



February 23, 2024

To: Benjamin McPherson (NYSDEC), Angela Martin (NYSDOH)
From: Roxanne Birx
CC: John Black, Peter Zaffram, James Edwards, John Yensan, Dan Flanigan, Brian Rudnick
RE: Source Area Solidification Addendum - Increase Solidification Mix Ratios
Interim Remedial Measure Workplan
Riverview Innovation & Technology Campus
Brownfield Cleanup Program Site No. C915353
3875 River Road
Town of Tonawanda, New York 14150

Introduction

Implementation of the Source Area Solidification Interim Remedial Measures (Solidification IRM) Work Plan for the RITC Brownfield Cleanup Program Site (BCP Site) located at 3875 River Road in Tonawanda, Erie County, New York has been ongoing since October 2023. Data recently received indicates samples from two cells in the MW-BCP-05 Area, samples from four cells in the Weak Ammonia Liquor (WAL) Area, and from two cells in the Phenol Area remain characteristically hazardous for benzene (Figure 1) after initial treatment. On behalf of Riverview Innovation & Technology Campus, Inc (RITC), Inventum Engineering, P.C. (Inventum) has prepared this memorandum detailing the proposed increased solidification mix ratio of 15% LKD and 10% breeze to address the hazardous samples. This increased mix is intended to apply to any current or future samples that may test characteristically hazardous in the Weak Ammonia, Phenol, and Light Oil Areas.

MW-BCP-05 Area

The solidification mix ratio for the MW-BCP-05 Area in the work plan was based on the bench-scale tests and is 5% Lime Kiln Dust (LKD) and 5% Breeze. Ten out of twelve verification samples in the MW-BCP-05 area have “passed,” with no characteristically hazardous analytical results from the TCLP procedure. Samples from cells G26 and G29 from the MW-BCP-05A area, both along the south side toward the box culvert, tested characteristically hazardous for benzene, with concentrations of 1.7 mg/L and 2.2 mg/L, respectively. See Table 1 for analytical data of MW-BCP-05 Area verification samples.

The fill in cells G29 and G28 was solidified with the addition of the sand recovered from the former UST removed from the MW-BCP-05 area in 2023. Approximately 18 to 21 cubic yards of sand were added to each of the two cells. Verification sample No. V30 was collected from cell G29, and represented both cells containing sand, in accordance with UST Sand Addendum (January 2024). The predominant constituent

detected in the sand was naphthalene, and the sand is not suspected as a source of the benzene detected in the TCLP analysis.

Three verification samples were collected from Row F, immediately north and further from the box culvert than Row G, none of which were characteristically hazardous. Verification samples from cells F31 and G32 in the adjacent Exhauster Building Area were also not characteristically hazardous. Therefore, RITC is proposing to remix cells G25 to G30 in the MW-BCP-05 Area (Figure 1).

Based on field observations of material in the MW-BCP-05 Area and the successful mix ratio of the Exhauster Building and Pump House Area, RITC is proposing to increase the solidification mix ratio with an additional 10% LKD and an additional 5% breeze by weight, bringing the mix totals for Cells G26 through G30 to 15% LKD and 10% breeze. This additional mix ratio is higher than defined in the Work Plan because at the current 5 percent mix ratio, Inventum is concerned that the additional 2.5 percent (12.5 tons) called for by the work plan would be an insufficient amount to properly distribute and uniformly mix. Following the re-solidification, additional verification samples will be collected from cells G26 and G29 in accordance with the Solidification Workplan, Section 2.2.

Weak Ammonia Liquor and Phenol Areas

The solidification mix ratio for the WAL and Phenol Areas were based on the bench-scale testing and work plan and is 5% Lime Kiln Dust (LKD) and 5% Breeze. Initial verification samples from the WAL area were collected from Cells L7, M6, and M9. The verification samples from cells L7 and M9 tested characteristically hazardous for benzene with concentrations of 3.6 mg/L and 0.66 mg/L, respectively. Notably, the L7 cell is below the former PT02 tank pad while the M9 cell is below the former PT03 tank pad. Subsequent samples from cells L11 and N10 also tested characteristically hazardous for benzene with concentrations of 1.4 mg/L and 1.2 mg/L, respectively. Samples from cells M6, N5, N7, and O8 are not characteristically hazardous for benzene. Verification samples have been collected from Cells J5, K8, and J9 in the Phenol Area. Samples from cells K8 and J9 are characteristically hazardous for benzene with concentrations of 0.5 mg/L and 0.73 mg/L, respectively. See Tables 2 and 3 for analytical data of WAL and Phenol Area verification samples received to date.

