



August 22, 2019

Mr. Jake Janicek
Caerus Oil and Gas
143 Diamond Avenue
Parachute, Co 81635

**RE: Investigation Report and No Further Action Request
P27 (East Fork)
COGCC Spill Number 464855
Garfield County, Colorado**

Mr. Janicek,

Entrada Consulting Group (Entrada) has prepared this Investigation Report and No Further Action Request report for Caerus Oil and Gas (Caerus) in response to the P27 Flowline release located in Garfield County, Colorado. The site is located at the end of East Fork in the North Parachute Ranch area of the Caerus operating field. The location coordinates are approximately 39.579233, North latitude, and -108.033142, West longitude.

Entrada was consulted to delineate the release after contaminants were visually observed after initial excavation and sampling occurred in June by Caerus personnel during the June 25th excavation.

- 06/03/2019 – Point of Release sample collected by Caerus
- 6/25/2019 – Excavation/Repairs/Delineation/Sampling completed by Caerus
 - Visual impacts noted traveling east towards meter skid, hydrovac needed due to lines in the area for impacted soil removal.
- 07/25/2019 – Entrada met with Brand X hydrovac to begin removal of impacted soil below meter skid and around flowlines.
 - Hydrovac was postponed after native soils were beginning to collapse.
 - Soil samples collected after approximately 3 yards of soil removed.
 - Lab report analysis indicated Total Petroleum Hydrocarbons (TPH) to be above Table 910-1 COGCC concentration level.
- 08/08/2019 – Entrada met with Pinyon Field Services, LLC to excavate Native side walls to make safe working environment.
- 08/09/2019 – Entrada met with Brand X hydrovac to finalize removal of impacted soil within area of lines. Approximately 2 cubic yards was removed for disposal.
 - PID intervals collected during duration of project to determine effectiveness of impacted soil removal.
 - PID never reached over 200 ppm during the phases of the project for Entrada.
 - Samples collected for delineation and clearance.

- Lab Reports confirmed impacted soils were removed from flowline area.
- All impacted soils during the duration of the project were transported to the North Solids Facility (NSF) [Location ID: 426582] , where they were final disposed of at Green Leaf Environmental Services.
 - Approximately 10 cubic yards was removed during the life of the project.

*Due to the inorganics present that exceed Table 910-1 Concentration Levels, Caerus shall request relief due to the fact the impacts are covered by background area samples, below 3', and the release did not leave the working surface of the pad. Relief under FAQ 31 and 32 of the COGCC should be in consideration.

CONCLUSIONS AND RECOMMENDATIONS

Laboratory analytical results from the release excavation samples indicated soil concentrations above the applicable COGCC Table 910-1 at the Northeast corner of the area of concern. The area was subsequently over-excavated via hydrovac, extending the floor of the excavation approximately 24 - 30 inches below and outside the flowlines. Field-screening and laboratory analytical results from the final extent and floor of the excavation indicate that BTEX, TPH-GRO and TPH-DRO concentrations are below the applicable COGCC Table 910-1 soil standards

Based upon excavation activities completed at the site and laboratory analytical data presented herein, petroleum hydrocarbon impacts to soil have been successfully removed. Caerus should request a No Further Action designation from the COGCC for this site.

We appreciate the opportunity to assist Caerus Oil and Gas. Please contact me (970) 901-9007 if you have any questions.

Sincerely,

ENTRADA CONSULTING GROUP



Matt Kasten
Project Scientist

Attachments:

Figure 1 – Sample Location Map
Table 1 – Soil Data Summary
Laboratory Analytical Reports
Photographic Log



• No Scale •

Stockpile



WWwall [7']

WBot [10']

WNWwall [7']

Swall [7']

Nwall [5.5']

NWwall [7']

POR [0-6"]
&
BASE [8']

Bot [8']

Wwall [4']

NEwall [7']

Swall [4']

Ewall [6']

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Google Earth

- △ - Grab Sample 6/3 & 6/25
- - Grab Sample 07/25
- ◆ - Grab Sample 08/09
- ▭ - Excavation / Hydrovac Area
- ▭ - Original Excavation
- - Areas of Concern

Caerus Oil and Gas

Pad: P27 (Location ID: 335806)
 Area: North Parachute Ranch - East Fork (Garfield County)
 Legal: SESE, Sec. 27, T5S, R95W, 6th PM

