TETRA TECH

January 6, 2021

Ms. Karen A. Cahill
Assistant Engineer
NYSDEC Region 7
615 Erie Boulevard W.
Syracuse, NY 13204-2400

RE: Work Plan For 1,4-Dioxane Groundwater Plume Delineation
Abandoned Solvent Center Site – Pompey, NY
(NYSDEC #734035)

Dear Ms. Cahill:

On behalf of the Participating Parties for the Abandoned Solvent Center Site in Pompey, New York, this work plan was prepared per the request in your correspondence dated October 22, 2020. The purpose of the proposed work is to delineate the extent of the off-site 1,4-dioxane (1,4-D) plume downgradient of the Abandoned Solvent Center Site in Pompey, NY. A conceptual site model (CSM) is provided below regarding the source and migration of 1,4-D followed by the proposed scope of work.

Conceptual Site Model

The geology at the site included unconsolidated glacial deposits comprised of silty clay till ranging in thickness from 35 to 67 feet thick. The thicker deposits occur in a north trending bedrock trough centered along Ridge Road. The upper 5 to 15 feet of the till is relatively loose and overlies a much denser till unit. The till unit overlies interbedded sedimentary bedrock comprised of shale, siltstone and limestone. The topography in the area mimics the bedrock topography and slopes to the north-northeast. The water table is shallow occurring at a depth of 2 to 8 feet below ground surface. The vertical hydraulic gradient is downward. The overall directions of groundwater flow are northeast in both the overburden and bedrock aquifers. The ultimate discharge of both the overburden and bedrock aquifers is to the west branch of Limestone Creek located approximately one mile to the east.

The contaminant of concern (COC) for this investigation is 1,4-D. The manufacturing of 1,4-D began in 1929 and it is estimated that 90% of this compound has been used to stabilize the chlorinated solvent 1,1,1-trichloroethane (1,1,1-TCA). While stabilizers have been reportedly used for trichloroethene (TCE), 1,4-D is not specifically identified as the stabilizer used. Some studies have confirmed the presence of 1,4-D at sites with TCE in the groundwater, but the absence of 1,1,1-TCA at these sites could be related to complete degradation of 1,1,1-TCA leaving only TCE.

The source of 1,1,1-TCA at the Abandoned Solvent Center Site appears to be from solvent recycling operations in the 1960s. Specifically, the former building's septic system (tank and leach field) appears to be the primary source of chlorinated aliphatics. During the 1992 Remedial Investigation (RI), prior to

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175 North Corporate Drive, Suite 100, Brookfield, WI 53045
Tel 262.792.1282 Fax 262.792.1310 www.tetratech.com

remediation, the septic tank near the northeast corner of the building foundation was found to contain impacted (i.e., chlorinated aliphatics) liquid and sediment as can be seen from the sampling results provided below. The compounds detected in the septic tank included 1,1,1-TCA and its degradation byproduct 1,1-dichloroethane (1,1-DCA) and TCE and its degradation byproduct 1,2-dichloroethene (1,2-DCE).

1992 Septic Tank Sample Results		
VOCs	Water (ug/L)	Sediment (ug/kg)
Acetone	30,000	ND
1,1-Dichloroethane	27,000	1,200,000
Total 1,2-Dichloroethene	13,000	ND
Methylene chloride	6,800	780,000
1, l, 1-Trichloroethane	160,000	17,000,000
Trichloroethene	89,000	11,000,000
Toluene	8,100	320000 J

During the RI, the only significant 1,1,1-TCA concentrations found in groundwater monitoring wells were in MW-2S (15,000 – 20,000 ug/L) and MW-2I (3,600 – 8,200 ug/L), which are located immediately downgradient of the former septic tank and leach field. Neither of the downgradient off-site wells (MW-5 nest and MW-8 nest) had detectable 1,1,1-TCA. The most recent results from October 2020 show 1,1,1-TCA at only two wells; MW-2S at 55 ug/L and MW-8S at 2.7 ug/L. It was also detected in the treatment system influent below the authorized treatment level at 2.5 ug/L. These results show a significant reduction in 1,1,1-TCA due to anaerobic degradation.