RITC is proposing to remix 21 cells outlined in Figure 1. All cells represented by samples that are characteristically hazardous will be mixed with an additional 10% LKD and 5% breeze for a total mix ratio of 15% LKD and 10% breeze. Cells L7, M9, L11, and N10 will be resampled in accordance with the Solidification Workplan, Section 2.2.

Figure 1 also shows an adjusted solidification boundary for the WAL Area based on confirmation sampling results. The initial confirmation samples collected from Cells K12 and N11 (confirmation sample No.'s C30 and C31) were characteristically hazardous for benzene. Additional confirmation samples were collected from Cells K14 and N12 (confirmation sample No.'s C41 and C42) to define a new eastern limit of WAL Area solidification. Neither confirmation sample from C41 nor C42 were hazardous for benzene (Table 4). Based on the hazardous sample results representing cells K12 and N11, these two cells and those included in the expansion of the eastern limit have been solidified with an increased mix of 15% LKD and 10% breeze initially, rather than the previous 5% LKD and 5% breeze ratios. Verification samples have been collected from cells K12 and L13 and are not characteristically hazardous (Table 2). The non-hazardous result from the sample collected from cell K12 demonstrates that 15% LKD and 10% breeze is effective at



reducing the concentration of benzene from a hazardous to non-hazardous level. Solidification mixing of cell N11 was completed February 16, 2024, and is scheduled to be sampled the week of February 26.

