



Mull Drilling Company, Inc.  
1700 N. Waterfront Parkway, Bld. 1200  
Wichita, Kansas 67206  
Tel: +1 316.264.6366  
Fax: +1 316.264.6440  
www.mulldrilg.com

June 20, 2023

Mr. Jason Kosola, P.G.  
Southeast Environmental Protection Specialist  
Colorado Oil & Gas Conservation Commission  
1120 Lincoln Street, Suite 801  
Denver, Colorado 80203

**RE: Mull Unit #20**  
**API # 05-017-06274;**  
**Soils Investigation Results, and Excavation**  
**Sec 6, Township 14S, Range 49W**  
**Form 27; COCGC Remediation Project # 26871**

Mr. Kosola:

Mull Drilling Co., Inc (Mull) is providing this report to the Colorado Oil and Gas Commission (COGCC) for environmental services ongoing at Mull Unit #20. The location in question is the site of an older temporarily abandoned producing well under the original ownership of Citation Petroleum. The well was not in service for some time. Mull mobilized to the site in the first quarters of 2023 to finalize the well abandonment process by cutting and capping the original casing at an appropriate depth below grade.



**Site Location**

In following proper abandonment procedures Mull performed an investigation of the flowlines in the area. It was determined that the process line that was attached to the MUSF #20 well was repurposed and is currently being utilized as a gas line which extends from the McCormick C tank battery, ultimately feeding the reinjection plant. As such, it will not be abandoned with the well. However, Mull submitting an updated GIS file and flowline integrity file to reconcile the existing data gap. The line shall be abandoned upon final decommissioning of the entire facility – Sorrento Plant – with the expected consent of the landowner.

Concurrent to capping services, a soils investigation occurred in order to verify the presence of any soil impacts. A licensed geologist mobilized to the location confirmed the presence of any soil impacts by taking samples with a photo ionization detector for headspace analysis and by taking soil samples in areas indicative of petroleum impacts. All samples conformed to Table 915-1 analysis. A total of seven samples were taken including a background sample and one at depth for ESA purposes. All collected soil samples were submitted to Pace Laboratories of Kansas for analysis following approved chain of custody protocols. Please see *Figure I* for current sampling locations.

Impacts at the location included marginal impacts by hydrocarbons but with no impacts above regulatory limits. Some pH levels were slightly elevated above regulatory limits in the wellhead area but shall be resolved during the reclamation phase with soil conditioners that shall lower the existing soil alkalinity. Arsenic was present in all samples, including the background. As a result, Mull will be ignoring that parameter as diagnostic of cleanup levels. For tabulated results please look to *Table-915-1 – MUSF 20*.

Additionally, two locations had elevated values for chromium (VI). During a slight background investigation, it was determined that these locations conformed to the mud pit that was utilized during drilling processes approximately 40 years ago. Nevertheless, Mull will mobilize to the location in the coming year to remove approximately 6 inches to 2 ft of soils initially. For a visual representation of the expected size and scale of the excavation please look to *Figure 2 – Expected Excavation Area*. Because of a lack of awareness relative to the depth and ultimate lateral extent of the pit Mull will take additional samples at depth and around the perimeter, sampling for RCRA Metals – including Chromium VI. The pit will then be left temporarily open until samples can be returned, ultimately guiding later excavations, as required.

Due to the presence of an operating utility line under the pit area – the afore-mentioned McCormick C utility line – care shall be taken to avoid a future spill. The Line will be hydrovac excavated should analytical determine that the soils around the line needs to be removed. During any operations the line will also be isolated from service. The initial expected excavation will be approximately 200 cubic yards in size. For a visual representation of the expected excavation area please see *Figure II – Expected Excavation Area*.

All impacted soils will be segregated onsite and then analyzed for proper waste disposal with proper Table 915-1 and Radium Sampling as required. All soils will be disposed to Phantom Landfill of Penrose Colorado, EPA #COR000208454 or an appropriate waste connections landfill nearby as dictated by extant impact. All depressions will be filled with clean soils. The

lease road to the location will also be removed with landowner notification and the area recontoured to conform to the original landform. Subsequently any areas needing reclamation will undergo that process including any soil conditioning needed for marginally elevated pH levels.

Should there be any questions or concerns feel free to contact us,

A handwritten signature in black ink that reads "James Beilman". The signature is written in a cursive, flowing style.

