PRICE ENERGY CONSULTING, LLC
P. O. BOX 50676
MIDLAND, TX 79710-0676
(432) 528-2777

January 20, 2020

Air Permits Initial Review Team (APIRT)
Texas Commission on Environmental Quality
MC 161
P. O. Box 13087
Austin, TX 78711-3087

Re: Capitan Energy, Inc., CN605627579
Dorothy State 12 1H Battery

Dear Madam/Sir:

Enclosed, please find the completed forms and supporting documentation to register the above referenced facility under 106.352(l) and 106.492, Permit by Rule.

If you have any questions or require additional information, please me at (432) 528-2777.

Sincerely,

Robert "Andy" Price

Enclosures

Cc: TCEQ, Region 7
9900 W IH-20, Ste. 100
Midland, TX 79706

Dan Huber, Capitan Energy Inc. – Carlsbad, NM

Capitan Energy Inc.
Dorothy State 12 1H Battery

PROCESS DESCRIPTION:

This Permit by Rule is submitted to authorize emissions from the Dorothy State 12 1H Battery. The PI-7 CERT is being submitted to certify the use of a flare to limit emissions from the storage tanks.

The facility gathers crude oil from producing wells. The produced fluids from three wells are initially split into gas, oil and water streams through inlet separation culminating in the line heater (LH-01).

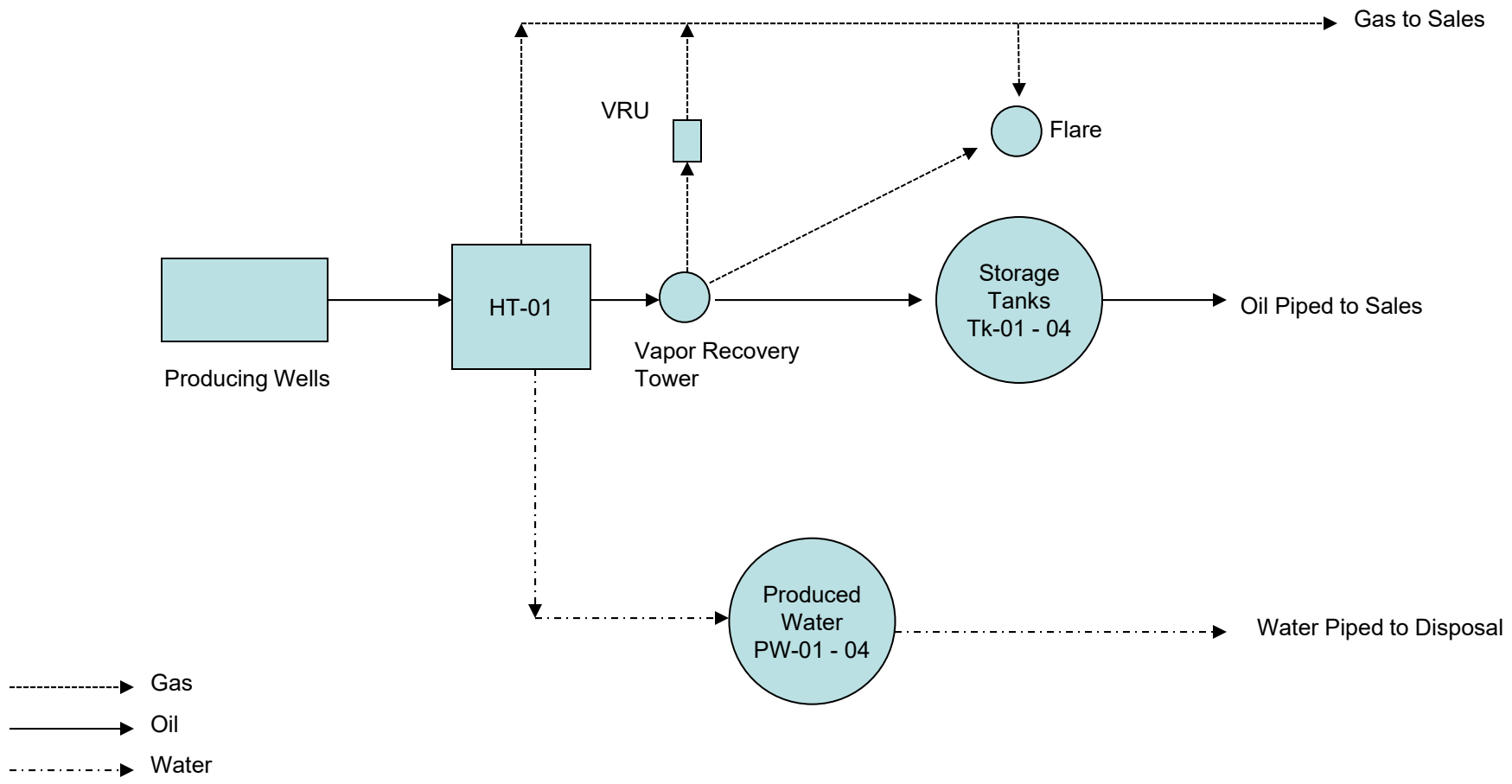
From the line heater, crude oil is routed to a vapor recovery tower (VRT) that removes the flash gas from the oil. The stabilized oil then flows to four (4) 500 bbl product tanks (TK-01 - 04). The gas from the VRT can be boosted by an electric VRU and mixed with gas from the inlet separators to gas sales or routed to the flare. This PBR represents all flash gas from the VRT as being combusted in the flare. Gas and crude oil are piped from the facility to downstream markets.

