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March 30, 2023

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

RE: Braukman Farms C
Results of Initial Cleanup, Investigation, and Pending Excavations
Facility/Location ID # 309594
COGCC Remediation Project # 26220

Mr. Kosola:

Mull Drilling Co., Inc (Mull) is providing this update to the Colorado Oil and Gas Commission (COGCC) for results of an initial Cleanup, Investigation, and Pending Excavations. The location in question was brought to Mull's attention through the actions of COGCC staff during regular mechanical integrity tests of the attached wellhead in September 2022.

During this period, it was determined that a leak of an off-location produced water flowline had occurred directly to the west of the tank battery. Also identified was a legacy location spill that had occurred sometime in the past; in this case from the same flowline but of greater, indeterminate magnitude.



Site Location

After initial actions were taken to suspend the leaking flowline, Mull notified proper COGCC staff of the spill and of the legacy location. Subsequently, Mull took actions to excavate and perform initial investigation work of the two areas previously identified. For these purposes Mull is identifying the two spills as the “**New Spill**” and the “**Old Spill**” locations. *Figure 1* provides an areal of the Site.

Investigations, Results, and Planned Remedial Actions

During the investigation of the **New Spill** area, Mull took 5 samples around the perimeter of the impacted area and at a deeper depth adjacent to the spill and flowline itself. The area in question was at a depth of approximately 4 ft below ground surface (BGS). All soils above and adjacent to this flowline release that appeared impacted were segregated to a soil pile north of the location for later disposal. All samples were submitted to Pace Laboratories of Kansas for analysis following approved chain of custody protocols. Please see the attached *Lab Reports*. Or for tabulated results, please look to *Table 915-1* in the attached files.

The results at this location indicate that there are areas of impact that will need removal down to 7’-8’ BGS. Impacts appear to be mainly chlorides due to high conductivity and Sodium Adsorption Ratio (SAR). Soils that were taken from the location and segregated confirm this impacted state. As a result, Mull intends to perform a relatively small excavation for soils down to and including areas at the 7-8 BGS range. The perimeter of the impacted area will be excavated to lesser degree to verify complete capture of impact and for safety purposes.

For a graphical representation of the area please refer to *Figure 2*. After the excavation Mull will take approximately 5 confirmation samples along the perimeter and at total depth of the area for verification or remaining impacts. All Sampling shall conform to table 915-1 and be submitted the Pace Analytical. The estimated number of soils that will be generated and disposed to state approved landfill will be approximately 50 cubic yards. Currently, the soils removed from this location originally are segregated to the north, approximately 15 cubic yards, and slated for removal to the landfill after taking proper Radionuclide testing.

Investigation of the **Old Spill** area proceeded subsequently to actions at the **New Spill** area and were analyzed via 7 sample locations that all occurred at the surface levels and depths. Included in this spill investigation was a background sample that occurred upgradient of the spill location. All samples were submitted to Pace Analytical of Kansas following approved chain of custody protocols. The attached *Lab Report* identifies the analysis in question as does the attached *Table 915-1*.

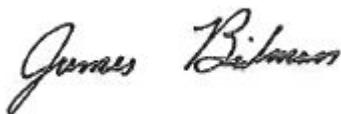
Results of this investigation identified a legacy location that has high relative values both in conductivity and SAR. The contaminate of concern is again chlorides. Subsequently in February 2023 Mull performed another small investigation, taking an additional 4 samples at the proximal and distal ends of the impacted areas to determine the stratification of the impacts. The approximate depth on these impacts is 3’-5’bgs. Impacts are again chlorides and conductance but appear to drop off substantially with depth as defined with the deeper 8’ bgs samples.

Currently, the estimated soils that are slated for removal at the old spill amount to 850 cubic yards. This measurement makes some generalizations on the depth of the impacts (3'-5' bgs) based on sampling processes. Nevertheless, to confirm proper capture of all impacts, Mull will take confirmation samples at the base and perimeter of excavation as required. Due to the age of this location, confirmation of capture cannot be determined via PID since all hydrocarbon impacts appear to have volatilized off, so the licensed geologist will not utilize that process at this location.

