2017 Supplemental Remedial Injection Work Plan Revision 1

Former EMCA Site
Site No. 360025
Mamaroneck, New York

Prepared for:

The Rohm and Haas Company, a wholly-owned subsidiary of The Dow Chemical Company

Prepared by:

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September 2017

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2017 SUPPLEMENTAL REMEDIAL

INJECTION WORK PLAN

FORMER EMCA SITE

SITE NO. 360025

MAMARONECK, NEW YORK

PREPARED FOR:

ROHM AND HAAS COMPANY

A WHOLLY-OWNED SUBSIDIARY OF THE DOW CHEMICAL COMPANY

PREPARED BY:

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SEPTEMBER 2017

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ACRONYMS AND ABBREVIATIONS

bgs	below ground surface
cm/sec	centimeters per second
EE/CA	Engineering Evaluation/Cost Analysis
IRA	Interim Remedial Action
mg/L	milligrams per liter
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
PDB	Passive Diffusion Bag
RI	Remedial Investigation
ROD	Record of Decision
TOGS	Technical and Operational Guidance Series
VOCs	volatile organic compounds
ZVI	zero valent iron
µg/L	micrograms per liter
USEPA	United States Environmental Protection Agency

1.0 INTRODUCTION

This Work Plan presents details of supplemental remedial injections that will be conducted at the former EMCA site located in Mamaroneck, Westchester County, New York. The supplemental remedial injections will be another phase of an ongoing groundwater remediation program implemented at the site since the late 1990s by Rohm and Haas Company, a wholly owned subsidiary of The Dow Chemical Company. AECOM Technical Services (AECOM, formerly URS Corporation) was retained by Rohm and Haas Company to assist with site investigation and remediation. **Figure 1** is the Site Location Map and **Figure 2** illustrates the approximate limits of the former EMCA site as well as adjacent site use. The Site Plan, illustrating significant site features, is shown on **Figure 3**.

This Work Plan was developed in response to groundwater sampling results from the routine October 2016, April 2017 and July 2017 monitoring events which indicated the presence of 1,1,2-trichloro-1,2,2-trifluoroethane (Freon 113) at concentrations exceeding criteria specifying contingency action. Contingency measures criteria are specified in the Site Management Plan (SMP) (URS, 2010).

This Work Plan presents an injection program using PlumeStop® Liquid Activated Carbon™ (PlumeStop®) to remediate groundwater contaminated by Freon 113. The scope of work has been developed based on groundwater monitoring results from April and July 2017. All work proposed at the site will require approval for access from the current site owner, Cablevision of Westchester (Cablevision). Key personnel involved with this project are listed below:

Name	Affiliation	Address	Telephone	Function
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Kevin Shanahan	AECOM	257 W. Genesee Street Buffalo, NY 14202	716-856-5636	AECOM Project Manager
Doug Gray	AECOM	1375 Euclid Ave. Cleveland, OH 44115	216-622-2283	AECOM Project Engineer
John Crespo	AECOM	125 Broad Street New York, NY 10004	646-772-9749	AECOM Site Safety Manager

2.0 SITE BACKGROUND

The former EMCA property is a 0.38-acre site located in a mixed residential/industrial area in Mamaroneck, New York (see **Figures 2 and 3**). Photographs of the site are included in **Appendix A.** The site was formerly owned by Rohm and Haas Company and was used for the manufacture of high conductivity precious metal paste used in circuits by the electronics industry. Manufacturing was discontinued in 1988. The current site owner is Cablevision of Westchester. This section provides a chronological summary of environmental investigations conducted at the site, remediation activities and other relevant work.

2.1 Previous Investigations

Environmental investigations were performed at the site between the late 1980s and 2000 in an effort to characterize the nature and extent of impacts. These investigations involved drilling, installation of groundwater monitoring wells and analysis of soil, groundwater and air samples (both indoor and outdoor). Investigation results were documented in a Remedial Investigation (RI) report prepared by URS (URS, 2000). Groundwater occurs under unconfined (water table) conditions; the water table varies between approximately 3 and 8 feet below ground surface (bgs). **Table 1** contains groundwater elevation measurements collected since 2012. The groundwater flow direction is typically northwest across the site, towards the Sheldrake River (see **Figure 4**).

Results of these investigations revealed that groundwater beneath the northeastern section of the site contained primarily Freon 113, and degradation products Freon 123a and Freon 1113, at concentrations above the New York State Department of Environmental Conservation (NYSDEC) Class GA Groundwater Quality Standards presented in Technical and Operational Guidance Series (TOGS) 1.1.1, June 1998 (amended April 2000). It is noted that there are no specific TOGS 1.1.1 groundwater standards or guidance values for Freon 113, Freon 123a or Freon 1113. However, consistent with TOGS 1.1.1, the Freon 113, Freon 123a and Freon 1113 results are compared to the "principal organic contaminant" standard for groundwater of 5 micrograms per liter (µg/L). **Table 2** contains groundwater analytical data collected at the site since 2012.

2.2 Evaluation of Remedial Technologies and Pilot Study

An Engineering Evaluation/Cost Analysis (EE/CA) was performed to evaluate remedial options for Freon 113 contamination in groundwater (URS, 2002). The remedial action objective established in

the EE/CA was to reduce the maximum concentration of Freon 113 in groundwater to a level approaching the New York State groundwater standard of 5 µg/L. The EE/CA recommended a pilot study to evaluate the effectiveness of remediation injections on reducing Freon concentrations. The pilot study conducted between May 2003 and July 2004 indicated that injection of emulsified oil and sodium lactate was successful in stimulating in-situ anaerobic biodegradation of Freon 113.

2.3 Remedial Injections

An Interim Remedial Action (IRA) was conducted in November 2004 in accordance with the IRA Work Plan (URS, 2004). Commercially-prepared emulsified oil and sodium lactate was injected into the saturated zone. The IRA injections targeted monitoring wells MW-02, MW-03 and MW-06; the area between well MW-03 and downgradient well MW-07; and near upgradient well GZ-06. The treatment zone extended from the top of the water table surface, approximately 5 feet bgs, to the maximum depth of contamination detected in previous investigations, 25 feet bgs. The injections resulted in a significant decrease of Freon 113 concentrations across the site.

Supplemental remedial injections were conducted in 2007, 2009, 2012, 2013 and 2014 to maintain and enhance conditions favorable for anaerobic biological processes and to remediate remaining areas of contamination. The 2012, 2013, and 2014 supplemental injections also included the KB-1 Plus® bacteria culture, developed by SiREM Laboratory in Guelph, Ontario, Canada, as a biological amendment to the emulsified vegetable oil and sodium lactate injections. These supplemental injections produced favorable conditions for Freon removal, however these conditions could not be maintained for more than one or two years, after which time Freon levels increased.

2.4 Site Management Plan

A Site Management Plan (SMP) was prepared for the site in 2010 to provide a detailed description of procedures required to manage remaining contamination at the site after completion of the Remedial Action, including:

1. Implementation and management of all engineering and institutional controls;
2. Media monitoring and criteria for termination of monitoring;
3. Implementation of supplemental treatment; and,

4. Performance of periodic inspections, certification results, and submittal of periodic review reports.

The SMP was approved by the NYSDEC. The plan specifies semi-annual groundwater monitoring at five wells for Freon 113, Freon 123a and Freon 1113. The SMP also includes contingency measure criteria that would trigger additional remedial actions in the event of increased Freon levels in groundwater and/or downgradient migration. A target maximum concentration was established for Freon 113 in groundwater, decreasing by 50 percent each year between 2011 and 2014. The maximum Freon 113 concentration for 2014 was 40 µg/L.

Figure 5 illustrates Freon concentrations detected in groundwater since 2006. The results of the October 2016, April 2017 and July 2017 groundwater sampling events indicate concentrations of Freon 113 increased in wells MW-02 and MW-03. As a result of these findings, AECOM has prepared this work plan for the implementation of a remedial action.

2.5 PlumeStop® Bench Scale Testing

In accordance with Section 4.0 of the SMP entitles Contingency Treatment Plan, alternative remediation techniques and products may be implemented, if approved by the NYSDEC. Dow's remediation treatability testing laboratory recently conducted evaluations of the performance of PlumeStop® liquid activated carbon on the removal of Freon-113 and degradation products Freon 123a and Freon 1113. PlumeStop® is a remediation amendment manufactured by Regenesis Corporation (Regenesis) and is described as liquid activated carbon that adsorbs contaminants and promotes bioremediation processes.

A sample of groundwater from the site containing approximately 3,000 µg/L of Freon 113 was obtained from well MW-02. Granular activated carbon (GAC) is well-suited for treating contaminated groundwater in a bed through which the water is pumped, but when used in situ it has a limited radius of influence because it doesn't diffuse. This shortcoming can be addressed by creating a stable dispersion of activated carbon in water using small particles and modification of the solid-liquid interface. A 4% aqueous dispersion of PlumeStop® was used to dose groundwater samples at three approximate concentrations of 500, 1,000 and 2,000 milligrams per liter (mg/L) carbon. Samples were taken at 1, 2, 4, and 7 days after treatment from each of the three treatment regimes. The results

demonstrated very rapid binding of the Freon 113 and then a much more gradual continued drop in concentration.

