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Soil Vapor Extraction (SVE) Recovery 2020 Events

Burch Keely Unit Satellite G CTB (3/27/19) 2RP 5360

32.81624°, -104.01595°

Eddy County, New Mexico

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1.0 SVE SUMMARY REPORT

1.1 SVE Results

The following report summarizes data collected during the 24-hour High Vacuum Soil Vapor Extraction (SVE) events conducted at the BKU Satellite G Battery Site, located in Loco Hills, Eddy County, New Mexico, in 2020. The objective of these SVE events was to remove vapor phase separated hydrocarbons (PSH) from on-site soil vapor extraction wells. Off gas vapors extracted from the extraction wells were destroyed using a propane-fired 1000-SCFM thermal oxidizer capable of processing 172.96 lbs/hr of gasoline.

A total of forty-eight (48) hours of vapor phase hydrocarbon recovery was performed on four (4) soil vapor extraction wells (SVE-1, SVE-2, SVE-3, and SVE-4). Refer to Appendix A for a summary of data collected during the SVE event.

Influent air samples were collected during the events. These samples were submitted for laboratory testing in order to compare the predicted vapor concentrations (based on field-screening or calculated based on fuel consumption) to the actual vapor concentrations. Influent samples were tested for Total-Gas Analysis (Hydrocarbon Composition) by GPA Method 2261. Laboratory analytical results can be found in Appendix B.

Based on collected field data and reported vapor concentrations, an estimated total of **224.13 equivalent gallons of hydrocarbons as off-gas vapor (Total)** were removed during the events. The calculations used to estimate the off-gas vapor mass recovered reflect the mass of total hydrocarbons recovered and does not necessarily equate to an equal mass of the product released. The mass recovery calculations may be affected by variations in the specific gravity of hydrocarbon released, age of release, activity of aerobic and/or anaerobic processes, and site-specific geochemical factors.

Air removal rates were calculated from velocity measurements recorded at the influent pipe to the SVE extraction pump and Preso® B+ manufacturer provided formulas. Air flow rates extracted from the recovery wells **averaged 430.39 SCFM** during the 2020 events.

1.2 Air Quality

Influent air samples were collected during the events. These samples were submitted for laboratory testing in order to compare the predicted vapor concentrations to the actual vapor concentrations. The maximum influent air concentration was recorded as **16,110 ppmv** for hydrocarbon composition. An effluent sample, that was taken in the first event, confirmed emissions were below the limits established by the PI-7 Permit.

COG Operating LLC – 700778.140 – Soil Vapor Extraction – 2020 Events

Laboratory analytical results can be found in Appendix B.

2 SYSTEM OPERATION DATA AND MASS RECOVERY CALCULATIONS

2.1 Formulae:

$$\text{Concentration (C_mg/l)} = \frac{\text{C_ppmv} \times \text{Mol. wt. in mg(estimated)} \times 1000 \times 0.000001}{0.0821 \times \text{Temp (K)}}$$

$$\text{Recovery Rate (lbs/hr)} = \frac{(\text{C_mg/l}) \times 2.2 \times (\text{Flowrate}) \times 60 \times \underline{28.32}}{1,000,000}$$

$$\text{Recovery (lbs)} = (\text{lbs/hr}) \times (\text{hrs})$$

$$\text{Correction Factor (CF)} = \frac{\text{FID Reading(ppmv)}}{\text{FID Reading at Time of Laboratory Analysis}}$$

$$\frac{\underline{8.34 \text{ lbs}}}{\text{gallon water}} \times 0.82 \text{ average specific gravity of condensate} = \frac{\underline{6.84 \text{ lbs light crude}}}{\text{gallon}} \text{ (estimated)}$$

