



SWN Production Company, LLC
 P O Box 12359
 Spring, Texas 77391-2359
 www.swn.com

RANDY MCDOWELL B

Permit Determination

0	CM	12/15/2016	PERMIT DETERMINATION	JH	12/20/2016
REV	BY	DATE	DESCRIPTION	FACILITIES REVIEWED	DATE



WEST VIRGINIA
 DEPARTMENT OF ENVIRONMENTAL PROTECTION
 DIVISION OF AIR QUALITY
 601 57th Street, SE
 Charleston, WV 25304
 Phone: (304) 926-0475
 www.dep.wv.gov/daq

PERMIT DETERMINATION FORM

(PDF)

FOR AGENCY USE ONLY:

PLANT I.D. # _____

PDF # _____

PERMIT WRITER: _____

1. NAME OF APPLICANT (AS REGISTERED WITH THE WV SECRETARY OF STATE'S OFFICE):

SWN PRODUCTION COMPANY, LLC

2. NAME OF FACILITY (IF DIFFERENT FROM ABOVE):

RANDY MCDOWELL B

3. NORTH AMERICAN INDUSTRY CLASSIFICATION SYSTEM (NAICS) CODE:

2 1 1 1 1 1

4A. MAILING ADDRESS:

179 INNOVATION DRIVE, JANE LEW, WV 26378

4B. PHYSICAL ADDRESS:

3189 PLEASANT RIDGE ROAD, CAMERON, WV 26033

5A. DIRECTIONS TO FACILITY (PLEASE PROVIDE MAP AS ATTACHMENT A):

From Route 2, head East on Proctor Creek Rd for 9.3 miles. Sharp left to stay on Proctor Creek Rd for 2.7 miles. Turn left on Middle Fork for 1.1 miles. Keep left to stay on Middle Fork for 1.5 miles. Turn right, drive 1.4 miles. Turn left onto Co Hwy 21/10 for 1.3 miles.

5B. NEAREST ROAD:

PLEASANT RIDGE ROAD

5C. NEAREST CITY OR TOWN:

CAMERON

5D. COUNTY:

Marshall

5E. UTM NORTHING (KM):

528.234424

5F. UTM EASTING (KM):

4398.640851

5G. UTM ZONE:

17N

6A. INDIVIDUAL TO CONTACT IF MORE INFORMATION IS REQUIRED:

Clay Murrall

6B. TITLE:

Staff Regulatory Specialist

6C. TELEPHONE:

304-884-1715

6D. FAX:

304-471-2497

6E. E-MAIL:

clay.murrall@swn.com

7A. DAQ PLANT I.D. NO. (FOR AN EXISTING FACILITY ONLY):

_____ - _____

7B. PLEASE LIST ALL CURRENT 45CSR13, 45CSR14, 45CSR19 AND/OR TITLE V (45CSR30) PERMIT NUMBERS ASSOCIATED WITH THIS PROCESS (FOR AN EXISTING FACILITY ONLY):

7C. IS THIS PDF BEING SUBMITTED AS THE RESULT OF AN ENFORCEMENT ACTION? IF YES, PLEASE LIST:

8A. TYPE OF EMISSION SOURCE (CHECK ONE):

- NEW SOURCE ADMINISTRATIVE UPDATE
 MODIFICATION OTHER (PLEASE EXPLAIN IN 11B)

8B. IF ADMINISTRATIVE UPDATE, DOES DAQ HAVE THE APPLICANT'S CONSENT TO UPDATE THE EXISTING PERMIT WITH THE INFORMATION CONTAINED HEREIN?

- YES NO

9. IS DEMOLITION OR PHYSICAL RENOVATION AT AN EXISTING FACILITY INVOLVED?

- YES NO

10A. DATE OF ANTICIPATED INSTALLATION OR CHANGE:

___/___/20__.

10B. DATE OF ANTICIPATED START-UP:

_____/_____/20__.

11A. PLEASE PROVIDE A DETAILED PROCESS FLOW DIAGRAM SHOWING EACH PROPOSED OR MODIFIED PROCESS EMISSION POINT AS ATTACHMENT B.

11B. PLEASE PROVIDE A DETAILED PROCESS DESCRIPTION AS ATTACHMENT C.

12. PLEASE PROVIDE MATERIAL SAFETY DATA SHEETS (MSDS) FOR ALL MATERIALS PROCESSED, USED OR PRODUCED AS ATTACHMENT D. FOR CHEMICAL PROCESSES, PLEASE PROVIDE A MSDS FOR EACH COMPOUND EMITTED TO AIR.

13A. REGULATED AIR POLLUTANT EMISSIONS:

⇒ FOR A NEW FACILITY, PLEASE PROVIDE PLANT WIDE EMISSIONS BASED ON THE POTENTIAL TO EMIT (PTE) FOR THE FOLLOWING AIR POLLUTANTS INCLUDING ALL PROCESSES.

⇒ FOR AN EXISTING FACILITY, PLEASE PROVIDE THE PROPOSED CHANGE IN EMISSIONS BASED ON THE PTE OF ALL PROCESS CHANGES FOR THE FOLLOWING AIR POLLUTANTS.

PTE FOR A GIVEN POLLUTANT IS TYPICALLY BEFORE AIR POLLUTION CONTROL DEVICES AND IS COLLECTED BASED ON THE MAXIMUM DESIGN CAPACITY OF PROCESS EQUIPMENT.

POLLUTANT	HOURLY PTE (LB/HR)	YEARLY PTE (TON/YR)
		(HOURLY PTE MULTIPLIED BY 8760 HR/YR) DIVIDED BY 2000 LB/TON
PM	0.04	0.20
PM ₁₀	0.20	0.20
VOCs	2.21	9.67
CO	0.50	2.17
NO _x	0.59	2.59
SO ₂	0.00	0.02
Pb	--	--
HAPs (AGGREGATE AMOUNT)	0.16	0.69
TAPs (INDIVIDUALLY)*		
OTHER (INDIVIDUALLY)*		

* ATTACH ADDITIONAL PAGES AS NEEDED


13B. PLEASE PROVIDE ALL SUPPORTING CALCULATIONS AS ATTACHMENT E.

CALCULATE AN HOURLY AND YEARLY PTE OF EACH PROCESS EMISSION POINT (SHOWN IN YOUR DETAILED PROCESS FLOW DIAGRAM) FOR ALL AIR POLLUTANTS LISTED ABOVE INCLUDING INDIVIDUAL HAP'S (LISTED IN SECTION 112(b) OF THE 1990 CAAA), TAP'S (LISTED IN 45CSR27), AND OTHER AIR POLLUTANTS (E.G. POLLUTANTS LISTED IN TABLE 45-13A OF 45CSR13, MINERAL ACIDS PER 45CSR7, ETC.).