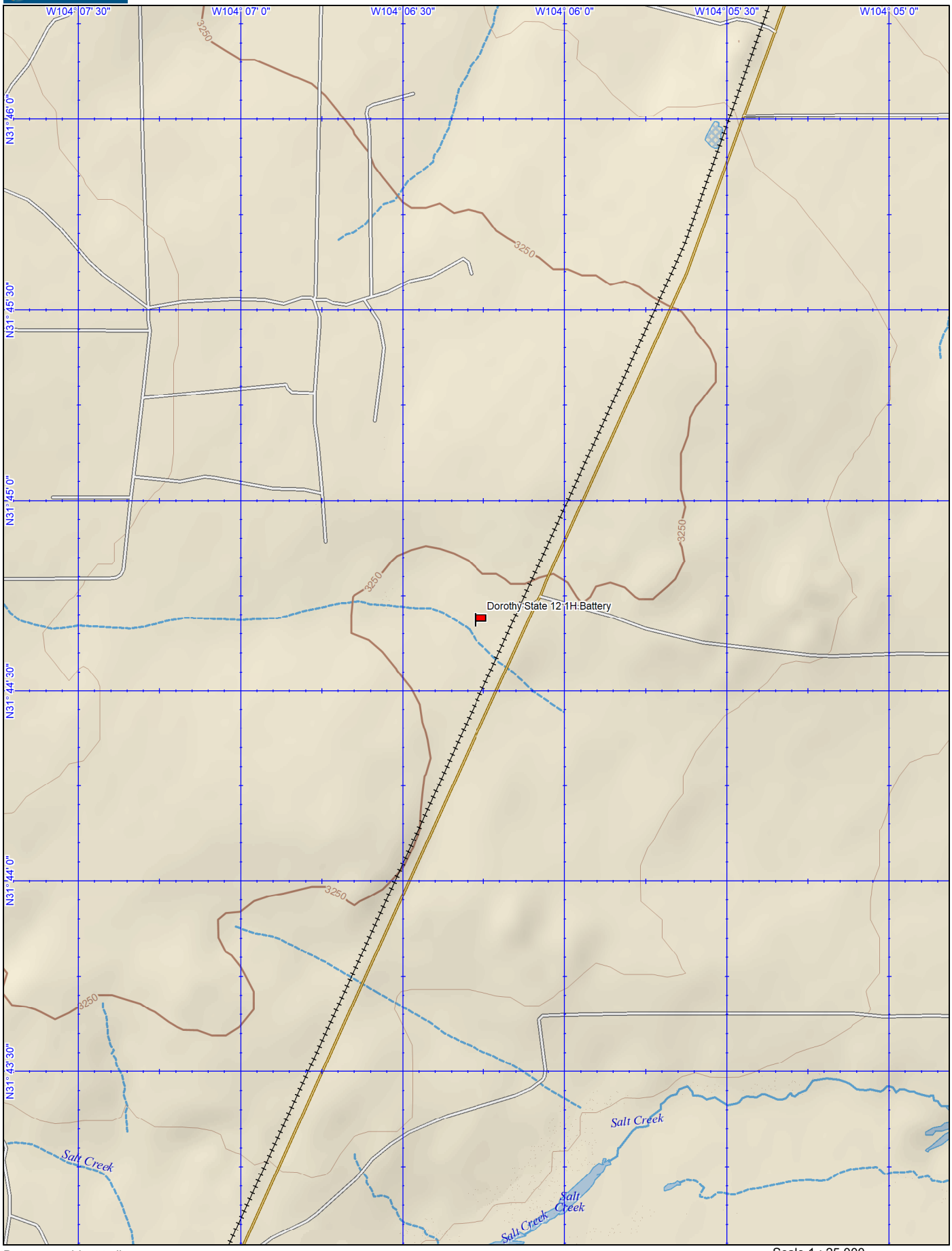
Water from the separators is routed to four (4) 500 bbl produced water tanks (PW-01 - 04). Produced water is piped from the facility to disposal.

Upset emissions from the gas sales line can be routed to the flare for destruction. The flare is equipped with pilot gas and electronic ignition system.

MSS Emissions for the facility are included with this application to be registered under 106.352(l).

Dorothy State 12 1H Battery Process Flow Diagram





TN

MN (6.8°E)

Scale 1 : 25,000

0 600 1200 1800 2400 3000 ft

0 200 400 600 800 1000 m

1" = 2,083.3 ft

Data Zoom 13-0

Capitan Energy
Dorothy State 12 1H Battery

Emission Rate Summary

			VOC Emissions		H2S Emissions		SO2 Emissions		NOx Emissions		CO Emissions	
EPN	Description	Production (bbls/day)	Emissions (lbs/hr)	Emissions (tons/yr)	Emissions (lbs/hr)	Emissions (tons/yr)	Emissions (lbs/hr)	Emissions (tons/yr)	Emissions (lbs/hr)	Emissions (tons/yr)	Emissions (lbs/hr)	Emissions (tons/yr)
PBR CERTIFIED EMISSIONS												
Tk-01	Oil Storage Tank	100	0.440	1.926	0.0000	0.0000						
Tk-02	Oil Storage Tank	100	0.440	1.926	0.0000	0.0000						
Tk-03	Oil Storage Tank	100	0.440	1.926	0.0000	0.0000						
Tk-04	Oil Storage Tank	100	0.440	1.926	0.0000	0.0000						
PW-01	Produced Water Tank	300	0.094	0.412	0.0000	0.0000						
PW-02	Produced Water Tank	300	0.094	0.412	0.0000	0.0000						
PW-03	Produced Water Tank	300	0.094	0.412	0.0000	0.0000						
PW-04	Produced Water Tank	300	0.094	0.412	0.0000	0.0000						
FL-01	Flare		Emissions Represented at Tanks				0.0000	0.00	0.34	1.49	0.68	2.97
PBR REGISTERED EMISSIONS												
Fug-01	Fugitive Emissions		0.504	2.208	0.0000	0.0000						
LH-01	Line Heater		0.002	0.010			0.0000	0.0000	0.0424	0.1855	0.0356	0.1558
MSS-01	MSS Emissions		6.629	0.135								
Totals			**9.27**	**11.71**	**0.00**	**0.00**	**0.00**	**0.00**	**0.38**	**1.67**	**0.71**	**3.13**

		PM10 Emissions		PM2.5 Emissions	
EPN	Description	Emissions (lbs/hr)	Emissions (tons/yr)	Emissions (lbs/hr)	Emissions (tons/yr)
LH-01	Line Heater	0.003	0.014	0.0024	0.0106
Totals		**0.00**	**0.01**	**0.00**	**0.01**

Capitan Energy
Dorothy State 12 1H Battery

CRUDE OIL STORAGE TANK EMISSIONS

	VOC Emissions									H2S Emissions	
	Throughput bbls/day	W&B Flashing Loss	Uncontrolled Flash Emissions		Flare Efficiency	Controlled Flash Emissions	W&B Losses	Flare Efficiency	Total Emissions (tpy)	**lbs/hr**	**tons/yr**
Tk-01	100	13.738	12.05		0.98	0.24	1.69	0.00	1.93	0.00000	0.0000
Tk-02	100	13.738	12.05		0.98	0.24	1.69	0.00	1.93	0.00000	0.0000
Tk-03	100	13.738	12.05		0.98	0.24	1.69	0.00	1.93	0.00000	0.0000
Tk-04	100	13.738	12.05		0.98	0.24	1.69	0.00	1.93	0.00000	0.0000

PRODUCED WATER STORAGE TANK EMISSIONS

			VOC Emissions*			**H2S Emissions**	
Emission Point	Throughput bbls/day	**Uncontrolled Emissions** tpy**	**lbs/hr**	**tons/yr**	**H2S Wt%**	**lbs/hr**	**tons/yr**
PW-01	**300**	**41.215**	**0.094**	**0.412**	**0.00**	0.00000	0.0000
PW-02	**300**	**41.215**	**0.094**	**0.412**	**0.00**	0.00000	0.0000
PW-03	**300**	**41.215**	**0.094**	**0.412**	**0.00**	0.00000	0.0000
PW-04	**300**	**41.215**	**0.094**	**0.412**	**0.00**	0.00000	0.0000