Analysis of Freon 113 in groundwater samples treated with PlumeStop® is fraught with difficulty, but a reasonable estimate of concentration reduction can be obtained by sampling the gas in the headspace of a treated sample and analyzing by Gas Chromatography-Mass Spectrometry-Solid Phase Micro Extraction methods. Such an analysis of groundwater treated with 2,000 mg PlumeStop® per liter of groundwater shows more than 90% reduction of concentration. Final concentrations of available Freon 113 by the headspace method after 7 days of treatment remained above the 5 ug/l remediation target with results in the 30 to 50 µg/L range. Secondary testing of the 2,000 mg/L PlumeStop® treated samples using SW-846 Method 8260 following procedures provided by Regenesis which breaks the carbon suspension to allow it to be removed by filtration resulted in Freon 113 concentrations below the 5 ug/L target concentration.

It is important to note that the bench scale testing used PlumeStop® with 4% carbon, while the proposed full-scale remediation discussed in Sections 4.0 and 5.0 will use PlumeStop® with 20% carbon.

3.0 OBJECTIVE

This section discusses the project objective for the proposed 2017 supplemental remedial injections using PlumeStop®. In 2013 and 2014, Freon concentrations at several of the monitoring wells in the remediation area reduced below or slightly above the groundwater cleanup goal of 5 µg/L. However, recent monitoring results from wells MW-02 and MW-03 indicate a rebound in Freon 113 concentrations to levels triggering additional remediation in accordance with the SMP (see **Figure 5**). Recent indicator parameter results for dissolved oxygen, oxidation reduction potential, sulfate, and methane concentrations show that conditions at the site have become unfavorable for robust reductive dechlorination. In addition, the analytical results presented in **Table 2** indicate low microbial populations.

Bench scale testing conducted by Dow's remediation treatability testing laboratory indicates that PlumeStop® is effective in reducing the concentration of dissolved Freon 113 in groundwater. Therefore, the project objective is to inject a sufficient quantity of PlumeStop®, at the appropriate locations and depth, to effectively remediate Freon 113 and associated degradation products to below the remediation goal of 5 ug/L.

3.1 Technical Evaluation

Previous injections of emulsified vegetable oil, sodium lactate and KB-1 bacteria have demonstrated short-duration success in reducing Freon concentrations in groundwater from a high of 17,000 ug/L at well MW-03, to below the remediation goal of 5 ug/L. However, within one or two years, the concentration of Freon has repeatedly rebounded to levels above the criteria in the SMP requiring supplemental injections. As a result, injection of PlumeStop® will be performed in 2017.

PlumeStop® product information is contained in **Appendix B**. The physical properties of PlumeStop® are intended to not only reduce the Freon levels rapidly, but maintain the low concentrations for a much longer duration. These properties include low viscosity to allow for enhanced control during injection, nanoscale particles to allow penetration into small pore spaces and activated carbon to remove Freon through adsorption. Once injected, PlumeStop® coats the aquifer soil particles with a thin layer of carbon. In addition, long-term in-situ bioremediation of Freon compounds adsorbed to the carbon will free up new carbon sites to allow remediation of additional Freon.

It is anticipated that the PlumeStop® injection will result in rapid and long-term reduction in Freon concentrations detected at wells MW-02 and MW-03. Additional remedial measures will be implemented if residual Freon levels are detected above the SMP contingency measure criterion of 40 ug/L during routine groundwater sampling conducted on or after the January 2018 sampling event. Since PlumeStop® will remain in the aquifer for several years, the additional remedial measures will likely consist of a focused remedial injection of Hydrogen Release Compound (HRC) in the vicinity of wells MW-02 and MW-03 to promote reducing conditions and optimize the anaerobic enhanced reductive dechlorination processes.

4.0 SCOPE OF THE SUPPLEMENTAL INJECTIONS

4.1 Scope

The Freon 113 concentrations in samples collected from wells MW-02 and MW-03 were as high as 2,100 µg/L and 80 µg/L, respectively, during the July 2017 sampling event (see **Figure 5**). Therefore, the supplemental remedial injections will be conducted in the vicinity of wells MW-02 and MW-03. An injection boring spacing of 12 feet was based on the aquifer soil characteristics such as porosity, permeability, grain size, and other considerations. **Figure 6** illustrates the locations of the 22 proposed injection boring locations.

The treatment interval will extend from one foot above the saturated zone (approximately 4 feet bgs) to a depth of 28 feet bgs, which is estimated to be deeper than the vertical extent of contamination. Injection borings will be advanced using a direct push drill rig such as a Geoprobe. Injections will be completed over six, 4-foot intervals. PlumeStop® injection quantities are discussed in Section 5.0 - Injection Program.

The effectiveness of the PlumeStop® injections will be evaluated, in part, through a supplemental groundwater sampling event conducted one month after remedial injections are complete. Consistent with the routine quarterly groundwater sampling program, samples will be collected from wells MW-02, MW-03, MW-04, MW-06 and MW-07R. Field parameters will be recorded during sampling including dissolved oxygen, oxidation-reduction potential, pH, conductivity, turbidity and temperature.

Groundwater samples will be collected using passive diffusion bags (PDBs) to eliminate the undesirable presence of PlumeStop® in the samples. The United States Environmental Protection Agency (USEPA) and other regulatory agencies have accepted the use of PDBs for groundwater sample collection and volatile organic compound (VOC) analysis. In order to demonstrate consistency in groundwater sample collection techniques and results, AECOM will deploy PDBs into monitoring wells MW-02 and MW-03 during the routine quarterly groundwater sampling event planned for early October 2017. The PDBs will be deployed into each well after sampling the wells using low flow sampling techniques and will be collected two weeks later.

All groundwater samples collected will be shipped under proper Chain-of-Custody to TestAmerica Laboratory for analysis of Freon 113, Freon 123a, Freon 1113 using USEPA Method SW8260B as well as natural attenuation parameters (methane, total and ferrous iron, alkalinity, hardness, nitrogen-nitrate, nitrogen-nitrite, sulfate, and total organic carbon). The Freon sampling data generated from wells MW-02 and MW-03 using PDBs two weeks after the routine quarterly sampling will be compared to the data collected using low flow sampling techniques. It is assumed that these results will be similar, and will demonstrate the effectiveness of the PDBs. The groundwater sampling data generated from samples collected approximately one month after the remedial injections will be used to evaluate the effectiveness of the PlumeStop® in reducing Freon concentrations.

Additional remedial measures will be implemented if Freon levels are detected above the SMP contingency measure criterion of 40 ug/L during the routine groundwater sampling program conducted on or after the January 2018 sampling event. The additional measures will likely include injection of HRC to promote anaerobic enhanced reductive dechlorination processes.

4.2 Product Information

Commercially-prepared PlumeStop® Liquid Activated Carbon™ manufactured by Regenesis of San Clemente, California, is a fast-acting, groundwater remediation reagent which can remediate a range of contaminants through adsorption and bioremediation. The product is a liquid containing 200,000 mg/L carbon and shipped in 400 pound drums or 2,000 pound totes. Product information is provided in **Appendix B**.

4.3 Project Schedule

Injection work is expected to begin early in the Fourth Quarter of 2017. It is anticipated that the field work for the PlumeStop® injection will require 10 to 15 days. The routine October 2017 groundwater sampling event will proceed as scheduled and prior to the remedial injection work. Samples will be collected from monitoring wells MW-02 and MW-03 two weeks after the routine October 2017 groundwater sampling event in order to demonstrate the effectiveness of PDBs. The supplemental groundwater sampling event will occur approximately one month after remedial injections.

4.4 Data Analysis and Reporting

The details of the 2017 supplemental injection work will be included in the report documenting the October 2017 groundwater sampling event. A section of the report will provide information regarding the injection method, actual locations, injection intervals, quantities injected, etc. The results of the supplemental groundwater sampling will also be included in that report.

5.0 INJECTION PROGRAM

AECOM intends to retain Regenesis to provide the PlumeStop® amendment, technicians experienced in PlumeStop® injection and equipment to effectively implement the injection program. AECOM also intends to retain a qualified drilling contractor to complete the remedial injections. **Figure 6** illustrates the existing site conditions and the 22 proposed PlumeStop® injection locations. All work will be performed in accordance with the site-specific Health and Safety Plan (HASP) and this 2017 Supplemental Remedial Injection Work Plan. Property access and all field activities must be coordinated with the appropriate personnel from Cablevision, the current property owner.