14. CERTIFICATION OF DATA

I, Carla Suszkowski (type name) attest that all the representations contained in this application, or appended hereto, are true, accurate, and complete to the best of my knowledge based on information and belief after reasonable inquiry, and that I am a **Responsible Official**** (President, Vice President, Secretary or Treasurer, General Partner or Sole Proprietor) of the Applicant.

Facilities Review _____ REV 0

Signature of Responsible Official: 

TITLE: Regulatory Manager: West Virginia Division Date: 12 / 21 / 2016

** The definition of the phrase 'Responsible Official' can be found at 45CSR13, Section 2.23.

NOTE: PLEASE CHECK ENCLOSED ATTACHMENTS:

ATTACHMENT A ATTACHMENT B ATTACHMENT C ATTACHMENT D ATTACHMENT E

Records on all changes are required to be kept and maintained on-site for two (2) years.

THE PERMIT DETERMINATION FORM WITH THE INSTRUCTIONS CAN BE FOUND ON DAQ'S PERMITTING SECTION WEB SITE:

www.dep.wv.gov/daq

INTRODUCTION NARRATIVE

The RANDY MCDOWELL B Production Facility, located in Marshall County, WV, is comprised of natural gas wells, production units, a heater treater, condensate storage tanks, produced water tanks and associated truck loadouts.

The facility was part of an acquisition and was operational at time of closing. Documentation of permit applicability could not be produced and therefore, SWN Production Company, LLC respectfully submits this request for Permit Determination.

Based on ProMax modeling of production at the facility, SWN has estimated emissions to be below permit thresholds defined in 45CSR13.

ATTACHMENT A

Map of RANDY MCDOWELL B Production Facility

Proximity Map



RANDY MCDOWELL B-MSH-PAD1

NAD83 UTM Zone 17N
X: 528.234424 Y: 4398.640851 Km
-80.670481 39.737281 Degrees
MARSHALL, WV

- | | |
|------------------------|---------------------|
| Schools | Compressor Stations |
| Residential Structures | Processing Plant |
| Rivers and Lakes | Power Plant |
| | Hospital |

ATTACHMENT B

BLOCK FLOW DIAGRAM

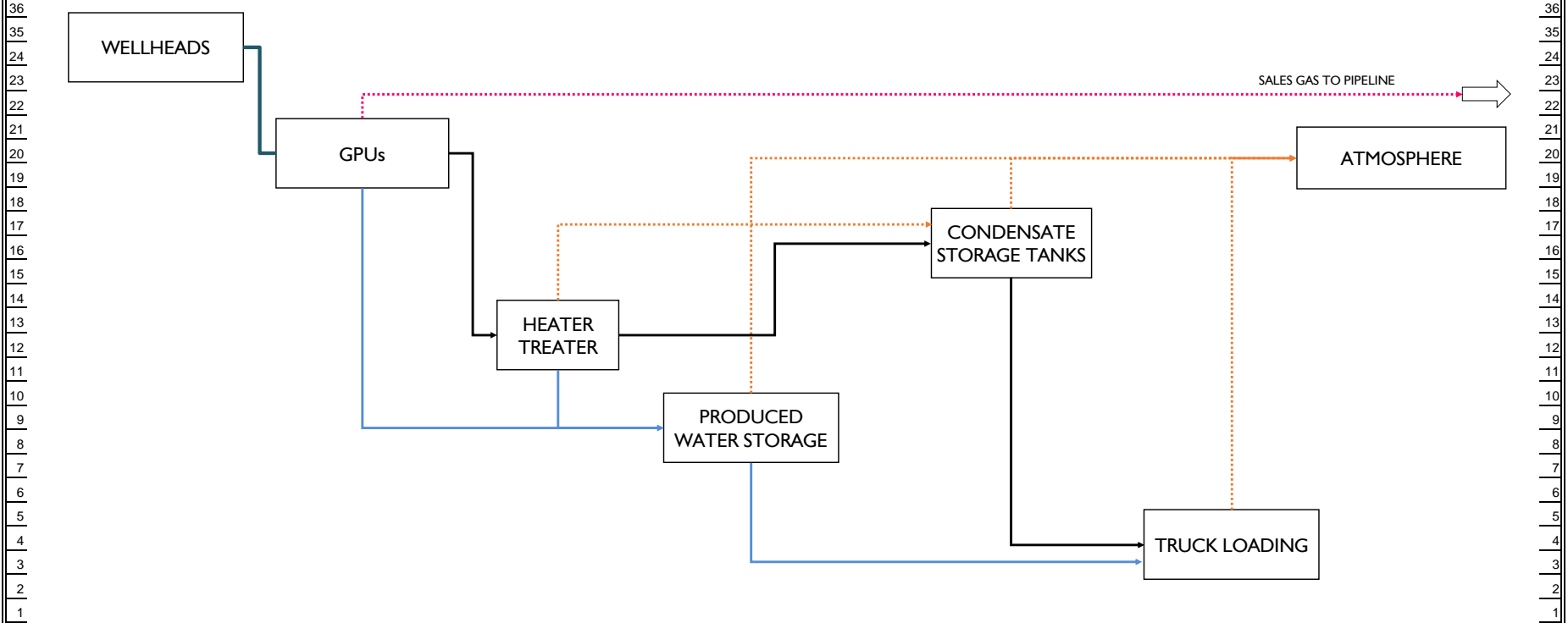
GPU I-6
1.0 MMBtu/hr Heaters
QUANTITY: 6

HT I
0.50 MMBtu/hr Heater Treater(s)
QUANTITY: 1

PW TK I-4
250 bbl Produced Water Storage Tanks
QUANTITY: 4

Cond TK I-4
Condensate Storage Tanks
QUANTITY: 4

TL COND & TL PW
Condensate Truck Loading
Produced Water Truck Loading



36
35
24
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	0	CM	12/13/16	PERMIT DETERMINATION	
REV.	BY	DATE	DESCRIPTION	12/13/16	RANDY MCDOWELL B



ATTACHMENT C

RANDY MCDOWELL B-MSH-PAD1 PROCESS DESCRIPTION

The RANDY MCDOWELL B-MSH-PAD1 is an oil and gas production facility.

Condensate, gas and produced water come from 6 natural gas wells.

Condensate, gas and produced water are routed through 6 Gas Production Units (GPUs) with 6 - 1.0 MMBtu/hr Heaters [GPU 1-6] where separation occurs.

Gas from the GPUs exits the facility via sales pipeline.

Condensate from the GPUs is routed to 1 - 0.50 MMBtu/hr Heater Treater(s) [HT 1].

Produced water from the separators and heater treater flows to 4 - Produced Water Storage Tanks [PW TK 1-4].

Produced water is transported off site by tanker truck. [TL PW].

Condensate from the heater treater flows to 4 - Condensate Storage Tanks [Cond TK 1-4].

Condensate is transported off-site by tanker truck [TL COND].