*** From E&P Tanks Results multiplied by 0.01 per TCEQ Guidance.**

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**********************************************************************************
*     Project Setup Information                                                  *
**********************************************************************************
Project File              : C:\Users\Andy\Documents\Virtual Machine Tanks Data\Capitan - Dorothy.ept3
Flowsheet Selection       : Oil Tank with Separator
Calculation Method        : RVP Distillation
Control Efficiency        :  0.00%
Known Separator Stream    : Low Pressure Oil
Entering Air Composition  : No
Component Group           : C10+

Filed Name                : Dorothy State 12 1H Battery
Well Name                 : Crude Oil Tank Emissions
Permit Number             : Wetherbee 421-423H Representative Analytical
Date                      : 2018.05.29


**********************************************************************************
*     Data Input                                                                 *
**********************************************************************************

Separator Pressure (psia)         : 42.00
Separator Temperature (F)         : 122.0
C10+ SG                           : 0.83
C10+ MW(lb/lbmol)                 : 201.44

-- Low Pressure Oil -----------------------------------------------------------
No.   Component           Mole%    Wt%
1     H2S                  0.0000   0.0000
2     O2                   0.0000   0.0000
3     CO2                  0.0071   0.0023
4     N2                   0.3474   0.0731
5     C1                   0.4902   0.0591
6     C2                   0.7186   0.1623
7     C3                   1.8537   0.6140
8     i-C4                 0.8567   0.3740
9     n-C4                 2.8079   1.2258
10    i-C5                 1.8965   1.0278
11    n-C5                 2.6461   1.4340
12    C6                   8.9876   5.8164
13    C7                  14.0526  10.5762
14    C8                  10.5600   9.0604
15    C9                   7.9667   7.6761
16    C10+                35.3849  53.5381
17    Benzene              0.2624   0.1539
18    Toluene              1.5813   1.0943
19    E-Benzene            1.9708   1.5716
20    Xylenes              3.6541   2.9140
21    n-C6                 3.6415   2.3572
22    224Trimethylp        0.3139   0.2693

-- Sales Oil ------------------------------------------------------------------
Production Rate (bbl/day)     : 100.00
Days of Annual Operation      : 365
API Gravity                   : 51.00
Reid Vapor Pressure (psia)    : 5.88
Ambient Pressure (psia)       : 14.70
Ambient Temperature (F)       : 70.0


**********************************************************************************
*     Calculation Results                                                        *
**********************************************************************************

-- Emission Summary -----------------------------------------------------------
                    Uncontrolled
```

	ton
Total HAPs	0.5800
Total HC	23.1760
VOCs, C2+	20.3480
VOCs, C3+	13.7380
CO2	0.1120
CH4	2.8280

Uncontrolled Recovery Information:

Vapor(mscfd):	1.6000
HC Vapor(mscfd):	1.3400
CO2(mscfd):	0.0100
CH4(mscfd):	0.3700
GOR(SCF/STB):	16.0000

-- Emission Composition ----------

NoComponent	Uncontrolled ton
1 H2S	0.0000
2 O2	0.0000
3 CO2	0.1120
4 N2	3.5000
5 C1	2.8280
6 C2	6.6100
7 C3	5.6650
8 i-C4	1.2670
9 n-C4	2.7690
10 i-C5	0.8760
11 n-C5	0.9030
12 C6	1.0750
13 Benzene	0.0230
14 Toluene	0.0450
15 E-Benzene	0.0210
16 Xylenes	0.0340
17 n-C6	0.4380
18 224Trimethylp	0.0180
19 Pseudo Comp1	0.5440
20 Pseudo Comp2	0.0550
21 Pseudo Comp3	0.0050
22 Pseudo Comp4	0.0000
23 Pseudo Comp5	0.0000
24 Total	26.7880

-- Stream Data ----------

NoComponent	MW lb/lbmol	LP Oil mole %	Flash Oil mole %	Sales Oil mole %	Flash Gas mole %	W&S Gas mole %	Total Emission mole %
1 H2S	34.80	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2 O2	32.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3 CO2	44.01	0.0071	0.0037	0.0000	0.2855	0.3842	0.3295
4 N2	28.01	0.3474	0.0343	0.0000	26.3571	3.5447	16.1992
5 C1	16.04	0.4902	0.1503	0.0001	28.7212	15.5483	22.8556
6 C2	30.07	0.7186	0.5343	0.1099	16.0277	44.0290	28.4960
7 C3	44.10	1.8537	1.7111	1.5294	13.6991	20.3322	16.6527
8 i-C4	58.12	0.8567	0.8349	0.8135	2.6686	3.0223	2.8261
9 n-C4	58.12	2.8079	2.7702	2.7341	5.9358	6.4752	6.1760
10 i-C5	72.15	1.8965	1.9009	1.9036	1.5343	1.6229	1.5738
11 n-C5	72.15	2.6461	2.6589	2.6685	1.5839	1.6704	1.6224
12 C6	84.00	8.9876	9.0763	9.1482	1.6184	1.7102	1.6593
13 Benzene	78.11	0.2624	0.2651	0.2673	0.0378	0.0394	0.0385
14 Toluene	92.14	1.5813	1.5996	1.6146	0.0625	0.0657	0.0640
15 E-Benzene	106.17	1.9708	1.9942	2.0134	0.0254	0.0270	0.0261
16 Xylenes	106.17	3.6541	3.6976	3.7333	0.0403	0.0427	0.0414
17 n-C6	86.18	3.6415	3.6776	3.7068	0.6438	0.6789	0.6594
18 224Trimethylp	114.23	0.3139	0.3174	0.3203	0.0195	0.0208	0.0201
19 Pseudo Comp1	100.72	24.6126	24.9007	25.1366	0.6797	0.7245	0.6996
20 Pseudo Comp2	126.68	14.1420	14.3116	14.4507	0.0553	0.0575	0.0563
21 Pseudo Comp3	164.86	15.6466	15.8349	15.9894	0.0040	0.0040	0.0040

22	Pseudo Comp4	225.43	7.2653	7.3527	7.4245	0.0000	0.0000	0.0000
23	Pseudo Comp5	328.30	6.2978	6.3736	6.4358	0.0000	0.0000	0.0000

	LP Oil	Flash Oil	Sales Oil	Flash Gas	W&S Gas	Total Emission
MW (lb/lbmol):	130.85	132.03	132.96	33.08	36.78	34.73
Stream Mole Ratio:	1.0000	0.9881	0.9786	0.0119	0.0095	0.0214
Stream Weight Ratio:	130.85	130.46	130.11	0.39	0.35	0.74
Total Emission (ton):				14.156	12.632	26.788
Heating Value (BTU/scf):				1477.70	2052.64	1733.70
Gas Gravity (Gas/Air):				1.14	1.27	1.20
Bubble Pt. @100F (psia):	66.32	18.44	6.99			
RVP @100F (psia):	12.17	8.33	5.85			
Spec. Gravity @100F:	0.75	0.75	0.75			

