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Mr. Drew Hoffert
Assistant Engineer
Division of Environmental Remediation
New York State Department of Environmental Conservation, Region IV
1130 N. Westcott Road
Schenectady, New York 12306

154189

Subject: Emerging Contaminant Groundwater Sampling Work Plan
Mercury Refining Superfund Site, Colonie, New York

Dear Mr. Hoffert:

On behalf of the Mercury Refining Site Remedial Action Group ("the Group"), and at the direction of de maximis, the Group's Project Coordinator, Brown and Caldwell Associates ("BC") submits this Emerging Contaminant Groundwater Sampling Work Plan (Work Plan) for the Mercury Refining Superfund Site ("Site"). This Work Plan has been prepared in response to a letter from the New York State Department of Environmental Conservation (NYSDEC) dated April 22, 2019 requesting sampling for emerging contaminants at the Site.

This Work Plan provides the means and methods for sampling and analyzing groundwater for 1,4-dioxane and per- and polyfluoroalkyl substances (PFAS). The anticipated work products resulting from the implementation of the Work Plan are discussed herein.

To facilitate review of this Work Plan, a Site Plan depicting the locations of the four existing groundwater monitoring well clusters (MW-ISS-12 through MW-ISS-15) is included in Attachment A (Figure 1). Each monitoring well cluster contains three wells with screened intervals positioned at varying depths to monitor: the shallow groundwater zone (indicated with an "S" after well number designation), the intermediate groundwater zone (indicated with an "I" after well number designation) and the deep groundwater zone (indicated with a "D" after well number designation). Under this plan, five of these wells (12S, 12I, 14S, 14D and 15S) will be sampled.

Background

The April 22, 2019 NYSDEC letter requires the testing for emerging contaminants from a select number of existing monitoring wells. As part of the CERCLA remedy for the Site, quarterly groundwater monitoring has been performed from September 2015 to June 2018. With USEPA and NYSDEC concurrence, future groundwater monitoring will be performed once every five calendar quarters from monitoring wells (MW-ISS-12S, MW-ISS-12I, MW-ISS-14S, MW-ISS-14D, MW-ISS-15S). It is these same five wells that will be sampled under this Plan.

Scope of Work

This Work Plan provides the sample location selection, sample collection, and reporting procedures. Activities performed under this Work Plan will adhere to the following guidance documents:

- Groundwater Sampling for Emerging Contaminants (NYSDEC, July 2018) – Attachment B;
- Collection of Groundwater Sample for Per- and Polyfluoroalkyl Substances (PFAS) from Monitoring Wells Sample Protocol (NYSDEC, August 2018) – Attachment C; and
- Appendix P of the Final Remedial Design Report (100% Submittal), Mercury Refining Superfund Site, Colonie, New York (BC, 2013).

Sample Locations

Consistent with the USEPA groundwater monitoring schedule for the Site, groundwater samples to be analyzed for emerging contaminants will be collected from monitoring wells MW-ISS-12S, MW-ISS-12I, MW-ISS-14S, MW-ISS-14D and MW-ISS-15S. These wells represent:

- One upgradient monitoring well screened in the shallow groundwater zone (MW-ISS-15S);
- One interior monitoring well screened in the shallow groundwater zone (MW-ISS-14S);
- One downgradient monitoring well screened in the shallow groundwater zone (MW-ISS-12S);
- One monitoring well screened in the intermediate groundwater zone (MW-ISS-12I); and
- One monitoring well in the deep groundwater zone (MW-ISS-14D).

Sample Collection and Analysis

Groundwater samples will be collected from the above-listed monitoring wells using low flow methods according to the requirements of the Site-specific USEPA-approved Operation and Maintenance (O&M) Plan. The groundwater samples will be submitted for analysis of 1,4-dioxane and PFAS to evaluate the potential presence of emerging contaminants at the Site. 1,4-dioxane will be analyzed using USEPA SW-846 Method 8270D with the selective ion monitoring (SIM) component of the 8270 analyses being performed to obtain lower detection limits. PFAS will be analyzed using the Modified EPA Method 537 to achieve 2 ng/L (ppt) detection limits. The samples will also be analyzed in the field for pH, specific conductivity, temperature, turbidity, oxidation reduction potential, and dissolved oxygen.