Appendix A – Tables & Figures

Table October 2020
System Operation Data and Mass Recovery Calculations

Time	Period (hours)	Influent Temp. (°F)	Vacuum (in. hg)	Vacuum (in. h2O)	Differential pressure (in. h2O)	Flow (SCFM)	FID Readings (ppm)	Lab Result (ppmv)	Assigned Lab Result (ppmv)	Correction Factor (CF)	Adjusted Lab Result (ppmv)	Adjusted Lab Result (mg/L)	Recovery (lbs/hr)	Recovery in Period (lbs)	Total Recovery (lbs)
16:00	1	80	2.0	27.2	172.3	439.11	50000	18250.00	18250.00	1.00	18250	21.48	35.26	35.26	35.26
17:00	1	80	2.0	27.2	166.7	431.92	50000	-	18250.00	1.00	18250	21.48	34.69	34.69	69.95
18:00	1	80	2.0	27.2	165.1	429.84	50000	-	18250.00	1.00	18250	21.48	34.52	34.52	104.47
19:00	1	80	2.0	27.2	164.0	428.41	50000	-	18250.00	1.00	18250	21.48	34.40	34.40	138.87
20:00	1	70	2.0	27.2	170.9	441.43	50000	-	18250.00	1.00	18250	21.89	36.12	36.12	174.99
21:00	1	66	2.0	27.2	169.5	441.29	50000	-	18250.00	1.00	18250	22.05	36.38	36.38	211.37
22:00	1	62	2.0	27.2	169.3	442.72	50000	-	18250.00	1.00	18250	22.22	36.78	36.78	248.15
23:00	1	62	2.0	27.2	168.7	441.93	50000	-	17940.00	1.00	17940	21.83	36.07	36.07	284.22
0:00	1	60	2.0	27.2	168.0	441.86	50000	-	17940.00	1.00	17940	21.92	36.20	36.20	320.43
1:00	1	60	2.0	27.2	168.4	442.39	50000	-	17940.00	1.00	17940	21.92	36.25	36.25	356.67
2:00	1	58	2.0	27.2	168.5	443.37	50000	-	17940.00	1.00	17940	22.00	36.47	36.47	393.14
3:00	1	54	2.0	27.2	168.9	445.62	50000	17940.00	17940.00	1.00	17940	22.17	36.94	36.94	430.08
4:00	1	54	2.0	27.2	169.4	446.28	50000	-	17940.00	1.00	17940	22.17	36.99	36.99	467.08
5:00	1	54	2.0	27.2	168.2	444.70	50000	-	17940.00	1.00	17940	22.17	36.86	36.86	503.94
6:00	1	54	2.0	27.2	168.1	444.56	50000	-	17940.00	1.00	17940	22.17	36.85	36.85	540.79
7:00	1	58	3.0	40.8	168.5	435.37	50000	-	17940.00	1.00	17940	22.00	35.81	35.81	576.60
8:00	1	60	3.0	40.8	169.7	436.08	50000	-	17940.00	1.00	17940	21.92	35.73	35.73	612.33
9:00	1	60	3.0	40.8	169.1	435.31	50000	-	17860.00	1.00	17860	21.81	35.49	35.49	647.82
10:00	1	62	3.0	40.8	169.9	435.50	50000	-	17860.00	1.00	17860	21.73	35.37	35.37	683.19
11:00	1	64	3.0	40.8	169.5	434.16	50000	-	17860.00	1.00	17860	21.64	35.13	35.13	718.32
12:00	1	66	3.0	40.8	169.4	433.20	50000	-	17860.00	1.00	17860	21.56	34.92	34.92	753.23
13:00	1	68	3.0	40.8	169.2	432.13	50000	-	17860.00	1.00	17860	21.48	34.70	34.70	787.93
14:00	1	70	3.0	40.8	169.8	432.08	50000	17860.00	17860.00	1.00	17860	21.40	34.56	34.56	822.49
15:00	1	70	3.0	40.8	169.5	431.69	50000	-	17860.00	1.00	17860	21.40	34.53	34.53	857.02
Averages:		64.67	2.38	32.30	168.78	437.96	50000.00						Total	857.02	

PSH Mass Recovered in Vapor Phase =

125.30 gallons

FID maximum Concentration = 50,000 PPM

Ex: Conversion from ppmv to mg/L (influent 3)

Measured Conc.	Molecular Wt.	Pressure	Gas Constant	Temp.	Temp.	Conc.
(ppmv)	(Grams)	(atm)	(atm.liter/K. mole)	(F)	(K)	(C_mg/l)
18250	28.9599	1	0.0821	80	299.666667	21.48217

Inputs are the green values.

Calculated values are yellow.

Constants are purple values.

Output are the blue values.

Total Hydrocarbon Recovery

PSH Mass Recovered in Vapor Phase =

857.02 lbs

PSH Mass Recovered in Liquid Phase =

125.30 gallons

0.00 lbs

0.00 gallons

**TOTAL = 857.02 lbs
125.30 gallons****Gallons removed determined at time of pick up**

PSH Volume in Gallons=

0

PSH Mass in Pounds=

0

% Total Hydrocarbon to ppmv - Influent 1

Compound	Molecular Weight (g/mol)	Vol. %	=	ppmv
Methane (CH4)	16.04	0		0.00
Ethane (C2H6)	30.07	0		0.00
Propane (C3H8)	44.10	0		0.00
Iso-Butane (C4H10)	58.12	0		0.00
N-Butane (C4H10)	58.12	0.006		60.00
Iso-Pentane (C4H12)	72.15	0.055		550.00
N-Pentane (C5H12)	72.15	0.115		1150.00
Hexane+ (C6H14)	86.18	1.649		16490.00
Total				18250.00

Molecular Weight Calculations

component	Molecular Weight (g/mol)	mol%
Nitrogen (N2)	28.016	95.9300
Methane (CH4)	16.0425	0.0000
Carbon Dioxide (CO2)	44.011	3.4870
Ethane (C2H6)	30.069	0.0000
Propane (C3H8)	44.0956	0.0000
Iso-Butane (C4H10)	58.1222	0.0000
N-Butane (C4H10)	58.1222	0.0030
Iso-Pentane (C4H12)	72.1488	0.0220
N-Pentane (C5H12)	72.1488	0.0460
Hexane+	97.3966	0.5120
Total		100
Calculated MW		28.9599