```
*****************************************************************************************
*     Project Setup Information                                                         *
*****************************************************************************************
Project File              : C:\Users\Andy\Documents\Virtual Machine Tanks Data\Capitan - Dorothy.ept3
Model                     : Stable Oil Tank
Calculation Method        : AP42
Control Efficiency        :  0.00%
Component Group           : C10+

Filed Name                : Dorothy State 12 1H Battery
Well Name                 : Crude Oil Tank Emissions W&B
Permit Number             : Wetherbee 421-423H Representative Analytical
Date                      : 2018.05.29


*****************************************************************************************
*     Data Input                                                                        *
*****************************************************************************************

Separator Pressure (psia)         : 42.00
Separator Temperature (F)         : 122.0
C10+ SG                           : 0.83
C10+ MW(lb/lbmol)                 : 201.44

-- Stable Oil ---------------------------------------------------------------------------
No.   Component           Mole%    Wt%
1     H2S                    0.0000   0.0000
2     O2                     0.0000   0.0000
3     CO2                    0.0000   0.0000
4     N2                     0.0000   0.0000
5     C1                     0.0015   0.0002
6     C2                     0.0387   0.0083
7     C3                     0.3175   0.1004
8     i-C4                   0.3058   0.1274
9     n-C4                   1.0815   0.4505
10    i-C5                   1.2011   0.6211
11    n-C5                   1.7557   0.9079
12    C6                     9.6915   5.9850
13    C7                    15.1533  10.8829
14    C8                    11.3871   9.3232
15    C9                     8.5908   7.8988
16    C10+                  38.1570  55.0915
17    Benzene                0.2829   0.1584
18    Toluene                1.7051   1.1260
19    E-Benzene              2.1251   1.6172
20    Xylenes                3.9402   2.9984
21    n-C6                   3.9267   2.4255
22    224Trimethylp          0.3385   0.2772

-- Sales Oil ----------------------------------------------------------------------------
Production Rate (bbl/day)     : 100.00
Days of Annual Operation      : 365
API Gravity                   : 51.00
Reid Vapor Pressure (psia)    : 5.88
Bulk Temperature              : 80.0

-- Tank and Shell Data ------------------------------------------------------------------
Diameter (ft)                 : 15.50
Shell Height (ft)             : 16.00
Cone Roof Slope               : 0.06
Average Liquid Height (ft)    : 8.00
Vent Pressure Range (psia)    : 0.06
Solar Absorbance              : 0.54

-- Meteorological Data ------------------------------------------------------------------
City                      : Roswell, NM
```

Min Ambient Temperature (F) : 47.5
Max Ambient Temperature (F) : 75.3
Total Solar Insolation (F) : 1810.00
Ambient Pressure (psia) : 14.70
Ambient Temperature (F) : 70.0

****
* Calculation Results *
****

-- Emission Summary --

	Uncontrolled ton
Total HAPs	0.1900
Total HC	1.7300
VOCs, C2+	1.7280
VOCs, C3+	1.6850
CO2	0.0000
CH4	0.0020

Uncontrolled Recovery Information:
Vapor(mscfd): 0.0540
HC Vapor(mscfd): 0.0540
CO2(mscfd): 0.0000
CH4(mscfd): 0.0000
GOR(SCF/STB): 0.5398

-- Emission Composition --

NoComponent		Uncontrolled ton
1	H2S	0.0000
2	O2	0.0000
3	CO2	0.0000
4	N2	0.0000
5	C1	0.0020
6	C2	0.0430
7	C3	0.2040
8	i-C4	0.1170
9	n-C4	0.2880
10	i-C5	0.1580
11	n-C5	0.1730
12	C6	0.3460
13	Benzene	0.0080
14	Toluene	0.0150
15	E-Benzene	0.0070
16	Xylenes	0.0120
17	n-C6	0.1420
18	224Trimethylp	0.0060
19	Pseudo Comp1	0.1880
20	Pseudo Comp2	0.0200
21	Pseudo Comp3	0.0020
22	Pseudo Comp4	0.0000
23	Pseudo Comp5	0.0000
24	Total	1.7310

-- Stream Data --

NoComponent		MW lb/lbmol	Stable Oil mole %	Sales Oil mole %	Total Emission mole %
1	H2S	34.80	0.0000	0.0000	0.0000
2	O2	32.00	0.0000	0.0000	0.0000
3	CO2	44.01	0.0000	0.0000	0.0000
4	N2	28.01	0.0000	0.0000	0.0000
5	C1	16.04	0.0015	0.0012	0.4123
6	C2	30.07	0.0387	0.0348	5.4711
7	C3	44.10	0.3175	0.3048	17.7797
8	i-C4	58.12	0.3058	0.3004	7.7593

9	n-C4	58.12	1.0815	1.0685	19.0295
10	i-C5	72.15	1.2011	1.1959	8.4138
11	n-C5	72.15	1.7557	1.7503	9.2136
12	C6	84.00	9.6915	9.6870	15.8397
13	Benzene	78.11	0.2829	0.2828	0.3706
14	Toluene	92.14	1.7051	1.7059	0.6342
15	E-Benzene	106.17	2.1251	2.1265	0.2655
16	Xylenes	106.17	3.9402	3.9428	0.4260
17	n-C6	86.18	3.9267	3.9249	6.3418
18	224Trimethylp	114.23	0.3385	0.3386	0.1964
19	Pseudo Comp1	100.72	26.5404	26.5545	7.1812
20	Pseudo Comp2	126.68	15.2498	15.2604	0.6166
21	Pseudo Comp3	164.86	16.8723	16.8845	0.0484
22	Pseudo Comp4	225.43	7.8344	7.8401	0.0004
23	Pseudo Comp5	328.30	6.7912	6.7961	0.0000

	Stable Oil	Sales Oil	Total Emissions
MW (lb/lbmol):	137.06	137.06	66.54
Stream Mole Ratio:	1.0000	0.9993	0.0007
Stream Weight Ratio:	137.06	136.96	0.05
Total Emission (ton):			1.730
Heating Value (Btu/scf):			3667.53
Gas Gravity (Gas/Air):			2.30
Bubble Pt. @100F (psia):	3.12	3.06	
RVP @100F (psia):	19.99	19.56	
Spec. Gravity @100F (API):	0.76	0.76	

```
*****************************************************************************************
*     Project Setup Information                                                         *
*****************************************************************************************
Project File              : C:\Users\Andy\Documents\Virtual Machine Tanks Data\Capitan - Dorothy.ept3
Flowsheet Selection       : Oil Tank with Separator
Calculation Method        : RVP Distillation
Control Efficiency        :  0.00%
Known Separator Stream    : Low Pressure Oil
Entering Air Composition  : No
Component Group           : C10+

Filed Name                : Dorothy State 12 1H Battery
Well Name                 : Produced Water Tank Emissions
Permit Number             : Wetherbee 421-423H Representative Analytical
Date                      : 2018.05.29


*****************************************************************************************
*     Data Input                                                                        *
*****************************************************************************************