James Beilman, PG, CPG  
Director – Safety & Environmental  
Tel: +1 316.264.6366 (128)  
Cell: +1 316.364.9203  
JBeilman@Mulldrilling.com

Attachments:

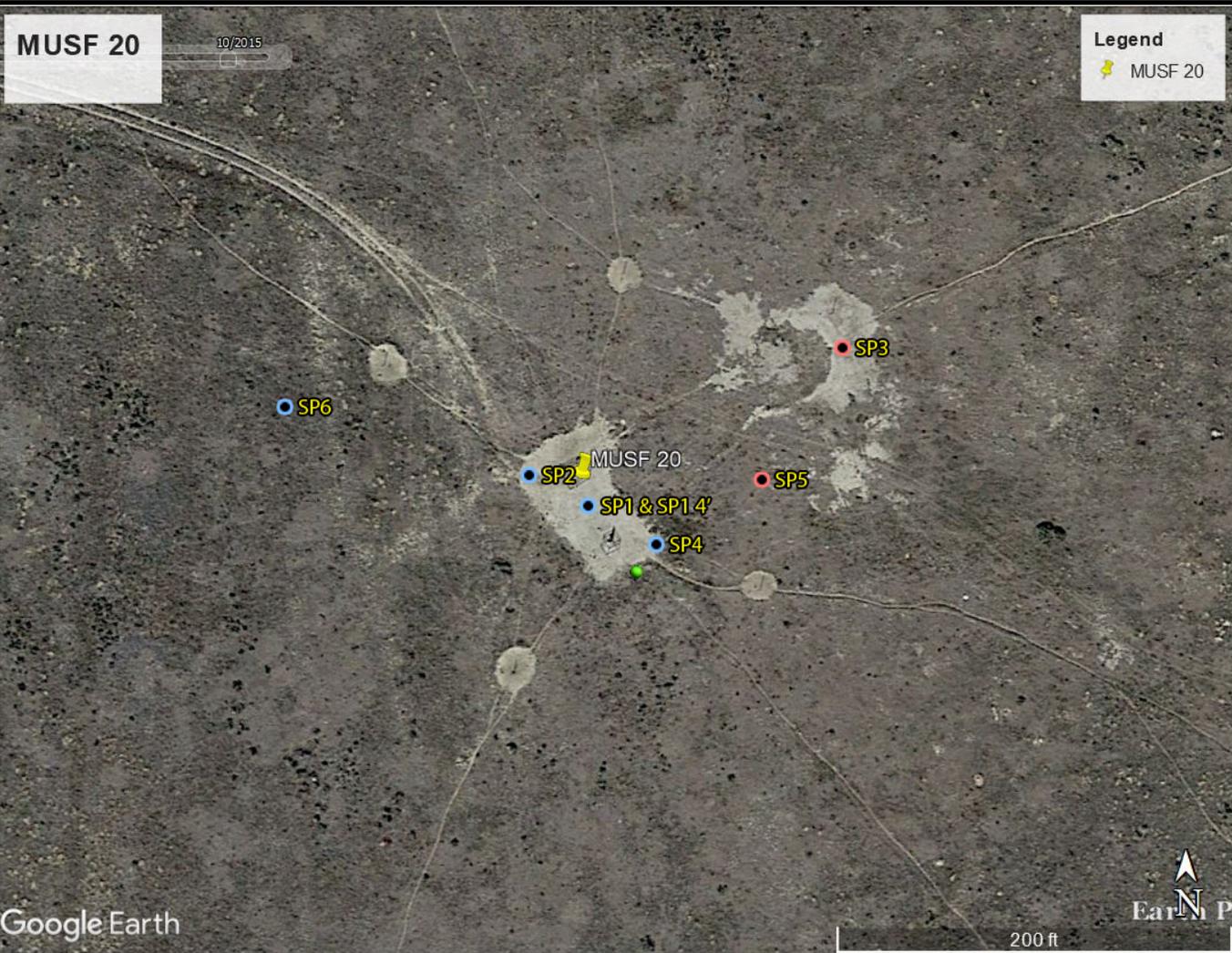
***Figure I – Sampling Points***

***Figure II – Expected Excavation Area***

***Table -- 915-1 – MUSF 20***

**Figure 1: Sampling Points**

**MUSF #20 Well**



**Legend**

Highlighted Points are sampling locations.  
Red Highlighted Points are impacted with Chromium VI