Special precautions will be taken when sampling the wells and collecting the groundwater samples for PFAS analysis. For instance, sampling materials such as Teflon™ lined tubing and waterproofed field clothing (e.g., GORE-TEX®) will not be used/worn to reduce the potential for cross-contamination and false positive sample results as these materials contain PFAS. Due to historical groundwater elevations, it is

assumed that a peristaltic pump will be used with high density polyethylene (HDPE) and silicon tubing to collect each groundwater sample. Sampling equipment components and sample containers will not come in contact with aluminum foil, low density polyethylene (LDPE), glass or polytetrafluoroethylene (PTFE) materials including sample bottle cap liners with a PTFE layer. Each groundwater sample will be placed in laboratory-provided, pre-cleaned HDPE or polypropylene bottles for PFAS and amber glass bottles for 1,4-dioxane.

Quality assurance/quality control samples will include one blind duplicate sample, one matrix spike/matrix spike duplicate sample, and one equipment blank sample at a rate of 1 per 20 samples collected. At a minimum, one equipment blank sample will be collected each day.

Equipment will be decontaminated using detergent and PFAS-free clean water rinse. All clothing worn by sampling personnel must have been laundered multiple times and must not contain waterproofed material. The sampler must wear nitrile gloves while filling and sealing the sample bottles. No waterproof notebooks, food, drinks, or plumbers thread seal tape will be used during sample collection.

Each groundwater sample will be analyzed by TestAmerica Laboratories, Inc., a New York State Department of Health (NYSDOH) environmental laboratory approval program (ELAP) certified laboratory for 1,4-dioxane and the full PFAS Target Analyte List provided in Attachment B. As required by NYSDEC, the reporting limits for PFAS will not exceed 2 ng/l. The method detection limit for 1,4-dioxane will not exceed 0.35 µg/l (ppb).

Data Interpretation and Reporting

Laboratory results for groundwater samples will be forwarded to a qualified data validator for preparation of a Data Usability Summary Report (DUSR). The DUSR will present a summary of data usability, including a discussion of qualified and rejected data and provide recommendations for resampling/reanalysis, as applicable.

A letter report summarizing the results of the emerging contaminants sampling will be provided to the NYSDEC, with a copy to USEPA. The letter report will include the following:

- Description of groundwater sampling activities
- A figure showing the general direction of groundwater flow
- The DUSR
- Tabular summaries of the analytical results
- Category B laboratory reports
- Observations and interpretation of the analytical results.

In addition, the analytical results will be provided to the NYSDEC as an Electronic Data Deliverable (EDD) formatted to the NYSDEC's required specifications. This will include: 1) populating the NYSDEC EDD with the analytical data; 2) validating the EDD using the database software application EQuIS™ from EarthSoft®, Inc.; and 3) submitting the validated EDD to the NYSDEC.

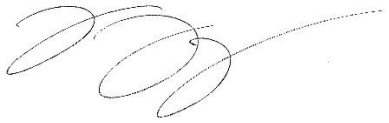
Schedule

Pending approval of this Work Plan, the groundwater sampling is scheduled to take place between October 30 and October 31, 2019.

Please contact Geoff Seibel of de maximis, inc. or me with comments or questions.

