Concentration ^c	Unit Run 1-hr Concentration ^c	Modeled 1-hr SO ₂ Concentration ^d	Modeled 3-hr SO ₂ Concentration ^e
		(lb/hr)	(ft)	(m)	(ft)	(m)	(ft)	(m)	(ft/s)	(m/s)	(F)	(K)	(m)	(ug/m ³)/(lb/hr)	(ug/m ³)	(ug/m ³)
Flare	FL-1	99.44	50	15.24	50	15.24	4.35	1.33	65.62	20.00	1,832	1,273	5,541.00	0.68	67.49	60.74
Totals		99.44													67.49	60.74
													Background Concentration ^f (ug/m ³):		50.00	130.00
													Maximum Ambient Concentration (ug/m ³):		117.49	190.74
													NAAQS (ug/m ³):		196	1300
													Meets NAAQS?:		Yes	Yes

^a Converted from feet: Length (m) = Length (ft) * 0.3048 m/ft

^b Temperature (K) = [Temperature (F) + 459.67] * 5/9

^c Modeled in SCREEN3, based on 1 lb/hr (0.126 g/s) emission rate.

^d 1-hr SO₂ Concentration = SO₂ Emission Rate (lb/hr) * 1-hr concentration (µg/m³)/(lb/hr)

^e 3-hr SO₂ Concentration = SO₂ Concentration (µg/m³)* 0.9

^f Background SO₂ concentration for Yoakum County (Region 2) from "Interim 1-Hour SO₂ Screening Background Concentrations in micrograms per cubic meter," (TCEQ, July 2010).

10/10/24
16:46:37

*** SCREEN3 MODEL RUN ***
*** VERSION DATED 13043 ***

Brahane Unit Tank Battery _FL-1

SIMPLE TERRAIN INPUTS:

SOURCE TYPE = POINT
EMISSION RATE (G/S) = 0.125998
STACK HEIGHT (M) = 15.2400
STK INSIDE DIAM (M) = 1.3259
STK EXIT VELOCITY (M/S) = 20.0010
STK GAS EXIT TEMP (K) = 1273.1500
AMBIENT AIR TEMP (K) = 293.0000
RECEPTOR HEIGHT (M) = 0.0000
URBAN/RURAL OPTION = RURAL
BUILDING HEIGHT (M) = 0.0000
MIN HORIZ BLDG DIM (M) = 0.0000
MAX HORIZ BLDG DIM (M) = 0.0000

THE REGULATORY (DEFAULT) MIXING HEIGHT OPTION WAS SELECTED.
THE REGULATORY (DEFAULT) ANEMOMETER HEIGHT OF 10.0 METERS WAS ENTERED.

BUOY. FLUX = 66.361 M**4/S**3; MOM. FLUX = 40.461 M**4/S**2.