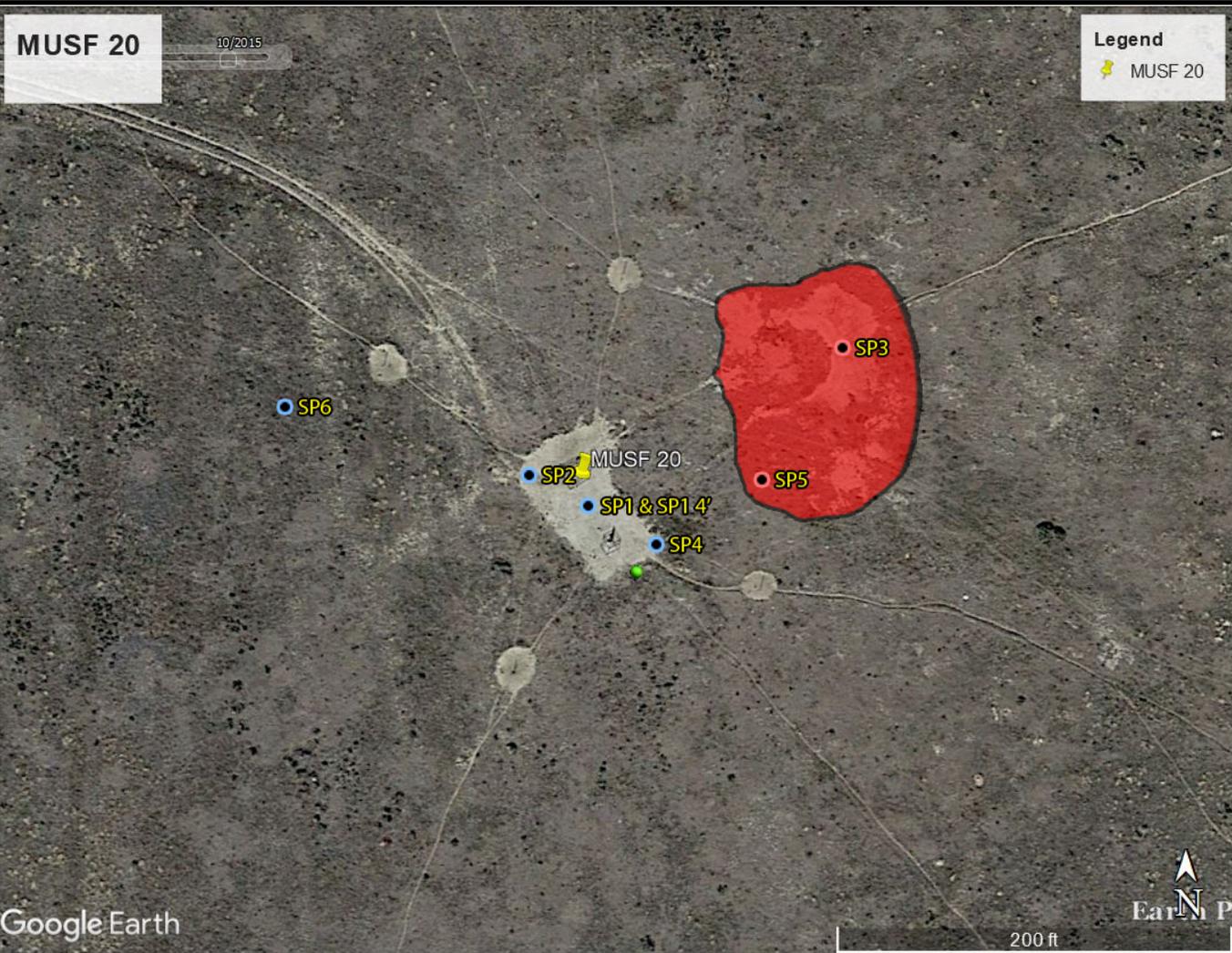
Regulatory Limits as COGCC promulgated table 915-1

<b>Location:</b>	Latitude: 38.845440	Longitude: -102.890060	<b>COGCC Project #</b>	26871
<b>State:</b>	Colorado			
<b>County:</b>	Cheyenne			



Figure II: Expected Excavation Area

MUSF #20 Well



Legend

Highlighted Points are sampling locations.  
Red Highlighted Points are impacted with Chromium VI

Highlighted Area is the expected excavation area.

Regulatory Limits as COGCC promulgated table 915-1

Location:	Latitude: 38.845440	Longitude: -102.890060	COGCC Project #	26871
State:	Colorado			
County:	Cheyenne			



