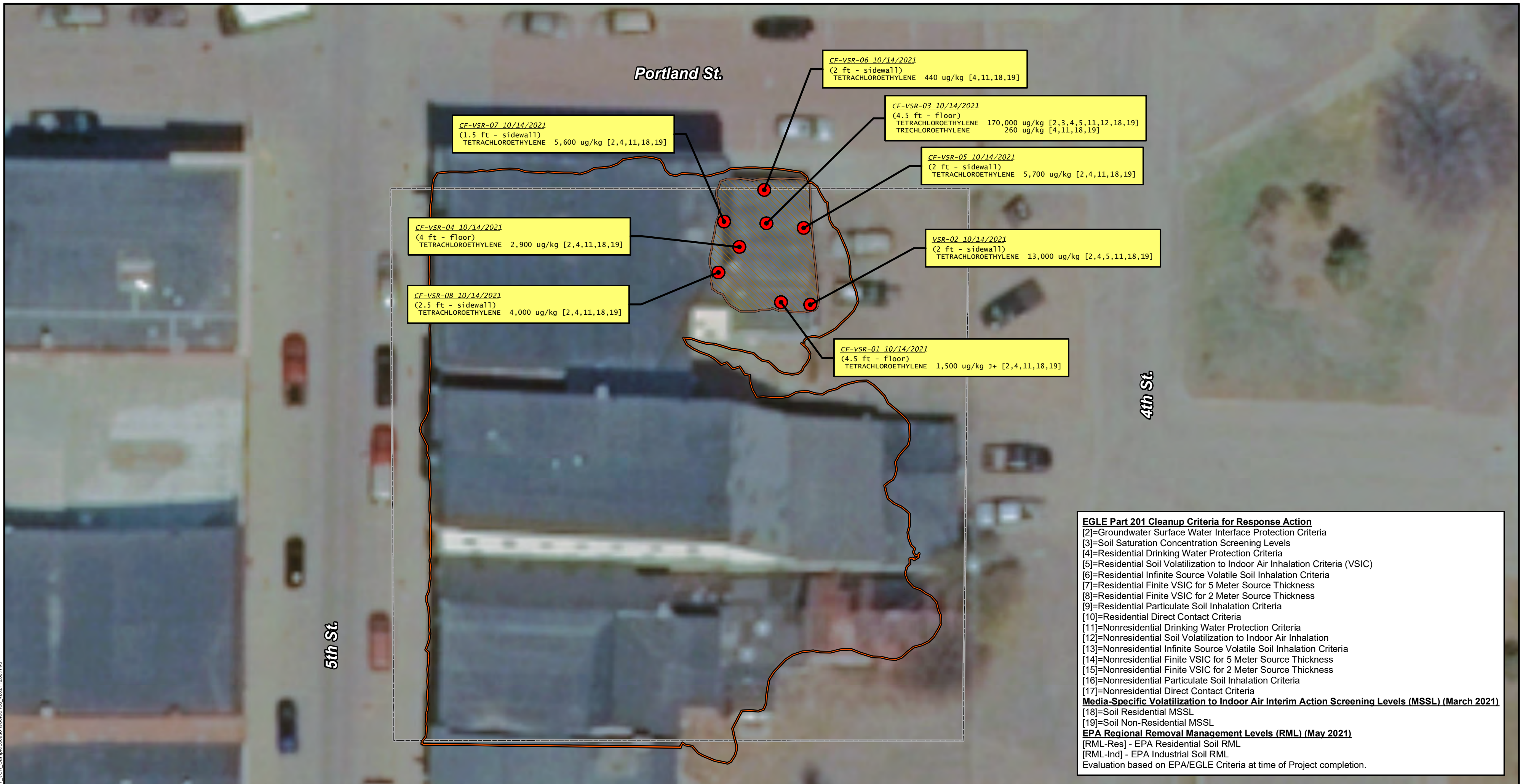
Scope of Work

Calumet Dry Cleaner Site (Location Code TBD)

100 Block of 5th Street, Calumet, Houghton County, Michigan

Assist with determining the nature and extent of solvent contamination in soil, soil gas, and groundwater at the Calumet Dry Cleaner Site. See attached existing data summary figure and table for reference. Investigation to include:

- Planning document preparation and review with the State Project Manager.
- Conduct a geophysical survey to discern subsurface structures and clear investigative locations.
- Request utility clearance.
- Coordinate field work with Village of Calumet to avoid underground utilities, traffic concerns, and proper site restoration.
- Install up to 12 soil borings to evaluate the horizontal and vertical extent of soil contamination. Retrieve continuous soil cores from the subsurface. Actual boring depths will be determined in the field and will be based on field observations and field screening results, but should extend until non-impacted soils are observed or groundwater is encountered. It is anticipated that two (2) subsurface soil samples from each boring location will be collected for laboratory analysis. Subsurface soil samples will be selected based on field screening results and visual or olfactory indication that contamination may be present. Survey the horizontal and vertical location of the soil borings.
- If encountered, collect groundwater samples from up to four (4) temporary monitoring wells. The actual locations and depths of the groundwater samples will be determined in the field and will be based on field observations and field screening results. In addition to collecting groundwater samples, collect groundwater elevation data at a minimum of three (3) temporary monitoring wells to establish the groundwater flow direction and check the wells for DNAPL. If possible for optimal triangulation, equidistantly spaced temporary wells screened within the same stratigraphic unit should be used to determine the groundwater flow direction. Based on the groundwater flow direction install the fourth well in a hydraulically down gradient location. The horizontal location and top of casings for all wells should be surveyed.
- Install and sample up to 8 soil vapor wells. The horizontal location and top of casings for all wells should be surveyed.
- Provide the State Project Manager with a report detailing the investigation.



EGLE Part 201 Cleanup Criteria for Response Action
[2]=Groundwater Surface Water Interface Protection Criteria
[3]=Soil Saturation Concentration Screening Levels
[4]=Residential Drinking Water Protection Criteria
[5]=Residential Soil Volatilization to Indoor Air Inhalation Criteria (VSIC)
[6]=Residential Infinite Source Volatile Soil Inhalation Criteria
[7]=Residential Finite VSIC for 5 Meter Source Thickness
[8]=Residential Finite VSIC for 2 Meter Source Thickness
[9]=Residential Particulate Soil Inhalation Criteria
[10]=Residential Direct Contact Criteria
[11]=Nonresidential Drinking Water Protection Criteria
[12]=Nonresidential Soil Volatilization to Indoor Air Inhalation
[13]=Nonresidential Infinite Source Volatile Soil Inhalation Criteria
[14]=Nonresidential Finite VSIC for 5 Meter Source Thickness
[15]=Nonresidential Finite VSIC for 2 Meter Source Thickness
[16]=Nonresidential Particulate Soil Inhalation Criteria
[17]=Nonresidential Direct Contact Criteria
Media-Specific Volatilization to Indoor Air Interim Action Screening Levels (MSSL) (March 2021)
[18]=Soil Residential MSSL
[19]=Soil Non-Residential MSSL
EPA Regional Removal Management Levels (RML) (May 2021)
[RML-Res] - EPA Residential Soil RML
[RML-Ind] - EPA Industrial Soil RML
Evaluation based on EPA/EGLE Criteria at time of Project completion.

Soil Sample Location Exceeding Criteria
Excavation Extent
Approximate Extent of Debris Removed
Approximate Site Boundary

Notes:
- ft = feet
- ug/kg = micrograms per kilogram
- J+ = The analyte was positively identified; the associated value is the approximate concentration of the analyte in the sample and may be biased high.

N
0 25
Feet
1 inch = 25 feet

5th St. Calumet Fire Site - RS
Calumet, Michigan

Figure 1
VSR Sample Location Map

TETRA TECH

Prepared For: USEPA | Prepared By: Tetra Tech

Corrdinate System: NAD 1983 StatePlane Michigan North FIPS 2111 Feet Intl
Source: Michigan Imagery Solution (Houghton - 2018)

Date Saved: 12/30/2021
EPA Contract No.: 68-HE-0519-D0005
TOLIN No.: 0001CF101

TABLE 1
Summary of Verification of Soil Remediation Sample Analytical Results
Calumet Fire Site
Calumet, Houghton County, Michigan

