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GHD Reference No: 006883

October 09, 2024
Revised February 4, 2025

Mr. Aiden Conway
Emergency Remedial Response Division
United States Environmental Protection Agency Region II
290 Broadway, 20th Floor
New York, New York 10007-1866

Evaluation Report – Trial/Partial Biosparge System Shutdown
Hooker Chemical/Ruco Polymer Corporation Site
Index No. II CERCLA-02-2001-2018

Dear Mr. Conway

This submittal provides the monitoring results for the sixth quarterly monitoring event and an evaluation of all data collected from the six events pursuant to the Trial/Partial Biosparge System Shutdown Work Plan dated May 27, 2022 (Work Plan) for the Hooker/Ruco Site in Hicksville, New York, on behalf of Glenn Springs Holdings, Inc. (GSH). The United States Environmental Protection Agency (USEPA) approved the Work Plan on August 18, 2022

The trial shutdown commenced on January 25, 2023. Injection wells IW-3 and IW-4, associated with the north injection well fence, and injection wells IW-16 and IW-17, associated with the middle injection well fence, were shut down. The location of the injection well fences are shown on Figure 1.

Quarterly groundwater sampling for vinyl chloride monomer (VCM), trichloroethylene (TCE), and tetrachloroethylene (PCE) occurred in each of the following monitoring wells during the trial/partial shutdown; MW-61(D2), MW-70(D1 and D2), MW-72(D1 and D2), MW-76 (D1, and D2), MW-81 (D1 and D2), MW-83(D2), MW-75(D1), and MW-87(D2). The locations of the monitored wells are presented on Figure 1. In addition, MW-92D1, located upgradient of the north injection well fence, was sampled during this event.

Sample collection for the first five quarterly events occurred April 19 to May 15, 2023, August 8, 2023, October 25 to November 16, 2023, February 1 and 2, 2024, and April 18 to 23, 2024.

Sample collection for the sixth quarterly event occurred on August 9, 2024. Results are presented in Table 1, as well as results from the previous quarterly events and the two most recent events pre-shutdown. A Quality Assurance/Quality Control (QA/QC) review of the August 2024 results is provided in Attachment A. The electronic deliverables were provided electronically to the USEPA on October 9, 2024. The results are discussed below.

North Injection Well Fence

A summary of VCM concentrations for monitoring wells proximate to the north injection well fence is illustrated in the table below. In addition, Figure 2 presents the most recent VCM concentration for all monitoring wells in in the vicinity of the north injection well fence.

Well	Monitoring Well VCM Concentrations (µg/L) Proximate to North Injection Well Fence							
	Pre-Shutdown		Post Shutdown					
	April 2022	October 2022	April 2023	August 2023	October 2023	February 2024	April 2024	August 2024
MW-75D1	ND	5.5	ND	ND	ND	ND	ND	1.6
MW-72D1	ND	ND	2.1	3.1	3.7	3.3/3.1	3.5	5.2
MW-72D2	ND	ND	ND	ND	ND	ND	ND	ND
MW-70D1	7.1J	ND	1.2	2.9	2.1	6.3	7.2	1.5
MW-70D2	ND	ND	ND	ND	ND	ND	ND	ND
MW-76D1	25	16	12	9.6	9.6	10	13	13
MW-76D2	ND	ND	ND	ND	ND	ND	ND	ND

As shown in the table:

– VCM was not detected in MW-70D2, MW-72D2, and MW-76D2 in the six post-shutdown sampling events.

– VCM was not detected in MW-75D1 in the post-shutdown sampling events except for the last event (1.6 µg/L).

– VCM concentrations in MW-76D1 decreased from pre-shutdown concentrations of 25 µg/L and 16 µg/L to a low of 9.6 µg/L; have been relatively stable (9.6 to 13 µg/L) over the six post shutdown events, and the concentrations are essentially the same between the first (12 µg/L) and last (13 µg/L) post-shutdown events.

– VCM increased in MW-72D1 from non-detect pre-shutdown to 2.1 µg/L in April 2023, remained between 3.1 µg/L and 3.7 µg/L from August 2023 to April 2024, then slightly increased to 5.2 µg/L in August 2024.

– VCM concentrations in MW-70D1 post-shutdown increased from 1.2 µg/L in April 2023 to 7.2 µg/L in April 2024, then decreased to 1.5 µg/L in August 2024.

As indicated previously, MW-92D1 was sampled this event to provide a current VCM concentration upgradient of the north injection well fence. The VCM concentration in this well was 9.0 µg/L, a slight decrease from 9.8 µg/L in October 2023.

South Injection Well Fence

A summary of VCM concentrations for monitoring wells proximate to the south injection well fence is illustrated in the table below. In addition, Figure 2 presents the most recent VCM concentration for all monitoring wells in in the vicinity of the south injection well fence. As shown in the summary table below, VCM was not detected (1 µg/L) in any of these wells during the six quarterly monitoring events except for a few instances in MW-83D2 and MW-87D2 where the detection limit ranged between 2 µg/L and 5 µg/L.

Well	Monitoring Well VCM Concentrations (µg/L) Proximate to South Injection Well Fence							
	Pre-Shutdown		Post-Shutdown					
	April 2022	October 2022	April 2023	August 2023	October 2023	February 2024	April 2024	August 2024
MW-87D2	ND	ND	ND	ND	ND	ND	ND	ND
MW-83D2	ND	ND	ND	ND	ND	ND	ND	ND
MW-61D2	ND	ND	ND	ND	ND	ND	ND	ND
MW-81D1	ND	ND	ND	ND	ND	ND	ND	ND
MW-81D2	ND	ND	ND	ND	ND	ND	ND	ND

Dissolved Oxygen Monitoring

Dissolved oxygen (DO) concentrations for this quarter as well as results from the previous quarterly events and the two most recent events pre-shutdown are presented in Table 1. As shown in Table 1, the DO concentrations are generally stable and for the first six post-shutdown events, all exceeded the target concentration of 2 milligrams/liter (mg/L)[1] with the exception of MW-70D1 (1.82 mg/L in August 2023 and 1.95 mg/L in February 2024), MW-70D2 (1.95 mg/L in February 2024), MW-72D1 (1.71 mg/L in April 2024), MW-75D1 (1.77 mg/L in April 2024), and MW-76D2 (1.7 mg/L in April 2024).