It was noted that all the sample locations between the Old and New spill areas exhibited elevated arsenic levels, including those in the background. As a result, arsenic is being disregarded as a cleanup parameter for Mull's remedial action objectives. Nevertheless, all subsequent sampling shall conform to Table 915-1 as appropriate for the state of Colorado.

Soils at this location will be disposed to Phantom Landfill of Penrose Colorado, EPA #COR000208454 or a similar permitted Colorado Facility under an approved waste profile. Upon final capture, clean soils shall then be transported and placed in the excavated area as required to re-contour the area. The area shall then be tilled, replanted with an approved NRCS seed mix and slated for reclamation responsibilities utilizing BMP's for stormwater management as appropriate.

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



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Attachments:

Figure 1 – Site Area

Figure 2 – New Spill Area

Figure 3 – Old Spill Area

Table 915 -1 Sampling Results

Lab Reports: 60410341, 60410331, 60421769

Figure 1: Tank Battery Area

Braukmann Farms C



Braukmann Farms C

Legend

Legend

Google Earth



300 ft

BRAUKMANN FARMS C TANK BATTERY

Regulatory Limits as COGCC promulgated table 915-1

Location:	Latitude: 39.031876	Longitude: -103.275250	COGCC Project #	26220
State:	Colorado			
County:	Lincoln			



Figure 2

Braukmann Farms C -- New Spill

Braukmann Farms C



Legend

Legend

Highlighted Points are for EC

Green Highlighted Point is above cleanup limits

Red Highlighted area is excavation area and upcoming excavation area.

Regulatory Limits as COGCC promulgated table 915-1

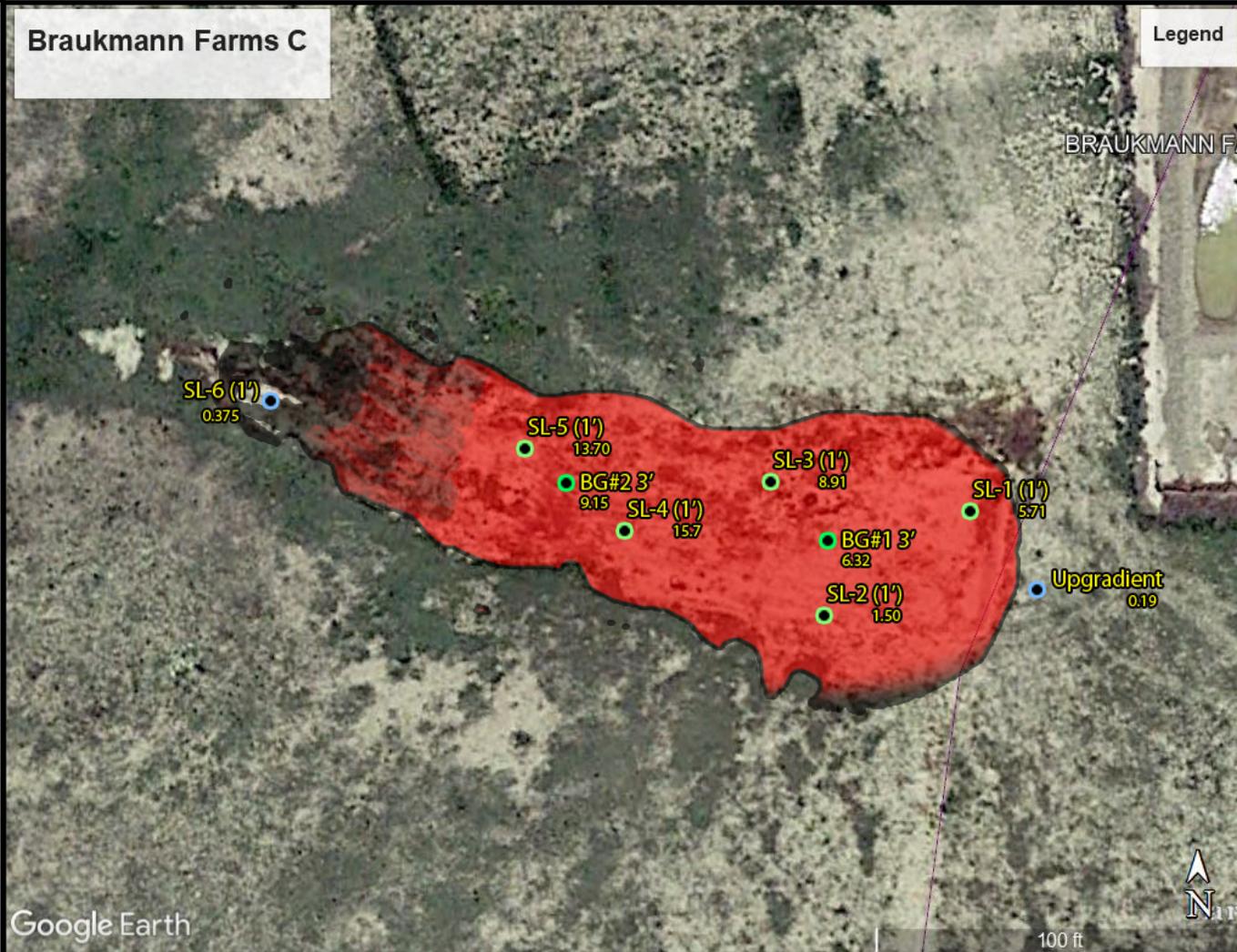
Location:	Latitude: 39.031876	Longitude: -103.275250	COGCC Project #	26220
State:	Colorado			
County:	Lincoln			