Separator Pressure (psia)         : 42.00
Separator Temperature (F)         : 122.0
C10+ SG                           : 0.83
C10+ MW(lb/lbmol)                 : 201.44

-- Low Pressure Oil ---------------------------------------------------------------------
No.   Component           Mole%    Wt%
1     H2S                   0.0000   0.0000
2     O2                    0.0000   0.0000
3     CO2                   0.0071   0.0023
4     N2                    0.3474   0.0731
5     C1                    0.4902   0.0591
6     C2                    0.7186   0.1623
7     C3                    1.8537   0.6140
8     i-C4                  0.8567   0.3740
9     n-C4                  2.8079   1.2258
10    i-C5                  1.8965   1.0278
11    n-C5                  2.6461   1.4340
12    C6                    8.9876   5.8164
13    C7                   14.0526  10.5762
14    C8                   10.5600   9.0604
15    C9                    7.9667   7.6761
16    C10+                 35.3849  53.5381
17    Benzene               0.2624   0.1539
18    Toluene               1.5813   1.0943
19    E-Benzene             1.9708   1.5716
20    Xylenes               3.6541   2.9140
21    n-C6                  3.6415   2.3572
22    224Trimethylp         0.3139   0.2693

-- Sales Oil ----------------------------------------------------------------------------
Production Rate (bbl/day)     : 300.00
Days of Annual Operation      : 365
API Gravity                   : 51.00
Reid Vapor Pressure (psia)    : 5.88
Ambient Pressure (psia)       : 14.70
Ambient Temperature (F)       : 70.0


*****************************************************************************************
*     Calculation Results                                                               *
*****************************************************************************************

