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VIA FEDERAL EXPRESS & ELECTRONIC MAIL

July 14, 2014

U.S. Environmental Protection Agency Region II
2890 Woodbridge Avenue
Building 209 (MS-211)
Edison, New Jersey 08837

Attention: Margaret Gregor
Dewey Loeffel Landfill On-Scene Coordinator
(1 hard copy and 1 electronic copy)

U.S. Environmental Protection Agency Region II
290 Broadway - Floor 19
New York, New York 10007

Attention: Benedetto Conetta
Dewey Loeffel Landfill Remedial Project Manager
(2 hard copies and 1 electronic copy)

Subject: Submittal of Revised Appendix G of DR/IP
Dewey Loeffel Landfill Superfund Site
Removal Order (Index No. CERCLA 02-2012-2005)
Nassau, New York

Dear Ms. Gregor and Mr. Conetta:

As an outgrowth of the meeting on the Site Characterization Summary Report (SCSR), please find enclosed a revised Appendix G to the Design report/Implementation Plan (DR/IP) to include additional investigation activities in the five deep open bedrock boreholes. The additional activities include (a) obtaining water-level elevations in zones isolated by packers to explore the possibility of a mound in the bedrock potentiometric surface on the west side of the plume and (b) obtaining vertical profiles of hydraulic conductivity.

We are prepared to implement the additional work as soon as it is approved by the United States Environmental Protection Agency (USEPA). In that regard, the packer testing in the new extraction wells (associated with Appendix F of the DR/IP) is set to begin on July 7, 2014 and last about three weeks.

As always, please contact me if you have any questions regarding this matter.

Sincerely,

Paul Wm. Hare
Program Manager, Northeast/Midwest Regions

enclosure

cc: New York/Caribbean Superfund Branch
Office of Regional Counsel
United States Environmental Protection Agency Region II
290 Broadway, 17th Floor
New York, New York 10007-1866

Attention: Sharon Kivowitz, Esq.
Attorney for Dewey Loeffel Site
(1 electronic copy)

Mr. Michael Komoroske
Environmental Engineer 3
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Ralph Morse, O'Brien & Gere (via email)
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Monitoring Plan for Existing Open Deep Bedrock Boreholes

Dewey Loeffel Landfill Superfund Site
Nassau, New York

February 13, 2013

Revised January 24, 2014

Last Revised July 14, 2014

O'BRIEN & GERE

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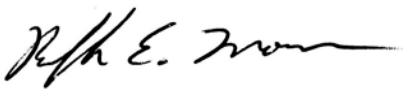
Open Deep Bedrock Boreholes Conversion to Monitoring Wells

Dewey Loeffel Landfill Superfund Site Nassau, New York

General Electric Company/SI Group, Inc.
Albany, New York



RALPH E. MORSE, MANAGING SCIENTIST
O'Brien & Gere Engineers, Inc.

1. INTRODUCTION

1.1. PURPOSE AND SCOPE

As stated in Section 4.3 of the Design Report/Implementation Plan (DR/IP), the objective of this appendix is to describe the additional activities that are proposed to be performed for the five open deep bedrock boreholes installed by the United States Environmental Protection Agency (EPA) in 2011 at the Dewey Loeffel Landfill Superfund Site (the Site). Specifically, groundwater samples will be collected from multiple intervals using passive diffusion bags (PDBs) set within each of the five open deep bedrock boreholes (designated EPA-1 through EPA-5) for comparison with the results of prior borehole flow meter and packer testing performed by EPA, and to evaluate groundwater quality below the deepest interval that was packer tested previously.

In addition, water-level monitoring of packer isolated intervals in open deep bedrock boreholes EPA-1, EPA-2, EPA-3 and EPA-4 and concurrent water-level monitoring in select monitoring wells at the Site is proposed to evaluate hydraulic head relationships both vertically and horizontally in the western portion of the bedrock plume. It is also proposed that a detailed profile of the variability of hydraulic conductivity with depth be obtained at open deep bedrock boreholes EPA-1 through EPA-5 using the Flexible Liner Underground Technologies, LLC (FLUTe™) Hydraulic Conductivity Profiler method.