Recommendations

As stated in the Work Plan, rebound for the purpose of the trial shutdown is defined as follows:

– The VCM concentration does not increase above 2 µg/L for two consecutive events at wells MW-61, MW-70, MW-72, MW-76D2, MW-81, and MW-83
– The VCM concentration does not increase in well MW-76D1

Based on the data, rebound may be occurring MW-72D1; however, concentrations are low and within the typical range of fluctuation observed at the monitoring wells over time. The detection of VCM marginally above 2 µg/L in MW-70D1 starting in August 2023 may be indicative of rebound as defined in the Work Plan; however, these concentrations are below the April 2022 concentration and decreased below 2 µg/L in the August 2024 event. Based on the sustained VCM concentrations above 2 µg/L in MW-72D, MW-70D1, and MW-76D1 (13 µg/L and less) and the VCM concentration in upgradient well MW-92D1 (9.0 µg/L), the following is recommended at this time regarding IW-3 and IW-4:

– Terminate the trial shutdown and restart air injections at IW-3 and IW-4
– Continue monitoring concentrations in the trial shutdown monitoring wells MW-70(D1 and D2), MW-72(D1 and D2), MW-76 (D1, and D2), and MW-75(D1)

GSH may request approval to restart the trial shutdown should concentrations decrease in the future.

VCM was not detected in any of the monitoring wells associated with injection wells IW-16 and IW-17 during the six post-shutdown events or the two pre-shutdown events. The most recent detection of VCM in any these occurred in October 2021 (MW-81D1)[2]. Therefore, based on these monitoring data, the trial shutdown of IW-16 and IW-17 has been successful and as such, the following is recommended at this time:

– Continue the trial shutdown at IW-16 and IW-17 for an additional year

[1] Target DO concentration per the "100% Final Design Report, Off-Site Groundwater Biosparge Phase I Treatment System", May 2005, where DO concentration is sufficient for VCM to biodegrade.
[2] Table 2, Semi-Annual Report – 1st Half 2024 (January through June), July 15, 2024

– Continue monitoring concentrations in the trial shutdown monitoring wells MW-61(D2), MW-81 (D1 and D2), MW-83(D2), and MW-87(D2)
– Re-evaluate the trial shutdown of IW-16 and IW-17 after the one-year period

Should you have any questions on the above, please do not hesitate to contact the undersigned at 519-340-4313 or email john.pentilchuk@GHD.com.

Regards

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Project Director

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JS/kf/16

Encl.

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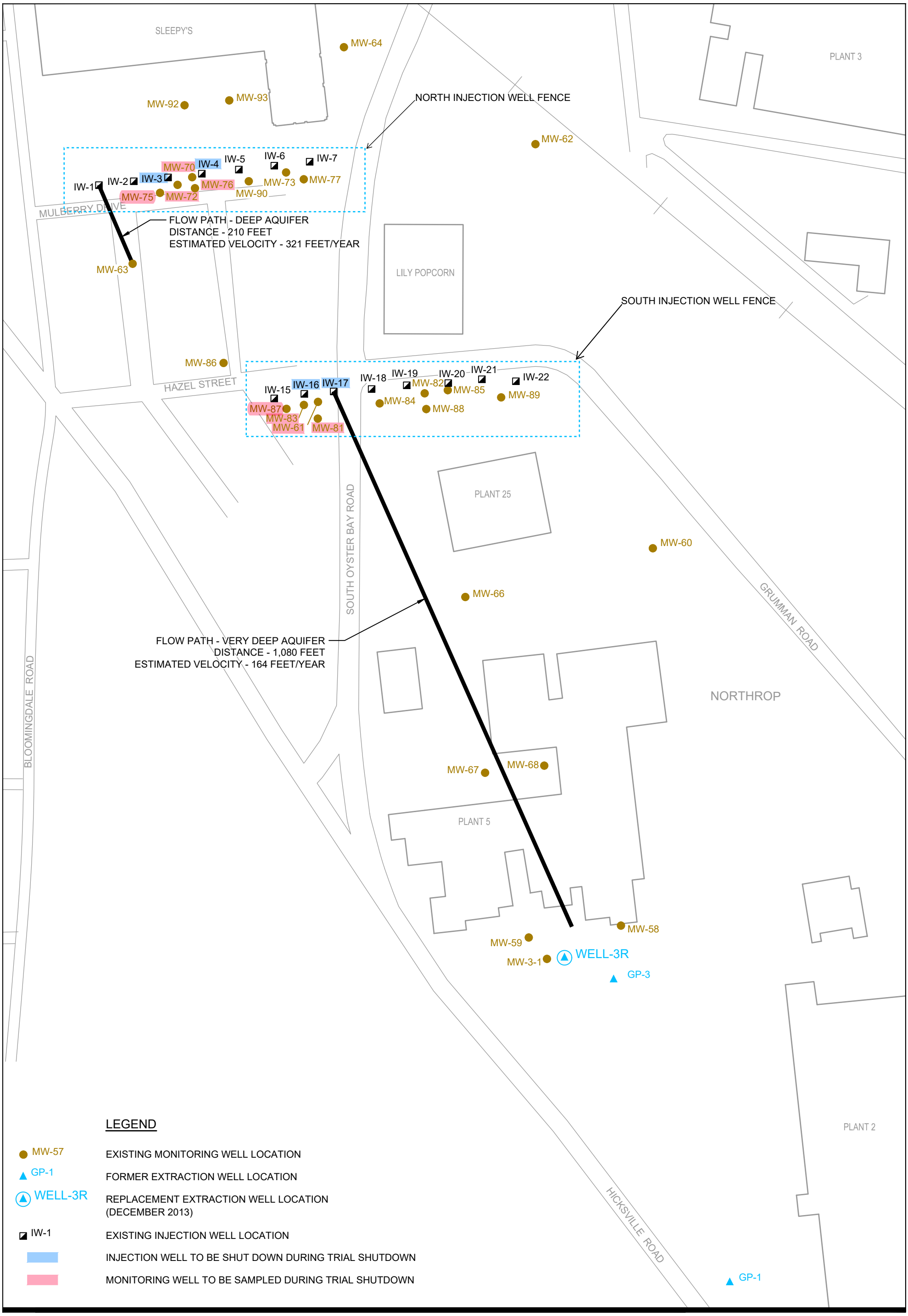