-- Emission Summary ---------------------------------------------------------------------
                    Uncontrolled
```

	ton
Total HAPs	1.7400
Total HC	69.5280
VOCs, C2+	61.0440
VOCs, C3+	41.2150
CO2	0.3360
CH4	8.4840

Uncontrolled Recovery Information:

Vapor(mscfd):	4.8100
HC Vapor(mscfd):	4.0100
CO2(mscfd):	0.0200
CH4(mscfd):	1.1000
GOR(SCF/STB):	16.0333

-- Emission Composition ----------

NoComponent	Uncontrolled ton
1 H2S	0.0000
2 O2	0.0000
3 CO2	0.3360
4 N2	10.5000
5 C1	8.4840
6 C2	19.8290
7 C3	16.9940
8 i-C4	3.8010
9 n-C4	8.3060
10 i-C5	2.6280
11 n-C5	2.7090
12 C6	3.2250
13 Benzene	0.0700
14 Toluene	0.1360
15 E-Benzene	0.0640
16 Xylenes	0.1020
17 n-C6	1.3150
18 224Trimethylp	0.0530
19 Pseudo Comp1	1.6310
20 Pseudo Comp2	0.1650
21 Pseudo Comp3	0.0150
22 Pseudo Comp4	0.0000
23 Pseudo Comp5	0.0000
24 Total	80.3630

-- Stream Data ----------

NoComponent	MW lb/lbmol	LP Oil mole %	Flash Oil mole %	Sales Oil mole %	Flash Gas mole %	W&S Gas mole %	Total Emission mole %
1 H2S	34.80	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2 O2	32.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3 CO2	44.01	0.0071	0.0037	0.0000	0.2855	0.3842	0.3295
4 N2	28.01	0.3474	0.0343	0.0000	26.3571	3.5447	16.1992
5 C1	16.04	0.4902	0.1503	0.0001	28.7212	15.5483	22.8556
6 C2	30.07	0.7186	0.5343	0.1099	16.0277	44.0290	28.4960
7 C3	44.10	1.8537	1.7111	1.5294	13.6991	20.3322	16.6527
8 i-C4	58.12	0.8567	0.8349	0.8135	2.6686	3.0223	2.8261
9 n-C4	58.12	2.8079	2.7702	2.7341	5.9358	6.4752	6.1760
10 i-C5	72.15	1.8965	1.9009	1.9036	1.5343	1.6229	1.5738
11 n-C5	72.15	2.6461	2.6589	2.6685	1.5839	1.6704	1.6224
12 C6	84.00	8.9876	9.0763	9.1482	1.6184	1.7102	1.6593
13 Benzene	78.11	0.2624	0.2651	0.2673	0.0378	0.0394	0.0385
14 Toluene	92.14	1.5813	1.5996	1.6146	0.0625	0.0657	0.0640
15 E-Benzene	106.17	1.9708	1.9942	2.0134	0.0254	0.0270	0.0261
16 Xylenes	106.17	3.6541	3.6976	3.7333	0.0403	0.0427	0.0414
17 n-C6	86.18	3.6415	3.6776	3.7068	0.6438	0.6789	0.6594
18 224Trimethylp	114.23	0.3139	0.3174	0.3203	0.0195	0.0208	0.0201
19 Pseudo Comp1	100.72	24.6126	24.9007	25.1366	0.6797	0.7245	0.6996
20 Pseudo Comp2	126.68	14.1420	14.3116	14.4507	0.0553	0.0575	0.0563
21 Pseudo Comp3	164.86	15.6466	15.8349	15.9894	0.0040	0.0040	0.0040

22	Pseudo Comp4	225.43	7.2653	7.3527	7.4245	0.0000	0.0000	0.0000
23	Pseudo Comp5	328.30	6.2978	6.3736	6.4358	0.0000	0.0000	0.0000

	LP Oil	Flash Oil	Sales Oil	Flash Gas	W&S Gas	Total Emission
MW (lb/lbmol):	130.85	132.03	132.96	33.08	36.78	34.73
Stream Mole Ratio:	1.0000	0.9881	0.9786	0.0119	0.0095	0.0214
Stream Weight Ratio:	130.85	130.46	130.11	0.39	0.35	0.74
Total Emission (ton):				42.467	37.897	80.363
Heating Value (BTU/scf):				1477.70	2052.64	1733.70
Gas Gravity (Gas/Air):				1.14	1.27	1.20
Bubble Pt. @100F (psia):	66.32	18.44	6.99			
RVP @100F (psia):	12.17	8.33	5.85			
Spec. Gravity @100F:	0.75	0.75	0.75			

FUGITIVE COMPONENT EMISSIONS

					VOC Emissions		H2S Emissions	
Component	Number	Service	Emissions Factor	VOC Content (Wt %)	lbs/hr	tons/yr	lbs/hr	tons/yr
Flanges	60	Gas	0.00086	15.90358558	0.008	0.04	0.000	0.00
Flanges	100	Light Liquid	0.00024	100	0.024	0.11	0.000	0.00
Flanges	40	Water/Oil	0.000006	100	0.000	0.00	0.000	0.00
Connector	60	Gas	0.000463	15.90358558	0.004	0.02	0.000	0.00
Connector	80	Light Liquid	0.000463	100	0.037	0.16	0.000	0.00
Connector	40	Water/Oil	0.000243	100	0.010	0.04	0.000	0.00
Pump Seals	2	Light Liquid	0.02866	100	0.057	0.25	0.000	0.00
Pump Seals	2	Water/Oil	0.000052	100	0.000	0.00	0.000	0.00
Valves	40	Gas	0.00992	15.90358558	0.063	0.28	0.000	0.00
Valves	40	Light Liquid	0.00551	100	0.220	0.97	0.000	0.00
Valves	40	Water/Oil	0.000216	100	0.009	0.04	0.000	0.00
Other	10	Gas	0.00992	15.90358558	0.016	0.07	0.000	0.00
Other	10	Light Liquid	0.00551	100	0.055	0.24	0.000	0.00
			Totals		**0.504**	**2.208**	**0.000**	**0.000**

Capitan Energy
Dorothy State 12 1H Battery
LH-01

Run Time (hours/yr)	8760	
H2S Content of Fuel (ppm)	0	
Fuel Gas Heating Value (Btu/scf)	1180.4	
Design Heat Input (MMBtu/hr)	0.5	
Fuel Usage Rate (scf/hr)	424	Heat Input / Fuel Gas Heating Value
Estimated Annual Fuel Usage (MMscf/yr)	3.711	Fuel Usage * Run Time

NOx Emission Factor (lbs/MMscf)	100	
NOx Emissions (lbs/hr)	**0.042**	Fuel Usage Rate * NOx Emission Factor / 1000000
NOx Emissions (Tons/yr)	**0.186**	NOx lbs/hr * Run Time / 2000

CO Emission Factor (lbs/MMscf)	84	
CO Emissions (lbs/hr)	**0.036**	Fuel Usage Rate * CO Emission Factor / 1000000
CO Emissions (Tons/yr)	**0.156**	CO lbs/hr * Run Time / 2000

VOC Emission Factor (lbs/MMscf)	5.5	
VOC Emissions (lbs/hr)	**0.002**	Fuel Usage Rate * VOC Emission Factor / 1000000
VOC Emissions (Tons/yr)	**0.010**	VOC lbs/hr * Run Time / 2000

SO2 Emission Factor (lbs/MMscf)	0.6	
SO2 Emissions (lbs/hr)	**0.000**	Fuel Usage Rate * SO2 Emission Factor * (H2S Content/3.18) / 1000000
SO2 Emissions (Tons/yr)	**0.000**	SO2 lbs/hr * Run Time / 2000

PM10 Emission Factor (lbs/MMscf)	7.6	
PM10 Emissions (lbs/hr)	**0.003**	Fuel Usage Rate * PM10 Emission Factor / 1000000
PM10 Emissions (Tons/yr)	**0.014**	PM10 lbs/hr * Run Time / 2000

PM2.5 Emission Factor (lbs/MMscf)	5.7	
PM2.5 Emissions (lbs/hr)	**0.002**	Fuel Usage Rate * PM2.5 Emission Factor / 1000000
PM2.5 Emissions (Tons/yr)	**0.011**	PM10 lbs/hr * Run Time / 2000

References:

EPA. "Compilation of Air Pollutant Emission Factors, Volume 1: Stationary Point and Area Sources," Section 1.4
AP-42, Ofice of Air Quality Planning and Standards, Research Triangle Park, NC. 5th edition (1/96). Supplements A & B (11/96).

Capitan Energy
Dorothy State 12 1H Battery
Flare Emissions

Gas to be flared

Sales Gas

Molecular Weight	33.08
Btu Content	1477.7