ATTACHMENT E

SUPPORTING CALCULATIONS

Emission Summary Sheet

Emission Unit ID Number	Source Description	Potential Emissions (tpy)							CH ₄	CO ₂	CO ₂ e
		NOx	CO	VOC	SOx	PM	PM10	Total HAPS			
PW TK 1-4	Produced Water Storage Tanks	---	---	0.15	---	---	---	0.0036	0.5319	0.0350	13.3332
Cond TK 1-4	Condensate Storage Tanks	---	---	5.25	---	---	---	0.1528	0.7095	0.0110	17.7481
GPU 1-6	1.0 MMBtu/hr Heaters	2.39	2.01	0.13	0.01	0.18	0.18	0.0452	0.0549	2866.91	2868.06
HT 1	0.50 MMBtu/hr Heater Treater(s)	0.20	0.17	0.01	0.00	0.02	0.02	0.0038	0.0046	238.91	239.01
TL PW	Produced Water Truck Loading	---	---	0.00	---	---	---	0.0000	0.0103	0.00	0.26
TL COND	Condensate Truck Loading	---	---	0.03	---	---	---	0.1528	0.2087	0.00	5.22
FUGITIVES	Equip Component Fugitives Estimate	---	---	4.04	---	---	---	0.3276	4.64	0.00	115.98
PNEUMATICS	Pneumatic Controllers	---	---	0.06	---	---	---	0.0047			
Total TPY		2.59	2.17	9.67	0.02	0.20	0.20	0.69	6.16	3105.87	3259.61
Total Lb/hr		0.59	0.50	2.21	0.00	0.04	0.04	0.16	1.41	709.10	744.20
Total Lb/day		14.18	11.91	53.00	0.09	1.08	1.08	3.78	33.75	17018.46	17860.86

RANDY MCDOWELL B
Heater Detail Sheet

REV 0

Equipment ID GPU 1-6
 Equipment Count 6
 Equipment Usage 1.0 MMBtu/hr Heaters
 Fuel Heating Value 1100 Btu/scf
 Design Heat Rate* 1.00 MMBtu/hr
 Site Heat Rate* 1.00 MMBtu/hr
 Potential Operation 8760 hr/yr
 Potential Fuel Usage 7.96 MMscf/yr

* These are heat release rates and not the duty for the heater

Potential Emissions

Pollutant	Emission Factor (lb/MMscf)	Nominal Rating (MMBtu/hr)	Hrs of Operation (hrs/yr)	Estimated Emissions		Source of Emission Factor
				(lb/hr)	(tpy)	
NOx	100.00	6.000	8760	0.55	2.39	AP-42 ¹
CO	84.00	6.000	8760	0.46	2.01	AP-42 ¹
VOC	5.50	6.000	8760	0.03	0.13	AP-42 ²
SO2	0.60	6.000	8760	0.00	0.01	AP-42 ²
PM10	7.60	6.000	8760	0.04	0.18	AP-42 ²
Benzene	0.002	6.000	8760	0.00	0.0001	AP-42 ³
Toluene	0.003	6.000	8760	0.00	0.0001	AP-42 ³
N-Hexane	1.80	6.000	8760	0.01	0.0430	AP-42 ³
Formaldehyde	0.08	6.000	8760	0.00	0.0018	AP-42 ³
Total HAPs	1.89	6.000	8760	0.01	0.05	AP-42 ³
CO ₂	120000.00	6.000	8760	654.55	2866.91	AP-42 ²
CH ₄	2.30	6.000	8760	0.01	0.05	AP-42 ²
CO ₂ e					2868.06	

¹ EPA AP-42, Volume I, Fifth Edition - July 1998, Table 1.4-1, Emission Factors for Nitrogen Oxides (NOx) and Carbon Monoxide (CO) from Natural Gas Combustion

² EPA AP-42, Volume I, Fifth Edition - July 1998, Table 1.4-2, Emission Factors for Criteria Pollutants and Greenhouse Gases from Natural Gas Combustion

³ EPA AP-42, Volume I, Fifth Edition - July 1998, Table 1.4-3, Emission Factors for Speciated Organic Compounds from Natural Gas Combustion

RANDY MCDOWELL B
Heater Treater Detail Sheet

REV 0

Equipment ID HT 1
 Equipment Count 1
 Equipment Usage 0.50 MMBtu/hr Heater Treater(s)
 Fuel Heating Value 1100 Btu/scf
 Design Heat Rate* 0.50 MMBtu/hr
 Site Heat Rate* 0.50 MMBtu/hr
 Potential Operation 8760 hr/yr
 Potential Fuel Usage 3.98 MMscf/yr

* These are heat release rates and not the duty for the heater

Potential Emissions

Pollutant	Emission Factor (lb/MMscf)	Nominal Rating (MMBtu/hr)	Hrs of Operation (hrs/yr)	Estimated Emissions		Source of Emission Factor
				(lb/hr)	(tpy)	
NOx	100.00	0.500	8760	0.05	0.20	AP-42 ¹
CO	84.00	0.500	8760	0.04	0.17	AP-42 ¹
VOC	5.50	0.500	8760	0.00	0.01	AP-42 ²
SO2	0.60	0.500	8760	0.00	0.00	AP-42 ²
PM10	7.60	0.500	8760	0.00	0.02	AP-42 ²
Benzene	0.002	0.500	8760	0.00	0.0000	AP-42 ³
Toluene	0.003	0.500	8760	0.00	0.0000	AP-42 ³
N-Hexane	1.80	0.500	8760	0.00	0.0036	AP-42 ³
Formaldehyde	0.08	0.500	8760	0.00	0.0001	AP-42 ³
Total HAPs	1.89	0.500	8760	0.00	0.00	AP-42 ³
CO ₂	120000.00	0.500	8760	54.55	238.91	AP-42 ²
CH ₄	2.30	0.500	8760	0.00	0.00	AP-42 ²
CO ₂ e					239.01	

¹ EPA AP-42, Volume I, Fifth Edition - July 1998, Table 1.4-1, Emission Factors for Nitrogen Oxides (NOx) and Carbon Monoxide (CO) from Natural Gas Combustion

² EPA AP-42, Volume I, Fifth Edition - July 1998, Table 1.4-2, Emission Factors for Criteria Pollutants and Greenhouse Gases from Natural Gas Combustion

³ EPA AP-42, Volume I, Fifth Edition - July 1998, Table 1.4-3, Emission Factors for Speciated Organic Compounds from Natural Gas Combustion