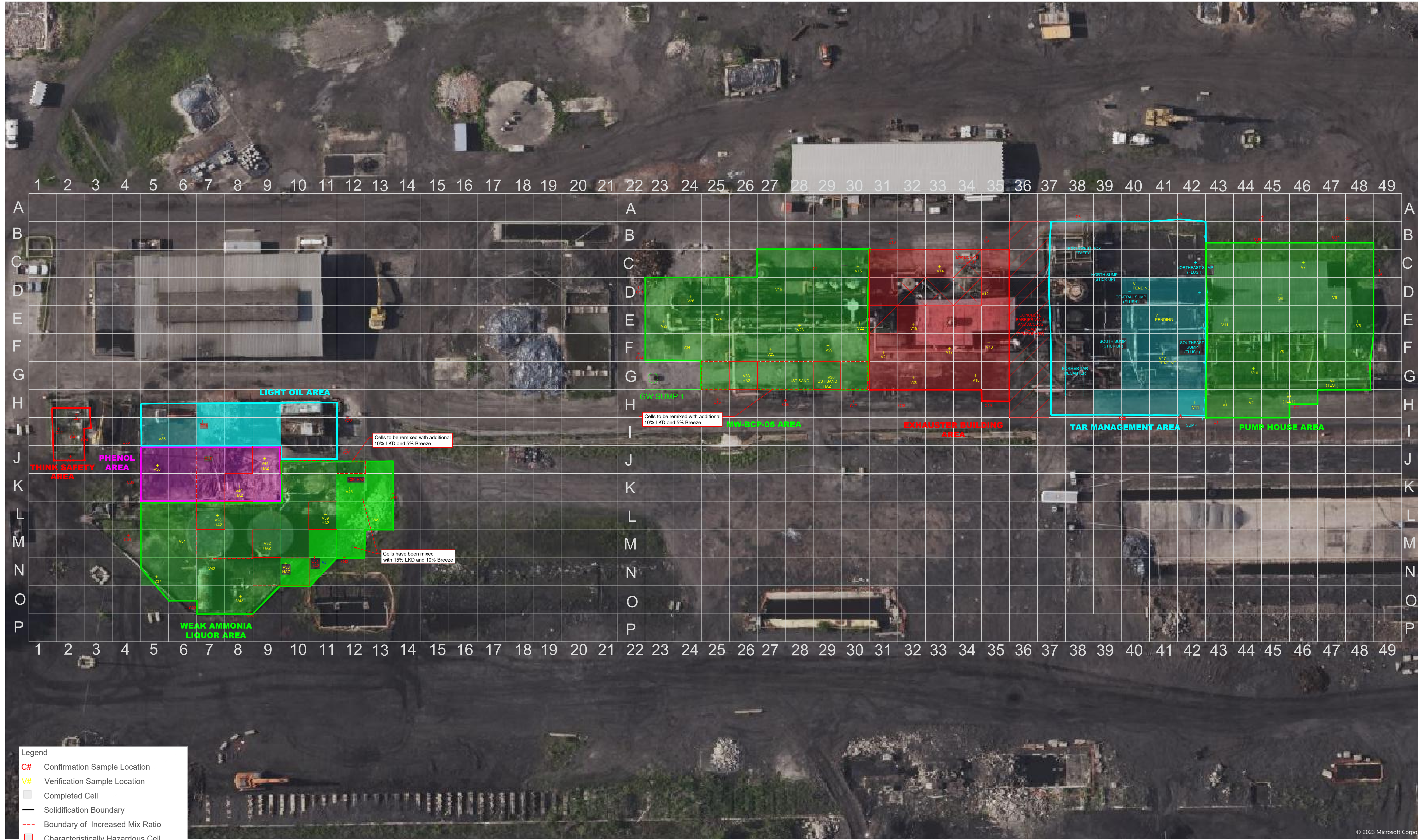
Light Oil Area

The first verification sample was collected from Cell I5 in the Light Oil Area and is pending analysis. Cells I5 and I6 have been solidified with 5% LKD and 5% breeze. No other cells in the Light Oil Area will be solidified until the solidification of the WAL Area is completed. Based on data received to date, , a mix of 15% LKD and 10% breeze is being proposed for the Light Oil Area.

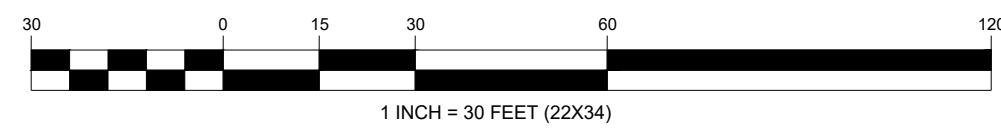


Figure 1





- Legend
- C# Confirmation Sample Location
 - V# Verification Sample Location
 - Completed Cell
 - Solidification Boundary
 - Boundary of Increased Mix Ratio
 - Characteristically Hazardous Cell
 - V# Proposed Verification Sample Location



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IN-SITU SOLIDIFICATION (ISS) GRID
 RIVERVIEW INNOVATION & TECHNOLOGY
 CAMPUS, INC.
 3875 RIVER ROAD
 TONAWANDA, NEW YORK 14150
 BCP SITE No. C915353

INVENTUM ENGINEERING
 441 CARLISLE DRIVE
 SUITE C
 HERNDON, VIRGINIA 20170
 (703) 722-6049
 www.inventumEng.com

FIGURE 1
 DRAWING NUMBER
 ISS GRID FEBRUARY 2024

Table 1



Table 2



Table 3





Table 3
Phenol Area Verification Samples
Riverview Innovation Technology Campus, Inc.,
Tonawanda, New York