% Total Hydrocarbon to ppmv - Influent 2

Compound	Molecular Weight (g/mol)	Vol. %	=	ppmv
Methane (CH4)	16.04	0		0.00
Ethane (C2H6)	30.07	0		0.00
Propane (C3H8)	44.10	0		0.00
Iso-Butane (C4H10)	58.12	0		0.00
N-Butane (C4H10)	58.12	0.006		60.00
Iso-Pentane (C4H12)	72.15	0.05		500.00
N-Pentane (C5H12)	72.15	0.117		1170.00
Hexane+ (C6H14)	86.18	1.621		16210.00
Total				17940.00

Molecular Weight Calculations

component	Molecular Weight (g/mol)	mol%
Nitrogen (N2)	28.016	95.9980
Methane (CH4)	16.0425	0.0000
Carbon Dioxide (CO2)	44.011	3.4290
Ethane (C2H6)	30.069	0.0000
Propane (C3H8)	44.0956	0.0000
Iso-Butane (C4H10)	58.1222	0.0000
N-Butane (C4H10)	58.1222	0.0030
Iso-Pentane (C4H12)	72.1488	0.0200
N-Pentane (C5H12)	72.1488	0.0470
Hexane+	97.3966	0.5030
Total		100
Calculated MW		28.9439

% Total Hydrocarbon to ppmv - Influent 3

Compound	Molecular Weight (g/mol)	Vol. %	=	ppmv
Methane (CH4)	16.04	0		0.00
Ethane (C2H6)	30.07	0		0.00
Propane (C3H8)	44.10	0		0.00
Iso-Butane (C4H10)	58.12	0		0.00
N-Butane (C4H10)	58.12	0.006		60.00
Iso-Pentane (C4H12)	72.15	0.05		500.00
N-Pentane (C5H12)	72.15	0.112		1120.00
Hexane+ (C6H14)	86.18	1.618		16180.00
Total				17860.00

Molecular Weight Calculations

component	Molecular Weight (g/mol)	mol%
Nitrogen (N2)	28.016	96.0810
Methane (CH4)	16.0425	0.0000
Carbon Dioxide (CO2)	44.011	3.3490
Ethane (C2H6)	30.069	0.0000
Propane (C3H8)	44.0956	0.0000
Iso-Butane (C4H10)	58.1222	0.0000
N-Butane (C4H10)	58.1222	0.0030
Iso-Pentane (C4H12)	72.1488	0.0200
N-Pentane (C5H12)	72.1488	0.0450
Hexane+	97.3966	0.5020
Total		100
Calculated MW		28.9296

MDPE FIELD NOTES				
Site Name:	COG BKU Satellite G			Event #:
Location:	Loco Hills, NM			Arrive at site: 15:00
Date:	10/15/2020			
Job#:	700778.140.04	LPST #:		Start Vac: 15:00
Phase:		Unit:	1107	Stop Vac: 15:00
Onsite Personnel:	B. Huntington & L. Bridges			Leave Site: 15:30

GAUGING DATA							
WELL#	BEFORE			AFTER			COMMENTS
	PSH	GW	PSH-T	PSH	GW	PSH-T	
SVE-1							100 FT. - Vapor Only
SVE-2							100 FT. - Vapor Only
SVE-3							50 FT. - Vapor Only
SVE-4							50 FT. - Vapor Only
WASTE:	H2O:			PSH:			TOTAL (GAL):

Sample Name	Analysis	Date:	Time:	Comments:	Bottle #	Start Vac	End Vac
INFLUENT	#1	C6t	15-Oct-20	16:00	FID = >50k		
INFLUENT	#2	C6t	16-Oct-20	3:00	FID = >50k		
INFLUENT	#3	C6t	16-Oct-20	14:00	FID = >50k		

Notes:	Pinacle Propane - No Waste

Start Date: 10/15/2020		700778.140.04 Concho COG BKU Satellite G - Loco Hills, NM (24HR) 1107 Pg. 1 of 1										
		Well Flow						Well Data				
TIME	SAMPLE TAKEN	Influent temp. (°f)	Diff. Pressure (INH2O) 2" Preso	Vac (In.Hg)	FID Composite (PPM)	Propane (%-size) 500 Gal.	EXHAUST TEMP F	COMMENTS:				
								SVE-1	SVE-2	SVE-3	SVE-4	
								VAC (INH2O)	VAC (INH2O)	VAC (INH2O)	VAC (INH2O)	VAC (INH2O)
15:00												
16:00	x	80	172.3	2.0	> 50k		1491	8.8	9.9	12.6	11.5	
17:00		80	166.7	2.0	> 50k		1518	11.9	13.0	14.6	14.7	
18:00		80	165.1	2.0	> 50k		1512	12.0	13.1	14.9	14.5	
19:00		80	164.0	2.0	> 50k		1541	12.2	13.3	15.4	14.1	
20:00		70	170.9	2.0	> 50k		1549	13.0	14.0	15.7	14.3	
21:00		66	169.5	2.0	> 50k		1545	13.2	14.0	15.3	14.2	
22:00		62	169.3	2.0	> 50k		1551	13.7	14.6	15.1	14.8	
23:00		62	168.7	2.0	> 50k		1559	13.6	14.2	15.5	14.4	
0:00		60	168.0	2.0	> 50k		1554	13.1	14.8	15.7	14.3	
1:00		60	168.4	2.0	> 50k		1547	13.4	14.4	15.6	14.6	
2:00		58	168.5	2.0	> 50k		1546	13.8	14.1	15	14.9	
3:00	X-2	54	168.9	2.0	> 50k		1549	13.0	14.2	15.9	14.5	
4:00		54	169.4	2.0	> 50k		1541	13.5	14.7	15.2	14.1	
5:00		54	168.2	2.0	> 50k		1550	13.9	14.5	15.7	14.7	
6:00		54	168.1	2.0	> 50k		1549	13	14.9	16.0	14.0	
7:00		58	166.5	3.0	> 50k		1542	13.5	14.3	15.5	14.8	
8:00		60	169.7	3.0	> 50k		1539	13.9	14.0	15.9	15.2	
9:00		60	169.1	3.0	> 50k		1541	14	14.6	16.0	15.0	
10:00		62	169.9	3.0	> 50k		1548	14.1	14.5	15.9	15.4	
11:00		64	169.5	3.0	> 50k		1544	14.2	14.3	15.7	15.3	
12:00		66	169.4	3.0	> 50k		1547	14.7	14.2	15.8	15.6	
13:00		68	169.2	3.0	> 50k		1546	14.8	14.0	15.5	15.9	
14:00	X-3	70	169.8	3.0	> 50k		1541	14.5	14.4	15.9	15.5	
15:00		70	169.0	3.0	> 50k		1549	14.3	14.0	15.6	15.7	