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HOOKER/RUCO SITE

SOUTH OYSTER BAY ROAD

NAVY SITE

PLANT 3

SLEEPY'S

MULBERRY DRIVE

LILY POPCORN

HAZEL STREET

PLANT 25

NORTHROP

GRUMMAN ROAD

PLANT 5

PLANT 2

SITE

HICKSVILLE ROAD

N

0 200 400ft

8/24 | 9.0 MW-92
MW-93 10/23 | 1.5
IW-4
8/24 | 1.5 MW-70
IW-3
IW-2
IW-1
8/24 | 1.6 MW-75
8/24 | 5.2 MW-72
8/24 | 13 MW-76
10/23 | ND MW-63
IW-5 IW-6 IW-7
MW-77 4/24 | ND
MW-73 10/23 | ND
MW-90 4/24 | ND
MW-62 10/23 | 7.1
IW-19
MW-82 4/24 | ND
IW-20
IW-21
IW-22
MW-89 4/24 | ND/ND
MW-85 4/24 | ND
MW-88 4/24 | ND
MW-84 4/24 | ND
IW-17 IW-16 IW-18
4/24 | ND MW-86
IW-15
8/24 | ND MW-87
8/24 | ND MW-83
8/24 | ND MW-61
8/24 | ND MW-81
MW-60 5/13 | ND
10/23 | ND MW-66
4/24 | ND MW-67
MW-68 4/24 | ND
MW-58 4/24 | ND
4/24 | ND MW-59
4/24 | 32.6/39.7 MW-3-1 (2)
WELL-3R (2) 4/24 | 1.7 (1)
▲ GP-3
GP-1 (2) 5/24 | ND

LEGEND

MW-57 — VCM CONCENTRATION AT OR BELOW 2 µg/L OR NON-DETECTED FOR LESS THAN 3 YEARS

MW-57 — VCM CONCENTRATION NON-DETECT FOR MORE THAN 3 YEARS

MW-57 — EXISTING MONITORING WELL LOCATION VCM BELOW 2 µg/L

MW-3-1 — EXISTING MONITORING WELL LOCATION VCM ABOVE 2 µg/L

▲ GP-3 — FORMER EXTRACTION WELL LOCATION

WELL-3R — REPLACEMENT EXTRACTION WELL LOCATION (DECEMBER 2013)

IW-1 — EXISTING INJECTION WELL LOCATION

4/13 | 140 — VCM CONCENTRATION (µg/L); MONTH/YEAR

(1) PUMPING WELL DRAWS GROUNDWATER FROM LARGER SURROUNDING AREA

(2) WELL SAMPLED AND DATA REPORTED BY NORTHROP

GHD

figure 2

MOST RECENT VCM GROUNDWATER CONCENTRATION

Hooker/Ruco Site, Hicksville, New York

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Table 1

Analytical Results
Trial/Partial Biosparge System Shutdown
Hooker Ruco Site
Hicksville, New York

Well	Date Sampled	PCE (µg/L)	TCE (µg/L)	VCM (µg/L)	DO [(1)] (mg/L)
MW-61D2	8/9/2024	84	53	1.0U	9.35
	4/23/2024	69	49	2.0U	9.22
	2/2/2024	85	55	2.0U	10.70
	11/3/2023	130	63	4.0U	14.37
	8/8/2023	93	63	1.0U	NM
	4/20/2023	92	60	1.0U	9.00
	10/27/2022	74	58	1.0U	7.17
	4/21/2021	66.1	42.3	1.0U	4.31
MW-70D1	8/9/2024	1.0U	1.0U	1.5	4.55
	4/18/2024	1.0U	1.0U	7.20	5.1
	2/1/2024	1.0U	1.0U	6.3	1.95
	10/30/2023	1.0U	1.0U	2.1	5.99
	8/8/2023	1.0U	1.0U	2.9	1.82
	4/20/2023	1.0U	1.0U	1.2	4.34
	10/25/2022	0.36U	0.46U	1.0U	2.73
	5/10/2022	1.0U	1.0U	7.1J	3.77
MW-70D2	8/9/2024	0.38J	1.0U	1.0U	3.38
	4/18/2024	1.0U	1.0U	1.0U	2.44
	2/1/2024	1.0U	1.0U	1.0U	1.95
	10/30/2023	1.0U	1.0U	1.0U	6.88
	8/8/2023	1.7	0.47J	1.0U	8.89
	4/20/2023	4.9	4.5	1.0U	3.68
	10/25/2022	1.9	3.4	1.0U	1.40
	5/10/2022	3.3	5.2	1.0UJ	4.85
MW-72D1	8/9/2024	1.0U	1.7	5.2	9.85
	4/18/2024	1.0U	1.5	3.5	1.71
	2/1/2024	0.49J/0.48J	1.6/1.6	3.3/3.1	3.24
	10/30/2023	1.0U	2.6	3.7	8.21
	8/8/2023	0.36J	2.4	3.1	5.24
	4/20/2023	1.0U	1.4	2.1	13.07
	5/15/2020	1.0U	1.0U	1.0U	9.43
	10/14/2019	1.0U	1.0U	1.0U	0.64
MW-72D2	8/9/2024	16/25	2.6/2.7	1.0U/1.0U	6.91
	4/18/2024	27	3.4	1.0U	4.21
	2/1/2024	30	2.9	1.0U	3.65
	10/30/2023	20	3	1.0U	7.72
	8/8/2023	12	2.8	1.0U	3.09
	4/20/2023	16	3.1	1.0U	6.97
	10/25/2022	13	3.2	1.0U	6.34
	5/11/2022	37	5.6	1.0U	10.49