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ANALYTE	SAMPLE ID:	J5-V36-02052024	K8-V40-02052024		J9-V44-02092024	
	LAB ID:	L2406250-02	L2406250-03		L2407436-01	
	COLLECTION DATE:	2/5/2024	2/5/2024		2/9/2024	
	SAMPLE DEPTH:	4.5' - 5.5' BGS	4.5' - 5.5' BGS		5' - 6' BGS	
	SAMPLE MATRIX:	SOLID	SOLID		SOLID	
	EPA-TCLP (mg/l)	Phenol Area, Cell J5 5% Breeze, 5% LKD	Phenol Area, Cell K8 5% Breeze, 5% LKD	Phenol Area, Cell J9 5% Breeze, 5% LKD		
TCLP VOLATILES BY EPA 1311						
1,1-Dichloroethene	0.7	<0.0017 U	<0.0017 U	<0.0017 U	<0.0017 U	
1,2-Dichloroethane	0.5	<0.0013 U	<0.0013 U	<0.0013 U	<0.0013 U	
1,4-Dichlorobenzene	7.5	<0.0019 U	<0.0019 U	<0.0019 U	<0.0019 U	
2-Butanone	200	<0.019 U	<0.019 U	<0.019 U	<0.019 U	
Benzene	0.5	0.029	0.5	0.73		
Carbon tetrachloride	0.5	<0.0013 U	<0.0013 U	<0.0013 U	<0.0013 U	
Chlorobenzene	100	<0.0018 U	<0.0018 U	<0.0018 U	<0.0018 U	
Chloroform	6	<0.0022 U	<0.0022 U	0.0026	J	
Tetrachloroethene	0.7	<0.0018 U	0.013	0.0046	J	
Trichloroethene	0.5	<0.0018 U	0.0018	J	<0.0018 U	
Vinyl chloride	0.2	<0.00071 U	<0.00071 U	<0.00071 U	<0.00071 U	
SUM		0.029	0.5148	0.7372	-	
TCLP SEMIVOLATILES BY EPA 1311						
2,4,5-Trichlorophenol	400	<0.0019 U	<0.0019 U	<0.0019 U	<0.0019 U	
2,4,6-Trichlorophenol	2	<0.0025 U	<0.0025 U	<0.0025 U	<0.0025 U	
2,4-Dinitrotoluene	0.13	<0.0019 U	<0.0019 U	<0.0019 U	<0.0019 U	
2-Methylphenol	200	0.023 J	0.026	0.012	J	
3-Methylphenol/4-Methylphenol	200	0.068	0.11	0.034		
Hexachlorobenzene	0.13	<0.0034 U	<0.0034 U	<0.0034 U	<0.0034 U	
Hexachlorobutadiene	0.5	<0.003 U	<0.003 U	<0.003 U	<0.003 U	
Hexachloroethane	3	<0.0022 U	<0.0022 U	<0.0022 U	<0.0022 U	
Nitrobenzene	2	<0.0033 U	<0.0033 U	<0.0033 U	<0.0033 U	
Pentachlorophenol	100	<0.0098 U	<0.0098 U	<0.0098 U	<0.0098 U	
Pyridine	5	<0.0045 U	<0.0045 U	<0.0045 U	<0.0045 U	
SUM		0.091	0.136	0.046	-	
TCLP HERBICIDES BY EPA 1311						
2,4,5-TP (Silvex)	1	<0.001 U	<0.001 U	<0.001 U	<0.001 U	
2,4-D	10	<0.001 U	<0.001 U	<0.001 U	<0.001 U	
TCLP PESTICIDES BY EPA 1311						
Chlordane	0.03	<0.000232 U	<0.000232 U	<0.000232 U	<0.000232 U	
Endrin	0.02	<0.000021 U	<0.000021 U	<0.000021 U	<0.000021 U	
Heptachlor	0.008	<0.000016 U	<0.000016 U	<0.000016 U	<0.000016 U	
Heptachlor epoxide	0.008	<0.000021 U	<0.000021 U	<0.000021 U	<0.000021 U	
Lindane	0.4	<0.000022 U	<0.000022 U	<0.000022 U	<0.000022 U	
Methoxychlor	10	<0.000034 U	<0.000034 U	<0.000034 U	<0.000034 U	
Toxaphene	0.5	<0.000314 U	<0.000314 U	<0.000314 U	<0.000314 U	



Table 3
 Phenol Area Verification Samples
 Riverview Innovation Technology Campus, Inc.,
 Tonawanda, New York