Additionally, it is proposed that each of the five open deep bedrock boreholes be converted into permanent monitoring wells and incorporated into the routine groundwater monitoring program. Based on the results obtained by EPA during its Initial Supplemental Site Investigation (ISSI), it is anticipated that each open deep bedrock borehole will be completed as a screened well. Conceptually, each well will have a single well screen 20 to 30 feet in length which targets the depth interval with the highest concentration of volatile organic compounds (VOCs) and which has also been shown to yield a sufficient quantity of groundwater for routine sampling. Alternatively, the open deep bedrock boreholes may remain and be sampled in the routine groundwater monitoring program using PDBs set at two or three depths or converted to FLUTe™ multi-level monitoring devices. The decision on which approach to use (completion of the boreholes into screened wells, use of two or three PBDs at different depths within the existing boreholes or completion as FLUTe™ multi-level monitoring devices) for routine long-term monitoring will be based on the results of the stratified PDB sampling in conjunction with the findings from EPA's ISSI.

2. INITIAL PASSIVE DIFFUSION BAG SAMPLING

Groundwater samples will be collected from multiple intervals from each of the five open deep bedrock boreholes using the PDB sampling method and analyzed for VOCs. Table 1 provides a summary of the proposed PDB sample intervals for each well. In general, the mid-point of the PDB will be placed at a depth corresponding to the mid-point of each prior packer testing interval. As shown on Table 1, one to three additional PDBs will be placed below the deepest interval that was packer tested previously. Detailed PDB sampling procedures are included as standard operating procedure F-11 presented in Appendix A to the Quality Assurance Project Plan (QAPP).

The collected PDB groundwater samples will be sent via chain-of-custody to Pace Analytical Services, Inc. (Pace) of Schenectady, New York for laboratory analysis of VOCs by EPA SW-846 Method 8260B. Quality assurance/quality control (QA/QC) samples will be collected at a frequency of one per 20 environmental samples. QA/QC samples will therefore include two blind duplicate samples and two matrix spike and matrix spike duplicate (MS/MSD) sample pairs. A trip blank will be included with each cooler shipped to the laboratory, and each shipment of samples to the laboratory will occur with 24 hours of sample collection. This groundwater sampling work will be performed by O'Brien & Gere Engineers, Inc. (O'Brien & Gere).

3. WATER-LEVEL MONITORING OF PACKER ISOLATED INTERVALS IN SELECT EPA BOREHOLES

To evaluate hydraulic head relationships both vertically and horizontally in the western portion of the bedrock plume. water-level monitoring in packer isolated intervals within deep bedrock boreholes EPA-1, EPA-2, EPA-3

and EPA-4, and concurrent water-level monitoring at nearby existing wells OMW-202, OMW-212, OMW-215, and OMW-218 will be performed to supplement the results of the initial PDB sampling program and the data obtained by EPA during its prior Initial Supplemental Site Investigation (ISSI).

A downhole, single or dual-straddle inflatable packer system will be used to isolate targeted zones within each of the boreholes. Up to six 20-foot zones will be hydraulically monitored in each of the four boreholes. The test zones across the four boreholes will be matched up so that the elevation of each monitoring interval and the subsequent hydraulic head data can be compared. The packer(s) will be inflated with nitrogen to isolate the test intervals. Water-level elevations will be collected at 30-second recording intervals from within the test interval and also within the open boreholes both above and below the test interval using pressure transducers and associated data logger(s). Water levels will be monitored until equilibrium is achieved, up to a maximum of two hours per test interval.