Table 1

Analytical Results
Trial/Partial Biosparge System Shutdown
Hooker Ruco Site
Hicksville, New York

Well	Date Sampled	PCE (µg/L)	TCE (µg/L)	VCM (µg/L)	DO [(1)] (mg/L)
MW-75D1	8/9/2024	1.0U	1.0U	1.6	2.25
	4/18/2024	1.0U	1.0U	1.0U	1.77
	2/1/2024	1.0U	1.0U	1.0U	2.42
	10/30/2023	1.0U	1.0U	1.0U	4.39
	8/8/2023	1.0U	1.0U	1.0U	4.22
	4/20/2023	1.0U	1.0U	1.0U	5.37
	10/25/2022	0.36U	0.46U	5.5	0.98
	5/11/2022	1.0U	1.0U	1.0UJ	8.27
MW-76D1	8/9/2024	1.0U	1.2	13	3.33
	4/18/2024	1.0U	1.3	13	4.35
	2/1/2024	1.0U	1.2	10	2.98
	10/30/2023	1.0U	1.2	9.6	6.42
	8/8/2023	1.0U	1.4	9.6	7.26
	4/20/2023	1.0U	1.1	12	6.21
	10/25/2022	1.0U	1.3	16	4.99
	5/11/2022	1.0U	0.99J	25J	2.15
MW-76D2	8/9/2024	20	11	1.0U	3.13
	4/18/2024	14	9.8	1.0U	1.7
	2/1/2024	20	9.0	1.0U	2.27
	10/30/2023	13	7.7	1.0U	5.95
	8/8/2023	1.6	1.0U	1.0U	9.59
	4/20/2023	1.2	1.0U	1.0U	5.69
	10/25/2022	8.1	4.2	1.0U	4.02
	5/11/2022	1.7	0.97J	1.0U	2.48
MW-81D1	8/9/2024	36	32	1.0U	10.79
	4/23/2024	26	30	1.0U	10.18
	2/2/2024	19	19	1.0U	10.74
	11/3/2023	27	25	1.0U	14.33
	8/8/2023	26	21	1.0U	13.31
	4/25/2023	30	19	1.0U	20.03
	10/28/2022	27	20	1.0U	9.70
	5/13/2022	40	35	1.0U	15.97
MW-81D2	8/9/2024	28	12	1.0U	3.5
	4/23/2024	26	7.7	1.0U	3.02
	2/2/2024	28	4.6	1.0U	4.17
	11/3/2023	20	2.7	1.0U	6.81
	8/8/2023	35	23	1.0U	2.35
	4/25/2023	10	8.5	1.0U	3.86
	10/28/2022	21	5.9	1.0U	9.7
	5/13/2022	13	11	1.0U	2.73

Table 1

Analytical Results
Trial/Partial Biosparge System Shutdown
Hooker Ruco Site
Hicksville, New York

Well	Date Sampled	PCE (µg/L)	TCE (µg/L)	VCM (µg/L)	DO (1) (mg/L)
MW-83D2	8/9/2024	74	110	2.0U	5.33
	4/23/2024	63	100	4.0U	4.86
	2/1/2024	57	94	4.0U	5.51
	11/3/2023	89	110	1.0U	8.40
	8/8/2023	89	130	1.0U	3.47
	4/21/2023	84	130	1.0U	5.87
	10/28/2022	69	120	1.8U	7.44
	5/12/2022	140	130	4.0U	6.99
MW-87D2	8/9/2024	130	14	1.0U	4.82
	4/23/2024	79	7.7	2.0U	4.49
	2/1/2024	210	20	5.0U	5.32
	11/3/2023	250	18	1.0U	8.09
	8/8/2023	230	16	1.0U	6.82
	4/21/2023	190	13	1.0U	6.10
	10/27/2022	200	22	3.6U	3.46
	5/13/2022	180	20	5.0U	7.00

Notes:

(1) - Dissolved oxygen measure in the field via super sleeve sampler retrieved from well screen interval
U - Not detected at associated value
J - Estimated concentration
NM - Not measured due to super sleeve sampler tearing during retrieval
- Post-shutdown sampling event. Shutdown commenced January 25, 2023
- Pre-shutdown sampling event

Attachment A

August 2024 Analytical Data Validation

Data Validation Report

September 26, 2024

To	John Pentilchuk	**Contact No.**	716-205-1990
From	Michelle Kukta/cs/14	**Email**	Michelle.Kukta@ghd.com
Subject	Analytical Results and Full Validation Q3 OU-3 Trial Shutdown Groundwater Monitoring Hooker Chemical/Ruco Polymer Superfund Site Glenn Springs Holdings, Inc Hicksville, New York August 2024	**Project No.**	11224973

The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

1. Introduction

This document details a full validation of analytical results for groundwater samples collected in support of the Q3 OU-3 Trial Shutdown Groundwater Monitoring at the Hicksville, New York site during August 2024. Samples were submitted to Eurofins Buffalo laboratory located in Amherst, New York. A sample collection and analysis summary is presented in Table 1. The validated analytical results are summarized in Table 2. A summary of the analytical methodology is presented in Table 3.