Table December 2020
System Operation Data and Mass Recovery Calculations

Time	Period (hours)	Influent Temp. (°F)	Vacuum (In. hg)	Vacuum (In. h2O)	Differential pressure (In. h2O)	Flow (SCFM)	FID Readings (ppm)	Lab Result (ppmv)	Assigned Lab Result (ppmv)	Correction Factor (CF)	Adjusted Lab Result (ppmv)	Adjusted Lab Result (mg/L)	Recovery (lbs/hr)	Recovery in Period (lbs)	Total Recovery (lbs)
15:30	1	62	5.0	68	170.7	420.03	50000	13180.00	13180.00	1.00	13180	15.96	25.06	25.06	25.06
16:30	1	64	5.0	68	169.2	417.39	50000	-	13180.00	1.00	13180	15.90	24.80	24.80	49.86
17:30	1	56	5.0	68	169.7	421.23	50000	-	13180.00	1.00	13180	16.14	25.42	25.42	75.28
18:30	1	50	5.0	68	169.0	422.83	50000	-	13180.00	1.00	13180	16.33	25.82	25.82	101.09
19:30	1	48	5.0	68	169.5	424.28	50000	-	13180.00	1.00	13180	16.40	26.01	26.01	127.10
20:30	1	46	5.0	68	169.4	425.00	50000	-	13180.00	1.00	13180	16.46	26.15	26.15	153.25
21:30	1	46	5.0	68	168.3	423.61	50000	-	13180.00	1.00	13180	16.46	26.07	26.07	179.32
22:30	1	46	5.0	68	169.0	424.49	50000	-	13610.00	1.00	13610	16.89	26.80	26.80	206.12
23:30	1	46	5.0	68	168.7	424.12	50000	-	13610.00	1.00	13610	16.89	26.78	26.78	232.90
0:30	1	47	5.0	68	167.4	422.06	50000	-	13610.00	1.00	13610	16.85	26.59	26.59	259.49
1:30	1	44	5.0	68	168.2	424.33	50000	-	13610.00	1.00	13610	16.96	26.90	26.90	286.38
2:30	1	42	5.0	68	168.8	425.93	50000	13610.00	13610.00	1.00	13610	17.02	27.10	27.10	313.49
3:30	1	42	5.0	68	167.5	424.29	50000	-	13610.00	1.00	13610	17.02	27.00	27.00	340.49
4:30	1	42	5.0	68	167.2	423.91	50000	-	13610.00	1.00	13610	17.02	26.98	26.98	367.46
5:30	1	42	5.0	68	168.8	425.93	50000	-	13610.00	1.00	13610	17.02	27.10	27.10	394.57
6:30	1	42	5.0	68	168.4	425.42	50000	-	13610.00	1.00	13610	17.02	27.07	27.07	421.64
7:30	1	40	5.0	68	168.1	425.89	50000	-	13610.00	1.00	13610	17.09	27.21	27.21	448.85
8:30	1	44	5.0	68	168.5	424.71	50000	-	16110.00	1.00	16110	20.18	32.04	32.04	480.89
9:30	1	46	5.0	68	168.8	424.24	50000	-	16110.00	1.00	16110	20.10	31.88	31.88	512.77
10:30	1	50	5.0	68	167.9	421.45	50000	-	16110.00	1.00	16110	19.94	31.42	31.42	544.18
11:30	1	56	5.0	68	168.2	419.36	50000	-	16110.00	1.00	16110	19.71	30.90	30.90	575.08
12:30	1	56	5.0	68	167.4	418.37	50000	-	16110.00	1.00	16110	19.71	30.83	30.83	605.91
13:30	1	56	5.0	68	168.1	419.24	50000	16110.00	16110.00	1.00	16110	19.71	30.89	30.89	636.80
14:30	1	56	5.0	68	168.4	419.61	50000	-	16110.00	1.00	16110	19.71	30.92	30.92	667.71
Averages:		48.71	5.00	68.00	168.55	422.82	50000.00						Total	667.71	

PSH Mass Recovered in Vapor Phase =

97.62 gallons

FID maximum Concentration = 50,000 PPM

Ex: Conversion from ppmv to mg/L (influent 3)

Measured Conc.	Molecular Wt.	Pressure	Gas Constant	Temp.	Temp.	Conc.
(ppmv)	(Grams)	(atm)	(atm.liter/K. mole)	(F)	(K)	(C_mg/l)
13180	28.7919	1	0.0821	62	289.666667	15.9567604

Inputs are the green values.