Specific Gravity	1.14

	Molecular Weight	Mole %	Weight %
H2S	34.8	0	0.000
O2	32	0	0.000
CO2	44.01	0.2855	0.380
N2	28.01	26.3571	22.317
Methane	16.04	28.7212	13.926
Ethane	30.07	16.0277	14.569
Propane	44.1	13.6991	18.263
Iso-Butane	58.12	2.6686	4.689
Normal Butane	58.12	5.9358	10.429
Iso-Pentane	72.15	1.5343	3.346
Normal Pentan	72.15	1.5839	3.455
Hexanes	86.16	1.6184	4.215
Benzene	78.11	0.0378	0.089
Toluene	92.13	0.0625	0.174
E-Benzene	106.17	0.0254	0.082
Xylenes	106.17	0.0403	0.129
n-Hexane	86.18	0.6438	1.677
224-Trimethyl-pentane	114.24	0.0195	0.067

Emission Point	Gas Volume (mcf/d)	VOC Wt %	Total SO2* (lbs/yr)	Gas Density (lbs/ft^3)	Flare Duration (days)
FL-01	40	46.615	0	0.09	365

Combustor SO2, NOx and CO EMISSIONS

						NOx Emissions		CO Emissions	
Gas Volume (mcf/day)	H2S Concentration (Mole %)	Sulfur (LT/Day)	SO2 Emissions (lbs/hr)	SO2 Flare Duration (days)	SO2 Emissions (tons)	lbs/hr	Tons	lbs/hr	Tons
40	0	0.00	0.000	365	0.00	0.34	1.49	0.68	2.97

106.492 Compliance Information:

Tip velocity = 0.46 scf/sec / 0.09 ft2 = 5.1 ft/sec which is < 400 ft/sec (gas HV is 1477.7 Btu/scf)

Capitan Energy
Dorothy State 12 1H Battery
Chemical Weight Percent Calculations

		Sales Gas*		Flash Gas**		W&B Gas**		Combined F, W&B	
	Spc Grv.	0.6992							
	Btu/scf	1180.4		1477.7		2052.64		1733.7	
	MW	20.192		33.08		36.78		34.73	
		Mole %	Wt%	Mole%	Wt%	Mole%	Wt%	Mole%	Wt%
H2S	34.8	0	0.000	0	0.000	0	0.000	0	0.000
O2	32	0.02	0.032	0	0.000	0	0.000	0	0.000
CO2	44.01	0.748	1.630	0.2855	0.380	0.3842	0.460	0.3295	0.418
N2	28.01	2.008	2.785	26.3571	22.317	3.5447	2.699	16.1992	13.065
C1	16.04	83.609	66.417	28.7212	13.926	15.5483	6.781	22.8556	10.556
C2	30.07	8.708	12.968	16.0277	14.569	44.029	35.997	28.496	24.672
C3	44.1	0	0.000	13.6991	18.263	20.3322	24.379	16.6527	21.146
i-C4	58.12	1.227	3.532	2.6686	4.689	3.0223	4.776	2.8261	4.729
n-C4	58.12	1.843	5.305	5.9358	10.429	6.4752	10.232	6.176	10.335
i-C5	72.15	0.546	1.951	1.5343	3.346	1.6229	3.184	1.5738	3.269
n-C5	72.15	0.566	2.022	1.5839	3.455	1.6704	3.277	1.6224	3.370
C6	86.16	0.725	3.094	1.6184	4.215	1.7102	4.006	1.6593	4.116
Benzene	78.11		0.000	0.0378	0.089	0.0394	0.084	0.0385	0.087
Toluene	92.13		0.000	0.0625	0.174	0.0657	0.165	0.064	0.170
E-Benzene	106.17		0.000	0.0254	0.082	0.027	0.078	0.0261	0.080
Xylenes	106.17		0.000	0.0403	0.129	0.0427	0.123	0.0414	0.127
n-C6	86.18		0.000	0.6438	1.677	0.6789	1.591	0.6594	1.636
224-tmp	114.24		0.000	0.0195	0.067	0.0208	0.072	0.0201	0.066
VOC Wt%			15.904		46.615		51.965		49.132

* From Gas Analysis
** From E&P Tanks Stream Data Printout in Section 7

Capitan Energy
Dorothy State 12 1H Battery
Planned MSS Emissions

MSS-1 Heater Treater Cleaning

Treater Volume (ft^3)	561.46
Treater Pressure (psia)	16.7
Atm Pressure (psia)	14.7
Max Heater Temp (F)	100
Ideal Gas Constant (ft^3)(psi)/(lb-mol)(R)	10.73
Number of Treaters per Cleaning	1
Duration of Cleanings (hours)	8
Cleanings per year	6
Vapor Pressure of Oil (psia)	5.4903
Vapor MW of Flash Gas (lb/lb-mol)	33.080
VOC Concentration (wt%)	46.615
Benzene Concentration (wt%)	0.089
Benzene Concentration (mol%)	0.038
H2S Concentration (wt%)	0.000
H2S Concentration (mol%)	0.000

Emissions	Opening Vessel			Depressurizing Vessel		Total	
	lb/activity	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
Total HC	45.383	5.673	0.136	6.175	0.148	11.847	0.284
VOC	21.155	2.644	0.063	2.878	0.069	5.523	0.133
Benzene	0.041	0.005	0.000	0.006	0.000	0.011	0.000
H2S	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Capitan Energy

Dorothy State 12 1H Battery

Planned MSS Emissions

Vacuum Truck Loading (Heater Treater Cleaning and Tank Cleaning)

L = 12.46 SPM/T AP-42, Fifth Edition, Equation 5.2-1, January 1995

	Source	Frequency/yr
MSS-2	Heater Treater	6
MSS-3	Crude Oil Tank	4
MSS-4	Produced Water Tank	4

L = Loading Loss (lb/1000 gal liquid loaded)
M = Vapor Molecular Weight of liquid loaded
P = True Vapor Pressure of liquid loaded
T = Temperature of bulk liquid loaded (R^o) F + 459.67
S = Saturation Factor (1.45 for splash loading, 0.6 for submerged from Table 5.2-1)

Hourly Emissions:

EPN	Loading Vessel	Liquid Loaded	Type of Loading	Saturation Factor	Max Temp.	Mol. Weight	Vapor Pressure	Loading Loss	Control Efficiency	Max. (gal/hr) Loading Rate	Loading Emissions (lbs/hr)
MSS-2	Tank Truck	Crude Oil	Submerged	0.6	542.82	36.78	5.4903	2.7811	0	126	0.35
MSS-3	Tank Truck	Crude Oil	Submerged	0.6	542.82	36.78	5.4903	2.7811	0	630	1.75
MSS-4	Tank Truck	Produced Water	Submerged	0.6	542.82	36.78	5.4903	2.7811	0	630	0.02

* Treater volume is estimated at 100 bbls for MSS-2. Tank Heel is assumed to be 3% of tank volume for MSS-3 and MSS-4. Tank cleaning 1/yr.

Annual Emissions:

EPN	Loading Vessel	Liquid Loaded	Type of Loading	Saturation Factor	Max Temp.	Mol. Weight	Vapor Pressure	Loading Loss	Control Efficiency	Max. (gal/yr) Loading Rate	Loading Emissions (tons/yr)
MSS-2	Tank Truck	Crude Oil	Submerged	0.6	531.41	36.78	4.4869	2.3216	0	756	0.001
MSS-3	Tank Truck	Crude Oil	Submerged	0.6	531.41	36.78	4.4869	2.3216	0	2520	0.003
MSS-4	Tank Truck	Produced Water	Submerged	0.6	531.41	36.78	4.4869	2.3216	0	2520	0.000

* Produced water emissions are 1% of that total per TCEQ Guidance

		MSS2		MSS3		MSS4	
Weight %		lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
51.97	VOC	0.182	0.000	0.910	0.002	0.009	0.000
0.00	H2S	0.000	0.000	0.000	0.000	0.000	0.000

Capitan Energy
Dorothy State 12 1H Battery
Planned MSS Emissions

MSS-5 Pigging Operations

Venting Pressure (psia)	50
Piping Length (ft)	2
Piping Diameter (ft)	0.33
Piping Volume (ft3)	0.17
Process Temperature (F)	95
Ideal Gas Constant (ft3)(psi)/(lbmol)	10.76
Acitivites per year	365