Full Contract Laboratory Program (CLP) equivalent raw data deliverables were provided by the laboratory. Evaluation of the data was based on information obtained from the finished data sheets, raw data, chain of custody forms, calibration data, blank data, recovery data from surrogate spikes/laboratory control samples (LCS)/matrix spike (MS) samples, and field quality assurance/quality control (QA/QC) samples. The assessment of analytical and in-house data included checks for data consistency (by observing comparability of duplicate analyses), adherence to accuracy and precision criteria, and transmittal errors.

The QA/QC criteria by which these data have been assessed are outlined in the analytical method referenced in Table 3 and applicable guidance from the documents entitled:

i) “Hooker Chemicals/Ruco Polymers Superfund Site Quality Assurance Project Plan (QAPP)", Revision 5, July 2022

ii) “National Functional Guidelines for Organic Superfund Methods Data Review", United States Environmental Protection Agency (USEPA), 540-R-20-005, November 2020

2. Sample Holding Time and Preservation

The sample holding time criteria for the analysis is summarized in Table 3. Sample chain of custody documents and analytical reports were used to determine sample holding times. All samples were analyzed within the required holding time.

All samples were properly preserved, delivered on ice, and stored by the laboratory at the required temperature (0-6°C).

3. Gas Chromatography/Mass Spectrometer (GC/MS) – Tuning and Mass Calibration

3.1 Organic Analyses

Prior to volatile organic compound (VOC) analysis, GC/MS instrumentation is tuned to ensure optimization over the mass range of interest. To evaluate instrument tuning, the method requires the analysis of the specific tuning compound bromofluorobenzene (BFB). The resulting spectra must meet the criteria cited in the method before analysis is initiated. Analysis of the tuning compound must then be repeated every 12 hours throughout sample analysis to ensure the continued optimization of the instrument.

The tuning compound was analyzed at the required frequency throughout VOC analysis periods. All tuning criteria were met indicating that proper optimization of the instrumentation was achieved.

4. Initial Calibration - Organic Analyses

To quantify VOCs of interest in samples, calibration of the GC/MS over a specific concentration range must be performed. Initially, a five-point calibration curve containing all compounds of interest is analyzed to characterize instrument response for each analyte over a specific concentration range. Linearity of the calibration curve and instrument sensitivity are evaluated against the following criteria:

i) All relative response factors (RRFs) must be greater than or equal to the method acceptance criteria

ii) The percent relative standard deviation (%RSD) values must not exceed 20.0 percent or a minimum coefficient of determination (R^2) of 0.990 if linear and quadratic regression calibration curves are used

The initial calibration data for VOCs were reviewed. All compounds met the criteria for sensitivity and linearity.

5. Continuing Calibration - Organic Analyses

To ensure that instrument calibration for VOC analyses is acceptable throughout the sample analysis period, continuing calibration standards must be analyzed and compared to the initial calibration curve every 12 hours. Stability of the calibration curve and instrument sensitivity are evaluated against the following criteria:

i) All RRF values must meet the criteria outlined in the analytical method

ii) Percent difference (%D) values must not exceed 20 percent, or the criteria outlined in the analytical method

Calibration standards were analyzed at the required frequency, and most results met the method criteria for instrument sensitivity and stability. 2-Butanone showed some variability from the initial calibration in one continuing calibration standard. Sample results associated with the outlying percent difference value were qualified as estimated (J) (see Table 4).

6. Laboratory Blank Analyses

Method blanks are prepared from a purified matrix and analyzed with investigative samples to determine the existence and magnitude of sample contamination introduced during the analytical procedures.

For this study, laboratory method blanks were analyzed at a minimum frequency of 1 per 20 investigative samples and/or 1 per analytical batch.

All method blank results were non-detect, indicating that laboratory contamination was not a factor for this investigation.

7. Surrogate Spike Recoveries

In accordance with the method employed, all samples, blanks, and QC samples analyzed for organics are spiked with surrogate compounds prior to sample analysis. Surrogate recoveries provide a means to evaluate the effects of laboratory performance on individual sample matrices.

All samples submitted for VOC determinations were spiked with the appropriate number of surrogate compounds prior to sample analysis.

Surrogate recoveries were assessed against laboratory control limits. All surrogate recoveries were within the laboratory control limits.

8. Internal Standards (IS) Analyses

IS data were evaluated for all VOC sample analyses.

To ensure that changes in the GC/MS sensitivity and response do not affect sample analysis results, IS compounds are added to each sample prior to analysis. All results are then calculated as a ratio of the IS responses.

The sample IS results were evaluated against the following criteria:

i) The retention time of the IS must not vary more than ±10 seconds from the associated calibration standard.

ii) IS area counts must not vary by more than a factor of two (50 percent to +100 percent) from the associated calibration standard.

All organic IS recoveries and retention times met the above criteria.

9. Laboratory Control Sample Analyses

LCS or LCS/laboratory control sample duplicates (LCSD) are prepared and analyzed as samples to assess the analytical efficiencies of the methods employed, independent of sample matrix effects. The relative percent difference (RPD) of the LCS/LCSD recoveries is used to evaluate analytical precision. High LCS recoveries and/or RPDs do not impact any associated non-detect sample results.

For this study, LCS were analyzed at a minimum frequency of one per analytical batch.

The LCS contained all compounds of interest. Most LCS recoveries were within the laboratory control limits, demonstrating acceptable analytical accuracy and precision. The LCSD recovery and RPD of acetone were outside control limits in one analytical batch. The associated positive sample result has been qualified as estimated based on the implied high bias (J+) (see Table 5).

10. Matrix Spike/Matrix Spike Duplicate (MS/MSD) Analyses

To evaluate the effects of sample matrices on the preparation process, measurement procedures, and accuracy of a particular analysis, samples are spiked with a known concentration of the analyte of concern and analyzed as

MS/MSD samples. The RPD between the MS and MSD is used to assess analytical precision. If only the MS or MSD recovery was outside of control limits, no qualification of the data was performed based on the acceptable recovery of the companion spike and the acceptable RPD. High MS recoveries do not impact any associated non-detect sample results.