Existing wells OMW-202, OMW-212, OMW-215, and OMW-218 will also be monitored with pressure transducers and associated data loggers concurrent with the packer isolation monitoring. A15-minute recording interval will be used for this monitoring. Similarly, water-level monitoring will be performed in EPA-1, EPA-2, EPA-3 and EPA-4 (except when packer testing is being performed in a particular borehole) throughout the duration of the packer isolated water-level monitoring. Periodic manual gauging of the wells equipped with pressure transducers and associated data loggers will be performed during the monitoring event as a check to enable comparison of the water-level elevations obtained manually with the results from the pressure transducers.

4. DETAILED HYDRAULIC CONDUCTIVITY PROFILING

To obtain a detailed profile of the variability of hydraulic conductivity with depth, FLUTe™ will test each of the open deep bedrock boreholes using its Hydraulic Conductivity Profiler method. During this process, a blank liner is installed into the borehole while monitoring the rate of decent, or velocity, that the liner everts down the borehole. Those data are then used to prepare a detailed vertical profile of hydraulic conductivity in the borehole.

5. CONVERSION OF OPEN DEEP BEDROCK BOREHOLES TO SCREENED MONITORING WELLS

5.1. GENERAL

As discussed above, it is proposed that each of the five open deep bedrock boreholes be completed as screened monitoring wells targeting the bedrock interval with the highest VOC concentrations at each location which also yields a sufficient quantity of groundwater for routine sampling. The proposed completion for each open bedrock borehole is summarized below based on information collected by EPA during its ISSI, primarily the borehole flow meter testing (under both ambient and pumping conditions) and packer testing. The screened intervals proposed below will be confirmed or modified based on the results of the initial PDB sampling discussed in Section 2 above. The final screened interval of each well will be presented to EPA for approval prior to monitoring well installation.

Alternatively, as discussed in Section 1.1, the open deep bedrock boreholes may remain and be sampled in the routine groundwater monitoring program using PDBs set at two or three depths or converted to FLUTe™ multi-level monitoring devices. These depths will be selected based on the results of the initial PDB sampling program described in Section 2, in conjunction with the results of EPA's ISSI. The proposed depth intervals will be presented to EPA for approval prior to future sampling events.

Borehole EPA-1

EPA-1 is an open bedrock borehole that is 260 feet in length, has a total depth of about 250 feet below ground surface (bgs) (the difference being due to deviation of the borehole from vertical) and is cased through the overburden and shallow bedrock to a depth of 101 feet bgs. Based on the results of the packer testing performed by EPA, total VOC concentrations ranged from approximately 223 micrograms per liter (ug/L) to 757 ug/L, with

the highest concentrations being detected in the 217 to 227 foot sample interval. Based on these data and an evaluation of the vertical flow meter data and borehole geophysical logs, the proposed screen interval for location EPA-1 is 195 to 225 feet (as measured along the length of the borehole).

Borehole EPA-2

EPA-2 is an open bedrock borehole that is 315 feet in length, has a total depth of about 294 feet bgs and is cased through the overburden and shallow bedrock to a depth of 81 feet bgs. Based on the results of the packer testing performed by EPA, total VOC concentrations ranged from approximately 8 ug/L to 299 ug/L, with the highest concentrations being detected in the 276 to 286 foot sample interval. Based on these data and an evaluation of the vertical flow meter data and borehole geophysical logs, the proposed screen interval for location EPA-2 is 270 to 290 feet (as measured along the length of the borehole).

Borehole EPA-3

EPA-3 is an open bedrock borehole that is 296 feet in length, has a total depth of about 295 feet bgs and is cased through the overburden and shallow bedrock to a depth of 115 feet bgs. Based on the results of the packer testing performed by EPA, total VOC concentrations ranged from approximately 117 ug/L to 398 ug/L, with the highest concentrations being detected in the 123 to 133 foot sample interval. Based on these data, an evaluation of the vertical flow meter data and borehole geophysical logs which indicated that inflow zones which represent the source of ambient downward flow to the borehole are present between about 112 and 150 feet, the proposed screen interval for EPA-3 is 120 to 150 feet (as measured along the length of the borehole).