Figure 3

Braukmann Farms C -- Old Spill

Braukmann Farms C



Legend

Legend

Highlighted Points are for EC

Green Highlighted Point is above cleanup limits

Red Highlighted area is the estimated excavation area.

Regulatory Limits as COGCC promulgated table 915-1

Google Earth

100 ft

Location:	Latitude: 39.031876	Longitude: -103.275250	COGCC Project #	26220
State:	Colorado			
County:	Lincoln			



Table 915-1		9/9/2022 New Spill (Pace 60410341)					
CLEANUP CONCENTRATIONS		SL-1 (4')	SL-2 (4')	SL-3 (4')	SL-4 (4')	SL-5 (7-8')	Soil Pile
Contaminant of Concern	Concentrations	39.031845; - 103.275395	39.031830; - 103.275390	39.031824; - 103.275397	39.031818; - 103.275398	39.031835; - 103.275399	39.032331; - 103.275330
Soil TPH (total volatile [C6-C10] and extractable [C10-C36] hydrocarbons)	500mg/kg	73.5	134.6	ND	ND	25.8	117
Soils and Groundwater - liquid hydrocarbons including condensate and oil	below visual detection limits	None	None	None	None	None	None
Soil Suitability for Reclamation							
Electrical conductivity (EC) (by saturated paste method)	<4mmhos/cm	14.00	25.00	7.12	19.00	3.56	26.00
Sodium adsorption ratio (SAR) (by saturated paste method)	<6	42.50	84.30	62.80	70.80	32.40	7.37
pH (by saturated paste method)	6-8.3	7.58	7.66	8.66	7.51	9.35	7.37
boron (hot water soluble soil extract)	2mg/l	2.53	5.11	5.51	1.38	2.53	2.69
Organic Compounds in Groundwater							
benzene	5µg/l	NA	NA	NA	NA	NA	NA
toluene	560 to 1,000µg/l	NA	NA	NA	NA	NA	NA
ethylbenzene	700µg/l	NA	NA	NA	NA	NA	NA
xylenes (sum of o-, m- and p- isomers = total xylenes)	1,400 to 10,000µg/l	NA	NA	NA	NA	NA	NA
naphthalene	140µg/l	NA	NA	NA	NA	NA	NA
1,2,4-trimethylbenzene	67µg/l	NA	NA	NA	NA	NA	NA
1,3,5-trimethylbenzene	67µg/l	NA	NA	NA	NA	NA	NA
Groundwater Inorganic Parameters							