MS/MSD analyses were performed as specified in Table 1.

The MS/MSD samples were spiked with all compounds of interest. All percent recoveries and RPD values were within the laboratory control limits, demonstrating acceptable analytical accuracy and precision.

11. Field QA/QC Samples

The field QA/QC consisted of one trip blank sample and one field duplicate sample set.

11.1 Trip Blank Sample Analysis

To evaluate contamination from sample collection, transportation, storage, and analytical activities, one trip blank sample was submitted to the laboratory for analysis. All results were non-detect for the compounds of interest.

11.2 Field Duplicate Sample Analysis

To assess the analytical and sampling protocol precision, one field duplicate sample set was collected and submitted "blind" to the laboratory, as specified in Table 1. The RPDs associated with the duplicate sample must be less than 50 percent for water samples. If the reported concentration in either the investigative sample or its duplicate is less than five times the reporting limit (RL), the evaluation criterion is the RL value for water samples.

All field duplicate results were within acceptable agreement and met the above criteria, demonstrating acceptable sampling and analytical precision.

12. Analyte Reporting

The laboratory reported detected results down to the sample-specific method detection limit (MDL) for each analyte. Positive analyte detections less than the RL but greater than the MDL were qualified as estimated (J) in Table 2. Non-detect results were presented as non-detect at the RL in Table 2.

13. Target Compound Identification

To minimize erroneous compound identification during organic analyses, qualitative criteria including compound retention time and mass spectra were evaluated according to the identification criteria established by the method. The samples identified in Table 1 were reviewed. The organic compounds reported adhered to the specified identification criteria.

14. Conclusion

Based on the assessment detailed in the foregoing, the data summarized in Table 2 are acceptable with the specific qualifications noted herein.

Regards,

Michelle Kukta
Data Management Team Leader - Chemistry and Data Validation

Table 1

Sample Collection and Analysis Summary
Q3 OU-3 Trial Shutdown Groundwater Monitoring
Hooker Chemical/Ruco Polymer Superfund Site
Glenn Springs Holdings, Inc.
Hicksville, New York
August 2024

					Parameter	
Sample Identification	**Location**	**Matrix**	**Collection Date (mm/dd/yyyy)**	**Collection Time (hr:min)**	**VOCs**	**Comments**
GW080924CZ001	MW-92D1	Groundwater	08/09/2024	08:15	X	
GW080924CZ002	MW-72D1	Groundwater	08/09/2024	08:45	X	
GW080924CZ003	MW-72D2	Groundwater	08/09/2024	09:15	X	
GW080924CZ004	MW-70D1	Groundwater	08/09/2024	09:50	X	
GW080924CZ005	MW-70D2	Groundwater	08/09/2024	10:15	X	MS/MSD
GW080924CZ006	MW-76D1	Groundwater	08/09/2024	10:50	X	
GW080924CZ007	MW-76D2	Groundwater	08/09/2024	11:15	X	
GW080924CZ008	MW-75D1	Groundwater	08/09/2024	11:45	X	
GW080924CZ009	MW-87D2	Groundwater	08/09/2024	12:45	X	
GW080924CZ00X	MW-72D1	Groundwater	08/09/2024	00:00	X	FD(GW080924CZ002)
GW080924CZ010	MW-83D2	Groundwater	08/09/2024	13:15	X	
GW080924CZ011	MW-81D1	Groundwater	08/09/2024	13:45	X	
GW080924CZ012	MW-81D2	Groundwater	08/09/2024	14:45	X	
GW080924CZ013	MW-61D2	Groundwater	08/09/2024	15:15	X	
Trip Blank -01	-	Water	08/09/2024	-	X	Trip Blank

Notes:

FD - Field Duplicate Sample of sample in parenthesis
MS/MSD - Matrix Spike/Matrix Spike Duplicate
VOCs - Volatile Organic Compounds
"-" - Not applicable

Analytical Results Summary
Q3 OU-3 Trial Shutodwn Groundwater Monitoring
Hooker Chemical/Ruco Polymer Superfund Site
Glenn Springs Holdings, Inc.
Hicksville, New York
August 2024

Location ID:		**MW-61D2**	**MW-70D1**	**MW-70D2**	**MW-72D1**	**MW-72D2**
Sample Name:		**GW080924CZ013**	**GW080924CZ004**	**GW080924CZ005**	**GW080924CZ002**	**GW080924CZ003**
Sample Date:		**08/09/2024**	**08/09/2024**	**08/09/2024**	**08/09/2024**	**08/09/2024**
Parameters	**Unit**					
Volatile Organic Compounds						
1,1,1-Trichloroethane	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,1,2,2-Tetrachloroethane	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,1,2-Trichloroethane	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,1-Dichloroethane	µg/L	0.96 J	1.0 U	1.0 U	1.0 U	1.0 U
1,1-Dichloroethene	µg/L	0.60 J	1.0 U	1.0 U	1.0 U	1.0 U
1,2-Dichloroethane	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,2-Dichloroethene (total)	µg/L	3.8	2.0 U	2.0 U	1.3 J	2.9
1,2-Dichloropropane	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
2-Butanone (Methyl ethyl ketone) (MEK)	µg/L	9.9 J	11	11	11	10 U
2-Hexanone	µg/L	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	µg/L	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Acetone	µg/L	48	48	63	58	28
Benzene	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Bromodichloromethane	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Bromoform	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Bromomethane (Methyl bromide)	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Carbon disulfide	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Carbon tetrachloride	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Chlorobenzene	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Chloroethane	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U

Analytical Results Summary
Q3 OU-3 Trial Shutodwn Groundwater Monitoring
Hooker Chemical/Ruco Polymer Superfund Site
Glenn Springs Holdings, Inc.
Hicksville, New York
August 2024