Borehole EPA-4

EPA-4 is an open bedrock borehole that is 290 feet in length, has a total depth of about 282 feet bgs and is cased through the overburden and shallow bedrock to a depth of 111 feet bgs. Based on the results of the packer testing performed by EPA, total VOC concentrations ranged from approximately 10 ug/L to 33 ug/L, with the highest concentrations being detected in the 190 to 200 foot sample interval. Based on these data, an evaluation of the vertical flow meter data, borehole geophysical logs and the ISSI Report which indicated that the 190 to 200 foot zone exhibited the highest sustained yield of all the intervals tested, the proposed screen interval for EPA-4 is 185 to 205 feet (as measured along the length of the borehole).

Borehole EPA-5

EPA-5 is an open bedrock borehole that is 221 feet in length, has a total depth of about 213 feet bgs and is cased through the overburden and shallow bedrock to a depth of 35 feet bgs. Based on the results of the packer testing performed by EPA, total VOC concentrations ranged from approximately 7 ug/L to 46 ug/L, with the highest concentrations being detected in the 55 to 65 foot sample interval. Based on these data and an evaluation of the vertical flow meter data and borehole geophysical logs, the proposed screen interval for EPA-5 is 50 to 70 feet (as measured along the length of the borehole).

5.2. MONITORING WELL INSTALLATION

If the open bedrock boreholes are converted into screened monitoring wells, then each well will be constructed of 2-inch ID, flush joint, schedule 40 or 80 polyvinyl chloride (PVC) riser pipe with a 20 or 30 foot length of 0.020-in slot polyvinyl chloride (PVC) well screen. Schedule 80 PVC well screen and riser pipe may be used for monitoring well construction at locations EPA-1, EPA-2 and EPA-4 due to the deeper well screen installation depths and the significant deviation of these boreholes from vertical. A threaded PVC bottom plug will be installed at the base of each groundwater monitoring well. A vented, non-threaded, locking J-plug will be installed at the top of the riser pipe. A designated measuring point will be notched into the top of the PVC riser pipe in each well to provide a permanent reference point for subsequent water level measurements.

Depending on the screened interval for each monitoring well, the open bedrock borehole may need to be shortened by filling in the lower portion of the borehole with a cement-bentonite grout mixture so that the open

interval below the screen is permanently sealed off. In this case the grout material will consist of Type I Portland cement mixed with either a powdered or granular bentonite. The grout mixture will be prepared in accordance with American Society for Testing and Materials (ASTM) Method D5092, such that approximately 3 to 5 pounds of bentonite will be mixed with 6½ to 7 gallons of water per 94-pound sack of cement. The grout will be introduced via a tremie pipe which will be lowered to just above the top of the bentonite seal. As the grout is introduced into the borehole, the tremie pipe will be removed in sections so that the grout is pumped into the borehole at a level below the top of the grout seal as it is emplaced. The grout will be allowed to cure for a minimum of 24 hours before any well materials are introduced into the borehole

After installing the PVC well materials, sand will be gradually introduced to fill the annular space between the well screen and the borehole wall. The sand pack will extended from the bottom of the boring to approximately 2 feet above the top of the screen. The sand pack will consist of clean, well-graded, silica sand with grain size distribution matched to the slot size of the well screen; Morie Grade 1 sand will be used. A bentonite seal will be placed above the sand pack to form a seal at least 2 feet thick. A cement-bentonite grout will be placed from the top of the bentonite seal to the ground surface. The grout material and installation will be completed in accordance with the procedures presented above. After well installation, a lockable cap will be installed on the top of the existing steel casing. Well installation activities will be performed by Parratt-Wolff Inc. of East Syracuse New York under the supervision of a qualified O'Brien & Gere geologist and/or hydrogeologist.

Alternatively, if, based on the results of the stratified PDB sampling and the findings from EPA's ISSI, the open bedrock boreholes are converted into multi-level monitoring wells, then FLUTe™ multi-level monitoring devices will be installed. Details of the design and installation of the FLUTe™ system for each open bedrock borehole will be presented to EPA for approval prior to implementation.