total dissolved solids (TDS)	<1.25 X local background	NA	NA	NA	NA	NA	NA
chloride ion	250mg/l or <1.25 X local background	NA	NA	NA	NA	NA	NA
sulfate ion	250mg/l or <1.25 X local background	NA	NA	NA	NA	NA	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
toluene	490	0.69 (M)	ND	ND	ND	ND	ND	ND
ethylbenzene	5.8	0.78 (M)	ND	ND	ND	ND	ND	ND
xylenes (sum of o-, m- and p- isomers = total xylenes)	58	9.9 (M)	ND	ND	ND	ND	ND	ND
1,2,4-trimethylbenzene	30	0.0081 (R)	ND	ND	ND	ND	ND	ND
1,3,5-trimethylbenzene	27	0.0087 (R)	ND	ND	ND	ND	ND	ND
acenaphthene	360	0.55 (R)	ND	ND	ND	ND	ND	ND
anthracene	1800	5.8 (R)	ND	ND	ND	ND	ND	ND
benz(a)anthracene	1.1	0.011 (R)	ND	ND	ND	ND	ND	ND
benzo(b)fluoranthene	1.1	0.3 (R)	ND	ND	ND	ND	ND	ND
benzo(k)fluoranthene	11	2.9 (R)	ND	ND	ND	ND	ND	ND
benzo(a)pyrene	0.11	0.24 (M)	ND	ND	ND	ND	ND	ND
chrysene	110	9 (R)	ND	ND	ND	ND	ND	ND
dibenzo(a,h)anthracene	0.11	0.096 (R)	ND	ND	ND	ND	ND	ND
fluoranthene	240	8.9 (R)	ND	ND	ND	ND	ND	ND
fluorene	240	0.54 (R)	ND	0.0041J	ND	ND	ND	0.0050J
indeno(1,2,3-cd)pyrene	1.1	0.98 (R)	ND	ND	ND	ND	ND	ND
1-methylnaphthalene	18	0.006 (R)	0.057	0.042	0.011	ND	ND	0.04
2-methylnaphthalene	24	0.019 (R)	0.043	0.047	0.0098	ND	ND	0.043
naphthalene	2	0.0038 (R)	0.016	0.03	0.023	0.0043	ND	0.018
pyrene	180	1.3 (R)	ND	ND	ND	ND	ND	ND
Metals in Soils								
arsenic	0.68	0.29 (M)	8.4	8.4	8.8	7.7	7.4	9.3
barium	15000	82 (M)	172	192	424	179	324	195
cadmium	71	0.38 (M)	0.54	0.45J	0.50J	0.51	0.5	0.47J
chromium (VI)	0.3	0.00067 (R)	ND	ND	ND	ND	ND	ND
copper	3100	46 (M)	16.4	16.7	16.8	15	15	14.4
lead	400	14 (M)	13.3	13.7	13.5	12.5	12	12.4
nickel	1500	26 (R)	15.5	16.5	16.4	14.4	15.4	13.5
selenium	390	0.26 (M)	0.55J	0.54J	0.60J	0.42J	0.46J	0.51J
silver	390	0.8 (R)	ND	ND	ND	ND	ND	ND
zinc	23000	370 (R)	58	72.3	95.3	63.9	108	94.6

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.