Calculated values are yellow.

Constants are purple values.

Output are the blue values.

Total Hydrocarbon Recovery

PSH Mass Recovered in Vapor Phase =

667.71 lbs

97.62 gallons

PSH Mass Recovered in Liquid Phase =

0.00 lbs

0.00 gallons

TOTAL = 667.71 lbs
97.62 gallons**Gallons removed determined at time of pick up**

PSH Volume in Gallons=

0

PSH Mass in Pounds=

0

% Total Hydrocarbon to ppmv - Influent 1

Compound	Molecular Weight (g/mol)	Vol. %	=	ppmv
Methane (CH4)	16.04	0		0.00
Ethane (C2H6)	30.07	0		0.00
Propane (C3H8)	44.10	0		0.00
Iso-Butane (C4H10)	58.12	0		0.00
N-Butane (C4H10)	58.12	0.006		60.00
Iso-Pentane (C4H12)	72.15	0.058		580.00
N-Pentane (C5H12)	72.15	0.133		1330.00
Hexane+ (C6H14)	86.18	1.121		11210.00
Total				13180.00

Molecular Weight Calculations

component	Molecular Weight (g/mol)	mol%
Nitrogen (N2)	28.016	96.4400
Methane (CH4)	16.0425	0.0000
Carbon Dioxide (CO2)	44.011	3.1350
Ethane (C2H6)	30.069	0.0000
Propane (C3H8)	44.0956	0.0000
Iso-Butane (C4H10)	58.1222	0.0000
N-Butane (C4H10)	58.1222	0.0030
Iso-Pentane (C4H12)	72.1488	0.0230
N-Pentane (C5H12)	72.1488	0.0530
Hexane+	97.3966	0.3460
Total		100
Calculated MW		28.7919

% Total Hydrocarbon to ppmv - Influent 2

Compound	Molecular Weight (g/mol)	Vol. %	=	ppmv
Methane (CH4)	16.04	0		0.00
Ethane (C2H6)	30.07	0		0.00
Propane (C3H8)	44.10	0		0.00
Iso-Butane (C4H10)	58.12	0		0.00
N-Butane (C4H10)	58.12	0.004		40.00
Iso-Pentane (C4H12)	72.15	0.043		430.00
N-Pentane (C5H12)	72.15	0.098		980.00
Hexane+ (C6H14)	86.18	1.216		12160.00
Total				13610.00

Molecular Weight Calculations

component	Molecular Weight (g/mol)	mol%
Nitrogen (N2)	28.016	97.6680
Methane (CH4)	16.0425	0.0000
Carbon Dioxide (CO2)	44.011	1.9010
Ethane (C2H6)	30.069	0.0000
Propane (C3H8)	44.0956	0.0000
Iso-Butane (C4H10)	58.1222	0.0000
N-Butane (C4H10)	58.1222	0.0020
Iso-Pentane (C4H12)	72.1488	0.0170
N-Pentane (C5H12)	72.1488	0.0390
Hexane+	97.3966	0.3730
Total		100
Calculated MW		28.6042

% Total Hydrocarbon to ppmv - Influent 3

Compound	Molecular Weight (g/mol)	Vol. %	=	ppmv
Methane (CH4)	16.04	0		0.00
Ethane (C2H6)	30.07	0		0.00
Propane (C3H8)	44.10	0		0.00
Iso-Butane (C4H10)	58.12	0		0.00
N-Butane (C4H10)	58.12	0.004		40.00
Iso-Pentane (C4H12)	72.15	0.048		480.00
N-Pentane (C5H12)	72.15	0.113		1130.00
Hexane+ (C6H14)	86.18	1.446		14460.00
Total				16110.00

Molecular Weight Calculations

component	Molecular Weight (g/mol)	mol%
Nitrogen (N2)	28.016	96.9460
Methane (CH4)	16.0425	0.0000
Carbon Dioxide (CO2)	44.011	2.5420
Ethane (C2H6)	30.069	0.0000
Propane (C3H8)	44.0956	0.0000
Iso-Butane (C4H10)	58.1222	0.0000
N-Butane (C4H10)	58.1222	0.0020
Iso-Pentane (C4H12)	72.1488	0.0190
N-Pentane (C5H12)	72.1488	0.0450
Hexane+	97.3966	0.4460
Total		100
Calculated MW		28.7609