TABLE 1
P27 FLOWLINE RELEASE
SOIL ANALYTICAL RESULTS
CAERUS OIL AND GAS LLC
PICEANCE BASIN, COLORADO

PARAMETER	COGCC CONCENTRATION LEVELS	UNITS	Spill Point of Release	Stockpile	E Wall @ 6'	N Wall @ 5.5'	W Wall 4'	S Wall @ 4'	Base @ 8'	NW Wall	NE Wall	Bottom	P27 WNW WALL	P27 WWALL	P27 WBOT	P27 SWALL
Sample Date			6/3/2019	6/3/2019	6/25/2019	6/25/2019	6/25/2019	6/25/2019	6/25/2019	7/25/2019	7/25/2019	7/25/2019	8/9/2019	8/9/2019	8/9/2019	8/9/2019
Sample Matrix			Spill	Spill	Spill	Spill	Spill	Spill	Spill	Spill	Spill	Spill	Spill	Spill	Spill	Spill
Arsenic	0.39	mg/kg	21.6	20.4	20	25	21	16	19	NA	NA	NA	NA	NA	NA	NA
Barium	15,000	mg/kg	3310	2830	3200	2300	3000	3100	590	NA	NA	NA	NA	NA	NA	NA
Cadmium	70	mg/kg	<0.50	<0.5	0.39	0.37	0.43	0.32	0.35	NA	NA	NA	NA	NA	NA	NA
Chromium (III)	120,000	mg/kg	18.9	17.5	23	23	20	16	0.19	NA	NA	NA	NA	NA	NA	NA
Chromium (VI)	23	mg/kg	<2.0	<2.0	<1.2	<1.1	<1.2	<1.2	NA	NA	NA	NA	NA	NA	NA	NA
Copper	3,100	mg/kg	21.9	23.5	24	19	21	17	21	NA	NA	NA	NA	NA	NA	NA
Lead	400	mg/kg	12.7	13.7	19	19	21	15	18	NA	NA	NA	NA	NA	NA	NA
Mercury	23	mg/kg	1.62	<0.02	0.58	0.1	0.031	0.071	0.02	NA	NA	NA	NA	NA	NA	NA
Nickel	1,600	mg/kg	16.7	19.7	16	15	14	12	15	NA	NA	NA	NA	NA	NA	NA
Selenium	390	mg/kg	<2.0	<2.0	0.65	0.51	0.59	<0.46	<0.4	NA	NA	NA	NA	NA	NA	NA
Silver	390	mg/kg	<1.0	<1.0	0.073	0.058	0.074	<0.46	0.063	NA	NA	NA	NA	NA	NA	NA
Zinc	23,000	mg/kg	49.3	46	54	47	53	41	55	NA	NA	NA	NA	NA	NA	NA
EC	4 or 2x background	mmhos/cm	1.9	0.121	1	0.39	0.44	2.2	0.43	NA	NA	NA	NA	NA	NA	NA
pH	6-9	SU	7.77	8.7	8.35	8.78	8.57	8.72	8.48	9.04	8.64	9.02	9.19	8.95	9.09	9.1
SAR	12	unitless	34.3	1.15	0.85	0.94	1.1	0.82	15	21.6	5.43	24.1	1.04	1.33	1.07	1.51
TPH-DRO			17800	97.5	31	29	11	15	93	512	223	143	115	97.9	96.2	92.2
TPH-GRO			1290	0.703	<6.9	6.7	5.5	3.6	15	1.16	6.77	0.355	0.191	0.274	0.18	0.176
TPH	500	mg/kg	19090	98.203	<37.9	35.7	16.5	18.6	108	513.16	229.77	143.355	115.191	98.174	96.38	92.376
Benzene	0.17	mg/kg	0.194	0.00309	<0.0057	<0.0056	<0.0061	<0.0058	<0.0059	0.0548	0.071	0.0271	0.00181	<0.001	0.00176	0.00119
Toluene	85	mg/kg	6.49	0.0197	<0.0057	<0.0056	<0.0061	<0.0058	0.0061	NA	NA	NA	NA	NA	NA	NA
Ethylbenzene	100	mg/kg	1.2	0.00769	<0.0057	<0.0056	<0.0061	<0.0058	0.0022	NA	NA	NA	NA	NA	NA	NA
Total Xylenes	175	mg/kg	44.2	0.132	<0.11	<0.10	<0.11	<0.11	0.22	NA	NA	NA	NA	NA	NA	NA
Acenaphthene	1,000	mg/kg	0.688	<0.006	<0.0048	<0.019	<0.005	<0.020	<0.019	NA	NA	NA	NA	NA	NA	NA
Anthracene	1,000	mg/kg	0.191	<0.006	<0.0048	<0.019	<0.005	<0.020	<0.019	NA	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	0.22	mg/kg	<0.006	<0.006	<0.0048	<0.019	<0.005	<0.020	<0.019	NA	NA	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	0.22	mg/kg	0.00622	<0.006	0.0036	<0.019	<0.005	<0.020	<0.019	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	2.2	mg/kg	0.019	<0.006	<0.0048	<0.019	<0.005	<0.020	<0.019	NA	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	0.022	mg/kg	<0.006	<0.006	<0.0048	<0.019	<0.005	<0.020	<0.019	NA	NA	NA	NA	NA	NA	NA
Chrysene	22	mg/kg	0.0116	<0.006	<0.0048	<0.019	<0.005	<0.020	<0.019	NA	NA	NA	NA	NA	NA	NA
Dibenzo(a,h)anthracene	0.022	mg/kg	<0.006	<0.006	<0.0048	<0.019	<0.005	<0.020	<0.019	NA	NA	NA	NA	NA	NA	NA
Fluoranthene	1,000	mg/kg	0.0094	<0.006	<0.0048	<0.019	<0.005	<0.020	<0.019	NA	NA	NA	NA	NA	NA	NA
Fluorene	1,000	mg/kg	2.12	<0.006	0.0055	<0.019	<0.005	<0.020	0.0083	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3,c,d)pyrene	0.22	mg/kg	<0.006	<0.006	<0.0048	<0.019	<0.005	<0.020	<0.019	NA	NA	NA	NA	NA	NA	NA
Naphthalene	23	mg/kg	8.34	0.137	0.045	0.033	0.055	0.034	0.069	NA	NA	NA	NA	NA	NA	NA
Pyrene	1,000	mg/kg	0.0289	<0.006	<0.0048	<0.019	<0.005	<0.020	<0.019	NA	NA	NA	NA	NA	NA	NA

Notes:
 < - less than the stated reporting limit
 Highlight - indicates result exceeds the COGCC concentration level
 COGCC - Colorado Oil and Gas Conservation Commission
 EC - electrical conductivity
 mg/kg - milligrams per kilogram
 mmhos/cm - millimhos per centimeter
 NA - not analyzed
 ND - non detect
 SAR - sodium adsorption ratio
 SU - standard unit
 TPH-GRO - total petroleum hydrocarbons-gasoline range organics
 TPH-DRO - total petroleum hydrocarbons-diesel range organics
 TPH - combination of TPH-GRO and TPH-DRO

07/25/2019 Hydrovac



08/09/2019 Hydrovac