In 2020, samples were collected from groundwater monitoring wells for 1,4-D analysis in February and October. The results are provided on Figure 1. Relatively low (<50 ug/L) to non-detectable concentrations of 1,4-D were found at on-site well nests MW-2 and MW-7. The site treatment system influent was sampled in October 2020 and 1,4-D was detected at 72 ug/L. By comparison, 1,4-D was detected in off-site wells at concentrations ranging from 770 to 870 ug/L at MW-8I and 130 to 930 ug/L at MW-5S. However, there are no VOCs (including 1,1,1-TCA) detected in these wells. The MW-5 and MW-8 locations are aligned with a bedrock trough and downgradient of the former septic tank and leach field source area.

The high concentration of 1,4-D with non-detectable levels of VOCs indicates there is not an off-site VOC DNAPL source for the 1,4-D, otherwise VOCs would also be present. The chemical characteristics of 1,4-D (miscibility in water, low potential for adsorption to organic carbon, and low biodegradation potential under anaerobic conditions) provide a greater mobility than chlorinated solvents released at the same location. At the same time there is significant biodegradation evidence for the compounds 1,1,1-TCA and TCE. Therefore, the off-site presence of 1,4-D appears related to an historic release leaving a remnant 1,4-D plume that has migrated farther than a significantly degraded and attenuated VOC plume.

A potential secondary source of 1,4-D is from the discharge of the groundwater treatment system at the northeast corner of the site to a surface water ditch located adjacent to Route 20. Operation of this system is required by the Administrative Order on Consent (effective August l, 1995) and Partial Consent Decree

(No. 97-CV-0976 dated December 15, 1997) for remedial design and remedial action between the New York State Department of Environmental Conservation (NYSDEC), GE, and BMS. The 1,4-D detections in MW-5/MW-8 nest wells are side gradient and unrelated to this 1,4-D source. Extracted groundwater is currently treated with an air stripper to remove the previously identified COCs. As a result of NYSDEC's emerging contaminant sampling requirements, 1,4-D was identified in the treatment system effluent in the October 2020 quarterly sampling event. Technologies to augment or replace the existing treatment system that are capable of treating for 1,4-D are currently being evaluated. The discharge flows as surface water along the drainage ditch in a northeasterly direction, parallel with Route 20. Infiltration of the surface water discharge to the shallow groundwater table will occur when the water table is low, but groundwater will discharge to the drainage ditch when the water table is high.

Scope of Work

The investigation to delineate the extent of the 1,4-D plume will be carried out in a phased approach starting with an initial scope to delineate 1,4-D in shallow unconsolidated deposits. Depending on those results, additional step-out locations may be sampled as needed to complete the lateral delineation. Once the lateral extent is defined, sampling of deeper unconsolidated deposits and bedrock will be completed.

Pre-Field Investigation Activities

The proposed sampling locations are shown in Figure 1. Access will need to be obtained from applicable property owners and the New York State Department of Transportation (NYSDOT) for locations in the right-of-way. Approved locations will also be cleared for potential buried utilities. Prior to mobilizing to the site, the site Health & Safety Plan will be amended to include activities associated with the proposed scope of work.

Shallow Piezometer Sampling

At the site, pairs of piezometers are installed up and downgradient of the groundwater collection trench and are used to evaluate inward hydraulic gradients. The piezometers are installed to a depth of approximately 20 feet within the shallow unconsolidated deposits. Figure 1 shows the locations of 3 sets of these piezometers (P-1/2, P-3/4 and P-5/6) where samples will be collected using low-flow sampling procedures with a peristaltic pump and dedicated polyethylene tubing for each well. The samples will be analyzed for 1,4-D by Alpha Analytical using Method 8270D SIM. For laboratory comparison, a sample will be collected from well MW-8I for 1,4-D analysis for comparison to previous results analyzed by Eurofins TestAmerica.