5.1 Utility Clearance, Coordination, Permits, and Property Owner Approval

Prior to substrate injection, each proposed location will be cleared to avoid underground utilities and structures. Private and public (Dig Safe New York) utility locating services will be used, and Cablevision will be contacted to provide subsurface utility information to clear the injection locations.

Prior to mobilization, AECOM will submit form OMB No. 2040-0042, Inventory of Injection Wells, to the United States Environmental Protection Agency's Office of Groundwater and Drinking Water for input into their Underground Injection Control program database.

5.2 Decontamination

All injection equipment will be cleaned with steam or hot high-pressure water at the drilling contractor's office prior to mobilization to the site. AECOM will inspect the equipment upon arrival to the site to confirm the equipment is free of soil or other materials. Downhole equipment, such as drive points and rods, will also be cleaned between injection locations using an Alconox and water solution. Drilling equipment will be decontaminated as necessary prior to demobilization.

5.3 Substrate Injection

The quantity of PlumeStop® required to remediate Freon compounds was determined using the proprietary design calculator provided by Regenesis. The calculations presented in **Appendix C** utilize design parameters related to the aquifer at the EMCA site and isotherms for Freon compounds. As indicated in **Appendix C**, the pore volume of the treatment zone contains 145,421 gallon of groundwater. Regenesis indicated to AECOM the PlumeStop® dose of 1,556 mg/L was based on Freon

compound isotherms. Using the pore volume and PlumeStop® dose, the calculator indicates that 1,131 gallons of PlumeStop®, containing 200,000 mg/L carbon, will provide sufficient carbon to remediate the Freon constituents.

In order to achieve an effective distribution in the subsurface, Regenesis recommends adding mixing water for a total injection volume of 30,688 gallons. Based on 22 injection points, approximately 1,395 gallons of PlumeStop® solution will be injected at each location. Assuming a uniform distribution over the 24 foot injection interval, it is anticipated that the injection rate will be approximately 58 gallons per foot.

The following procedures will be implemented at each injection location:

- A leading retractable screen tip and drive rod assembly will be advanced to 28 feet bgs and retracted slightly.
- Clean (potable) water will be poured into the rods to displace air, thus preventing any injection of air into the treatment zone.
- The PlumeStop® solution will be pumped into the treatment zone at a uniform rate of approximately 58 gallons per foot over each 4 foot increment while the rods are withdrawn. The rate of injection will be reduced if daylighting is observed at the surface.
- The injection process will be repeated over successive 4-foot intervals until a depth of 4 feet bgs is reached.
- The completed injected borehole will be backfilled with bentonite chips.
- The ground surface will be restored in-kind to match existing site conditions.

5.4 Field Documentation

Field activities will be documented using field notebooks, photographs, and standard field forms. Field notebooks will serve as the primary record of activities at the site. Field notebooks will be bound with consecutively numbered pages. All entries into the notebook will contain a variety of information including: date, time, weather, personnel, personnel affiliation, equipment being used, level of personnel protective equipment, instrument calibration, drilling information, sampling/measurement data, quantities injected, and any other relevant information. If an incorrect

entry is made, the information will be crossed out with a single strike mark and initialed. Field notebooks will be stored in a project file after the injection work is complete.

5.5 Health and Safety

Health and safety is of paramount importance to Rohm and Haas and AECOM. The Health and Safety Plan for the groundwater sampling and supplemental remedial injections activities (AECOM, 2017a) will be onsite and followed during all construction activities. AECOM will host a safety meeting with our staff and subcontractors each morning prior to initiating any work. During the safety meeting, potential hazards associated with the work for that day will be discussed and mitigation measures will be implemented to reduce or eliminate the risk of the hazard occurring.

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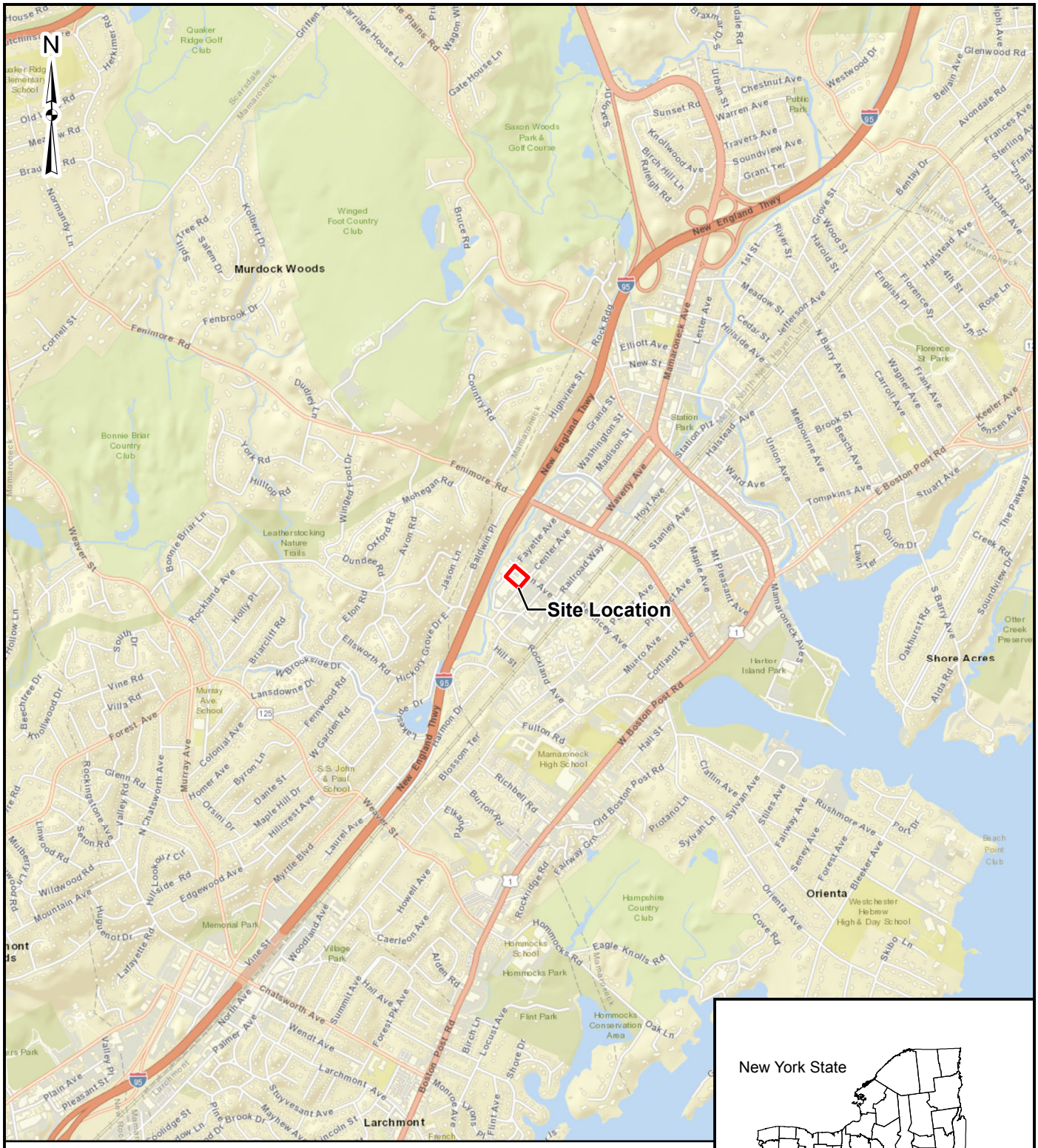
FIGURES