Very truly yours,

Brown and Caldwell Associates



Brian Taylor, PG
Professional Hydrogeologist/Project Manager

cc: Thomas Mongelli, USEPA
Kyle Foote, Esq., Mercury Refining Site Remedial Action Group
Geoff Seibel, *de maximis*
Jeff Caputi and Keith Bogatch, BC

Attachments

Attachment A – Site Plan

Attachment B - Groundwater Sampling for Emerging Contaminants (NYSDEC, July 2018)

Attachment C - Collection of Groundwater Sample for Per- and Polyfluoroalkyl Substances (PFAS) from Monitoring Wells Sample Protocol (NYSDEC, August 2018)

Attachment A: Site Plan

0 40 80

SCALE IN FEET

LEGEND:

- MONITORING WELLS (INSTALLED AUGUST 2013)
- MONITORING WELLS (INSTALLED MAY 2015)
- SOIL VAPOR SAMPLING LOCATION
- SEWER MANHOLE
- CURRENT STRUCTURES
- 230 MAJOR GRADE CONTOUR
- 228 MINOR GRADE CONTOUR
- G G UNDERGROUND GAS
- ST ST STORMWATER PIPE (DASHED WHERE INFERRED)
- UE UE UNDERGROUND ELECTRIC
- OHW OVERHEAD WIRE
- x x CHAIN LINK FENCE
- STREAM
- ASPHALT PAVEMENT
- TOWNSHIP LINE
- PROPERTY LINE

NOTES:

1. THE MONITORING WELL CLUSTERS REPRESENT THE LOCATIONS FOR POST-REMEDIATION GROUNDWATER MONITORING. EACH CLUSTER CONSISTS OF A SHALLOW, INTERMEDIATE, AND DEEP WELL.

BENCHMARK:
SQ. CUT IN CONC.
LOADING DOCK
ELEV. : 239.48

CONC. LOADING DOCK

ASPHALT

SEALMASTER FACILITY
PROPERTY

CONC. PAD

MIXED WOODS
18" HARDWOODS

M.W.

CONC. PAD

UNPAVED AREA

SANITARY SEWER MANHOLES

RIM 235.14
INV S. 299.39
SUMP 225.61

FB

RIM 234.79
SUMP 223.62

RIM 234.60
SUMP 223.79

VEHICLE GATE

CONC. PAD

GATE

ASPHALT

6' C.L.F.

CONC.

C.CURB

RIM 234.68
SUMP 230.80

FORMER QUONSET BUILDING HANGAR CONCRETE PAD

GAS LINE

NM 16B

NM 16C
NY1 27C

6' C.L.F.

MERCURY REFINING CO., INC.
PROPERTY

MW-ISS-15I
MW-ISS-15S
MW-ISS-15D

CONC. PAD WITH ELEC. CABINET

PHASE 1 & 1A BUILDING
3 STORY
CONC. BLOCK
BUILDING

CONC. PAD

SV-4
SV-3
SV-1
SV-2

C.CURB

ALLIED BUILDING
PRODUCTS
PROPERTY

STORAGE SHED

TOWN OF COLONIE
TOWN OF GUILDERLAND

GATE

LOCATION OF FORMER
CONTAINER STORAGE
BUILDING (DEMOLISHED)

IN-SITU SOLIDIFICATION/
STABILIZATION AREA

MW-ISS-14I
MW-ISS-14S
MW-ISS-14D

6' C.L.F.

MW-ISS-12I
MW-ISS-12S
MW-ISS-12D

MW-ISS-13I
MW-ISS-13S
MW-ISS-13D

4' C.L.F.

LANDS N/F
MERCURY REFINING CO., INC.

APPROXIMATE EDGE OF STREAM

FLOW DIRECTION

APPROXIMATE EDGE OF STREAM

1.5" FIP

STREAM

INV 216.88
18" CMP

INV 209.23
48" RCP

UNNAMED TRIBUTARY OF
PATROON CREEK

LANDS N/F
CONSOLIDATED RAIL CORP.

Brown AND Caldwell	SCALE: 1" = 40' 148177 DATE: March 16, 2017	MERCURY REFINING SITE SUPERFUND SITE SUPERFUND ID NO. NY00048148175 26 RAILROAD AVENUE COLONIE, NEW YORK GUILDERLAND, NEW YORK	SITE PLAN	FIGURE 1

Attachment B: Groundwater Sampling for Emerging Contaminants (NYSDEC, July 2018)

Groundwater Sampling for Emerging Contaminants

July 2018

Issue: NYSDEC has committed to analyzing representative groundwater samples at remediation sites for emerging contaminants (1,4-dioxane and PFAS) as described in the below guidance.