RANDY MCDOWELL B
Tank Detail Sheet

REV 0

Source ID Number	Cond TK 1-4	Hours of operation	8760	hr/yr
Equipment ID	Cond TK	Condensate Production	1,396	bbl/yr
Tank Description	Condensate Storage Tanks			
Tank Usage	Condensate Storage			
Tank Count	4	VOC	1.38E+00	lb/bbl from Model
Tank Capacity	400 bbl	HAPs	2.19E-01	lb/bbl from Model
Tank Contents	Condensate	Tank Construction	Welded	(Welded, Bolted, Fiberglass)
Emission Controls	NONE	Roof color & condition	White, good	(eg. light brown, good)
Tank Orientation	Vertical, above ground	shell color & condition	White, good	(eg. white, fair)
Shell Height / Length	20 ft	FR Primary Seal	N/A	
Shell Diameter	12 ft	FR Secondary Seal	N/A	
Roof Slope	0.06	Vent pressure setting	0.03	+/- psig
Roof Type	Cone	VOC Control Efficiency	0%	

Potential Emissions

Pollutant		Hrs of Operation (hrs/yr)	Estimated Uncontrolled Emissions ¹			Source of Emission Factor
			(lb/hr)	(tpy)	(lb/yr)	
VOC	Flash	8760	0.22	0.96	1921.96	Model
VOC	W&B	8760	0.98	4.28	8569.03	ProMax
Total			1.20	5.25		
HAPs		8760	3.49E-02	1.53E-01	305.61	Model
CH4		8760	1.62E-01	7.09E-01		Model
CO2		8760	2.51E-03	1.10E-02		Model
CO2e		8760	4.05E+00	1.77E+01		Model

RANDY MCDOWELL B
Tank Detail Sheet

REV 0

Source ID Number	PW TK 1-4	Hours of operation	8760	hr/yr
Equipment ID	PW TK	Water Production	10,653	bbbl/yr
Tank Description	Produced Water Storage Tanks	Oil in water	1.00	% Oil
Tank Usage	Produced Water Storage	Oil in water	106.5	bbbl/yr Oil
Tank Count	4	VOC	2.64E-02	lb/bbbl from Model
Tank Capacity	250 bbl	HAPs	6.71E-04	lb/bbbl from Model
Tank Contents	Produced Water	Tank Construction	Welded	(Welded, Bolted, Fiberglass)
Emission Controls	NONE	Roof color & condition	White, good	(eg. light brown, good)
Tank Orientation	Vertical, above ground	shell color & condition	White, good	(eg. white, fair)
Shell Height / Length	14 ft	FR Primary Seal	N/A	
Shell Diameter	11 ft	FR Secondary Seal	N/A	
Roof Slope	0.06	Vent pressure setting	0.03	+/- psig
Roof Type	Cone	VOC Control Efficiency	0%	

Potential Emissions

Pollutant		Hrs of Operation (hrs/yr)	Estimated Uncontrolled Emissions ¹			Source of Emission Factor
			(lb/hr)	(tpy)	(lb/yr)	
VOC	Flash	8760	3.21E-02	1.41E-01	2.81E+02	Model
VOC	W&B	8760	2.50E-03	1.10E-02	2.19E+01	ProMax
Total			3.46E-02	1.51E-01		
HAPs		8760	8.17E-04	3.58E-03	7.15E+00	Model
CH4		8760	1.21E-01	5.32E-01		Model
CO2		8760	7.99E-03	3.50E-02		Model
CO2e		8760	3.04E+00	1.33E+01		

RANDY MCDOWELL B
Condensate Truck Loading

REV 0

TL COND

Select Model Liquid --->Gasoline RVP 13
 or Enter These Factors Directly Below

S= 0.6 saturation factor
 P= 8.3 psia true vapor pressure
 M= 62 lb/lb-mol molecular weight of vapors
 T= 70 °F temperature
 $L_L = 7.26 \text{ lb}/1000 \text{ gallons} = 12.46 * S * P * M / (T + 460)$
 L_L= 0.305 lb/bbl Loading Losses

Production: 1,396 bbl/year Condensate

3.82432877 bbl/day
 NONE Control 0%

Potential Emissions

Pollutant	Component Wt%	Component EF lb/bbl	Uncontrolled		Controlled		
			lb/yr	tpy	(lb/yr)	(tpy)	
VOC		3.63E-02	5.07E+01	2.54E-02	5.07E+01	2.54E-02	
TOTAL HAPS		2.19E-01	3.06E+02	1.53E-01	3.06E+02	1.53E-01	Model
CH4		2.99E-01	4.17E+02	2.09E-01	4.17E+02	2.09E-01	Model
CO2		4.63E-03	6.46E+00	3.23E-03	6.46E+00	3.23E-03	Model

¹ EPA AP-42, Volume I, Fifth Edition - January 1995, Table 5.2-1, Saturation (S) Factors for Calculating Petroleum Liquid Loading Losses

²API Compendium of Greenhouse Gas Emissions Methodologies for the Oil and Natural Gas Industry, Table 5-12

RANDY MCDOWELL B
Produced Water Truck Loading

REV 0

TL PW

Select Model Liquid --->Gasoline RVP 13
 or Enter These Factors Directly Below

S= 0.6 saturation factor
 P= 8.3 psia true vapor pressure
 M= 62 lb/lb-mol molecular weight of vapors
 T= 70 °F temperature
 $L_L = 7.26 \text{ lb/1000 gallons} = 12.46 * S * P * M / (T + 460)$
 $L_L = 0.305 \text{ lb/bbl}$ Loading Losses

Production: 10,653 bbl/year Produced Water
 107 bbl/year oil based on 1% oil in the Produced Water
 0.29185342 bbl/day
 NONE Control 0%

Potential Emissions

Pollutant	Component	Component	EF	Uncontrolled		Controlled		
	Mass Frac	lb/bbl		lb/yr	tpy	(lb/yr)	(tpy)	
VOC			2.64E-02	2.81E+00	1.41E-03	2.81E+00	1.41E-03	
TOTAL HAPS			6.71E-04	7.15E-02	3.58E-05	7.15E-02	3.58E-05	Model
CH4			1.94E-01	2.07E+01	1.03E-02	2.07E+01	1.03E-02	Model
CO2			1.28E-02	1.36E+00	6.81E-04	1.36E+00	6.81E-04	Model

¹ EPA AP-42, Volume I, Fifth Edition - January 1995, Table 5.2-1, Saturation (S) Factors for Calculating Petroleum Liquid Loading Losses

² API Compendium of Greenhouse Gas Emissions Methodologies for the Oil and Natural Gas Industry, Table 5-12