Duration of Activity (hours)	1
Molecular Weight of Gas	20.192
VOC Concentration (wt%)	15.904
Benzene Concentration (wt%)	0.000
H2S Concentration (mol%)	0.000

Emissions	Opening Vessel	
	lb/hr	tpy
Total HC	0.029	0.005
VOC	0.005	0.001
Benzene	0.000	0.000
H2S	0.000	0.000

Emissions vented to atmosphere after opening pipelines are calculated using the Ideal Gas Law and are based on the entire pipe volume venting to the atmosphere at pipeline pressure.

Capitan Energy Inc.
Dorothy State 12 1H Battery

Emissions Calculation Methodology

Storage Tanks:

Working, Breathing and Flashing Losses – Estimated using E&P Tanks

The representative analytical data used is from the Wetherbee lease which produces crude oil from the same formation and has similar equipment and site processes as the Dorothy State 12 1H Battery.

Produced Water Tank Emissions:

Produced water tank emissions were calculated using E&P Tanks, the results multiplied by 0.01 (1%) per TCEQ guidance.

Heaters:

NOx, CO, VOC, SO2, PM – Utilize AP-42 Emission Factors, Section 1.4. The Btu/scf content of the fuel gas was taken from the facility gas analysis.

Fugitive Emissions:

TCEQ approved Fugitive Emission factors were used.

Truck Loading:

AP-42 Emission Factors were used.

HOWARD
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GAS ANALYSIS REPORT

LAB REPORT NUMBER: 190710-9026-07-071019-01

PHYSICAL CONSTANTS PER GPA 2145-16

STATION:	1071	DATE ANALYZED:	07/10/2019
PRODUCER:	CAPITAN	DATE ON:	07/08/2019
LEASE:	DOROTHY SALES	DATE OFF:	07/08/2019
EFFECTIVE DATE:	07/01/2019		

COMPONENT	MOLE %	GPM	WT. %
H2S	0.000		0.000
OXYGEN	0.020		0.032
NITROGEN	2.008		2.786
CARBON DIOXIDE	0.748		1.630
METHANE	83.609		66.428
ETHANE	8.708	2.323	12.968
PROPANE	0.000	0.000	0.000
I-BUTANE	1.227	0.401	3.532
N-BUTANE	1.843	0.580	5.305
I-PENTANE	0.546	0.199	1.951
N-PENTANE	0.566	0.205	2.022
HEXANE PLUS	0.725	0.314	3.346
TOTAL	100.000	4.022	100.000

(ALL VALUES CALCULATED @ 14.65 PSIA & 60 DEG. F)

REAL GRAVITY	0.6992	BTU WET BASIS	1159.7
MOL. WT.	20.192	BTU DRY BASIS	1180.4
H2S PPM:	0		

SAMPLED BY	WM	SAMPLE PRESS:	206.74
SAMPLE TYPE:	SPOT	SAMPLE TEMP:	100.87
CYLINDER NO.:	5480	COUNTY / STATE:	CULBERSON, TX
COMMENT:	SPOT		

08-31-2018

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SUMMARY OF CHROMATOGRAPHIC ANALYSIS

COMPANY:	COG	**JOB #:**	1802001
SAMPLE ID:	PRESSURIZED SEPARATOR CRUDE OIL	**SAMPLE #:**	1802001-02PC
SAMPLE TYPE:	SPOT	**DATE ON:**	1/25/2018
STATION:	WEATHERBEE 421/423 BATTERY	**DATE OFF:**	1/25/2018
SAMPLE PRESS.,psig:	42	**TIME ON:**	09:36
SAMPLE TEMPERATURE, F	122	**TIME OFF:**	09:36
ANALYSIS DATE:	2/5/2018	**SAMPLED BY:**	R I O
ANALYSIS COMMENTS:		**ANALYST:**	J. R. PRITCHARD

TANKS DATA INPUT REPORT

COMPONENT	MOLE %	WEIGHT %	VOLUME %
HYDROGEN SULFIDE	0.0000	0.0000	0.0000
CARBON DIOXIDE	0.0071	0.0024	0.0022
NITROGEN	0.3474	0.0733	0.0675
METHANE	0.4902	0.0592	0.1468
ETHANE	0.7186	0.1627	0.3394
PROPANE	1.8537	0.6157	0.9022
ISO-BUTANE	0.8567	0.3750	0.4952
N-BUTANE	2.8079	1.2292	1.5646
ISO-PENTANE	1.8965	1.0306	1.2267
N-PENTANE	2.6461	1.4380	1.6939
N-HEXANE	3.6415	2.3637	2.6474
OTHER HEXANES	8.9876	5.7518	5.9024
HEPTANES	14.0526	10.4094	10.6555
OCTANES	10.5600	9.0856	9.5546
NONANES	7.9667	7.6963	7.9267
BENZENE	0.2624	0.1544	0.1300
TOLUENE	1.5813	1.0974	0.9332
ETHYLBENZENE	1.9708	1.5760	1.3400
XYLENES	3.6541	2.9221	2.4952
2,2,4 TRIMETHYLPENTANE	0.3139	0.2701	0.2592
DECANES PLUS	35.3849	53.6871	51.7173
TOTAL	100.0000	100.0000	100.0000

CALCULATED PARAMETERS

TOTAL ANALYSIS SUMMARY

AVE MOLE WT	132.7666
SP GRAV, 60F/60	0.7556
API GRAVITY	55.8
REL DENS, AIR=1	4.5839
VAPOR PRESS PSIA	37.59
CU FT VAPOR/GAL	20.39

DECANES PLUS SUMMARY

AVE MOLE WT	201.4372
SP GRAV, 60F/60	0.8339
API GRAVITY	38.2
LBS/GAL	6.6720
REL DENS, AIR=1	6.9549
VAPOR PRESS PSIA	0.02

CHARACTERISTICS OF STOCK TANK OIL

API GRAVITY @ 60 F (ASTM D287)	51.0
REID VAPOR PRESSURE, psia (ASTM D323)	5.88
WEIGHT % SULFUR (ASTM D4294)	0.0273

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SUMMARY OF CHROMATOGRAPHIC ANALYSIS

COMPANY:	COG	**JOB #:**	1802001
SAMPLE ID:	FLASHED SEPARATOR CRUDE OIL	**SAMPLE #:**	1802001-02FC
SAMPLE TYPE:	SPOT	**DATE ON:**	1/25/2018
STATION:	WEATHERBEE 421/423 BATTERY	**DATE OFF:**	1/25/2018
SAMPLE PRESS.,psig:	0	**TIME ON:**	09:36
SAMPLE TEMPERATURE, F	75	**TIME OFF:**	09:36
ANALYSIS DATE:	2/5/2018	**SAMPLED BY:**	R I O
ANALYSIS COMMENTS:		**ANALYST:**	J. R. PRITCHARD

TANKS DATA INPUT REPORT

COMPONENT	MOLE %	WEIGHT %	VOLUME %
HYDROGEN SULFIDE	0.0000	0.0000	0.0000
CARBON DIOXIDE	0.0000	0.0000	0.0000
NITROGEN	0.0000	0.0000	0.0000
METHANE	0.0015	0.0002	0.0005
ETHANE	0.0387	0.0084	0.0177
PROPANE	0.3175	0.1006	0.1489
ISO-BUTANE	0.3058	0.1278	0.1705
N-BUTANE	1.0815	0.4518	0.5808
ISO-PENTANE	1.2011	0.6229	0.7489
N-PENTANE	1.7557	0.9105	1.0833
N-HEXANE	3.9267	2.4325	2.7518
OTHER HEXANES	9.6915	5.9191	6.1350
HEPTANES	15.1533	10.7121	11.0754
OCTANES	11.3871	9.3498	9.9310
NONANES	8.5908	7.9202	8.2392
BENZENE	0.2829	0.1588	0.1351
TOLUENE	1.7051	1.1293	0.9699
ETHYLBENZENE	2.1251	1.6218	1.3927
XYLENES	3.9402	3.0070	2.5934
2,2,4 TRIMETHYLPENTANE	0.3385	0.2779	0.2694
DECANES PLUS	38.1570	55.2493	53.7565
TOTAL	100.0000	100.0000	100.0000

CALCULATED PARAMETERS

TOTAL ANALYSIS SUMMARY

AVE MOLE WT	139.1199
SP GRAV, 60F/60	0.7719
API GRAVITY	51.8
REL DENS, AIR=1	4.8033
VAPOR PRESS PSIA	3.33
CU FT VAPOR/GAL	19.09

DECANES PLUS SUMMARY

AVE MOLE WT	201.4379
SP GRAV, 60F/60	0.8339
API GRAVITY	38.2
LBS/GAL	6.6720
REL DENS, AIR=1	6.9549
VAPOR PRESS PSIA	0.02

CHARACTERISTICS OF STOCK TANK OIL

API GRAVITY @ 60 F (ASTM D287)	51.0
REID VAPOR PRESSURE, psia (ASTM D323)	5.88
WEIGHT % SULFUR (ASTM D4294)	0.0273