Direct Push Vertical Profile Shallow Groundwater Sampling

To determine the lateral extent of 1,4-D in shallow groundwater in the vicinity of MW-5/MW-8 and along the discharge drainage ditch, groundwater samples will be collected using a Geoprobe for direct push sampling. At each sampling location the Geoprobe DT22 dual tube sampling system (DT22 Dual Tube Sampling System SOP | Geoprobe Systems®) will be advanced to collect soil core for lithological characterization. The continuous soil core samples collected from the boreholes will be screened in the field for the presence of VOCs using a photoionization detector (PID) at approximately 6-inch intervals. The soil samples will be logged using the Unified Soil Classification System. Investigation-derived soil waste will be containerized for off-site disposal.

Groundwater samples will be collected using the Geoprobe SP22 screen point groundwater sampler (SP22 Groundwater Sampler SOP | Geoprobe Systems®) at 10-foot intervals beginning at a depth of 10 feet.

Once the leading end of the probe rod reaches the sampling depth, the SP22 screen point will be inserted to that depth and the rod extracted enough to expose the screen. If groundwater is slow to fill the screen interval, the Geoprobe will start at the next location leaving the tools in place to allow time for water to collect. The groundwater samples will be collected from the temporary screen interval using a peristatic pump and dedicated polyethylene tubing or a stainless-steel mini bailer if the water level is deeper than 26 feet (limit of peristaltic pump). The sampling process will be repeated until refusal in the dense till. It is anticipated that samples will be collected at the 20-foot and possibly 30-foot intervals. The groundwater samples will be analyzed by Alpha Analytical for 1,4-D using Method 8270D SIM. For quality control, one duplicate, one trip blank and one equipment (if bailer is used) blank sample will be collected for 1,4-D analysis.

Once the laboratory results are received, the data will be evaluated to determine if data gaps exist in the lateral delineation of the 1,4-D plume. If additional sampling is required, the Geoprobe will be remobilized to collect additional vertical profile samples at step out locations (Phase II) using the same procedures described above. Possible step out locations are shown on Figure 1. Proposed step out sampling locations will be submitted to NYSDEC for approval prior to sampling.

Deep Groundwater Sampling

Based on the results of the shallow plume investigation, a separate work plan will be prepared and submitted for the deeper groundwater investigation. This investigation would include the collection of groundwater samples from the dense till and from the bedrock to define the vertical extent of the 1,4-D plume. Because of the dense till and bedrock, the sample collection would use hollow stem augers and/or rotosonic drilling methods.

Schedule

Upon NYSDEC approval of the work plan, we will begin making arrangements for access from the applicable property owners. The start date for this work will depend on property access, weather and snow cover. The initial phase of direct push sampling will take approximately one week to implement. Recommendations for the subsequent phase of investigation will be provided within four weeks of receipt and validation of laboratory reports.

Please feel free to contact me, if you have any questions.

Tetra Tech, Inc.

Michael R. Noel, P.G.
Vice President, Principal Hydrogeologist

Enclosure

cc: Dan Tucholski, Bureau of Environmental Exposure Investigation - NYSDOH
Bob Gibson, General Electric Company
Richard Mator, Bristol-Myers Squibb Company

	TVOCs	1,4-D
MW-6S		
1995	ND	NS
2/12/2020	ND	0.6
10/30/2020	NS	NS
MW-6D		
1995	ND	NS
2/12/2020	ND	0.15
10/30/2020	NS	NS

MW-6S,D

	TVOCs	1,4-D
MW-5S		
1995	10	NS
2/12/2020	ND	930
10/30/2020	ND	130
MW-5D		
1995	ND	NS
2/12/2020	ND	ND
10/30/2020	ND	ND

MW-5S,D

	TVOCs	1,4-D
MW-8S		
1995	95	NS
2/12/2020	3.7	100
10/30/2020	16.4	100
MW-8I		
1995	ND	NS
2/12/2020	ND	870
10/30/2020	ND	770
MW-8D		
1995	ND	NS
2/12/2020	ND	47
10/30/2020	ND	61