Released to Imaging: 1/8/2025 11:12:48 AM

Start Date: 12/17/2020		700778.140.05 Concho COG BKU Satellite G - Loco Hills, NM (24HR) 2097 Pg. 1 of 1										
		Well Flow						Well Data				
TIME	SAMPLE TAKEN	Influent temp. (°f)	Diff. Pressure (INH2O) 2" Preso	Vac (In.Hg)	FID Composite (PPM)	Propane (%-size) 500 Gal.	EXHAUST TEMP F	COMMENTS:				
								SVE-1	SVE-2	SVE-3	SVE-4	
								VAC (INH2O)	VAC (INH2O)	VAC (INH2O)	VAC (INH2O)	VAC (INH2O)
14:30												
15:30	x	62	170.7	5.0	> 50k		1446	7.10	9.25	12.08	10.18	
16:30		64	169.2	5.0	> 50k		1459	11.05	12.97	15.69	12.68	
17:30		56	169.7	5.0	> 50k		1463	11.98	13.28	15.26	12.11	
18:30		50	169.0	5.0	> 50k		1470	11.37	13.01	15.11	12.84	
19:30		48	169.5	5.0	> 50k		1536	12.90	13.44	15.05	13.42	
20:30		46	169.4	5.0	> 50k		1577	11.76	13.58	14.93	13.26	
21:30		46	168.3	5.0	> 50k		1584	11.62	13.65	15.27	13.37	
22:30		46	169.0	5.0	> 50k		1589	11.55	13.21	15.66	13.61	
23:30		46	168.7	5.0	> 50k		1588	11.86	13.82	15.18	13.35	
0:30		47	167.4	5.0	> 50k		1579	11.47	13.77	15.70	13.59	
1:30		44	168.2	5.0	> 50k		1583	11.38	13.65	15.61	13.41	
2:30	X-2	42	168.8	5.0	> 50k		1584	11.86	13.84	15.83	13.39	
3:30		42	167.5	5.0	> 50k		1581	11.74	13.90	15.10	13.11	
4:30		42	167.2	5.0	> 50k		1582	12.11	14.01	15.22	13.77	
5:30		42	168.8	5.0	> 50k		1579	12.38	13.96	15.05	13.60	
6:30		42	168.4	5.0	> 50k		1580	11.86	14.11	15.31	13.55	
7:30		40	168.1	5.0	> 50k		1582	12.31	13.84	15.27	13.29	
8:30		44	168.5	5.0	> 50k		1579	11.99	14.26	15.88	13.92	
9:30		46	168.8	5.0	> 50k		1575	12.15	14.40	15.69	13.99	
10:30		50	167.9	5.0	> 50k		1560	12.25	13.55	15.34	13.34	
11:30		56	168.2	5.0	> 50k		1565	11.76	13.96	15.51	13.57	
12:30		56	167.4	5.0	> 50k		1563	11.97	13.82	15.28	13.02	
13:30	X-3	56	168.1	5.0	> 50k		1556	12.20	13.77	15.16	13.36	
14:30		56	168.4	5.0	> 50k		1560	12.11	13.52	15.37	13.45	



Talon/LPE. 921 N Bivins Amarillo, Texas 79107. (806) 467-0607

Summary of SVE Recovery Events
COG Operating, LLC
BKU Satellite G Release Site
Loco Hills, Eddy County, New Mexico

Date of MDPE Event	Talon Project ID	Duration of Event	PSH Mass Recovered in Vapor Phase		TOTAL Recovery (Gallons)
			Pounds (lbs)	Gallons	
October 29-31, 2019	700778.140.02	48-hrs	913.11	140.26	140.26
October 15 - 16, 2020	700778.140.04	24-hrs	857.02	125.3	125.3
December 17 -18, 2020	700778.140.05	24-hrs	675.98	98.83	98.83

**Appendix B –
Laboratory Analytical Report**



Certificate of Analysis

Number: 1030-20100950-001A

Houston Laboratories

8820 Interchange Drive

Houston, TX 77054

Phone 713-660-0901

Jason Shubert
Talon/LPE
921 N Bivins
Amarillo, TX 79107

Oct. 27, 2020

Station Name: Influent 1
Station Number: 700778.140.04
Station Location: Loco Hills
Analyzed: 10/27/2020 09:04:41 by PTW

Sampled By: LB
Sample Of: Gas Spot
Sample Date: 10/15/2020 16:00
Sample Conditions:
Method: GPA-2261M

Analytical Data

Components	Mol. %	Wt. %	GPM at 14.65 psia		
Nitrogen	95.930	92.871		GPM TOTAL C2+	0.248
Methane	NIL	NIL		GPM TOTAL C3+	0.248
Carbon Dioxide	3.487	5.304		GPM TOTAL iC5+	0.247
Ethane	NIL	NIL	NIL		
Propane	NIL	NIL	NIL		
Iso-butane	NIL	NIL	NIL		
n-Butane	0.003	0.006	0.001		
Iso-pentane	0.022	0.055	0.008		
n-Pentane	0.046	0.115	0.017		
Hexanes Plus	0.512	1.649	0.222		
	100.000	100.000	0.248		