	Location ID:	MW-61D2	MW-70D1	MW-70D2	MW-72D1	MW-72D2
	Sample Name:	GW080924CZ013	GW080924CZ004	GW080924CZ005	GW080924CZ002	GW080924CZ003
	Sample Date:	08/09/2024	08/09/2024	08/09/2024	08/09/2024	08/09/2024
Parameters	**Unit**					
Volatile Organic Compounds						
Chloroform (Trichloromethane)	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Chloromethane (Methyl chloride)	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
cis-1,2-Dichloroethene	µg/L	3.8	1.0 U	1.0 U	1.3	2.9
cis-1,3-Dichloropropene	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Dibromochloromethane	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Ethylbenzene	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
m&p-Xylenes	µg/L	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Methylene chloride	µg/L	1.0 U	1.0 U	0.62 J	1.0 U	1.0 U
o-Xylene	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Styrene	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Tetrachloroethene	µg/L	84	1.0 U	0.38 J	1.0 U	16
Toluene	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
trans-1,2-Dichloroethene	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
trans-1,3-Dichloropropene	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Trichloroethene	µg/L	53	1.0 U	1.0 U	1.7	2.6
Vinyl chloride	µg/L	1.0 U	1.5	1.0 U	5.2	1.0 U
Xylenes (total)	µg/L	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U

Analytical Results Summary
Q3 OU-3 Trial Shutodwn Groundwater Monitoring
Hooker Chemical/Ruco Polymer Superfund Site
Glenn Springs Holdings, Inc.
Hicksville, New York
August 2024

Location ID:		**MW-72D2**	**MW-75D1**	**MW-76D1**	**MW-76D2**	**MW-81D1**
Sample Name:		**GW080924CZ00X**	**GW080924CZ008**	**GW080924CZ006**	**GW080924CZ007**	**GW080924CZ011**
Sample Date:		**08/09/2024**	**08/09/2024**	**08/09/2024**	**08/09/2024**	**08/09/2024**
		Duplicate				
Parameters	**Unit**					
Volatile Organic Compounds						
1,1,1-Trichloroethane	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,1,2,2-Tetrachloroethane	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,1,2-Trichloroethane	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,1-Dichloroethane	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,1-Dichloroethene	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,2-Dichloroethane	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,2-Dichloroethene (total)	µg/L	2.9	2.0 U	2.6	1.1 J	2.4
1,2-Dichloropropane	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
2-Butanone (Methyl ethyl ketone) (MEK)	µg/L	10 U	10 U	10 U	9.4 J	11
2-Hexanone	µg/L	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	µg/L	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Acetone	µg/L	29	30	27	56	47
Benzene	µg/L	1.0 U	0.49 J	1.0 U	1.0 U	1.0 U
Bromodichloromethane	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Bromoform	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Bromomethane (Methyl bromide)	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Carbon disulfide	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Carbon tetrachloride	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Chlorobenzene	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Chloroethane	µg/L	1.0 U	0.43 J	1.0 U	0.69 J	0.66 J

Table 2

Analytical Results Summary
Q3 OU-3 Trial Shutodwn Groundwater Monitoring
Hooker Chemical/Ruco Polymer Superfund Site
Glenn Springs Holdings, Inc.
Hicksville, New York
August 2024

Location ID:		**MW-72D2**	**MW-75D1**	**MW-76D1**	**MW-76D2**	**MW-81D1**
Sample Name:		**GW080924CZ00X**	**GW080924CZ008**	**GW080924CZ006**	**GW080924CZ007**	**GW080924CZ011**
Sample Date:		**08/09/2024**	**08/09/2024**	**08/09/2024**	**08/09/2024**	**08/09/2024**
		Duplicate				
Parameters	**Unit**					
Volatile Organic Compounds						
Chloroform (Trichloromethane)	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Chloromethane (Methyl chloride)	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
cis-1,2-Dichloroethene	µg/L	2.9	1.0 U	2.6	1.1	2.4
cis-1,3-Dichloropropene	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Dibromochloromethane	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Ethylbenzene	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
m&p-Xylenes	µg/L	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Methylene chloride	µg/L	1.0 U	1.0 U	0.45 J	1.0 U	1.0 U
o-Xylene	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Styrene	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Tetrachloroethene	µg/L	25	1.0 U	1.0 U	20	36
Toluene	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
trans-1,2-Dichloroethene	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
trans-1,3-Dichloropropene	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Trichloroethene	µg/L	2.7	1.0 U	1.2	11	32
Vinyl chloride	µg/L	1.0 U	1.6	13	1.0 U	1.0 U
Xylenes (total)	µg/L	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U

Table 2

Analytical Results Summary
Q3 OU-3 Trial Shutodwn Groundwater Monitoring
Hooker Chemical/Ruco Polymer Superfund Site
Glenn Springs Holdings, Inc.
Hicksville, New York
August 2024