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TCLP METALS BY EPA 1311							
Arsenic, TCLP	5	<0.019	U	<0.019	U	<0.019	U
Barium, TCLP	100	0.883		0.629		0.866	
Cadmium, TCLP	1	<0.01	U	<0.01	U	<0.01	U
Chromium, TCLP	5	<0.021	U	<0.021	U	<0.021	U
Lead, TCLP	5	<0.027	U	<0.027	U	<0.027	U
Mercury, TCLP	0.2	0.005		<0.0005	U	<0.0005	U
Selenium, TCLP	1	<0.035	U	<0.035	U	<0.035	U
Silver, TCLP	5	<0.028	U	<0.028	U	<0.028	U
TOTAL METALS							
Mercury, Total		20.9		2.17		3.56	
GENERAL CHEMISTRY							
Cyanide, Total		5.2		2.4		9.3	
Nitrogen, Ammonia		290		94		56	
Solids, Total		81.5		84.4		78	

Table 4





Table 4
Confirmation Samples
Riverview Innovation Technology Campus, Inc.,
Tonawanda, New York

DRAFT

ANALYTE	SAMPLE ID:	C35-11152023	C36-11152023	C37-12202023	C38-12202023	C41-01292024	C42-01292024
	LAB ID:	L2367879-03	L2367879-04	L2375166-01	L2375166-02	L2404920-01	L2404920-02
	COLLECTION DATE:	11/15/2023	11/15/2023	12/20/2023	12/20/2023	1/29/2024	1/29/2024
	SAMPLE DEPTH:	24" - 36" BGS	24" - 36" BGS	36" - 42"	36" - 42"	18" - 30" BGS	36" - 48" BGS
	SAMPLE MATRIX:	SOIL	SOIL	SOIL	SOIL	SOLID	SOLID
	EPA-TCLP (mg/l)	Light Oil Area	Light Oil Area	Pump House Area (Re-sample north)	Pump House Area (Re-sample north)	Weak Ammonia Liquor	Weak Ammonia Liquor
TCLP VOLATILES BY EPA 1311							
1,1-Dichloroethene	0.7	<0.0017 U	<0.0017 U	<0.0017 U	<0.0017 U	<0.0017 U	<0.0017 U
1,2-Dichloroethane	0.5	<0.0013 U	<0.0013 U	<0.0013 U	<0.0013 U	<0.0013 U	<0.0013 U
1,4-Dichlorobenzene	7.5	<0.0019 U	<0.0019 U	<0.0019 U	<0.0019 U	<0.0019 U	<0.0019 U
2-Butanone	200	<0.019 U	<0.019 U	<0.019 U	<0.019 U	<0.019 U	<0.019 U
Benzene	0.5	0.051	0.0067	0.041	0.024	0.0029 J	0.038
Carbon tetrachloride	0.5	<0.0013 U	<0.0013 U	<0.0013 U	<0.0013 U	<0.0013 U	<0.0013 U
Chlorobenzene	100	<0.0018 U	<0.0018 U	<0.0018 U	<0.0018 U	<0.0018 U	<0.0018 U
Chloroform	6	<0.0022 U	<0.0022 U	<0.0022 U	<0.0022 U	<0.0022 U	<0.0022 U
Tetrachloroethene	0.7	<0.0018 U	<0.0018 U	<0.0018 U	<0.0018 U	<0.0018 U	<0.0018 U
Trichloroethene	0.5	<0.0018 U	<0.0018 U	<0.0018 U	<0.0018 U	<0.0018 U	<0.0018 U
Vinyl chloride	0.2	<0.00071 U	<0.00071 U	<0.00071 U	<0.00071 U	<0.00071 U	<0.00071 U
SUM		0.051	0.0067	0.041	0.024	0.0029	0.038
TCLP SEMIVOLATILES BY EPA 1311							
2,4,5-Trichlorophenol	400	<0.0019 U	<0.0019 U	<0.0019 U	<0.0019 U	<0.0019 U	<0.0019 U
2,4,6-Trichlorophenol	2	<0.0025 U	<0.0025 U	<0.0025 U	<0.0025 U	<0.0025 U	<0.0025 U
2,4-Dinitrotoluene	0.13	<0.0019 U	<0.0019 U	<0.0019 U	<0.0019 U	<0.0019 U	<0.0019 U