Calculated Physical Properties	Total	C6+
Relative Density Real Gas	0.9991	3.2176
Calculated Molecular Weight	28.94	93.19
Compressibility Factor	0.9996	
GPA 2172 Calculation:		
Calculated Gross BTU per ft³ @ 14.65 psia & 60°F		
Real Gas Dry BTU	29	5113
Water Sat. Gas Base BTU	29	5024

Hydrocarbon Laboratory Manager

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



Certificate of Analysis

Number: 1030-20100950-002A

Houston Laboratories

8820 Interchange Drive

Houston, TX 77054

Phone 713-660-0901

Jason Shubert
Talon/LPE
921 N Bivins
Amarillo, TX 79107

Oct. 27, 2020

Station Name: Influent 2
Station Number: 700778.140.04
Station Location: Loco Hills
Analyzed: 10/27/2020 09:20:15 by PTW

Sampled By: LB
Sample Of: Gas Spot
Sample Date: 10/16/2020 03:00
Sample Conditions:
Method: GPA-2261M

Analytical Data

Components	Mol. %	Wt. %	GPM at 14.65 psia		
Nitrogen	95.998	92.988		GPM TOTAL C2+	0.243
Methane	NIL	NIL		GPM TOTAL C3+	0.243
Carbon Dioxide	3.429	5.218		GPM TOTAL iC5+	0.242
Ethane	NIL	NIL	NIL		
Propane	NIL	NIL	NIL		
Iso-butane	NIL	NIL	NIL		
n-Butane	0.003	0.006	0.001		
Iso-pentane	0.020	0.050	0.007		
n-Pentane	0.047	0.117	0.017		
Hexanes Plus	0.503	1.621	0.218		
	100.000	100.000	0.243		

Calculated Physical Properties	Total	C6+
Relative Density Real Gas	0.9986	3.2176
Calculated Molecular Weight	28.92	93.19
Compressibility Factor	0.9996	
GPA 2172 Calculation:		
Calculated Gross BTU per ft³ @ 14.65 psia & 60°F		
Real Gas Dry BTU	29	5113
Water Sat. Gas Base BTU	28	5024

Hydrocarbon Laboratory Manager

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



Certificate of Analysis

Number: 1030-20100950-003A

Houston Laboratories

8820 Interchange Drive

Houston, TX 77054

Phone 713-660-0901

Jason Shubert
Talon/LPE
921 N Bivins
Amarillo, TX 79107

Oct. 27, 2020

Station Name: Influent 3
Station Number: 700778.140.04
Station Location: Loco Hills
Analyzed: 10/27/2020 09:33:34 by PTW

Sampled By: LB
Sample Of: Gas Spot
Sample Date: 10/16/2020 14:00
Sample Conditions:
Method: GPA-2261M

Analytical Data

Components	Mol. %	Wt. %	GPM at 14.65 psia		
Nitrogen	96.081	93.115		GPM TOTAL C2+	0.242
Methane	NIL	NIL		GPM TOTAL C3+	0.242
Carbon Dioxide	3.349	5.099		GPM TOTAL iC5+	0.241
Ethane	NIL	NIL	NIL		
Propane	NIL	NIL	NIL		
Iso-butane	NIL	NIL	NIL		
n-Butane	0.003	0.006	0.001		
Iso-pentane	0.020	0.050	0.007		
n-Pentane	0.045	0.112	0.016		
Hexanes Plus	0.502	1.618	0.218		
	100.000	100.000	0.242		

Calculated Physical Properties	Total	C6+
Relative Density Real Gas	0.9981	3.2176
Calculated Molecular Weight	28.91	93.19
Compressibility Factor	0.9996	
GPA 2172 Calculation:		
Calculated Gross BTU per ft³ @ 14.65 psia & 60°F		
Real Gas Dry BTU	28	5113
Water Sat. Gas Base BTU	28	5024

Hydrocarbon Laboratory Manager

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

Analysis Request Chain of Custody Record

459 Hughes Dr. Traverse City, MI 49686
(516) 947-5777

Page 4 of 4



Certificate of Analysis

Number: 1030-20120952-001A

Houston Laboratories

8820 Interchange Drive

Houston, TX 77054

Phone 713-660-0901

Jason Shubert
Talon/LPE
921 N Bivins
Amarillo, TX 79107

Jan. 04, 2021

Station Name: Influent # 1
Station Number: 700778.140.05
Station Location: Loco Hills, NM
Sample Point: Concho Loco Hills
Analyzed: 12/31/2020 10:44:07 by PTW

Sampled By:
Sample Of: Gas Spot
Sample Date: 12/17/2020 15:30
Sample Conditions:
Method: GPA-2261M

Analytical Data

Components	Mol. %	Wt. %	GPM at 14.65 psia		
Nitrogen	96.440	93.887		GPM TOTAL C2+	0.178
Methane	NIL	NIL		GPM TOTAL C3+	0.178
Carbon Dioxide	3.135	4.795		GPM TOTAL iC5+	0.177
Ethane	NIL	NIL	NIL		
Propane	NIL	NIL	NIL		
Iso-butane	NIL	NIL	NIL		
n-Butane	0.003	0.006	0.001		
Iso-pentane	0.023	0.058	0.008		
n-Pentane	0.053	0.133	0.019		
Hexanes Plus	0.346	1.121	0.150		
	100.000	100.000	0.178		