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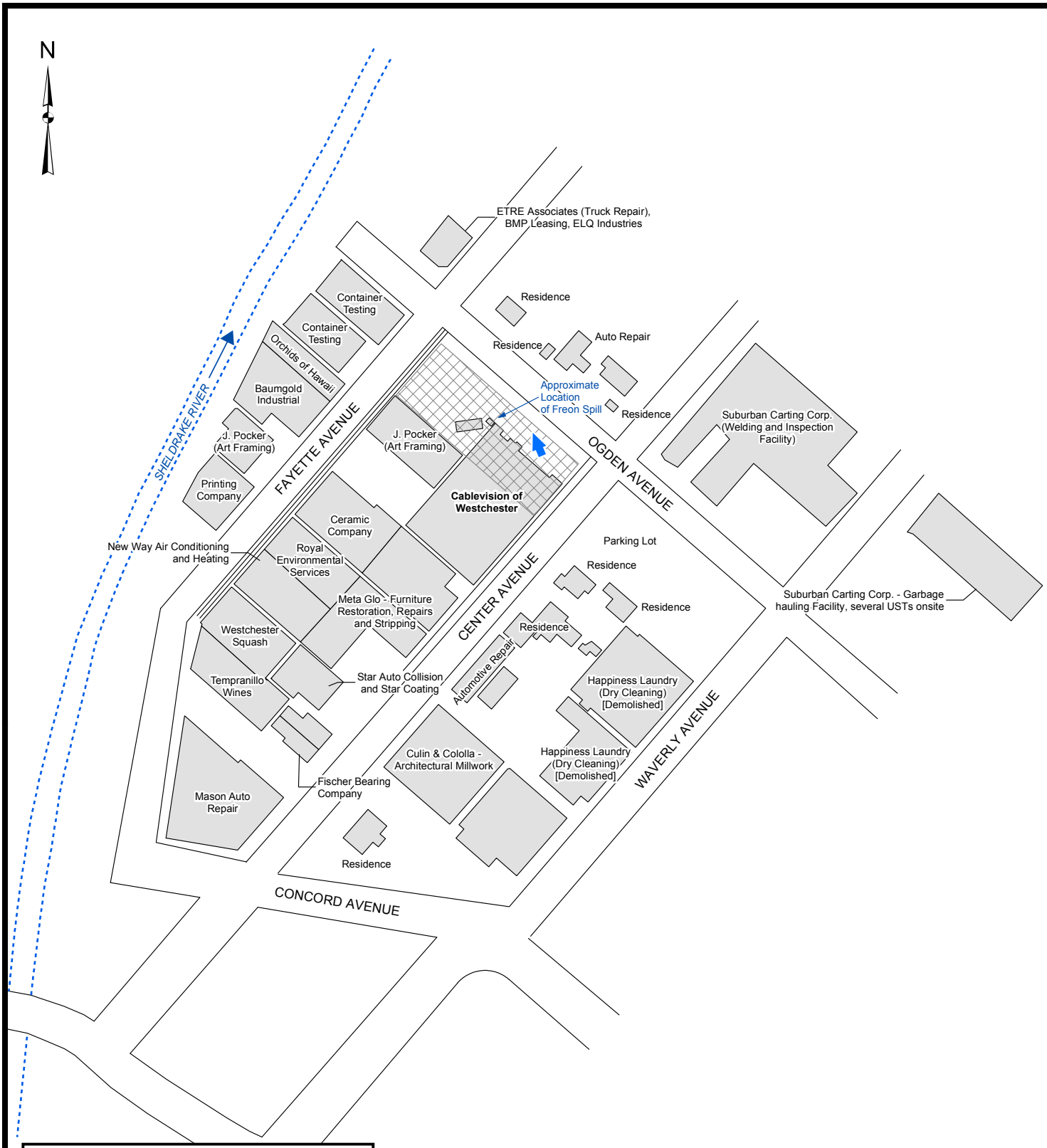
AECOM

FORMER EMCA
SITE LOCATION
SITE NO. 360025
MAMARONECK, NEW YORK

FIGURE 1



AECOM

FORMER EMCA
BUILDING LOCATION MAP
SITE NO. 360025
MAMARONECK, NEW YORK

FIGURE 2

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N

MW-05

FAYETTE AVENUE

OGDEN AVENUE

MW-04

MW-07R

GATE

GATE

UTILITY POLE

ASPHALT PARKING LOT

MW-03

GATE

MW-06

MW-02

HVAC UNIT

EMERGENCY GENERATOR

DUMPSTER

COMMUNICATION TOWER

ASPHALT PARKING LOT

FORMER EMCA SITE BOUNDARY (APPROXIMATE)

CABLEVISION BUILDING

GZ-06

CENTER AVENUE

GZ-03

Legend

- Monitoring Well
- Overhead Utility
- Underground Utility

20 0 20 Feet

FORMER EMCA SITE PLAN SITE NO. 360025 MAMARONECK, NEW YORK

AECOM

FIGURE 3

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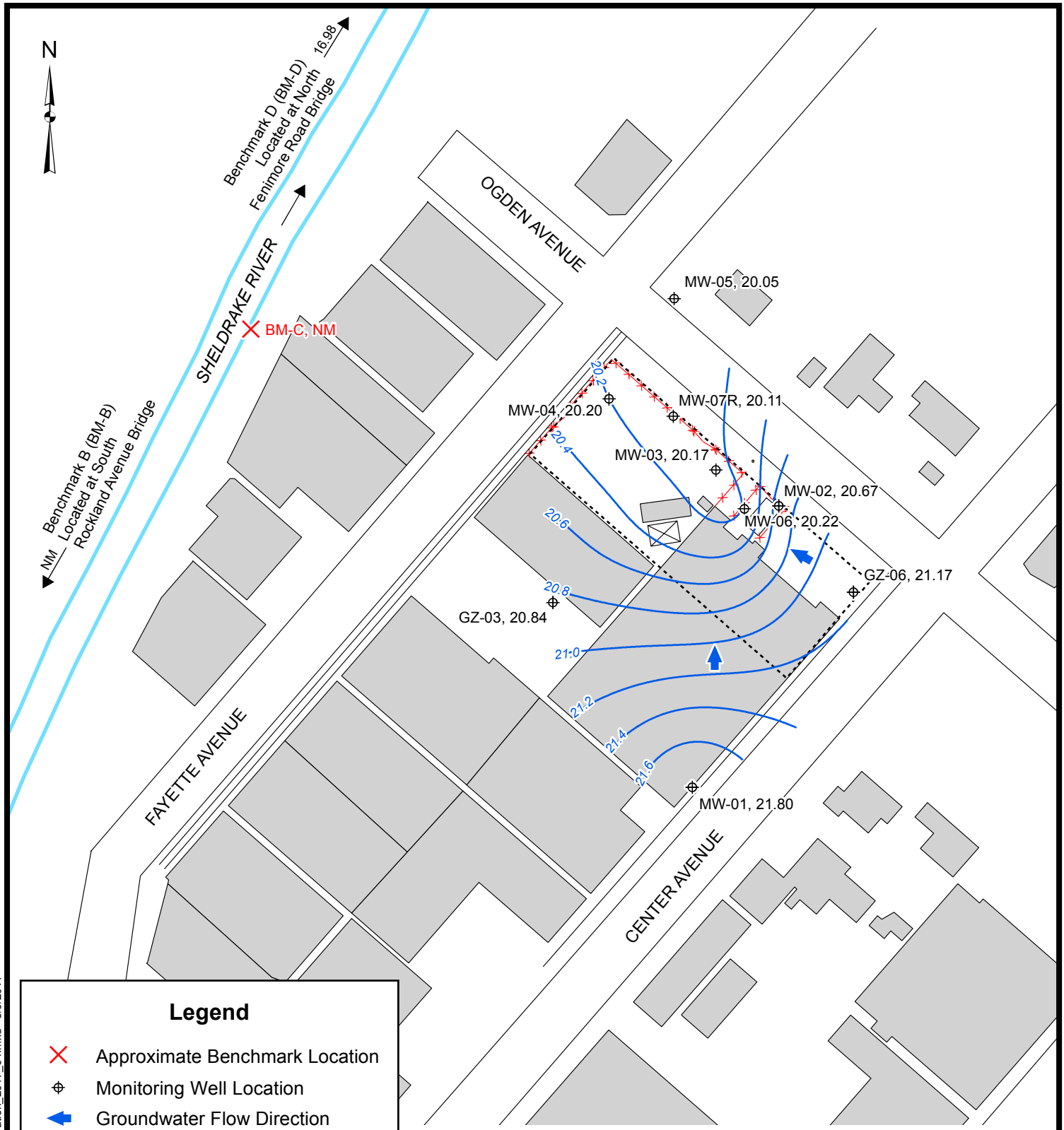

Legend

- Approximate Benchmark Location
- Monitoring Well Location
- Groundwater Flow Direction
- –19.8– Groundwater Elevation Contour
- Former EMCA Site Boundary (Approximate)

MW-02, 20.67
Location ID
Groundwater Elevation (based upon AECOM survey datum)

NOTES:
(1) Well MW-07 was replaced by well MW-07R on September 3, 2009.
(2) Benchmark C was originally established as a temporary benchmark off a tree branch overhanging the Sheldrake River between the north and south bridges. The approximate water surface elevation for this benchmark was calculated by taking the average water surface elevation of Benchmark B and Benchmark D until 2015 when measurements at Benchmark B were no longer taken due to safety concerns.
(3) NM - Not Measured

80 0 80 Feet

AECOM

FORMER EMCA
GROUNDWATER ELEVATION - APRIL 18, 2017
SITE NO. 360025
MAMARONECK, NEW YORK

FIGURE 4

J:\Projects\11172730.00000\DB\GIS\2001\ArcMap\GW_Elevation_2017_04.mxd 8/9/2017

N

SHELDRAKE RIVER

FAYETTE AVENUE

OGDEN AVENUE

CENTER AVENUE

MW-05

MW-04	8/06	2/07	8/07	2/08	8/08	2/09	10/09	2/10	6/10	10/10	4/11	9/11	4/12	9/12	4/13	10/13	4/14	7/14	10/14	4/15	10/15	4/16	10/16	4/17	7/17
Freon-113	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.38J	ND	ND	ND	ND	ND
Freon-123A	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Freon-1113	0.7J	0.6J	ND	1.0J	ND	1.0J	15	7.7J	12	2.8	5J	1.2	7.2J	2.5	4.4J	12	ND	ND	1.2	2.1	4.4	0.5J	4.3	ND	0.9J