*** FULL METEOROLOGY ***

*** SCREEN AUTOMATED DISTANCES ***

*** TERRAIN HEIGHT OF 0. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

DIST (M)	CONC (UG/M**3)	STAB	U10M (M/S)	USTK (M/S)	MIX HT (M)	PLUME HT (M)	SIGMA Y (M)	SIGMA Z (M)	DWASH
15.	0.000	1	1.0	1.0	482.0	481.00	12.09	11.29	NO
100.	0.1330E-01	5	1.0	1.2	10000.0	129.80	33.30	32.92	NO
200.	0.1515E-01	5	1.0	1.2	10000.0	129.80	34.74	33.32	NO
300.	0.1098	4	20.0	21.3	6400.0	36.27	22.94	12.70	NO
400.	0.3007	4	20.0	21.3	6400.0	36.27	29.83	15.98	NO
500.	0.4443	4	20.0	21.3	6400.0	36.27	36.56	19.10	NO
600.	0.5131	4	20.0	21.3	6400.0	36.27	43.16	22.09	NO
700.	0.5271	4	20.0	21.3	6400.0	36.27	49.61	24.88	NO
800.	0.5134	4	20.0	21.3	6400.0	36.27	55.94	27.54	NO
900.	0.4868	4	20.0	21.3	6400.0	36.27	62.22	30.16	NO
1000.	0.4549	4	20.0	21.3	6400.0	36.27	68.43	32.73	NO
1100.	0.4270	4	15.0	16.0	4800.0	44.60	74.80	35.19	NO
1200.	0.4060	4	15.0	16.0	4800.0	44.60	80.90	37.10	NO
1300.	0.3848	4	15.0	16.0	4800.0	44.60	86.94	38.96	NO
1400.	0.3641	4	15.0	16.0	4800.0	44.60	92.95	40.77	NO
1500.	0.3443	4	15.0	16.0	4800.0	44.60	98.92	42.54	NO
1600.	0.3258	4	10.0	10.7	3200.0	60.27	105.28	45.30	NO
1700.	0.3165	4	10.0	10.7	3200.0	60.27	111.15	46.96	NO
1800.	0.3069	4	10.0	10.7	3200.0	60.27	116.99	48.60	NO
1900.	0.2970	4	10.0	10.7	3200.0	60.27	122.81	50.20	NO
2000.	0.2872	4	10.0	10.7	3200.0	60.27	128.59	51.78	NO
2100.	0.2775	4	10.0	10.7	3200.0	60.27	134.34	53.33	NO
2200.	0.2679	4	10.0	10.7	3200.0	60.27	140.07	54.86	NO
2300.	0.2587	4	10.0	10.7	3200.0	60.27	145.78	56.36	NO
2400.	0.2513	4	8.0	8.5	2560.0	71.53	151.77	58.65	NO
2500.	0.2450	4	8.0	8.5	2560.0	71.53	157.41	60.09	NO
2600.	0.2387	4	8.0	8.5	2560.0	71.53	163.04	61.52	NO
2700.	0.2342	5	2.5	2.9	10000.0	99.65	127.88	46.50	NO
2800.	0.2396	5	2.0	2.3	10000.0	106.17	132.36	48.19	NO
2900.	0.2453	5	2.0	2.3	10000.0	106.17	136.46	48.89	NO
3000.	0.2507	5	2.0	2.3	10000.0	106.17	140.55	49.57	NO
3500.	0.2754	5	1.5	1.7	10000.0	115.32	161.31	54.26	NO
4000.	0.2971	5	1.0	1.2	10000.0	129.80	182.03	59.57	NO

4500.	0.3115	5	1.0	1.2	10000.0	129.80	201.76	62.14	NO
5000.	0.3217	5	1.0	1.2	10000.0	129.80	221.30	64.61	NO
5500.	0.3286	5	1.0	1.2	10000.0	129.80	240.65	67.00	NO
6000.	0.3326	5	1.0	1.2	10000.0	129.80	259.84	69.30	NO
6500.	0.3344	5	1.0	1.2	10000.0	129.80	278.87	71.53	NO
7000.	0.3344	5	1.0	1.2	10000.0	129.80	297.74	73.70	NO
7500.	0.3330	5	1.0	1.2	10000.0	129.80	316.47	75.81	NO
8000.	0.3305	5	1.0	1.2	10000.0	129.80	335.07	77.86	NO
8500.	0.3271	5	1.0	1.2	10000.0	129.80	353.54	79.85	NO
9000.	0.3231	5	1.0	1.2	10000.0	129.80	371.89	81.81	NO
9500.	0.3185	5	1.0	1.2	10000.0	129.80	390.12	83.71	NO
10000.	0.3136	5	1.0	1.2	10000.0	129.80	408.24	85.58	NO
15000.	0.2812	6	1.0	1.3	10000.0	107.67	389.32	60.91	NO

MAXIMUM 1-HR CONCENTRATION AT OR BEYOND 15. M:
 686. 0.5274 4 20.0 21.3 6400.0 36.27 48.78 24.53 NO

DWASH= MEANS NO CALC MADE (CONC = 0.0)
 DWASH=NO MEANS NO BUILDING DOWNWASH USED
 DWASH=HS MEANS HUBER-SNYDER DOWNWASH USED
 DWASH=SS MEANS SCHULMAN-SCIRE DOWNWASH USED
 DWASH=NA MEANS DOWNWASH NOT APPLICABLE, X<3*LB

*** INVERSION BREAK-UP FUMIGATION CALC. ***
 CONC (UG/M**3) = 0.6787
 DIST TO MAX (M) = 5541.35

 *** SUMMARY OF SCREEN MODEL RESULTS ***

CALCULATION PROCEDURE	MAX CONC (UG/M**3)	DIST TO MAX (M)	TERRAIN HT (M)
SIMPLE TERRAIN	0.5274	686.	0.
INV BREAKUP FUMI	0.6787	5541.	--

 ** REMEMBER TO INCLUDE BACKGROUND CONCENTRATIONS **