RANDY MCDOWELL B
 Equip Component Fugitives Estimate

REV 0

	Counts	Emission Factor ¹ lb/hr/ component	% Control Efficiency	% VOC	VOC Emissions		Benzene	Toluene	E-benzene	Xylene	n-Hexane	%CH4	CH4 Emissions		CO ₂ e	
					lb/hr	tpy	lb/yr	lb/yr	lb/yr	lb/yr	lb/yr		lb/hr	tpy	tpy	
Valve																
Gas/Vapor	23	0.00992	0	12	0.03	0.12	0.05	0.10	0.01	0.16	3.34	59.83	0.14	0.60	14.95	
Light Liquid	66	0.00551	0	100	0.36	1.59	3.66	19.59	4.78	36.79	242.43	1.17	0.00	0.02	0.47	
Water/Oil	36	0.000216	0	50	0.00	0.02	0.08	0.42	0.10	0.79	0.52	1.17	0.00	0.00	0.01	
Pumps Seals																
Light Liquid	0	0.02866	0	100	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.17	0.00	0.00	0.00	
Water/Oil	0	0.0000529	0	50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.17	0.00	0.00	0.00	
Flanges																
Gas/Vapor	99	0.00086	0	12	0.01	0.04	0.02	0.04	0.00	0.06	1.25	59.83	0.05	0.22	5.58	
Light Liquid	101	0.000243	0	100	0.02	0.11	0.25	1.32	0.32	2.48	16.36	100	0.02	0.11	2.69	
Water/Oil	30	0.00000617		50	0.00	0.00	0.00	0.01	0.00	0.02	0.01	100	0.00	0.00	0.02	
Open-Ended Lines																
Gas/Vapor	0	0.00441	0	12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	59.83	0.00	0.00	0.00	
Light Liquid	0	0.00309	0	100	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100	0.00	0.00	0.00	
Water/Oil	0	0.0006	0	50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100	0.00	0.00	0.00	
Other																
Gas/Vapor	13	0.0194	0	12	0.03	0.13	0.05	0.11	0.01	0.17	3.69	59.83	0.15	0.66	16.52	
Light Liquid	9	0.0165	0	100	0.15	0.65	1.50	8.00	1.95	15.02	99.00	100	0.15	0.65	16.26	
Water/Oil	12	0.0309	0	50	0.19	0.81	3.74	19.98	4.87	37.52	24.72	100	0.37	1.62	40.60	
Connectors																
Gas/Vapor	155	0.000441	0	12	0.01	0.04	0.01	0.03	0.00	0.05	1.00	59.83	0.04	0.18	4.48	
Light Liquid	240	0.000463	0	100	0.11	0.49	1.12	5.99	1.46	11.24	74.08	100	0.11	0.49	12.17	
Water/Oil	84	0.000243	0	50	0.01	0.04	0.21	1.10	0.27	2.07	1.36	100	0.02	0.09	2.24	
Total Emissions					0.92	4.04	10.68	56.68	13.79	106.37	467.75		1.06	4.64	115.98	

Note

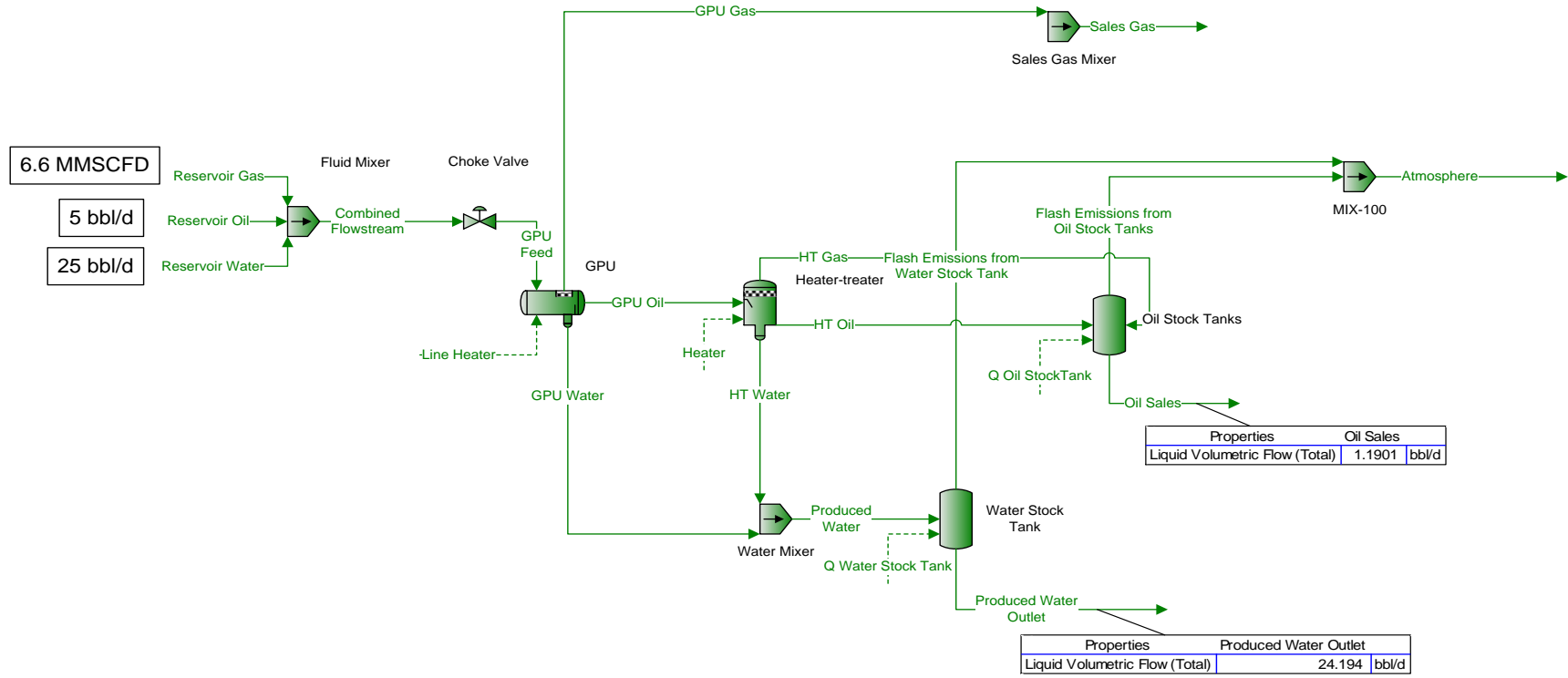
1. Factors from EPA Document EPA-453/R-95-017, November 1995.