MW-03	8/06	2/07	8/07	2/08	8/08	2/09	10/09	2/10	6/10	10/10	4/11	9/11	4/12	9/12	4/13	10/13	4/14	7/14	10/14	11/14	12/14	3/15	4/15	10/15	4/16	10/16	4/17	7/17
Freon-113	ND	10	2.0J	0.5J	ND	5.0J	0.9J	ND	ND	ND	32	5.4	20J	1.1	27	ND	100	120	0.81J	ND	ND	18	25	0.52J	42	11	140	80
Freon-123A	0.8J	48	7.0J	4.0J	1.0J	40	2.1	ND	0.5J	ND	99J	9.4	36	3.2	30	ND	62	100	1.3	ND	1.7	17	25	1.7	30	3.3	52	17
Freon-1113	51	39	54	13J	10	38	20	17J	26	4.6	110J	82	150J	130	160J	58	96	170	96	86	150	110	120	140	180	290	230	160

MW-07/07R	8/06	2/07	8/07	2/08	8/08	2/09	10/09	2/10	6/10	10/10	4/11	9/11	4/12	9/12	4/13	10/13	4/14	7/14	10/14	3/15	4/15	10/15	4/16	10/16	4/17	7/17
Freon-113	ND	ND	6.0J	ND	3.0J	46	580	18J	1.1J	53J	18	1.6	67J	5.9J	5.5	12	ND	ND	15	ND	ND	ND	ND	ND	ND	ND
Freon-123A	1.0J	3.0J	10	0.9J	16	20	76	8.1	1.8	9.5	6.3J	0.9J	11	2.4J	2.6	1.1	ND	1.2	2.2	0.78J	0.39J	ND	ND	ND	0.32J	0.37J
Freon-1113	97	89	82	92	170	150	370	150J	390	350	370J	26	630J	430	310J	390	2.1	69	130	130	10	46	22	65	3.6	17

MW-02	8/06	11/06	2/07	8/07	2/08	8/08	2/09	10/09	2/10	6/10	10/10	4/11	9/11	4/12	9/12	11/12	1/13	2/13	4/13	7/13	8/13	9/13	10/13	4/14	7/14	10/14	11/14	12/14	3/15	4/15	10/15	4/16	10/16	4/17	7/17
Freon-113	890	100	800	290	830J	700	1300	1200	76J	670	580	920	490	1200J	650	65	28	18	12	ND	ND	ND	ND	3.1	83	0.19J	0.14J	ND	45	24	21	960	940	2200	2100
Freon-123A	110	10	95	40	72	38J	34J	51	6.1	37	26	33J	26	57	26	29	52	30J	11	ND	ND	ND	ND	10	62	3.3	1.5	1.7	67	22	7.7	220	37	170	68
Freon-1113	200	21	84	61	120J	160	81J	300	92J	240	180	110J	180	140J	98	380	400	330J	400J	120	66	42	61	210	480	270J	66	56	300	310	260	940	1000	1300	470

GZ-03	8/07
Freon-113	ND
Freon-123A	ND
Freon-1113	ND

GZ-06	8/06	11/06	2/07	8/07	2/08	8/08	2/09
Freon-113	74	2.0J	14	13	ND	ND	ND
Freon-123A	23	2.0J	4.0J	10	ND	ND	ND
Freon-1113	13	2.0J	1.0J	2.0J	ND	ND	ND

MW-06	8/06	2/07	8/07	2/08	8/08	2/09	10/09	2/10	6/10	10/10	4/11	9/11	4/12	9/12	4/13	10/13	4/14	7/14	10/14	4/15	10/15	4/16	10/16	4/17	7/17
Freon-113	ND	3J	ND	ND	ND	2.0J	ND	ND	ND	ND	33	ND	82J	3.3	0.19J	ND	26	ND	ND	1.6	ND	ND	ND	5.5	4.4
Freon-123A	ND	8J	0.6J	ND	ND	35	ND	3.6	0.57J	ND	38J	4.4	28	3.6	4.9	ND	33	2.7	ND	8.1	ND	1.1	0.28J	13	3.6
Freon-1113	ND	100	21	8.0J	4.0J	34	6.4	35J	68J	61	96J	30	230J	140	61J	27	75	84	51	110	51	51	68	60	31

MW-01	8/07
Freon-113	ND
Freon-123A	ND
Freon-1113	ND

Legend

- Existing Monitoring Well Location
- Generalized Groundwater Flow Direction
- Concentration Exceeds NYSDEC TOGS (1.1.1) Class GA Standards
- 12/05 - Post-IRM Injection Sampling Dates
- 2/08 - Post-2007 Supplemental Injection Sampling Dates
- 10/09 - Post-2009 Supplemental Injection Sampling Dates
- 11/12 - Post-2012 Supplemental Injection Sampling Dates
- 7/13 - Post-2013 Supplemental Injection Sampling Dates
- 10/14 - Post-2014 Supplemental Injection Sampling Dates

NOTES:

All analytical results are reported in µg/L.
Well, MW-07, was replaced by well, MW-07R, on September 3, 2009.
ND = Not Detected
J = Estimated Value
Freon-113 = 1,1,2-Trichloro-1,2,2-trifluoroethane
Freon-123A = 1,2-Dichloro-1,1,2-trifluoroethane
Freon-1113 = Chlorotrifluoroethene

100 0 100 Feet

FORMER EMCA
SUMMARY OF FREON DETECTIONS IN GROUNDWATER (2006 - 2017)
SITE NO. 360025
MAMARONECK, NEW YORK

AECOM

FIGURE 5

J:\Projects\11172730.00000\DB\GIS\2001\ArcMap\Chemical_Update_2017_07.mxd 8/10/2017

N

MW-05

FAYETTE AVENUE

OGDEN AVENUE

MW-04

MW-07R

GATE

GATE

20.2

20.4

20.6

20.8

ASPHALT PARKING LOT

UTILITY POLE

MW-03

EMERGENCY GENERATOR

HVAC UNIT

COMMUNICATION TOWER

MW-06

MW-02

GATE

DUMPSTER

ASPHALT PARKING LOT

FORMER EMCA SITE BOUNDARY (APPROXIMATE)

CENTER AVENUE

CABLEVISION BUILDING

GZ-03

GZ-06

Legend

- Monitoring Well
- Plume Stop® Injection Boring
- Groundwater Flow Direction (April 2017)
- Groundwater Elevation Contour (April 2017)
- Overhead Utility
- Underground Utility

20 0 20 Feet

FORMER EMCA SITE
PROPOSED 2017 REMEDIAL INJECTION PLAN
SITE NO. 360025
MAMARONECK, NEW YORK

AECOM

FIGURE 6

J:\Projects\11172730.00000\DB\GIS\2001\ArcMap\Proposed Injection (2017)_REV.mxd 8/28/2017

TABLES

TABLE 1
GROUNDWATER ELEVATION MEASUREMENTS
FORMER EMCA SITE, MAMARONECK, NEW YORK

Location ID / Type	Northing	Easting	Ground Elevation (ft)	Casing Elevation (ft)	Meas.point (Riser)Elev.(ft)	Geol. Zone	Specific Gravity	Date / Time	Depth to Water (ft)	Water Elev. (ft)	Product Thick. (ft)	Corrected Water Elev. (ft)	Remark
GZ-03	1981	2713	26.52		26.16		1						
MWN								4/11/2012 0800	NM	-	NM	-	Inaccessible
MWN								9/24/2012 0000	6.00	20.16	0.00	20.16	
MWN								4/8/2013 0000			NP		Inaccessible
MWN								10/22/2013 0000	7.25	18.91	0.00	18.91	
MWN								4/28/2014 0000	3.54	22.62	0.00	22.62	
MWN								7/1/2014 0000	6.12	20.04	0.00	20.04	
MWN								10/27/2014 0000	5.98	20.18	0.00	20.18	
MWN								4/22/2015	3.05	23.11	0.00	23.11	
MWN								10/8/2015 0000	5.66	20.50	0.00	20.50	
MWN								4/27/2016 0000	5.42	20.74	0.00	20.74	
MWN								10/5/2016 0000	6.69	19.47	0.00	19.47	
MWN								4/18/2017 0000	5.32	20.84	0.00	20.84	Crumbling Concrete Pad
MWN								7/18/2017 0000	5.53	20.63	0.00	20.63	
GZ-06	1987	2890	28.2		28.02		1						
MWN								4/11/2012 0800	7.34	20.68	0.00	20.68	
MWN								9/24/2012 0000	7.90	20.12	0.00	20.12	
MWN								4/8/2013 1619	7.52	20.50	0.00	20.50	
MWN								10/22/2013 0000	8.56	19.46	0.00	19.46	
MWN								4/28/2014 0000	7.24	20.78	0.00	20.78	
MWN								7/1/2014 0000	7.40	20.62	0.00	20.62	
MWN								10/27/2014 0000	7.84	20.18	0.00	20.18	
MWN								4/22/2015	6.51	21.51	0.00	21.51	
MWN								10/8/2015 0000	7.43	20.59	0.00	20.59	
MWN								4/27/2016 0000	7.34	20.68	0.00	20.68	
MWN								10/5/2016 0000	8.09	19.93	0.00	19.93	
MWN								4/18/2017 0000	6.85	21.17	0.00	21.17	

NM - No Measurement

The value noted in the column labeled Specific Gravity is an assumed value for free product, if found.