Table 915-1		9/9/2022 Old Spill (Pace 60410331)						
CLEANUP CONCENTRATIONS		SL-1	SL-2	SL-3	SL-4	SL-5	SL-6	Upgradient (Background)
Contaminant of Concern	Concentrations	39.031663; - 103.275545	39.031569; - 103.275659	39.031656; - 103.275739	39.131613; - 103.275970	39.031670; - 103.275970	39.031719; - 103.276199	39.031591; - 103.275484
Soil TPH (total volatile [C6-C10] and extractable [C10-C36] hydrocarbons)	500mg/kg	ND	ND	ND	ND	11.8	54	NA
Soils and Groundwater - liquid hydrocarbons including condensate and oil	below visual detection limits	None	ND	ND	ND	ND	ND	NA
Soil Suitability for Reclamation								
Electrical conductivity (EC) (by saturated paste method)	<4mmhos/cm	5.71	1.50	8.91	15.70	13.70	0.38	0.19
Sodium adsorption ratio (SAR) (by saturated paste method)	<6	12.10	26.10	27.40	40.70	25.80	1.47	0.29
pH (by saturated paste method)	6-8.3	7.86	8.58	7.95	7.86	7.68	7.98	8.22
boron (hot water soluble soil extract)	2mg/l	0.46	0.44	1.98	1.26	1.81	0.998	0.49
Organic Compounds in Groundwater								
benzene	5µg/l	NA	NA	NA	NA	NA	NA	NA
toluene	560 to 1,000µg/l	NA	NA	NA	NA	NA	NA	NA
ethylbenzene	700µg/l	NA	NA	NA	NA	NA	NA	NA
xylenes (sum of o-, m- and p- isomers = total xylenes)	1,400 to 10,000µg/l	NA	NA	NA	NA	NA	NA	NA
naphthalene	140µg/l	NA	NA	NA	NA	NA	NA	NA
1,2,4-trimethylbenzene	67µg/l	NA	NA	NA	NA	NA	NA	NA
1,3,5-trimethylbenzene	67µg/l	NA	NA	NA	NA	NA	NA	NA
Groundwater Inorganic Parameters								
total dissolved solids (TDS)	<1.25 X local background	NA	NA	NA	NA	NA	NA	NA
chloride ion	250mg/l or <1.25 X local background	NA	NA	NA	NA	NA	NA	NA
sulfate ion	250mg/l or <1.25 X local background	NA	NA	NA	NA	NA	NA	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	NA
toluene	490	0.69 (M)	ND	ND	ND	ND	ND	ND	NA
ethylbenzene	5.8	0.78 (M)	ND	ND	ND	ND	ND	ND	NA
xylenes (sum of o-, m- and p- isomers = total xylenes)	58	9.9 (M)	ND	ND	ND	ND	ND	ND	NA
1,2,4-trimethylbenzene	30	0.0081 (R)	ND	ND	ND	ND	ND	ND	NA
1,3,5-trimethylbenzene	27	0.0087 (R)	ND	ND	ND	ND	ND	ND	NA
acenaphthene	360	0.55 (R)	ND	ND	ND	ND	ND	ND	NA
anthracene	1800	5.8 (R)	ND	ND	ND	ND	ND	ND	NA
benz(a)anthracene	1.1	0.011 (R)	ND	ND	ND	ND	ND	ND	NA
benzo(b)fluoranthene	1.1	0.3 (R)	ND	ND	ND	ND	ND	ND	NA
benzo(k)fluoranthene	11	2.9 (R)	ND	ND	ND	ND	ND	ND	NA
benzo(a)pyrene	0.11	0.24 (M)	ND	ND	ND	ND	ND	ND	NA
chrysene	110	9 (R)	ND	ND	ND	ND	ND	ND	NA
dibenzo(a,h)anthracene	0.11	0.096 (R)	ND	ND	ND	ND	ND	ND	NA
fluoranthene	240	8.9 (R)	ND	ND	ND	ND	ND	ND	NA
fluorene	240	0.54 (R)	ND	ND	ND	ND	ND	ND	NA
indeno(1,2,3-cd)pyrene	1.1	0.98 (R)	ND	ND	ND	ND	ND	ND	NA
1-methylnaphthalene	18	0.006 (R)	ND	ND	ND	ND	ND	ND	NA
2-methylnaphthalene	24	0.019 (R)	ND	ND	ND	ND	ND	ND	NA
naphthalene	2	0.0038 (R)	ND	ND	ND	ND	ND	ND	NA
pyrene	180	1.3 (R)	ND	ND	ND	ND	ND	ND	NA
Metals in Soils									
arsenic	0.68	0.29 (M)	8.1	8.7	5.7	8.9	7.8	7.9	7.7
barium	15000	82 (M)	214	156	193	224	137	215	168
cadmium	71	0.38 (M)	0.49	0.47	0.42J	0.47	0.41	0.57	0.53
chromium (VI)	0.3	0.0067 (R)	ND						
copper	3100	46 (M)	15.9	15.3	11.3	14.6	12	17.1	13.9
lead	400	14 (M)	12.2	16	10.5	11.6	11.4	13.9	14.8
nickel	1500	26 (R)	14.2	16.1	11.4	13.4	11.3	14.8	13
selenium	390	0.26 (M)	0.56J	0.58J	0.51J	0.46J	0.53J	0.38J	0.62J
silver	390	0.8 (R)	ND						

zinc	23000	370 (R)	50.7	56.7	44.3	46.5	43	62.6	53.1
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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.