MW-8S,I,D

	TVOCs	1,4-D
MW-11S		
1995	69	NS
2/12/2020	ND	ND
10/30/2020	ND	0.38

	TVOCs	1,4-D
MW-2S		
1995	NS	NS
2/12/2020	1148.1	0.76
10/30/2020	1406	1.2
MW-2I		
1995	140000	NS
2/12/2020	16900	20
10/30/2020	17500	18
MW-2D		
1995	10100	NS
2/12/2020	37.6	6.1
10/30/2020	53	4

	TVOCs	1,4-D
MW-4S		
1995	ND	NS
2/12/2020	ND	ND
10/30/2020	NS	NS
MW-4D		
1995	ND	NS
2/12/2020	ND	ND
10/30/2020	NS	NS

	TVOCs	1,4-D
MW-7S		
1995	61000	NS
2/12/2020	892	40
10/30/2020	3296	47
MW-7I		
1995	46290	NS
2/12/2020	1608	ND
10/30/2020	360.1	NS
MW-7D		
1995	ND	NS
2/12/2020	ND	ND
10/30/2020	ND	ND

	TVOCs	1,4-D
MW-1S		
1995	ND	NS
2/12/2020	ND	ND
10/30/2020	NS	NS
MW-1D		
1995	ND	NS
2/12/2020	ND	ND
10/30/2020	NS	NS

EXPLANATION

- PIEZOMETER
- MONITORING WELL
- STAND PIPE
- GROUNDWATER COLLECTION TRENCH
- GROUNDWATER CUT–OFF WALL
- PIEZOMETER SAMPLE
- DIRECT PUSH GROUNDWATER VERTICAL PROFILE
- STEP OUT LOCATION
- RESIDENTIAL WELL

NOTE:
TOTAL VOC CONCENTRATIONS SHOWN ARE IN PARTS PER BILLION

ND = NOT DETECTED

NS = NOT SAMPLED

J = ESTIMATE VALUE

H = SAMPLE PREPPED OR ANALYZED BEYOND HOLDING TIME

B = ANALYTE IS FOUND IN ASSOCIATED BLANK AS WELL AS SAMPLE

* = LAB CONTROL SAMPLE EXCEEDS CONTROL LIMITS

017.-02-01.4
017.-02-01.5
017.-02-03.0
017.-02-04.0
017.-02-02.0
023.-02-03.0
023.-01-06.0
023.-02-02.0
023.-01-07.0
023.-02-01.1
023.-01-08.0
023.-02-04.2
023.-02-04.8
023.-02-05.0
023.-02-04.1

BUMPUS RESIDENCE WELL
SCALISI RESIDENCE WELL
CHERRY VALLEY TURNPIKE (US ROUTE 20)
RIDGE ROAD (COUNTY ROAD 128)
FACILITY ACCESS ROAD
GROUND WATER TREATMENT SYSTEM BUILDING
LIMIT OF CAPPED AREA
GROUND WATER CUT–OFF WALL
GROUND WATER COLLECTION TRENCH

MW-1S MW-1D MW-2I MW-2D MW-2S MW-4S,D MW-7S MW-7I MW-7D MW-11S P-1 P-2 P-3 P-4 P-5 P-6 P-7 P-8 P-9 P-10 SP-1 SP-2

0 120 240
SCALE IN FEET

NOTE: BASE MAP AND WELL LOCATIONS PROVIDED BY O'BRIEN & GERE FILE NO. 3027.23745–005 MAY 2000

TITLE:
PROPOSED 1,4-DIOXANE GROUNDWATER INVESTIGATION

LOCATION:
Abandoned Solvent Center Site
Pompey, New York

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APPROVED	MRN
DRAFTED	CMP
PROJECT#	117C–GE–00070
DATE	12–04–20

FIGURE
B5

S:\CAD\GE\POMPEY\DECEMBER 2020\PROPOSED 14-D GW INVESTIGATION 12-02-20.DWG