Implementation

NYSDEC project managers will be contacting site owners to schedule sampling for these chemicals. Only groundwater sampling is required. The number of samples required will be similar to the number of samples where "full TAL/TCL sampling" would typically be required in a remedial investigation. If sampling is not feasible (e.g., the site no longer has any monitoring wells in place), sampling may be waived on a site-specific basis after first considering potential sources of these chemicals and whether there are water supplies nearby.

Upon a new site being brought into any program (i.e., SSF, BCP), PFAS and 1,4-dioxane will be incorporated into the investigation of groundwater as part of the standard "full TAL/TCL" sampling. Until an SCO is established for PFAS, soil samples do not need to be analyzed for PFAS unless groundwater contamination is detected. Separate guidance will be developed to address sites where emerging contaminants are found in the groundwater. The analysis currently performed for SVOCs in soil is adequate for evaluation of 1,4-dioxane, which already has an established SCO.

Analysis and Reporting

Labs should provide a full category B deliverable, and a DUSR should be prepared by an independent 3rd party data validator. QA/QC samples should be collected as required in DER-10, Section 2.3(c). The electronic data submission should meet the requirements provided at: https://www.dec.ny.gov/chemical/62440.html ,

The work plan should explicitly describe analysis and reporting requirements.

PFAS sample analysis: Currently, ELAP does not offer certification for PFAS compounds in matrices other than finished drinking water. However, laboratories analyzing environmental samples (ex. soil, sediments, and groundwater) are required, by DER, to hold ELAP certification for PFOA and PFOS in drinking water by EPA Method 537 or ISO 25101.

Modified EPA Method 537 is the preferred method to use for groundwater samples due to the ability to achieve 2 ng/L (ppt) reporting limits. If contract labs or work plans submitted by responsible parties indicate that they are not able to achieve similar reporting limits, the project manager should discuss this with a DER chemist. Note: Reporting limits for PFOA and PFOS should not exceed 2 ng/L.

PFAS sample reporting: DER has developed a PFAS target analyte list (below) with the intent of achieving reporting consistency between labs for commonly reportable analytes. It is expected that reported results for PFAS will include, at a minimum, all the compounds listed. This list may be updated in the future as new information is learned and as labs develop new capabilities. If lab and/or matrix specific issues are encountered for any particular compounds, the NYSDEC project manager will make case-by-case decisions as to whether particular analytes may be temporarily or permanently discontinued from analysis for each site. Any technical lab issues should be brought to the attention of a NYSDEC chemist.

Some sampling using this full PFAS target analyte list is needed to understand the nature of contamination. It may also be critical to differentiate PFAS compounds associated with a site from other sources of these chemicals. Like routine refinements to parameter lists based on investigative findings, the full PFAS target analyte list may not be needed for all sampling intended to define the extent of contamination. Project managers may approve a shorter analyte list (e.g., just the UCMR3 list) for some reporting on a case by case basis.

1,4-Dioxane Analysis and Reporting: The method detection limit (MDL) for 1,4-dioxane should be no higher than 0.35 µg/l (ppb). Although ELAP offers certification for both EPA Method 8260 SIM and EPA Method 8270 SIM, DER is advising the use of method 8270 SIM. EPA Method 8270 SIM provides a more robust extraction procedure, uses a larger sample volume, and is less vulnerable to interference from chlorinated solvents.