Table 915-1			2.8.23 Old Spill (Pace 60421769)			
CLEANUP CONCENTRATIONS			BG #1 3'	BG #1 8'	BG #2 3'	BG #2 8'
Contaminant of Concern	Concentrations		39.031629; - 103.275648	39.031629; - 103.275648	39.031660; - 103.275933	39.031660; - 103.275933
Soil TPH (total volatile [C6-C10] and extractable [C10-C36] hydrocarbons)	500mg/kg		ND	ND	ND	ND
Soils and Groundwater - liquid hydrocarbons including condensate and oil	below visual detection limits		ND	ND	ND	ND
Soil Suitability for Reclamation						
Electrical conductivity (EC) (by saturated paste method)	<4mmhos/cm		6.32	1.16	9.15	0.96
Sodium adsorption ratio (SAR) (by saturated paste method)	<6		5.92	2.54	4.15	1.05
pH (by saturated paste method)	6-8.3		7.43	7.62	7.42	7.65
boron (hot water soluble soil extract)	2mg/l		0.69	1.07	6.08	0.97
Organic Compounds in Groundwater						
benzene	5µg/l		NA	NA	NA	NA
toluene	560 to 1,000µg/l		NA	NA	NA	NA
ethylbenzene	700µg/l		NA	NA	NA	NA
xylenes (sum of o-, m- and p- isomers = total xylenes)	1,400 to 10,000µg/l		NA	NA	NA	NA
naphthalene	140µg/l		NA	NA	NA	NA
1,2,4-trimethylbenzene	67µg/l		NA	NA	NA	NA
1,3,5-trimethylbenzene	67µg/l		NA	NA	NA	NA
Groundwater Inorganic Parameters						
total dissolved solids (TDS)	<1.25 X local background		NA	NA	NA	NA
chloride ion	250mg/l or <1.25 X local background		NA	NA	NA	NA
sulfate ion	250mg/l or <1.25 X local background		NA	NA	NA	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
toluene	490	0.69 (M)	ND	ND	ND	ND
ethylbenzene	5.8	0.78 (M)	ND	ND	ND	ND
xylenes (sum of o-, m- and p- isomers = total xylenes)	58	9.9 (M)	ND	ND	ND	ND
1,2,4-trimethylbenzene	30	0.0081 (R)	ND	ND	ND	ND
1,3,5-trimethylbenzene	27	0.0087 (R)	ND	ND	ND	ND
acenaphthene	360	0.55 (R)	ND	ND	ND	ND
anthracene	1800	5.8 (R)	ND	ND	ND	ND
benz(a)anthracene	1.1	0.011 (R)	ND	ND	ND	ND
benzo(b)fluoranthene	1.1	0.3 (R)	ND	ND	ND	ND
benzo(k)fluoranthene	11	2.9 (R)	ND	ND	ND	ND
benzo(a)pyrene	0.11	0.24 (M)	ND	ND	ND	ND
chrysene	110	9 (R)	ND	ND	ND	ND
dibenzo(a,h)anthracene	0.11	0.096 (R)	ND	ND	ND	ND
fluoranthene	240	8.9 (R)	ND	ND	ND	ND
fluorene	240	0.54 (R)	ND	ND	ND	ND
indeno(1,2,3-cd)pyrene	1.1	0.98 (R)	ND	ND	ND	ND
1-methylnaphthalene	18	0.006 (R)	ND	ND	ND	ND
2-methylnaphthalene	24	0.019 (R)	ND	ND	ND	ND
naphthalene	2	0.0038 (R)	ND	ND	ND	ND
pyrene	180	1.3 (R)	ND	ND	ND	ND
Metals in Soils						
arsenic	0.68	0.29 (M)	5.9	6.1	7.2	3.6
barium	15000	82 (M)	280	160	194	69.6
cadmium	71	0.38 (M)	0.24J	0.11J	0.17J	ND
chromium (VI)	0.3	0.00067 (R)	ND	ND	ND	ND
copper	3100	46 (M)	11.7	9.9	14.5	4.7
lead	400	14 (M)	9	9.5	11.2	4.6
nickel	1500	26 (R)	11.5	9.4	12.8	4.1
selenium	390	0.26 (M)	ND	ND	ND	ND
silver	390	0.8 (R)	ND	ND	ND	ND
zinc	23000	370 (R)	38.4	33.5	48.3	17

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.