Type:
MWN Monitoring Well
SG Staff Gauge

Filter = ([tblGWD].[LOGDATE] Between #1/1/2012# And #7/31/2017#)

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TABLE 1
GROUNDWATER ELEVATION MEASUREMENTS
FORMER EMCA SITE, MAMARONECK, NEW YORK

Location ID / Type	Northing	Easting	Ground Elevation (ft)	Casing Elevation (ft)	Meas.point (Riser)Elev.(ft)	Geol. Zone	Specific Gravity	Date / Time	Depth to Water (ft)	Water Elev. (ft)	Product Thick. (ft)	Corrected Water Elev. (ft)	Remark
MWN								7/18/2017 0000	7.37	20.65	0.00	20.65	
MW-01	1872	2795	26.05		25.74		1						
MWN								4/11/2012 0800	6.02	19.72	0.00	19.72	
MWN								9/24/2012 0000	5.75	19.99	0.00	19.99	
MWN								4/8/2013 1627	5.16	20.58	0.00	20.58	
MWN								10/22/2013 0000	6.51	19.23	0.00	19.23	
MWN								4/28/2014 0000	4.06	21.68	0.00	21.68	
MWN								7/1/2014 0000	5.23	20.51	0.00	20.51	
MWN								10/27/2014 0000	5.69	20.05	0.00	20.05	
MWN								4/22/2015	3.23	22.51	0.00	22.51	
MWN								10/8/2015 0000	4.32	21.42	0.00	21.42	
MWN								4/27/2016 0000	4.01	21.73	0.00	21.73	
MWN								10/5/2016 0000	5.48	20.26	0.00	20.26	
MWN								4/18/2017 0000	3.94	21.80	0.00	21.80	
MWN								7/18/2017 0000	4.15	21.59	0.00	21.59	
MW-02	2038	2846	25.71		25.63		1						
MWN								4/11/2012 0800	6.38	19.25	0.00	19.25	
MWN								9/24/2012 0000	6.06	19.57	0.00	19.57	
MWN								4/9/2013 0820	5.98	19.65	0.00	19.65	
MWN								10/22/2013 0000	6.77	18.86	0.00	18.86	
MWN								4/16/2014 0000	5.08	20.55	0.00	20.55	
MWN								4/28/2014 0000	5.62	20.01	0.00	20.01	
MWN								7/1/2014 0000	5.87	19.76	0.00	19.76	
MWN								10/27/2014 0000	6.05	19.58	0.00	19.58	
MWN								4/22/2015	4.62	21.01	0.00	21.01	
MWN								10/8/2015 0000	5.85	19.78	0.00	19.78	
MWN								4/27/2016 0000	5.58	20.05	0.00	20.05	

NM - No Measurement

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Type:
MWN Monitoring Well
SG Staff Gauge

TABLE 1
GROUNDWATER ELEVATION MEASUREMENTS
FORMER EMCA SITE, MAMARONECK, NEW YORK

Location ID / Type	Northing	Easting	Ground Elevation (ft)	Casing Elevation (ft)	Meas.point (Riser)Elev.(ft)	Geol. Zone	Specific Gravity	Date / Time	Depth to Water (ft)	Water Elev. (ft)	Product Thick. (ft)	Corrected Water Elev. (ft)	Remark
MWN								10/5/2016 0000	6.11	19.52	0.00	19.52	
MWN								4/18/2017 0000	4.96	20.67	0.00	20.67	
MWN								7/18/2017 0000	5.76	19.87	0.00	19.87	
MW-03	2059	2809	26.04		25.59		1						
MWN								4/11/2012 0800	6.38	19.21	0.00	19.21	
MWN								9/24/2012 0000	6.05	19.54	0.00	19.54	
MWN								4/9/2013 1240	5.98	19.61	0.00	19.61	
MWN								10/22/2013 0000	6.74	18.85	0.00	18.85	
MWN								4/16/2014 0000	5.11	20.48	0.00	20.48	
MWN								4/28/2014 0000	5.62	19.97	0.00	19.97	
MWN								7/1/2014 0000	5.87	19.72	0.00	19.72	
MWN								10/27/2014 0000	6.09	19.50	0.00	19.50	
MWN								4/22/2015	4.67	20.92	0.00	20.92	
MWN								10/8/2015 0000	5.90	19.69	0.00	19.69	
MWN								4/27/2016 0000	5.81	19.78	0.00	19.78	
MWN								10/5/2016 0000	5.99	19.60	0.00	19.60	
MWN								4/18/2017 0000	5.42	20.17	0.00	20.17	
MWN								7/18/2017 0000	4.99	20.60	0.00	20.60	
MW-04	2101	2746	25.41		25.31		1						
MWN								4/11/2012 0800	6.23	19.08	0.00	19.08	
MWN								9/24/2012 0000	5.85	19.46	0.00	19.46	
MWN								4/9/2013 1328	5.73	19.58	0.00	19.58	
MWN								10/22/2013 0000	6.59	18.72	0.00	18.72	
MWN								4/16/2014 0000	5.31	20.00	0.00	20.00	
MWN								4/28/2014 0000	5.31	20.00	0.00	20.00	
MWN								7/1/2014 0000	5.65	19.66	0.00	19.66	
MWN								10/27/2014 0000	5.84	19.47	0.00	19.47	

NM - No Measurement

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Type:
MWN Monitoring Well
SG Staff Gauge

TABLE 1
GROUNDWATER ELEVATION MEASUREMENTS
FORMER EMCA SITE, MAMARONECK, NEW YORK

Location ID / Type	Northing	Easting	Ground Elevation (ft)	Casing Elevation (ft)	Meas.point (Riser)Elev.(ft)	Geol. Zone	Specific Gravity	Date / Time	Depth to Water (ft)	Water Elev. (ft)	Product Thick. (ft)	Corrected Water Elev. (ft)	Remark
MWN								4/22/2015	4.16	21.15	0.00	21.15	
MWN								10/8/2015 0000	4.59	20.72	0.00	20.72	
MWN								4/27/2016 0000	5.47	19.84	0.00	19.84	
MWN								10/5/2016 0000	5.01	20.30	0.00	20.30	
MWN								4/18/2017 0000	5.11	20.20	0.00	20.20	
MWN								7/18/2017 0000	5.59	19.72	0.00	19.72	
MW-05	2160.091194	2784.442553	98.25		24.63		1						
MWN								4/11/2012 0800	5.40	19.23	0.00	19.23	
MWN								9/24/2012 0000	5.12	19.51	0.00	19.51	
MWN								4/8/2013 1640	4.90	19.73	0.00	19.73	
MWN								10/22/2013 0000	5.86	18.77	0.00	18.77	
MWN								4/28/2014 0000	4.46	20.17	0.00	20.17	
MWN								7/1/2014 0000	4.90	19.73	0.00	19.73	
MWN								10/27/2014 0000	4.92	19.71	0.00	19.71	
MWN								4/22/2015	2.96	21.67	0.00	21.67	
MWN								10/8/2015 0000	5.01	19.62	0.00	19.62	
MWN								4/27/2016 0000	4.71	19.92	0.00	19.92	
MWN								10/5/2016 0000	5.44	19.19	0.00	19.19	
MWN								4/18/2017 0000	4.58	20.05	0.00	20.05	
MWN								7/18/2017 0000	4.96	19.67	0.00	19.67	
MW-06	2036.09641	2825.78627	25.9		25.77		1						
MWN								4/11/2012 0800	6.51	19.26	0.00	19.26	
MWN								9/24/2012 0000	6.18	19.59	0.00	19.59	
MWN								4/9/2013 1045	6.08	19.69	0.00	19.69	
MWN								10/22/2013 0000	6.92	18.85	0.00	18.85	
MWN								4/16/2014 0000	5.18	20.59	0.00	20.59	
MWN								4/28/2014 0000	5.67	20.10	0.00	20.10	

NM - No Measurement

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Type:
MWN Monitoring Well
SG Staff Gauge