Calculated Physical Properties	Total	C6+
Relative Density Real Gas	0.9935	3.2176
Calculated Molecular Weight	28.77	93.19
Compressibility Factor	0.9996	
GPA 2172 Calculation:		
Calculated Gross BTU per ft³ @ 14.65 psia & 60°F		
Real Gas Dry BTU	21	5113
Water Sat. Gas Base BTU	20	5024

Hydrocarbon Laboratory Manager

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



Certificate of Analysis

Number: 1030-20120952-002A

Houston Laboratories

8820 Interchange Drive

Houston, TX 77054

Phone 713-660-0901

Jason Shubert
Talon/LPE
921 N Bivins
Amarillo, TX 79107

Jan. 04, 2021

Station Name: Influent # 2
Station Number: 700778.140.05
Station Location: Loco Hills, NM
Sample Point: Concho Loco Hills
Analyzed: 12/31/2020 10:57:01 by PTW

Sampled By:
Sample Of: Gas Spot
Sample Date: 12/18/2020 02:30
Sample Conditions:
Method: GPA-2261M

Analytical Data

Components	Mol. %	Wt. %	GPM at 14.65 psia		
Nitrogen	97.668	95.712		GPM TOTAL C2+	0.183
Methane	NIL	NIL		GPM TOTAL C3+	0.183
Carbon Dioxide	1.901	2.927		GPM TOTAL iC5+	0.182
Ethane	NIL	NIL	NIL		
Propane	NIL	NIL	NIL		
Iso-butane	NIL	NIL	NIL		
n-Butane	0.002	0.004	0.001		
Iso-pentane	0.017	0.043	0.006		
n-Pentane	0.039	0.098	0.014		
Hexanes Plus	0.373	1.216	0.162		
	100.000	100.000	0.183		

Calculated Physical Properties	Total	C6+
Relative Density Real Gas	0.9870	3.2176
Calculated Molecular Weight	28.59	93.19
Compressibility Factor	0.9996	
GPA 2172 Calculation:		
Calculated Gross BTU per ft³ @ 14.65 psia & 60°F		
Real Gas Dry BTU	21	5113
Water Sat. Gas Base BTU	21	5024

Hydrocarbon Laboratory Manager

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



Certificate of Analysis

Number: 1030-20120952-003A

Houston Laboratories

8820 Interchange Drive

Houston, TX 77054

Phone 713-660-0901

Jason Shubert
Talon/LPE
921 N Bivins
Amarillo, TX 79107

Jan. 04, 2021

Station Name: Influent # 3
Station Number: 700778.140.05
Station Location: Loco Hills, NM
Sample Point: Concho Loco Hills
Analyzed: 12/31/2020 11:09:39 by PTW

Sampled By:
Sample Of: Gas Spot
Sample Date: 12/18/2020 13:30
Sample Conditions:
Method: GPA-2261M

Analytical Data

Components	Mol. %	Wt. %	GPM at 14.65 psia		
Nitrogen	96.946	94.496		GPM TOTAL C2+	0.218
Methane	NIL	NIL		GPM TOTAL C3+	0.218
Carbon Dioxide	2.542	3.893		GPM TOTAL iC5+	0.217
Ethane	NIL	NIL	NIL		
Propane	NIL	NIL	NIL		
Iso-butane	NIL	NIL	NIL		
n-Butane	0.002	0.004	0.001		
Iso-pentane	0.019	0.048	0.007		
n-Pentane	0.045	0.113	0.016		
Hexanes Plus	0.446	1.446	0.194		
	100.000	100.000	0.218		

Calculated Physical Properties	Total	C6+
Relative Density Real Gas	0.9923	3.2176
Calculated Molecular Weight	28.74	93.19
Compressibility Factor	0.9996	
GPA 2172 Calculation:		
Calculated Gross BTU per ft³ @ 14.65 psia & 60°F		
Real Gas Dry BTU	25	5113
Water Sat. Gas Base BTU	25	5024

Hydrocarbon Laboratory Manager

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

Analysis Request Chain of Custody Record

Note: As a convenience to our clients, this form is available in an electronic format. Please contact one of our offices above for the form to be e-mailed to you.

Sante Fe Main Office
Phone: (505) 476-3441

General Information
Phone: (505) 629-6116

Online Phone Directory
<https://www.emnrd.nm.gov/ocd/contact-us>

State of New Mexico
Energy, Minerals and Natural Resources
Oil Conservation Division
1220 S. St Francis Dr.
Santa Fe, NM 87505

CONDITIONS

Action 17647

CONDITIONS

Operator: COG OPERATING LLC 600 W Illinois Ave Midland, TX 79701	OGRID: 229137
	Action Number: 17647
	Action Type: [C-141] Release Corrective Action (C-141)

CONDITIONS

Created By	Condition	Condition Date
rhamlet	Thank you for the Data Summary Report on the BKU Satellite G Battery 24-hour High Vacuum Soil Vapor Extraction event. The document will be accepted for record and placed in the incident file with the approved remediation plan for future reference.	1/8/2025