2-Methylphenol	200	0.04	<0.0055 U	0.0058 J	0.012 J	<0.0055 U	<0.0055 U
3-Methylphenol/4-Methylphenol	200	0.088	<0.0028 U	0.0094 J	0.016 J	<0.0028 U	<0.0028 U
Hexachlorobenzene	0.13	<0.0034 U	<0.0034 U	<0.0034 U	<0.0034 U	<0.0034 U	<0.0034 U
Hexachlorobutadiene	0.5	<0.003 U	<0.003 U	<0.003 U	<0.003 U	<0.003 U	<0.003 U
Hexachloroethane	3	<0.0022 U	<0.0022 U	<0.0022 U	<0.0022 U	<0.0022 U	<0.0022 U
Nitrobenzene	2	<0.0033 U	<0.0033 U	<0.0033 U	<0.0033 U	<0.0033 U	<0.0033 U
Pentachlorophenol	100	<0.0098 U	<0.0098 U	<0.0098 U	<0.0098 U	<0.0098 U	<0.0098 U
Pyridine	5	<0.0045 U	<0.0045 U	<0.0045 U	<0.0045 U	<0.0045 U	<0.0045 U
SUM		0.128	-	0.0152	0.028	-	-
TCLP HERBICIDES BY EPA 1311							
2,4,5-TP (Silvex)	1	<0.001 U	<0.001 U	<0.001 U	<0.001 U	<0.001 U	<0.001 U
2,4-D	10	<0.001 U	<0.001 U	<0.001 U	<0.001 U	<0.001 U	<0.001 U
TCLP PESTICIDES BY EPA 1311							
Chlordane	0.03	<0.000232 U	<0.000232 U	<0.000232 U	<0.000232 U	<0.000232 U	<0.000232 U
Endrin	0.02	<0.000021 U	<0.000021 U	<0.000021 U	<0.000021 U	<0.000021 U	<0.000021 U
Heptachlor	0.008	<0.000016 U	<0.000016 U	<0.000016 U	<0.000016 U	<0.000016 U	<0.000016 U
Heptachlor epoxide	0.008	<0.000021 U	<0.000021 U	<0.000021 U	<0.000021 U	<0.000021 U	<0.000021 U
Lindane	0.4	<0.000022 U	<0.000022 U	<0.000022 U	<0.000022 U	0.000023 JIP	<0.000022 U
Methoxychlor	10	<0.000034 U	<0.000034 U	<0.000034 U	<0.000034 U	<0.000034 U	<0.000034 U
Toxaphene	0.5	<0.000314 U	<0.000314 U	<0.000314 U	<0.000314 U	<0.000314 U	<0.000314 U
TCLP METALS BY EPA 1311							
Arsenic, TCLP	5	0.0462 J	0.0435 J	<0.019 U	<0.019 U	<0.019 U	<0.019 U
Barium, TCLP	100	0.603	0.823	0.446 J	0.757	0.611	0.335 J
Cadmium, TCLP	1	<0.01 U	<0.01 U	<0.01 U	<0.01 U	<0.01 U	<0.01 U
Chromium, TCLP	5	<0.021 U	<0.021 U	<0.021 U	<0.021 U	0.039 J	0.0431 J
Lead, TCLP	5	<0.027 U	0.298 J	<0.027 U	2.9	<0.027 U	<0.027 U
Mercury, TCLP	0.2	<0.0005 U	<0.0005 U	<0.0005 U	<0.0005 U	<0.0005 U	<0.0005 U
Selenium, TCLP	1	<0.035 U	<0.035 U	<0.035 U	<0.035 U	<0.035 U	<0.035 U
Silver, TCLP	5	<0.028 U	<0.028 U	<0.028 U	<0.028 U	<0.028 U	<0.028 U
GENERAL CHEMISTRY							
Nitrogen, Ammonia		-	-	-	-	82.3	83.3
Solids, Total		-	-	-	-	-	-

* Comparison is not performed on parameters with non-numeric
EPA-TCLP: EPA Toxicity Characteristic (TCLP) Regulatory Levels Cri
September 10, 2015.

Qualifiers:

U - Not detected at the reported detection limit for the sample.

J - Presumptive evidence of compound.

Bold - Compound is detected

Red Highlight - Exceeds EPA TCLP Standards