TABLE 1
GROUNDWATER ELEVATION MEASUREMENTS
FORMER EMCA SITE, MAMARONECK, NEW YORK

Location ID / Type	Northing	Easting	Ground Elevation (ft)	Casing Elevation (ft)	Meas.point (Riser)Elev.(ft)	Geol. Zone	Specific Gravity	Date / Time	Depth to Water (ft)	Water Elev. (ft)	Product Thick. (ft)	Corrected Water Elev. (ft)	Remark
MWN								7/1/2014 0000	5.98	19.79	0.00	19.79	
MWN								10/27/2014 0000	6.22	19.55	0.00	19.55	
MWN								4/22/2015	4.75	21.02	0.00	21.02	
MWN								10/8/2015 0000	6.01	19.76	0.00	19.76	
MWN								4/27/2016 0000	5.98	19.79	0.00	19.79	
MWN								10/5/2016 0000	6.52	19.25	0.00	19.25	
MWN								4/18/2017 0000	5.55	20.22	NP		
MWN								7/18/2017 0000	5.98	19.79	0.00	19.79	
MW-07R	2090.71043	2783.86481	26.06		25.63		1						
MWN								4/11/2012 0800	6.50	19.13	0.00	19.13	
MWN								9/24/2012 0000	6.15	19.48	0.00	19.48	
MWN								4/9/2013 1337	6.08	19.55	0.00	19.55	
MWN								10/22/2013 0000	6.85	18.78	0.00	18.78	
MWN								4/16/2014 0000	5.10	20.53	0.00	20.53	
MWN								4/28/2014 0000	5.72	19.91	0.00	19.91	
MWN								7/1/2014 0000	5.98	19.65	0.00	19.65	
MWN								10/27/2014 0000	6.18	19.45	0.00	19.45	
MWN								4/22/2015	4.76	20.87	0.00	20.87	
MWN								10/8/2015 0000	5.98	19.65	0.00	19.65	
MWN								4/27/2016 0000	5.91	19.72	0.00	19.72	
MWN								10/5/2016 0000	6.48	19.15	0.00	19.15	
MWN								4/18/2017 0000	5.52	20.11	NP		
MWN								7/18/2017 0000	5.97	19.66	0.00	19.66	

NM - No Measurement

The value noted in the column labeled Specific Gravity is an assumed value for free product, if found.

Type:
MWN Monitoring Well
SG Staff Gauge

Filter = ([tblGWD].[LOGDATE] Between #1/1/2012# And #7/31/2017#)

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J:\Projects\11172730.00000\DB\PROGRAM\EDMS.mde/Groundwater Level

TABLE 2
GROUNDWATER ANALYTICAL RESULTS
FORMER EMCA SITE, MAMARONECK, NEW YORK

Location ID			MW-02	MW-02	MW-02	MW-02	MW-02
Sample ID			20120411MW-02V08N	20120924MW-02V10N	20121022MW-02V10N	MW-02	20121129MW-02V10N
Matrix			Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Depth Interval (ft)			-	-	-	-	-
Date Sampled			04/11/12	09/24/12	10/22/12	10/31/12	11/29/12
Parameter	**Units**	**Criteria***					
Volatiles							
Chlorotrifluoroethene (Freon-1113)	UG/L	5	140 J	98	NA	NA	380
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon-113)	UG/L	5	1,200 J	650	NA	NA	65
1,2-Dichloro-1,1,2-trifluoroethane (Freon-123A)	UG/L	5	57	26	NA	NA	29
Dissolved Gases							
Methane	UG/L	-	8,100	4,000	NA	NA	5,600
Total Metals							
Iron	UG/L	300	NA	32,900	NA	NA	NA
Miscellaneous Parameters							
Alkalinity, Total (as CaCO3)	MG/L	-	NA	245	NA	NA	NA
Alkalinity, Bicarbonate (as CaCO3)	MG/L	-	NA	245	NA	NA	NA
Alkalinity, Carbonate (as CaCO3)	MG/L	-	NA	5.0 U	NA	NA	NA
Alkalinity, Hydroxide	MG/L	-	NA	5.0 U	NA	NA	NA
Dehalococcoides ethenogenes	CEQ/mL	-	NA	100	NA	NA	2,000
Dehalobacter	GC/mL	-	NA	5	NA	NA	40,000
Hardness (as CaCO3)	MG/L	-	NA	388	NA	NA	NA
Nitrogen, Nitrate	MG/L	10	NA	0.047 U	NA	NA	NA
Nitrogen, Nitrite	MG/L	1	NA	NA	NA	NA	NA
Nitrogen, Nitrate-Nitrite	MG/L	10	NA	NA	NA	NA	NA
Sulfate	MG/L	250	51.8	50.8	NA	NA	2.2 U
Total Organic Carbon	MG/L	-	NA	8.4	NA	NA	NA
Ferrous Iron (lab)	MG/L	-	NA	NA	NA	NA	NA

*Criteria- NYSDEC TOGS (1.1.1), Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations, Class GA, Revised April 2000.

Flags assigned during chemistry validation are shown.

Concentration Exceeds Criteria

Detection Limits shown are MDL

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[LOGDATE] >= #1/1/2012# AND [MATRIX] = 'WG' AND ([SACODE] = 'N' OR [SACODE] = 'FD'

TABLE 2
GROUNDWATER ANALYTICAL RESULTS
FORMER EMCA SITE, MAMARONECK, NEW YORK

Location ID			MW-02	MW-02	MW-02	MW-02	MW-02
Sample ID			20120411MW-02V08N	20120924MW-02V10N	20121022MW-02V10N	MW-02	20121129MW-02V10N
Matrix			Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Depth Interval (ft)			-	-	-	-	-
Date Sampled			04/11/12	09/24/12	10/22/12	10/31/12	11/29/12
Parameter	**Units**	**Criteria***					
Volatile Fatty Acids							
Acetic Acid	MG/L	-	NA	NA	NA	NA	NA
Formic Acid	MG/L	-	NA	NA	NA	NA	NA
Lactic Acid	MG/L	-	NA	NA	NA	NA	NA
n-Butyric Acid	MG/L	-	NA	NA	NA	NA	NA
Propionic Acid	MG/L	-	NA	NA	NA	NA	NA
Pyruvic Acid	MG/L	-	NA	NA	NA	NA	NA
Field Parameter							
Dissolved Oxygen	MG/L	-	0 U	0 U	0.42	0.47	0.78
Ferrous Iron	MG/L	-	NA	9.0	NA	NA	NA
Oxidation-Reduction Potential	mV	-	-44	-78	-119	-82	-116
pH	S.U.	-	6.56	6.62	6.38	6.35	6.40
Specific Conductance	MS/CM	-	1.86	1.69	2.53	2.52	2.39
Temperature	DEG C	-	13.45	24.07	19.21	19.42	14.75
Turbidity	NTU	-	0 U	0 U	0 U	9.3	0 U

*Criteria- NYSDEC TOGS (1.1.1), Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations, Class GA, Revised April 2000.

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Concentration Exceeds Criteria

Detection Limits shown are MDL

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[LOGDATE] >= #1/1/2012# AND [MATRIX] = 'WG' AND ([SACODE] = 'N' OR [SACODE] = 'FD'

TABLE 2
GROUNDWATER ANALYTICAL RESULTS
FORMER EMCA SITE, MAMARONECK, NEW YORK

Location ID			MW-02	MW-02	MW-02	MW-02	MW-02
Sample ID			20130115MW-02V10N	20130219MW-02V10N	20130409MW-02V09FD	20130409MW-02V09N	20130711MW-02V09N
Matrix			Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Depth Interval (ft)			-	-	-	-	-
Date Sampled			01/15/13	02/19/13	04/09/13	04/09/13	07/11/13
Parameter	**Units**	**Criteria***			Field Duplicate (1-1)		
Volatiles							
Chlorotrifluoroethene (Freon-1113)	UG/L	5	400	330 J	400 J	280 J	120
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon-113)	UG/L	5	28	18	12	11	0.080 UJ
1,2-Dichloro-1,1,2-trifluoroethane (Freon-123A)	UG/L	5	52	30 J	11	11	0.84 U
Dissolved Gases							
Methane	UG/L	-	8,000	8,000	9,600	9,000	7,700
Total Metals							
Iron	UG/L	300	NA	NA	56,600	58,100	NA
Miscellaneous Parameters							
Alkalinity, Total (as CaCO3)	MG/L	-	NA	NA	510	249	NA
Alkalinity, Bicarbonate (as CaCO3)	MG/L	-	NA	NA	510	249	NA
Alkalinity, Carbonate (as CaCO3)	MG/L	-	NA	NA	5.0 U	5.0 U	NA
Alkalinity, Hydroxide	MG/L	-	NA	NA	5.0 U	5.0 U	NA
Dehalococcoides ethenogenes	CEQ/mL	-	2,000	200	NA	60	1,000
Dehalobacter	GC/mL	-	30,000	2,000	NA	1,000	6,000 J
Hardness (as CaCO3)	MG/L	-	NA	NA	673	653	NA
Nitrogen, Nitrate	MG/L	10	NA	NA	0.047 UJ	0.047 UJ	NA
Nitrogen, Nitrite	MG/L	1	NA	NA	NA	NA	NA
Nitrogen, Nitrate-Nitrite	MG/L	10	NA	NA	NA	NA	NA
Sulfate	MG/L	250	14.4	13 J	9.2	19.9	2.2 U
Total Organic Carbon	MG/L	-	NA	NA	31.1	31.1	NA
Ferrous Iron (lab)	MG/L	-	NA	NA	NA	NA	NA

*Criteria- NYSDEC TOGS (1.1.1), Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations, Class GA, Revised April 2000.