MUSF 20 Table 915-1		4/13/2023						
CLEANUP CONCENTRATIONS		SP 1	SP 1 4'	SP 2	SP 3	SP 4	SP 5	SP 6
Contaminant of Concern	Concentrations	38.845399; -102.890035	38.845399; -102.890035	38.845438; -102.890148	38.845617; -102.889595	38.845349; -102.889941	38.845426; -102.889735	38.845532; -102.890538
Soil TPH (total volatile [C6-C10] and extractable [C10-C36] hydrocarbons)	500mg/kg	6.9J	ND	5.7J	7.7J	49	72.1	21.6
Soils and Groundwater - liquid hydrocarbons including condensate and oil	below visual detection limits	ND						
Soil Suitability for Reclamation								
Electrical conductivity (EC) (by saturated paste method)	<4mmhos/cm	0.163	0.141	0.114	2.7	0.133	0.203	0.16
Sodium adsorption ratio (SAR) (by saturated paste method)	<6	0.3	0.399	0.108	2.55	0.118	0.0763	0.0756
pH (by saturated paste method)	6-8.3	8.44	8.4	8.23	7.69	7.92	7.83	7.86
boron (hot water soluble soil extract)	2mg/l	0.176J	0.195J	0.195J	0.418	0.252	0.322	0.201
Organic Compounds in Groundwater								
benzene	5µg/l	NA						
toluene	560 to 1,000µg/l	NA						
ethylbenzene	700µg/l	NA						
xylenes (sum of o-, m- and p- isomers = total xylenes)	1,400 to 10,000µg/l	NA						
naphthalene	140µg/l	NA						
1,2,4-trimethylbenzene	67µg/l	NA						
1,3,5-trimethylbenzene	67µg/l	NA						
Groundwater Inorganic Parameters								
total dissolved solids (TDS)	<1.25 X local background	NA						
chloride ion	250mg/l or <1.25 X local background	NA						
sulfate ion	250mg/l or <1.25 X local background	NA						

Soils	Residential Soil Screening Level Concentrations (mg/kg)	Protection of Groundwater Soil Screening Level Concentrations (mg/kg)							
Organic Compounds in Soils									
benzene	1.2	0.0026 (M)	ND	ND	ND	ND	ND	ND	ND
toluene	490	0.69 (M)	ND	ND	ND	ND	ND	ND	ND
ethylbenzene	5.8	0.78 (M)	ND	ND	ND	0.0011J	ND	ND	ND
xylenes (sum of o-, m- and p- isomers = total xylenes)	58	9.9 (M)	ND	ND	ND	0.0061J	ND	ND	ND
1,2,4-trimethylbenzene	30	0.0081 (R)	ND	ND	ND	0.0019J	ND	0.0010J	ND
1,3,5-trimethylbenzene	27	0.0087 (R)	ND	ND	ND	0.00064J	ND	ND	ND
acenaphthene	360	0.55 (R)	ND	ND	ND	ND	ND	ND	ND
anthracene	1800	5.8 (R)	ND	ND	ND	ND	ND	ND	ND
benz(a)anthracene	1.1	0.011 (R)	ND	ND	ND	ND	ND	0.0034J	ND
benzo(b)fluoranthene	1.1	0.3 (R)	ND	ND	ND	0.0031J	ND	0.0027J	ND
benzo(k)fluoranthene	11	2.9 (R)	ND	ND	ND	ND	ND	ND	ND
benzo(a)pyrene	0.11	0.24 (M)	ND	ND	ND	ND	ND	ND	ND
chrysene	110	9 (R)	ND	ND	ND	0.0041	ND	0.0039	ND
dibenzo(a,h)anthracene	0.11	0.096 (R)	ND	ND	ND	ND	ND	ND	ND
fluoranthene	240	8.9 (R)	ND	ND	ND	ND	ND	ND	ND
fluorene	240	0.54 (R)	ND	ND	ND	ND	ND	ND	ND
indeno(1,2,3-cd)pyrene	1.1	0.98 (R)	ND	ND	ND	ND	ND	ND	ND
1-methylnaphthalene	18	0.006 (R)	ND	ND	ND	ND	ND	ND	ND
2-methylnaphthalene	24	0.019 (R)	ND	ND	ND	ND	ND	ND	ND
naphthalene	2	0.0038 (R)	ND	ND	ND	ND	ND	ND	ND
pyrene	180	1.3 (R)	ND	ND	ND	ND	ND	ND	ND
Metals in Soils									
arsenic	0.68	0.29 (M)	5.1	3	4.3	5.6	3.3	3.3	2.7
barium	15000	82 (M)	75.6	64	111	97.7	57.6	57.6	59.8
cadmium	71	0.38 (M)	0.26J	0.29J	0.42	0.59	0.26J	0.26J	0.28J
chromium (VI)	0.3	0.00067 (R)	ND	ND	ND	1.4	ND	0.672J	ND
copper	3100	46 (M)	4.5	4.7	7.3	9.2	4.9	11.2	4.5
lead	400	14 (M)	8	4.6	7.1	19.4	21.7	27.3	4.8
nickel	1500	26 (R)	4	5	7.7	9.5	3.7	10.7	4.4
selenium	390	0.26 (M)	ND	ND	ND	0.75J	ND	1.1J	ND
silver	390	0.8 (R)	ND	ND	ND	ND	ND	ND	ND
zinc	23000	370 (R)	20.4	19.2	27.8	29.8	21.1	34.6	21

The letter "(R)" following a protection of Groundwater soil screening level indicates the concentration is derived from a risk-based approach. The letter "(M)" following a protection of Groundwater soil screening level indicates the concentration is derived from the drinking water MCL.