Location ID:		**MW-81D2**	**MW-83D2**	**MW-87D2**	**MW-92D1**
Sample Name:		**GW080924CZ012**	**GW080924CZ010**	**GW080924CZ009**	**GW080924CZ001**
Sample Date:		**08/09/2024**	**08/09/2024**	**08/09/2024**	**08/09/2024**
Parameters	**Unit**				
Volatile Organic Compounds					
1,1,1-Trichloroethane	µg/L	1.0 U	2.0 U	1.0 U	1.0 U
1,1,2,2-Tetrachloroethane	µg/L	1.0 U	2.0 U	1.0 U	1.0 U
1,1,2-Trichloroethane	µg/L	1.0 U	2.0 U	1.0 U	1.0 U
1,1-Dichloroethane	µg/L	0.52 J	2.0 U	1.0 U	1.0 U
1,1-Dichloroethene	µg/L	1.0 U	1.1 J	0.40 J	1.0 U
1,2-Dichloroethane	µg/L	1.0 U	2.0 U	1.0 U	1.0 U
1,2-Dichloroethene (total)	µg/L	7.4	12	10	1.6 J
1,2-Dichloropropane	µg/L	1.0 U	2.0 U	1.0 U	1.0 U
2-Butanone (Methyl ethyl ketone) (MEK)	µg/L	11	4.6 J	10	8.5 J
2-Hexanone	µg/L	5.0 U	10 U	5.0 U	5.0 U
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	µg/L	5.0 U	10 U	5.0 U	5.0 U
Acetone	µg/L	68	43 J+	36	55
Benzene	µg/L	1.0 U	2.0 U	1.0 U	1.0 U
Bromodichloromethane	µg/L	1.0 U	2.0 U	1.0 U	1.0 U
Bromoform	µg/L	1.0 U	2.0 U	1.0 U	1.0 U
Bromomethane (Methyl bromide)	µg/L	1.0 U	2.0 U	1.0 U	1.0 U
Carbon disulfide	µg/L	1.0 U	2.0 U	1.0 U	1.0 U
Carbon tetrachloride	µg/L	1.0 U	2.0 U	1.0 U	1.0 U
Chlorobenzene	µg/L	1.0 U	2.0 U	1.0 U	1.0 U
Chloroethane	µg/L	1.0 U	2.0 U	1.0 U	1.0 U

Table 2

Analytical Results Summary
Q3 OU-3 Trial Shutodwn Groundwater Monitoring
Hooker Chemical/Ruco Polymer Superfund Site
Glenn Springs Holdings, Inc.
Hicksville, New York
August 2024

Location ID:		**MW-81D2**	**MW-83D2**	**MW-87D2**	**MW-92D1**
Sample Name:		**GW080924CZ012**	**GW080924CZ010**	**GW080924CZ009**	**GW080924CZ001**
Sample Date:		**08/09/2024**	**08/09/2024**	**08/09/2024**	**08/09/2024**
Parameters	**Unit**				
Volatile Organic Compounds					
Chloroform (Trichloromethane)	µg/L	1.0 U	2.0 U	1.0 U	1.0 U
Chloromethane (Methyl chloride)	µg/L	1.0 U	2.0 U	1.0 U	1.0 U
cis-1,2-Dichloroethene	µg/L	7.4	12	10	1.6
cis-1,3-Dichloropropene	µg/L	1.0 U	2.0 U	1.0 U	1.0 U
Dibromochloromethane	µg/L	1.0 U	2.0 U	1.0 U	1.0 U
Ethylbenzene	µg/L	1.0 U	2.0 U	1.0 U	1.0 U
m&p-Xylenes	µg/L	2.0 U	4.0 U	2.0 U	2.0 U
Methylene chloride	µg/L	1.0 U	2.0 U	1.0 U	1.0 U
o-Xylene	µg/L	1.0 U	2.0 U	1.0 U	1.0 U
Styrene	µg/L	1.0 U	2.0 U	1.0 U	1.0 U
Tetrachloroethene	µg/L	28	74	130	1.0 U
Toluene	µg/L	1.0 U	2.0 U	1.0 U	1.0 U
trans-1,2-Dichloroethene	µg/L	1.0 U	2.0 U	1.0 U	1.0 U
trans-1,3-Dichloropropene	µg/L	1.0 U	2.0 U	1.0 U	1.0 U
Trichloroethene	µg/L	12	110	14	2.0
Vinyl chloride	µg/L	1.0 U	2.0 U	1.0 U	9.0
Xylenes (total)	µg/L	2.0 U	4.0 U	2.0 U	2.0 U

Notes:

U - Not detected at the associated reporting limit
J - Estimated concentration
J+ - Estimated concentration; implied high bias

Table 3

Analytical Methods
Q3 OU-3 Trial Shutdown Groundwater Monitoring
Hooker Chemical/Ruco Polymer Superfund Site
Glenn Springs Holdings, Inc.
Hicksville, New York
August 2024

Parameter	Method	Matrix	Holding Time Collection to Analysis (Days)
Volatile Organic Compounds (VOCs)	SW-846 8260C	Groundwater	14

Method Reference:

SW-846 - "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", SW-846, Third Edition, 1986, with subsequent revisions

Table 4

Qualified Sample Results Due to Outlying Continuing Calibration Results
Q3 OU-3 Trial Shutdown Groundwater Monitoring
Hooker Chemical/Ruco Polymer Superfund Site
Glenn Springs Holdings, Inc.
Hicksville, New York
August 2024

Parameter	Analyte	Calibration Date (mm/dd/yyyy)	RRF	%D	Associated Sample ID	Qualified Result	Units
VOCs	2-Butanone (Methyl ethyl ketone)	08/16/2024	1.177	25	GW080924CZ009	12 J	µg/L
					GW080924CZ010	4.6 J	µg/L

Notes:

%D - Percent difference
RRF - Relative Response Factor
J - Estimated concentration
VOCs - Volatile Organic Compounds

Table 5

Qualified Sample Results Due to Outlying LCS/LCSD Results
Q3 OU-3 Trial Shutdown Groundwater Monitoring
Hooker Chemical/Ruco Polymer Superfund Site
Glenn Springs Holdings, Inc.
Hicksville, New York
August 2024

Parameter	Analyte	LCS Date (mm/dd/yyyy)	LCS % Recovery	LCSD % Recovery	RPD (percent)	Control Limits % Recovery	Control Limits RPD	Associated Sample ID	Qualified Result	Units
VOCs	Acetone	08/16/2024	96	147	42	56-142	15	GW080924CZ010	43 J+	µg/L

Notes:

LCS - Laboratory Control Sample
LCSD - Laboratory Control Sample Duplicate
RPD - Relative Percent Difference
J+ - Estimated concentration; implied high bias
VOCs - Volatile Organic Compounds