5.3. SURVEYING

Each open bedrock borehole and/or screened monitoring well will be surveyed for horizontal and vertical control and will be incorporated into the existing Site base map. Ground surface at each location will be surveyed to the nearest 0.1 feet. Each open bedrock borehole will be surveyed vertically to the nearest 0.01 feet at the top of the protective steel casing (measuring point). If the boreholes are converted into screened monitoring wells, then the wells will also be surveyed vertically to the nearest 0.01 feet at the top of the riser pipe, and this will be used as the measuring point. This surveying work will be performed by ARCADIS U.S., Inc. (ARCADIS).

5.4. HANDLING OF INVESTIGATION-DERIVED MATERIALS

Investigation-derived materials (IDM) resulting from the initial groundwater sampling, packer testing, hydraulic conductivity profiling and (if performed) monitoring well installation and development activities will require appropriate management. The IDM includes, or potentially includes, the following:

- Excess groundwater from the initial PDB sampling;
- Groundwater resulting from packer testing, hydraulic conductivity profiling and monitoring well installation and development (if performed);
- Decontamination fluids;
- Personnel protective equipment (PPE) and associated debris resulting from the execution of the various field activities.

The management of these materials is discussed below.

5.4.1. Groundwater

A very minor amount of excess groundwater (*e.g.*, less than 5 gallons) will result from the initial PDB sampling program. This excess groundwater will be transported to the landfill proper and transferred into one of the two

on-site frac tanks located in the pole barn, for subsequent off-site transport, treatment, and disposal in accordance with the Transportation and Disposal Plan conditionally approved by EPA.

Groundwater produced during packer testing, hydraulic conductivity profiling and conversion of the open bedrock boreholes into monitoring wells (if performed) and subsequent development will be containerized in polyethylene storage tanks and/or 55-gallon drums and transported to the landfill proper where it will be transferred to one of the two on-site frac tanks located in the pole barn. This groundwater will then be transferred into tanker trucks for off-site transport, treatment, and disposal in accordance with the Transportation and Disposal Plan conditionally approved by EPA. Alternatively, depending on timing, the groundwater may be treated on-site using the new treatment system once it has been placed into routine operation.

5.4.2. Decontamination Fluids

Decontamination fluids containing non-indigenous materials (*i.e.*, alconox solution) generated during packer testing, hydraulic conductivity profiling and conversion of the open bedrock boreholes into screened monitoring wells (if performed) and subsequent development will be containerized in 55-gallon drums and temporarily stored at a central location at the landfill proper. Pending approval from Clean Harbors Environmental Services, Inc. (Clean Harbors), the decontamination fluid will be transferred to one of the two on-site frac tanks located in the pole barn for subsequent off-site transport, treatment, and disposal in accordance with the Transportation and Disposal Plan conditionally approved by EPA. Alternatively, small amounts of decontamination fluids may be treated on-site using the new treatment system.

5.4.3. PPE and Associated Debris

Very little PPE and other associated debris (*e.g.*, plastic bags [empty PDBs], sampling gloves, etc.) will result from the initial PDB sampling program. This material will be placed in plastic bags and then added to the drum of PPE and other associated debris located in the pole barn at the landfill proper, for subsequent disposition in accordance with the Transportation and Disposal Plan conditionally approved by EPA.

PPE and other associated debris (ground plastic, tubing, etc.) generated during packer testing, hydraulic conductivity profiling and conversion of the open deep bedrock boreholes into screened monitoring wells (if performed), will be placed in plastic bags and then added to the drum of PPE and other associated debris located in the pole barn at the landfill proper, for subsequent disposition in accordance with the Transportation and Disposal Plan conditionally approved by EPA. Alternatively, if the volume of PPE and other associated debris generated during this work warrants the use of additional drums, this material will be containerized in 55-gallon drums and staged in a central location at the landfill proper. These drums will be temporarily stored adjacent to the gravel turnaround in a manner that does not impede truck traffic. These materials will be characterized as necessary for profile approval, and will then be transported off-site for disposal at a permitted facility in accordance with the Transportation and Disposal Plan conditionally approved by EPA.