Full PFAS Target Analyte List

Group	Chemical Name	Abbreviation	CAS Number
Perfluoroalkyl sulfonates	**Perfluorobutanesulfonic acid**	**PFBS**	**375-73-5**
	Perfluorohexanesulfonic acid	**PFHxS**	**355-46-4**
	Perfluoroheptanesulfonic acid	PFHpS	375-92-8
	Perfluorooctanessulfonic acid	**PFOS**	**1763-23-1**
	Perfluorodecanesulfonic acid	PFDS	335-77-3
Perfluoroalkyl carboxylates	Perfluorobutanoic acid	PFBA	375-22-4
	Perfluoropentanoic acid	PFPeA	2706-90-3
	Perfluorohexanoic acid	PFHxA	307-24-4
	Perfluoroheptanoic acid	**PFHpA**	**375-85-9**
	Perfluorooctanoic acid	**PFOA**	**335-67-1**
	Perfluorononanoic acid	**PFNA**	**375-95-1**
	Perfluorodecanoic acid	PFDA	335-76-2
	Perfluoroundecanoic acid	PFUA/PFUdA	2058-94-8
	Perfluorododecanoic acid	PFDoA	307-55-1
	Perfluorotridecanoic acid	PFTriA/PFTrDA	72629-94-8
	Perfluorotetradecanoic acid	PFTA/PFTeDA	376-06-7
Fluorinated Telomer Sulfonates	6:2 Fluorotelomer sulfonate	6:2 FTS	27619-97-2
	8:2 Fluorotelomer sulfonate	8:2 FTS	39108-34-4
Perfluorooctane-sulfonamides	Perfluroroctanesulfonamide	FOSA	754-91-6
Perfluorooctane-sulfonamidoacetic acids	N-methyl perfluorooctanesulfonamidoacetic acid	N-MeFOSAA	2355-31-9
	N-ethyl perfluorooctanesulfonamidoacetic acid	N-EtFOSAA	2991-50-6

Bold entries depict the 6 original UCMR3 chemicals

Attachment C: Collection of Groundwater Sample for Per- and Polyfluoroalkyl Substances (PFAS) from Monitoring Wells Sample Protocol (NYSDEC, August 2018)

Brown AND Caldwell

Collection of Groundwater Samples for Per- and Polyfluoroalkyl Substances (PFAS) from Monitoring Wells Sample Protocol

Samples collected using this protocol are intended to be analyzed for perfluorooctanoic acid (PFOA) and other perfluorinated compounds by Modified (Low Level) Test Method 537.

The sampling procedure used must be consistent with the NYSDEC March 1991 Sampling Guidelines and Protocols http://www.dec.ny.gov/docs/remediation_hudson_pdf/sgpsect5.pdf with the following materials limitations.

At this time acceptable materials for sampling include: stainless steel, high density polyethylene (HDPE) and polypropylene. Additional materials may be acceptable if proven not to contain PFAS. **NOTE: Grunfos pumps and some bladder pumps are known to contain PFAS materials (e.g. Teflon™ washers for Grunfos pumps and LDPE bladders for bladder pumps).** All sampling equipment components and sample containers should not come in contact with aluminum foil, low density polyethylene (LDPE), glass or polytetrafluoroethylene (PTFE, Teflon™) materials including sample bottle cap liners with a PTFE layer. Standard two step decontamination using detergent and clean water rinse will be performed for equipment that does come in contact with PFAS materials. Clothing that contains PTFE material (including GORE-TEX®) or that have been waterproofed with PFAS materials must be avoided. Many food and drink packaging materials and "plumbers thread seal tape" contain PFAS.

All clothing worn by sampling personnel must have been laundered multiple times. The sampler must wear nitrile gloves while filling and sealing the sample bottles.

Pre-cleaned sample bottles with closures, coolers, ice, sample labels and a chain of custody form will be provided by the laboratory.

1. Fill two pre-cleaned 250 mL HDPE or polypropylene bottle with the sample.
2. Cap the bottles with an acceptable cap and liner closure system.
3. Label the sample bottles.
4. Fill out the chain of custody.
5. Place in a cooler maintained at 4 ± 2º Celsius.

Collect one equipment blank for every sample batch, not to exceed 20 samples.

Collect one field duplicate for every sample batch, not to exceed 20 samples.

Collect one matrix spike / matrix spike duplicate (MS/MSD) for every sample batch, not to exceed 20 samples.

Request appropriate data deliverable (Category A or B) and an electronic data deliverable.