Equipment ID	Continuous Bleed PC	
Equipment Usage		
Equipment Make		
Equipment Model		
Emission Controls		
Equipment Count	0	
Design Flow*	0.00	SCFH
Potential Operation		hr/yr
Service		

Equipment ID	Intermittent Bleed PC	
Equipment Usage	Separator Level Control	
Equipment Make	NORRISEAL	
Equipment Model	1001 A	
Emission Controls	None	
Equipment Count	12	
Design Flow*	0.20	SCFH
Potential Operation	8760	hr/yr
Service	NG	

Potential Emissions Combined

Pollutant	% of VOC	Emission Factor (lb/SCF)	Hrs of Operation (hrs/yr)	Estimated Emissions		Source of Emission Factor
				(lb/hr)	(tpy)	
VOC		0.01	8760	0.01	0.06	MODEL
Total HAPs		0.000	8760	0.00	0.00	MODEL
CH4		0.035	8760	0.08	0.37	MODEL
CO2		0.000	8760	0.00	0.00	MODEL



6.6 MMSCFD
 5 bb/d
 25 bb/d

Properties	Oil Sales
Liquid Volumetric Flow (Total)	1.1901 bb/d

Properties	Produced Water Outlet
Liquid Volumetric Flow (Total)	24.194 bb/d

Annual tank loss calculations for "Produced Water".
 Total working and breathing losses from the Vertical Cylinder are 0.006626 ton/yr.
 Loading losses are 0.001028 ton/yr of loaded liquid.
 * Only Non-Exempt VOC are reported.
 Vapor adjusted to ensure mass balance

PW Tanks TL W&B

Annual tank loss calculations for "HT Oil".
 Total working and breathing losses from the Vertical Cylinder are 1.589 ton/yr.
 Loading losses are 0.02429 ton/yr of loaded liquid.
 * Only Non-Exempt VOC are reported.
 Vapor adjusted to ensure mass balance

Oil Tanks TL W&B

"Flash Emissions from Water Stock Tank" VOCs = 0.01649 lb/h
 "Flash Emissions from Water Stock Tank" HAPs = 0.0004197 lb/h

"Flash Emissions from Oil Stock Tanks" VOCs = 0.7458 lb/h
 "Flash Emissions from Oil Stock Tanks" HAPs = 0.1186 lb/h

Process Streams	Atmosphere	Combined Flowstream	Flash Emissions from Oil Stock Tanks	Flash Emissions from Water Stock Tank	GPU Feed	GPU Gas	GPU Oil	GPU Water	HT Gas	HT Oil	HT Water	Oil Sales	Produced Water	Produced Water Outlet	Reservoir Gas	Reservoir Oil	Reservoir Water	Sales Gas	
Composition	Status:	Selected	Selected	Selected	Selected	Selected	Selected	Selected	Selected	Selected	Selected	Selected	Selected	Selected	Selected	Selected	Selected	Selected	
Phase: Mixed Liquid	From Block:	MX-100	Fluid Mixer	Oil Stock Tanks	Water Stock Tank	Choke Valve	GPU	GPU	GPU	Heater-treater	Heater-treater	Heater-treater	Oil Stock Tanks	Water Mixer	Water Stock Tank	--	--	--	Sales Gas Mixer
To Block:	--	Choke Valve	MX-100	MX-100	GPU	Sales Gas Mixer	Heater-treater	Water Mixer	Oil Stock Tanks	Oil Stock Tanks	Water Mixer	--	Water Stock Tank	Water Stock Tank	Fluid Mixer	Fluid Mixer	Fluid Mixer	--	
Mass Fraction																			
H2S			0			0													
Nitrogen			0.0028535			0.0028535													
Oxygen			0			0													
CO2			0.0060815			0.0060815													
Water			94.2769			94.2769													
C1			0.119826			0.119826													
C2			0.154201			0.154201													
C3			0.197225			0.197225													
iC4			0.0859064			0.0859064													
nC4			0.185691			0.185691													
Neopentane			3.40568E-05			3.40568E-05													
iC5			0.160918			0.160918													
nC5			0.149262			0.149262													
2,2-Dimethylbutane			0.000472949			0.000472949													
Cyclopentane			0			0													
2,3-Dimethylbutane			0.00129943			0.00129943													
2-Methylpentane			0.00626220			0.00626220													
3-Methylpentane			0.0062611			0.0062611													
iC6			1.06427			1.06427													
Methylcyclopentane			0.00189484			0.00189484													
Cyclohexane			0.00427984			0.00427984													
2-Methylhexane			0.0237805			0.0237805													
3-Methylhexane			0.0274035			0.0274035													
2,2,4-Trimethylpentane			0			0													
nC7			0.0899723			0.0899723													
Methylcyclohexane			0.0372740			0.0372740													
nC8			0.450145			0.450145													
nC9			0.542858			0.542858													
nC10			0.693044			0.693044													
Benzene			0.000376439			0.000376439													
Toluene			0.00850064			0.00850064													
Ethylbenzene			0.021214			0.021214													
m-xylene			0.0294243			0.0294243													
p-xylene			0			0													
o-xylene			0.0465874			0.0465874													
C11+			1.60627			1.60627													
Mass Flow	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h
H2S			0			0													
Nitrogen			0.00107921			0.00107921													
Oxygen			0			0													
CO2			0.0230108			0.0230108													
Water			356.329			356.329													
C1			0.452895			0.452895													
C2			0.582817			0.582817													
C3			0.745430			0.745430													
iC4			0.324692			0.324692													
nC4			0.701838			0.701838													
Neopentane			0.000128721			0.000128721													
iC5			0.606204			0.606204													
nC5			0.564150			0.564150													
2,2-Dimethylbutane			0.00178756			0.00178756													
Cyclopentane			0			0													
2,3-Dimethylbutane			0.00491132			0.00491132													
2-Methylpentane			0.0313034			0.0313034													
3-Methylpentane			0.0237590			0.0237590													
iC6			4.02253			4.02253													
Methylcyclopentane			0.00716174			0.00716174													
Cyclohexane			0.0161761			0.0161761													
2-Methylhexane			0.0898809			0.0898809													
3-Methylhexane			0.103574			0.103574													
2,2,4-Trimethylpentane			0			0													
nC7			0.340059			0.340059													
Methylcyclohexane			0.140881			0.140881													
nC8			1.70137			1.70137													
nC9			2.05179			2.05179													
nC10			2.61943			2.61943													
Benzene			0.0142279			0.0142279													
Toluene			0.0321290			0.0321290													
Ethylbenzene			0.0802085			0.0802085													
m-xylene			0.111212			0.111212													
p-xylene			0			0													
o-xylene			0.176082			0.176082													
C11+			6.07107			6.07107													
Properties	Status:	Selected	Selected	Selected	Selected	Selected	Selected	Selected	Selected	Selected	Selected	Selected	Selected	Selected	Selected	Selected	Selected	Selected	
Phase: Mixed Liquid	From Block:	MX-100	Fluid Mixer	Oil Stock Tanks	Water Stock Tank	Choke Valve	GPU	GPU	GPU	Heater-treater	Heater-treater	Heater-treater	Oil Stock Tanks	Water Mixer	Water Stock Tank	--	--	--	Sales Gas Mixer
To Block:	--	Choke Valve	MX-100	MX-100	GPU	Sales Gas Mixer	Heater-treater	Water Mixer	Oil Stock Tanks	Oil Stock Tanks	Water Mixer	--	Water Stock Tank	Water Stock Tank	Fluid Mixer	Fluid Mixer	Fluid Mixer	--	
Property	Units																		
Temperature	F		48.3898			48.3898													
Pressure	psig		268			268													
Mole Fraction Vapor			0			0													
Mole Fraction Light Liquid			1.12629			1.12629													
Mole Fraction Heavy Liquid			98.8737			98.8737													
Molecular Weight	lb/mol		18.8627			18.8627													
Mass Density	lb/ft³		60.9796			60.9796													
Mass Flow	lbmol/h		20.0162			20.0162													
Mass Flow	lb/h		377.960			377.960													
Vapor Volumetric Flow	ft³/h		6.19844			6.19844													
Liquid Volumetric Flow	gpm		0.772793			0.772793													
Std Vapor Volumetric Flow	MMSCFD		0.182300			0.182300													
Std Liquid Volumetric Flow	sgpm		0.7768																