6. LABORATORY ANALYSIS AND DATA VALIDATION

As discussed above, groundwater samples will be collected for laboratory analyses during implementation of the initial PDB sampling program. Level 4, Contract Laboratory Program (CLP) equivalent data packages will be obtained from Pace for the VOC analytical data associated with the groundwater samples. Level 2 data packages will be obtained from Pace for any required IDM characterization samples, as discussed in Section 3.5.

Data validation will be performed for the VOC analytical data associated with the groundwater samples collected during the initial PDB sampling. Full validation of the analytical data will be performed in accordance with the procedures detailed in the QAPP approved by EPA.

7. REPORTING

As required by Paragraph 74 of the Consent Order, progress reporting to EPA will take the form of daily oral and monthly written reports. The format and schedule for each of these reports is described below. Weekly written reports are not proposed for this work.

Daily written reports in the form of an email will be submitted to EPA following each day of significant field work during the following activities: PDB installation and retrieval, packer testing, hydraulic conductivity profiling, monitoring well installation (if performed), and monitoring well development (if performed). The written reports will be submitted to EPA's Remedial Project Manager (RPM [currently Mr. Benedetto Conetta]) no later than the following day of significant field work.

Monthly written progress reports will have a similar format to the progress reports which have been and are currently being submitted to EPA by Respondents. The monthly written progress reports will include any laboratory analytical data (preliminary or validated) for the groundwater samples collected during the stratified PDB sampling that are received from the laboratory during the reporting period. The reports will be submitted to EPA's RPM and On-Scene Coordinator (OSC) and other parties as required by the Consent Order.

The results of the initial PDB sampling program, packer testing and hydraulic conductivity profiling discussed above will be incorporated into a brief summary report. This report will include a summary of the work scope, the specific field investigation methodologies used during implementation of the work scope and a presentation of the data generated during the investigation activities in a clear and logical format using tables, graphs, and figures, as appropriate. Analytical data will be presented on computer-generated summary tables. In addition, reports generated by the laboratory (*i.e.*, Pace) and well completion logs (if any) will be presented as appendices to the summary report.

Table 1
Proposed Passive Diffusion Bag Sampling Program

Dewey Loeffel Landfill Superfund Site
Nassau, New York

Well ID	EPA-1		EPA-2		EPA-3		EPA-4		EPA-5	
Total Length of Borehole	*260*		*315*		*295*		*290*		*221*	
	EPA Packer Testing Interval	*Center Point of PDB Sample Interval*	*EPA Packer Testing Interval*	*Center Point of PDB Sample Interval*	*EPA Packer Testing Interval*	*Center Point of PDB Sample Interval*	*EPA Packer Testing Interval*	*Center Point of PDB Sample Interval*	*EPA Packer Testing Interval*	*Center Point of PDB Sample Interval*
	120 - 130	125	80 - 90	85	123 - 133	128	107 - 117	112	55 - 65	60
	135 - 145	---	113 - 123	118	142 - 152	147	117 - 127	---	122 - 132	127
	146 - 156	151	148 - 158	153	160 - 170	165	127 - 137	132	145 - 155	150
	167 - 177	---	218 - 228	223	176 - 186	181	155 - 165	160	170 - 180	175
	179 - 189	184	254 - 264	259	208 - 218	213	180 - 190	---	---	192
	194 - 204	199	276 - 286	281	237 - 247	242	190 - 200	195	---	212
	205 - 215	210	---	300	---	259	200 - 210	---		
	217 - 227	222			---	276	218 - 228	223		
	---	237			---	290	239 - 249	244		
	---	253					260 - 270	265		
							---	280		
Total Number of Sample Intervals	*8*		*7*		*9*		*8*		*6*	

Notes:

1. Borehole length and intervals are in feet as measured along the length of the borehole.
2. "PDB" designates passive diffusion bag.
3. "---" indicates no corresponding sample interval.