		EGLE Part 201 Generic Cleanup Criteria						Media-Specific Volatilization to Indoor Air Interim Action Screening Levels		Calumet Fire Site - Verification of Soil Remediation Samples															
Sample Location	**CAS Number**	**[2] Groundwater Surface Water Interface Protection Criteria**	**[3] Soil Saturation**	**[4] Residential Drinking Water Protection Criteria**	**[5] Residential Soil Volatilization to Indoor Air Inhalation Criteria**	**[11] Nonresidential Drinking Water Protection Criteria**	**[12] Nonresidential Soil Volatilization to Indoor Air Inhalation Criteria**	**[18] Soil Residential MSSL**	**[19] Soil Nonresidential MSSL**	**VSR-01**		**VSR-02**		**VSR-03**		**VSR-04**		**VSR-05**		**VSR-06**		**VSR-07**		**VSR-08**	
Field Sample ID										CF-VSR-01-101421		CF-VSR-02-101421		CF-VSR-03-101421		CF-VSR-04-101421		CF-VSR-05-101421		CF-VSR-06-101421		CF-VSR-07-101421		CF-VSR-08-101421	
Sample Date										10/14/2021		10/14/2021		10/14/2021		10/14/2021		10/14/2021		10/14/2021		10/14/2021		10/14/2021	
Sample Depth (bgs)										4.5 ft (floor)		2.0 ft (sidewall)		4.5 ft (floor)		4.0 ft (floor)		2.0 ft (sidewall)		2.0 ft (sidewall)		1.5 ft (sidewall)		2.5 ft (sidewall)	
Sample Description										Brown SAND, dry, potentially fill PID Reading = 0 ppm		Brown SAND, dry, potentially fill PID Reading = 1 ppm		Brown SAND, dry, with strong odor, potentially fill PID Reading = 804 ppm		Brown SAND, dry, with strong odor, potentially fill PID Reading = 24 ppm		Brown SAND, dry, with strong odor, potentially fill PID Reading = 27 ppm		Brown SAND, dry, potentially fill PID Reading = 0 ppm		Brown SAND, dry, with slight odor, potentially fill PID Reading = 4 ppm		Brown SAND, dry, with slight odor, potentially fill PID Reading = 5 ppm	
										Result	Exceeds	Result	Exceeds	Result	Exceeds	Result	Exceeds	Result	Exceeds	Result	Exceeds	Result	Exceeds	Result	Exceeds
Organics - VOCs (ug/kg)																									
4-METHYL-2-PENTANONE (MIBK)	108-10-1	ID	2,700,000	36,000	37,000,000 (C)	100,000	69,000,000 (C)	3,300	6,600	<41 U	--	<44 U	--	**100**	--	<42 U	--	<47 U	--	<46 U	--	<43 U	--	<39 U	--
ACETONE	67-64-1	34,000	110,000,000	15,000	290,000,000 (C)	42,000	540,000,000 (C)	260,000	520,000	**420 J+**	--	**180**	--	**160**	--	**150**	--	**210**	--	**260**	--	**210**	--	**160**	--
METHYL ACETATE	79-20-9	NA	NA	NA	NA	NA	NA	NA	NA	<350 U	--	**370**	--	<380 U	--	<350 U	--	**410**	--	**400**	--	<360 U	--	<320 U	--
METHYLCYLOHEXANE	108-87-2	NA	NA	NA	NA	NA	NA	NA	NA	<41 U	--	<44 U	--	<45 U	--	<42 U	--	<47 U	--	<46 U	--	**770**	--	<39 U	--
TETRACHLOROETHYLENE	127-18-4	1,200 (X)	88,000	100	11,000	100	21,000	6.2	12	**1,500 J+**	**[2,4,11,18,19]**	**13,000**	**[2,4,5,11,18,19]**	**170,000**	**[2,3,4,5,11,12,18,19]**	**2,900**	**[2,4,11,18,19]**	**5,700**	**[2,4,11,18,19]**	**440**	**[4,11,18,19]**	**5,600**	**[2,4,11,18,19]**	**4,000**	**[2,4,11,18,19]**
TOLUENE	108-88-3	5,400	250,000	16,000	330,000 (C)	16,000	610,000 (C)	3,700	11,000	<41 U	--	<44 U	--	<45 U	--	<42 U	--	<47 U	--	<46 U	--	**56**	--	<39 U	--
TRICHLOROETHYLENE	79-01-6	4,000 (X)	500,000	100	1,000	100	1,900	0.33	0.67	<41 U	--	<44 U	--	**260**	**[4,11,18,19]**	<42 U	--	<47 U	--	<46 U	--	<43 U	--	<39 U	--

Note: Analytical and Criteria Footnotes are included on the last page of the table.

TABLE 1
Summary of Verification of Soil Remediation Sample Analytical Results
Calumet Fire Site
Calumet, Houghton County, Michigan

Soil Table Footnotes:

- The Department of Environmental, Great Lakes, and Energy (EGLE) Part 201 residential and non-residential generic cleanup criteria and screening levels criteria were originally promulgated December 21, 2002 within the Administrative Rules for Part 201, Environmental Remediation, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended. This table reflects revisions to the criteria pursuant to the December 2010 Part 201 amendments and new criteria consistent with the provisions of R299.5706a. Remediation, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended. Release Date: December 30, 2013. Updated June 2018.
- EGLE Remediation and Redevelopment Division (RRD) updated the 2013 Guidance Document for the Vapor Intrusion Pathway (2013 VI Guidance) by replacing the previously rescinded screening levels with Media Specific Volatilization to Indoor Air Interim Action Screening Levels (MSSLs), updated March 2021.
- Environmental Protection Agency (EPA) Removal Management Levels for Chemicals (RMLs), dated May 2021. EPA RMLs correspond to a 10^{-4} risk level for carcinogens or a Hazard Quotient (HQ) of 3 for non-carcinogens.
- Only detected analytes are listed - Gray rows indicate requested analyses.
- **Bold** values are concentrations detected above the laboratory reporting limit.
- **Bold/Shaded** cells indicate analyte concentration exceeded applicable criteria. EGLE Part 201 criteria, MSSLs and/or EPA RMLs exceeded is indicated by the footnote in [brackets] following the result value and defined below:

[2] - Groundwater Surface Water Interface Protection Criteria
[3] - Soil Saturation Concentration Screening Levels
[4] - Residential Drinking Water Protection Criteria
[5] - Residential Soil Volatilization to Indoor Air Inhalation Criteria (VSIC)
[6] - Residential Infinite Source Volatile Soil Inhalation Criteria
[7] - Residential Finite VSIC for 5 Meter Source Thickness
[8] - Residential Finite VSIC for 2 Meter Source Thickness
[9] - Residential Particulate Soil Inhalation Criteria
[10] - Residential Direct Contact Criteria
[11] - Nonresidential Drinking Water Protection Criteria
[12] - Nonresidential Soil Volatilization to Indoor Air Inhalation
[13] - Nonresidential Infinite Source Volatile Soil Inhalation Criteria
[14] - Nonresidential Finite VSIC for 5 Meter Source Thickness
[15] - Nonresidential Finite VSIC for 2 Meter Source Thickness
[16] - Nonresidential Particulate Soil Inhalation Criteria
[17] - Nonresidential Direct Contact Criteria
[18] - Soil Residential MSSL
[19] - Soil Nonresidential MSSL
[RML-Res] - EPA Residential Soil RML
[RML-Ind] - EPA Industrial Soil RML

Evaluation based on EPA/EGLE Criteria at time of Project completion.

-- = No Exceedances
bgs = Below ground surface
ft = Feet
PID = Photoionization detector
ppm = Parts per million
VOC = Volatile organic compound
ug/kg = Micrograms per kilogram

Criteria Footnotes:

ID = Insufficient data to develop criterion.

NA = A criterion or value is not available

(C) = The criterion developed under R 299.20 to R 299.26 exceeds the chemical- specific soil saturation screening level (Csat). The person proposing or implementing response activity shall document whether additional response activity is required to control free-phase liquids or NAPL to protect against risks associated with free-phase liquids by using methods appropriate for the free-phase liquids present. Development of a site-specific Csat or methods presented in R 299.22, R 299.24(5), and R 299.26(8) may be conducted for the relevant exposure pathways.

(X) = The GSI criterion shown in the generic cleanup criteria tables is not protective for surface water that is used as a drinking water source. (See R 299.49 Footnotes for generic cleanup criteria tables for additional information.)

Laboratory Footnotes:

J+ = The analyte was positively identified; the associated value is the approximate concentration of the analyte in the sample and may be biased high.

U = Analyte analyzed for but not detected above the reported sample reporting limit.

TABLE 1
Summary of Verification of Soil Remediation Sample Analytical Results
Calumet Fire Site
Calumet, Houghton County, Michigan

	Criteria Evaluated	Exceedance	Tetrachloroethylene Criteria (ug/kg)
EGLE Part 201 Generic Cleanup Criteria (June 2018)	[2] - Groundwater Surface Water Interface Protection Criteria	YES	1,200 (X)
	[3] - Soil Saturation Concentration Screening Levels	YES	88,000
	[4] - Residential Drinking Water Protection Criteria	YES	100
	[5] - Residential Soil Volatilization to Indoor Air Inhalation Criteria (VSIC)	YES	11,000
	[6] - Residential Infinite Source Volatile Soil Inhalation Criteria	NO	170,000
	[7] - Residential Finite VSIC for 5 Meter Source Thickness	NO	480,000
	[8] - Residential Finite VSIC for 2 Meter Source Thickness	NO	1,100,000
	[9] - Residential Particulate Soil Inhalation Criteria	NO	2,700,000,000
	[10] - Residential Direct Contact Criteria	NO	200,000
	[11] - Nonresidential Drinking Water Protection Criteria	YES	100
	[12] - Nonresidential Soil Volatilization to Indoor Air Inhalation	YES	21,000
	[13] - Nonresidential Infinite Source Volatile Soil Inhalation Criteria	NO	210,000
	[14] - Nonresidential Finite VSIC for 5 Meter Source Thickness	NO	490,000
	[15] - Nonresidential Finite VSIC for 2 Meter Source Thickness	NO	1,100,000
	[16] - Nonresidential Particulate Soil Inhalation Criteria	NO	1,200,000,000
	[17] - Nonresidential Direct Contact Criteria	NO	930,000
Media-Specific Volatilization to Indoor Air Interim Action Screening Levels (March 2021)	[18] - Soil Residential Media-Specific Screening Level (MSSL)	YES	6.2
	[19] - Soil Nonresidential MSSL	YES	12
EPA Regional Removal Management Levels (May 2021)	[RML-Res] - EPA Residential Soil RML	NO	240,000
	[RML-Ind] - EPA Industrial Soil RML	NO	1,200,000