



ENVIRONMENTAL GROUP, INC.
ENGINEERING, ARCHITECTURE & SURVEYING, PC

October 03, 2016

Mr. James Drumm, Project Manager
New York State Department of Environmental Conservation
Division of Environmental Remediation
625 Broadway, 12th Floor
Albany, New York 12233-7016

**Re: Dynamic Systems Inc. DEC Site No. 442040
Interim Remedial Measures Work Plan Addendum**

Dear Mr. Drumm:

On behalf of Dynamic Systems, Inc., Spectra has prepared the Interim Remedial Measures Work Plan (IRWP) Addendum. This work plan addendum discusses additional injection of 3DMe technology proximal to several monitoring points on site.

DSI and Spectra are prepared to begin the work upon approval of the plan by the NYSDEC. Please feel free to call Joe Krikorian or myself at (518) 782-0882 if you have any questions.

Sincerely,

SPECTRA ENGINEERING, ARCHITECTURE
AND SURVEYING, P.C.

Frank R. Peduto, P.E.
Project Manager

Enclosure

cc w/ enc.: D. Ferguson, DSI
J. Privitera, Esq. (CD only)

cc w/out enc.: S. Dewes, NYSDEC

FRP/JK

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ENVIRONMENTAL GROUP, INC.

ENGINEERING, ARCHITECTURE & SURVEYING, PC

**DYNAMIC SYSTEMS, INC.
RENSSELAER COUNTY, NEW YORK**

**INTERIM REMEDIAL MEASURES WORK PLAN
ADDENDUM 1**

Prepared for:

Dynamic Systems, Inc.
323 State Route 355
Poestenkill, New York 12140

Prepared by:

Spectra Engineering, Architecture and Surveying, P.C.
19 British American Boulevard
Latham, New York 12110
(518) 782-0882
Project No. 11124

OCTOBER 2016

1.0 Introduction

Spectra environmental Group (Spectra), on behalf of Dynamic Systems Incorporated (DSI), has prepared this addendum to the interim remedial measures work plan (IRMWP; submitted and approved in June, 2015). The purpose of this addendum is to propose additional remedial activities to be completed at the DSI facility in Poestenkill, NY. Additional activities will be completed in order to proactively and expeditiously remediate areas of concern that maintain relatively elevated concentrations of TCE within the DSI site.

2.0 Previously Completed Remedial Activities (IRMWP)

In June of 2015, Spectra oversaw the injection of Regensis' 3DMe and CRS technologies into 88 injection points south of and within the DSI building. Four post-injection sampling events have been conducted, the results of which have been recorded in quarterly reports. Analytical data shows that since injection, TCE is actively being reduced to its daughter products in most sample locations (See Table 1, Graph 1). It is anticipated that at these locations, with ongoing quarterly sampling, COC trends will continue in the direction of dechlorination until reaching the end product of ethene.

However, at sample locations MW-2N, MW-2, DSI-3, and DSI-4, concentrations remain relatively elevated for TCE, cis-1,2-DCE, and VC. During previous remedial activities, these areas were not saturated with injection points because it was expected that the 3DMe solution from proximal injection points would either extend laterally or gain exposure to contamination due to groundwater transport. While it is expected to occur eventually, DSI management has chosen to be proactive and address these areas more aggressively.

3.0 Proposed Additional Remedial Activities

Sampling since the initial injection was completed shows that 3DMe is successfully remediating TCE across the majority of the site. Therefore, based on its effectiveness and its ability to transport through dense substrate, 3DMe is recommended as the remedial measure for any proposed additional remedial activities.

Spectra proposes a second series of 3DMe injections proximal to MW-2N, MW-2, DSI-3, and DSI-4 (See Figure 1). The additional proposed activities will be conducted in order to focus treatment on areas of the site where recent analytical data show slow or limited dechlorination of COCs.

Two injection points will be completed 4 feet upgradient of each monitoring well. As the solution is injected into the points, the monitoring wells will be visually inspected in order to ensure that the solution is reaching the desired radius of influence.

3.1 Injection Procedure

The 3-DMe injection solution will be comprised of a mixture of 10% 3-DMe concentrate and 90% water. 3-DMe injection will utilize direct push Geoprobe methodology. A 2-foot retractable screen will be driven to the bottom of the vertical extent of contamination. Once at its target depth, the screen will be exposed and the solution will be pressure-pumped into the zone. Either end of the rod that contains the screen is solid steel, creating a vertical barrier. This barrier ensures that, even under pressure, the solution is injected into its target zone. Approximately 34 gallons of 3-DMe solution will be injected into every screened zone. Once the target volume has been applied, the Geoprobe pulls the screen up 2 feet and begins injection into the next zone. This process is repeated until the solution has been injected over the desired vertical extent of the injection point. Flow meters will be used during injection to determine the volume of solution injected. Table 1, below, shows the vertical intervals over which the solution will be injected for each sample point.

Table 1

Monitoring Well	Screened/Injection Interval (ft bgs)
MW-2	4-14
MW-2N	4.5-14.5
DSI-3	19-24
DSI-4	5-10

3.2 Post Injection Activities

Upon completion of the second injection, Spectra will conduct groundwater sampling for the third quarterly report of 2016. Groundwater will be analyzed for VOCs and dissolved gasses in order to assess the effectiveness of 3DMe on the dechlorination of TCE and its daughter products. Sampling will continue on the same schedule as approved in the IRMWP.

The effectiveness of the 3-DMe technology can be assessed and monitored by measuring concentrations of TCE compared to concentrations of its daughter products as well as a number of indicators that must be present in specific ranges in order for reductive dechlorination to occur. Groundwater sampling from the site characterization revealed that concentrations of DO, iron, nitrates, sulfates, methane, and ORP values are within these ranges. As natural and 3-DMe-influenced reductive dechlorination continues, TCE will break down into cis-1,2-DCE or trans-1,2-Dichloroethene, VC, Ethane, and finally to Ethene. Groundwater samples will be analyzed for these constituents and the above-listed indicators in order to monitor the progress of remediation.

The first groundwater sampling event will take place approximately one month following injection. After the initial sampling event, the quarterly monitoring program established after the IRMWP will continue. Groundwater samples will be analyzed for VOCs by EPA method 8260 every sampling event. A full suite analysis including VOCs by EPA method 8260 and methane, ethane, ethene, will take place every other sampling event. Additionally, all wells will be sampled using low-flow sampling procedures. Water quality parameters, including pH, conductivity, temperature, dissolved oxygen (DO), and turbidity will be measured every 5 minutes during sampling. A minimum of 1 L will be purged between readings, and a goal will be to collect samples after stabilization is achieved (three successive readings within: ± 0.1 for pH, $\pm 3\%$ for conductivity, ± 10 mv for redox, and $\pm 10\%$ for turbidity and dissolved oxygen) and/or once three (3) well volumes have been purged. VOC samples will be collected at a flow rate between 100 and 250 ml/min.

3.3 Schedule

The remedial activities described in this addendum work plan will be schedule following the Department's approval. Based on drilling contractor schedule and timing for shipment of product, it is anticipated that this work plan will be implemented during the latter portion of October 2016.