User Value Sets Report

Client Name:	CHK APP A	Job:	C:\Users\murralc\Documents\ProMax Local\CHK APP A-WTZ
Location:	0		
Flowsheet:	CHK		

Oil Tanks TL W&B

User Value [ShellLength]

Parameter	20* ft	Upper Bound	ft
Lower Bound	0* ft	Enforce Bounds	FALSE

User Value [ShellDiam]

Parameter	12* ft	Upper Bound	ft
Lower Bound	0* ft	Enforce Bounds	FALSE

User Value [BreatherVP]

Parameter	0.5* psig	Upper Bound	psig
Lower Bound	psig	Enforce Bounds	FALSE

User Value [BreatherVacP]

Parameter	-0.0300000* psig	Upper Bound	psig
Lower Bound	psig	Enforce Bounds	FALSE

User Value [DomeRadius]

Parameter	ft	Upper Bound	ft
Lower Bound	ft	Enforce Bounds	FALSE

User Value [OpPress]

Parameter	0.5* psig	Upper Bound	psig
Lower Bound	psig	Enforce Bounds	FALSE

User Value [AvgPercentLiq]

Parameter	50* %	Upper Bound	%
Lower Bound	%	Enforce Bounds	FALSE

User Value [MaxPercentLiq]

Parameter	90* %	Upper Bound	%
Lower Bound	%	Enforce Bounds	FALSE

User Value [AnnNetTP]

Parameter	1* bbl/day	Upper Bound	bbl/day
Lower Bound	0* bbl/day	Enforce Bounds	FALSE

User Value [OREff]

Parameter	0* %	Upper Bound	%
Lower Bound	%	Enforce Bounds	FALSE

User Value [MaxAvgT]

Parameter	59.9* °F	Upper Bound	°F
Lower Bound	°F	Enforce Bounds	FALSE

User Value [MinAvgT]

Parameter	40.7* °F	Upper Bound	°F
Lower Bound	°F	Enforce Bounds	FALSE

User Value [BulkLiqT]

Parameter	50.32* °F	Upper Bound	°F
Lower Bound	°F	Enforce Bounds	FALSE

User Value [AvgP]			
Parameter	14.1085* psia	Upper Bound	psia
Lower Bound	psia	Enforce Bounds	FALSE
User Value [ThermI]			
Parameter	1069* Btu/ft^2/day	Upper Bound	Btu/ft^2/day
Lower Bound	Btu/ft^2/day	Enforce Bounds	FALSE
User Value [AvgWindSpeed]			
Parameter	9.1* mi/h	Upper Bound	mi/h
Lower Bound	mi/h	Enforce Bounds	FALSE
User Value [MaxHourlyLoadingRate]			
Parameter	110* bbl/hr	Upper Bound	bbl/hr
Lower Bound	0* bbl/hr	Enforce Bounds	FALSE
User Value [EntrainedOilFrac]			
Parameter	1* %	Upper Bound	%
Lower Bound	%	Enforce Bounds	FALSE
User Value [TurnoverRate]			
Parameter	0.335521*	Upper Bound	
Lower Bound		Enforce Bounds	FALSE
User Value [LLossSatFactor]			
Parameter	0.6*	Upper Bound	
Lower Bound		Enforce Bounds	FALSE
User Value [AtmPressure]			
Parameter	14.1085* psia	Upper Bound	psia
Lower Bound	psia	Enforce Bounds	FALSE
User Value [TVP]			
Parameter	11.6446* psia	Upper Bound	psia
Lower Bound	psia	Enforce Bounds	FALSE
User Value [AvgLiqSurfaceT]			
Parameter	51.7469* °F	Upper Bound	°F
Lower Bound	°F	Enforce Bounds	FALSE
User Value [MaxLiqSurfaceT]			
Parameter	56.4750* °F	Upper Bound	°F
Lower Bound	°F	Enforce Bounds	FALSE
User Value [TotalLosses]			
Parameter	1.72936* ton/yr	Upper Bound	ton/yr
Lower Bound	ton/yr	Enforce Bounds	FALSE
User Value [WorkingLosses]			
Parameter	0.0143541* ton/yr	Upper Bound	ton/yr
Lower Bound	ton/yr	Enforce Bounds	FALSE
User Value [StandingLosses]			
Parameter	0.562100* ton/yr	Upper Bound	ton/yr
Lower Bound	ton/yr	Enforce Bounds	FALSE
User Value [RimSealLosses]			
Parameter	0* ton/yr	Upper Bound	ton/yr
Lower Bound	ton/yr	Enforce Bounds	FALSE
User Value [WithdrawalLoss]			
Parameter	0* ton/yr	Upper Bound	ton/yr

Lower Bound	ton/yr	Enforce Bounds	FALSE
User Value [LoadingLosses]			
Parameter	0.0264388* ton/yr	Upper Bound	ton/yr
Lower Bound	ton/yr	Enforce Bounds	FALSE
User Value [MaxHourlyLoadingLoss]			
Parameter	31.1956* lb/hr	Upper Bound	lb/hr
Lower Bound	lb/hr	Enforce Bounds	FALSE
User Value [PStar]			
Parameter		Upper Bound	
Lower Bound		Enforce Bounds	FALSE
User Value [DeckFittingLosses]			
Parameter	0* ton/yr	Upper Bound	ton/yr
Lower Bound	ton/yr	Enforce Bounds	FALSE
User Value [DeckSeamLosses]			
Parameter	0* ton/yr	Upper Bound	ton/yr
Lower Bound	ton/yr	Enforce Bounds	FALSE
User Value [FlashingLosses]			
Parameter	0.283166* ton/yr	Upper Bound	ton/yr
Lower Bound	ton/yr	Enforce Bounds	FALSE
User Value [TotalResidual]			
Parameter	45.9398* ton/yr	Upper Bound	ton/yr
Lower Bound	ton/yr	Enforce Bounds	FALSE
User Value [GasMoleWeight]			
Parameter	0.0396671* kg/mol	Upper Bound	kg/mol
Lower Bound	kg/mol	Enforce Bounds	FALSE
User Value [VapReportableFrac]			
Parameter	91.8666* %	Upper Bound	%
Lower Bound	%	Enforce Bounds	FALSE
User Value [LiqReportableFrac]			
Parameter	99.6992* %	Upper Bound	%
Lower Bound	%	Enforce Bounds	FALSE
User Value [FlashReportableFrac]			
Parameter	60.5633* %	Upper Bound	%
Lower Bound	%	Enforce Bounds	FALSE
Notes:			
This User Value Set was programmatically generated. GUID={8E66DB54-4E8F-4A76-AA6A-F526F6055378}			
PW Tanks TL W&B			
User Value [ShellLength]			
Parameter	14* ft	Upper Bound	ft
Lower Bound	0* ft	Enforce Bounds	FALSE
User Value [ShellDiam]			
Parameter	11* ft	Upper Bound	ft
Lower Bound	0* ft	Enforce Bounds	FALSE
User Value [BreatherVP]			
Parameter	0.5* psig	Upper Bound	psig
Lower Bound	psig	Enforce Bounds	FALSE

User Value [BreatherVacP]

Parameter	-0.0300000* psig	Upper Bound	psig
Lower Bound	psig	Enforce Bounds	FALSE

User Value [DomeRadius]

Parameter	ft	Upper Bound	ft
Lower Bound	ft	Enforce Bounds	FALSE

User Value [OpPress]

Parameter	0.5* psig	Upper Bound	psig
Lower Bound	psig	Enforce Bounds	FALSE

User Value [AvgPercentLiq]

Parameter	50* %	Upper Bound	%
Lower Bound	%	Enforce Bounds	FALSE

User Value [MaxPercentLiq]

Parameter	90* %	Upper Bound	%
Lower Bound	%	Enforce Bounds	FALSE

User Value [AnnNetTP]

Parameter	24.0970* bbl/day	Upper Bound	bbl/day
Lower Bound	0* bbl/day	Enforce Bounds	FALSE

User Value [OREff]

Parameter	0* %	Upper Bound	%
Lower Bound	%	Enforce Bounds	FALSE

User Value [MaxAvgT]

Parameter	59.9* °F	Upper Bound	°F
Lower Bound	°F	Enforce Bounds	FALSE

User Value [MinAvgT]

Parameter	40.7* °F	Upper Bound	°F
Lower Bound	°F	Enforce Bounds	FALSE

User Value [BulkLiqT]

Parameter	50.32* °F	Upper Bound	°F
Lower Bound	°F	Enforce Bounds	FALSE

User Value [AvgP]

Parameter	14.1085* psia	Upper Bound	psia
Lower Bound	psia	Enforce Bounds	FALSE

User Value [ThermI]

Parameter	1069* Btu/ft^2/day	Upper Bound	Btu/ft^2/day
Lower Bound	Btu/ft^2/day	Enforce Bounds	FALSE

User Value [AvgWindSpeed]

Parameter	9.1* mi/h	Upper Bound	mi/h
Lower Bound	mi/h	Enforce Bounds	FALSE

User Value [MaxHourlyLoadingRate]

Parameter	110* bbl/hr	Upper Bound	bbl/hr
Lower Bound	0* bbl/hr	Enforce Bounds	FALSE

User Value [EntrainedOilFrac]

Parameter	1* %	Upper Bound	%
Lower Bound	%	Enforce Bounds	FALSE

User Value [TurnoverRate]

Parameter	13.7455*	Upper Bound	
Lower Bound		Enforce Bounds	FALSE
User Value [LLossSatFactor]			
Parameter	0.6*	Upper Bound	
Lower Bound		Enforce Bounds	FALSE
User Value [AtmPressure]			
Parameter	14.1085* psia	Upper Bound	psia
Lower Bound	psia	Enforce Bounds	FALSE
User Value [TVP]			
Parameter	13.4850* psia	Upper Bound	psia
Lower Bound	psia	Enforce Bounds	FALSE
User Value [AvgLiqSurfaceT]			
Parameter	51.7469* °F	Upper Bound	°F
Lower Bound	°F	Enforce Bounds	FALSE
User Value [MaxLiqSurfaceT]			
Parameter	56.4750* °F	Upper Bound	°F
Lower Bound	°F	Enforce Bounds	FALSE
User Value [TotalLosses]			
Parameter	0.137511* ton/yr	Upper Bound	ton/yr
Lower Bound	ton/yr	Enforce Bounds	FALSE
User Value [WorkingLosses]			
Parameter	0.0115837* ton/yr	Upper Bound	ton/yr
Lower Bound	ton/yr	Enforce Bounds	FALSE
User Value [StandingLosses]			
Parameter	0.0342534* ton/yr	Upper Bound	ton/yr
Lower Bound	ton/yr	Enforce Bounds	FALSE
User Value [RimSealLosses]			
Parameter	0* ton/yr	Upper Bound	ton/yr
Lower Bound	ton/yr	Enforce Bounds	FALSE
User Value [WithdrawalLoss]			
Parameter	0* ton/yr	Upper Bound	ton/yr
Lower Bound	ton/yr	Enforce Bounds	FALSE
User Value [LoadingLosses]			
Parameter	0.0213360* ton/yr	Upper Bound	ton/yr
Lower Bound	ton/yr	Enforce Bounds	FALSE
User Value [MaxHourlyLoadingLoss]			
Parameter	17.9936* lb/hr	Upper Bound	lb/hr
Lower Bound	lb/hr	Enforce Bounds	FALSE
User Value [PStar]			
Parameter		Upper Bound	
Lower Bound		Enforce Bounds	FALSE
User Value [DeckFittingLosses]			
Parameter	0* ton/yr	Upper Bound	ton/yr
Lower Bound	ton/yr	Enforce Bounds	FALSE
User Value [DeckSeamLosses]			
Parameter	0* ton/yr	Upper Bound	ton/yr
Lower Bound	ton/yr	Enforce Bounds	FALSE

User Value [FlashingLosses]

Parameter	0.841392* ton/yr	Upper Bound	ton/yr
Lower Bound	ton/yr	Enforce Bounds	FALSE

User Value [TotalResidual]

Parameter	1541.38* ton/yr	Upper Bound	ton/yr
Lower Bound	ton/yr	Enforce Bounds	FALSE

User Value [GasMoleWeight]

Parameter	0.0197574* kg/mol	Upper Bound	kg/mol
Lower Bound	kg/mol	Enforce Bounds	FALSE

User Value [VapReportableFrac]

Parameter	4.81818* %	Upper Bound	%
Lower Bound	%	Enforce Bounds	FALSE

User Value [LiqReportableFrac]

Parameter	0.000587956* %	Upper Bound	%
Lower Bound	%	Enforce Bounds	FALSE

User Value [FlashReportableFrac]

Parameter	8.41462* %	Upper Bound	%
Lower Bound	%	Enforce Bounds	FALSE

Notes:

This User Value Set was programmatically generated. GUID={3A05EE02-9C4A-46AF-A627-730E614DA63D}