Flags assigned during chemistry validation are shown.

Concentration Exceeds Criteria

Detection Limits shown are MDL

TABLE 2
GROUNDWATER ANALYTICAL RESULTS
FORMER EMCA SITE, MAMARONECK, NEW YORK

Location ID			MW-02	MW-02	MW-02	MW-02	MW-02
Sample ID			20130115MW-02V10N	20130219MW-02V10N	20130409MW-02V09FD	20130409MW-02V09N	20130711MW-02V09N
Matrix			Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Depth Interval (ft)			-	-	-	-	-
Date Sampled			01/15/13	02/19/13	04/09/13	04/09/13	07/11/13
Parameter	**Units**	**Criteria***			Field Duplicate (1-1)		
Volatile Fatty Acids							
Acetic Acid	MG/L	-	NA	0.15 U	NA	29.3 J	NA
Formic Acid	MG/L	-	NA	0.11 U	NA	0.11 U	NA
Lactic Acid	MG/L	-	NA	0.14 U	NA	0.14 U	NA
n-Butyric Acid	MG/L	-	NA	0.19 J	NA	0.16 U	NA
Propionic Acid	MG/L	-	NA	0.17 U	NA	0.17 U	NA
Pyruvic Acid	MG/L	-	NA	0.08 U	NA	4.4	NA
Field Parameter							
Dissolved Oxygen	MG/L	-	1.36	4.57	NA	0.65	3.32
Ferrous Iron	MG/L	-	NA	NA	NA	44.3	NA
Oxidation-Reduction Potential	mV	-	-121	-140	NA	-116	-165
pH	S.U.	-	6.58	6.82	NA	6.27	6.61
Specific Conductance	MS/CM	-	2.43	2.61	NA	8.18	2.60
Temperature	DEG C	-	13.05	10.18	NA	13.29	19.29
Turbidity	NTU	-	0 U	0 U	NA	0 U	0 U

*Criteria- NYSDEC TOGS (1.1.1), Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations, Class GA, Revised April 2000.

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Concentration Exceeds Criteria

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TABLE 2
GROUNDWATER ANALYTICAL RESULTS
FORMER EMCA SITE, MAMARONECK, NEW YORK

Location ID			MW-02	MW-02	MW-02	MW-02	MW-02
Sample ID			20130807MW-02V09N	20130903MW-02V09N	20131022MW-02V09FD	20131022MW-02V09N	20140416MW-02V09N
Matrix			Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Depth Interval (ft)			-	-	-	-	-
Date Sampled			08/07/13	09/03/13	10/22/13	10/22/13	04/16/14
Parameter	**Units**	**Criteria***			Field Duplicate (1-1)		
Volatiles							
Chlorotrifluoroethene (Freon-1113)	UG/L	5	66 J	42	64	61	210
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon-113)	UG/L	5	0.080 U	0.080 U	0.080 U	0.080 U	3.1
1,2-Dichloro-1,1,2-trifluoroethane (Freon-123A)	UG/L	5	0.84 U	0.84 U	0.84 U	0.84 U	10
Dissolved Gases							
Methane	UG/L	-	11,000	14,000	9,600	13,000	12,000
Total Metals							
Iron	UG/L	300	NA	NA	77,200	78,400	69,900
Miscellaneous Parameters							
Alkalinity, Total (as CaCO3)	MG/L	-	NA	NA	230	233	456
Alkalinity, Bicarbonate (as CaCO3)	MG/L	-	NA	NA	NA	NA	456
Alkalinity, Carbonate (as CaCO3)	MG/L	-	NA	NA	NA	NA	5.0 U
Alkalinity, Hydroxide	MG/L	-	NA	NA	NA	NA	5.0 U
Dehalococcoides ethenogenes	CEQ/mL	-	800 J	50 J	NA	30	NA
Dehalobacter	GC/mL	-	10,000	3,000	NA	500	70
Hardness (as CaCO3)	MG/L	-	NA	NA	69.3	131	455
Nitrogen, Nitrate	MG/L	10	NA	NA	0.047 UJ	0.28 J	0.047 U
Nitrogen, Nitrite	MG/L	1	NA	NA	0.078 J	0.036 J	0.049 J
Nitrogen, Nitrate-Nitrite	MG/L	10	NA	NA	NA	NA	NA
Sulfate	MG/L	250	2.2 U	2.5 J	3.9 J	3.9 J	6.6
Total Organic Carbon	MG/L	-	NA	NA	9.5	9.5	12.8
Ferrous Iron (lab)	MG/L	-	NA	NA	NA	NA	NA

*Criteria- NYSDEC TOGS (1.1.1), Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations, Class GA, Revised April 2000.

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Concentration Exceeds Criteria

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TABLE 2
GROUNDWATER ANALYTICAL RESULTS
FORMER EMCA SITE, MAMARONECK, NEW YORK

Location ID			MW-02	MW-02	MW-02	MW-02	MW-02
Sample ID			20130807MW-02V09N	20130903MW-02V09N	20131022MW-02V09FD	20131022MW-02V09N	20140416MW-02V09N
Matrix			Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Depth Interval (ft)			-	-	-	-	-
Date Sampled			08/07/13	09/03/13	10/22/13	10/22/13	04/16/14
Parameter	**Units**	**Criteria***			Field Duplicate (1-1)		
Volatile Fatty Acids							
Acetic Acid	MG/L	-	NA	NA	NA	NA	NA
Formic Acid	MG/L	-	NA	NA	NA	NA	NA
Lactic Acid	MG/L	-	NA	NA	NA	NA	NA
n-Butyric Acid	MG/L	-	NA	NA	NA	NA	NA
Propionic Acid	MG/L	-	NA	NA	NA	NA	NA
Pyruvic Acid	MG/L	-	NA	NA	NA	NA	NA
Field Parameter							
Dissolved Oxygen	MG/L	-	0.98	1.64	NA	0.35	9.11
Ferrous Iron	MG/L	-	NA	NA	NA	46.5	3.5
Oxidation-Reduction Potential	mV	-	-146	-134	NA	-125	-149
pH	S.U.	-	6.42	6.10	NA	6.41	7.04
Specific Conductance	MS/CM	-	2.22	2.06	NA	1.76	2.49
Temperature	DEG C	-	18.82	20.14	NA	19.68	9.66
Turbidity	NTU	-	0 U	1.0	NA	1.2	0 U

*Criteria- NYSDEC TOGS (1.1.1), Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations, Class GA, Revised April 2000.

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TABLE 2
GROUNDWATER ANALYTICAL RESULTS
FORMER EMCA SITE, MAMARONECK, NEW YORK

Location ID			MW-02	MW-02	MW-02	MW-02	MW-02
Sample ID			DUP04162014	20140701MW-02V09N	Dup20140701	20141027MW-02V09N	20141124MW-02V09N
Matrix			Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Depth Interval (ft)			-	-	-	-	-
Date Sampled			04/16/14	07/01/14	07/01/14	10/27/14	11/24/14
Parameter	**Units**	**Criteria***	Field Duplicate (1-1)		Field Duplicate (1-1)		
Volatiles							
Chlorotrifluoroethene (Freon-1113)	UG/L	5	190	480	380	270 J	66
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon-113)	UG/L	5	2.9	83	78	0.19 J	0.14 J
1,2-Dichloro-1,1,2-trifluoroethane (Freon-123A)	UG/L	5	11	62	50	3.3	1.5
Dissolved Gases							
Methane	UG/L	-	13,000	12,000	8,000	2,600	4,500
Total Metals							
Iron	UG/L	300	70,500	73,100	74,300	94,800	NA
Miscellaneous Parameters							
Alkalinity, Total (as CaCO3)	MG/L	-	456	254	292	367	NA
Alkalinity, Bicarbonate (as CaCO3)	MG/L	-	456	254	292	367	NA
Alkalinity, Carbonate (as CaCO3)	MG/L	-	5.0 U	5.0 U	5.0 U	5.0 U	NA
Alkalinity, Hydroxide	MG/L	-	5.0 U	5.0 U	5.0 U	5.0 U	NA
Dehalococcoides ethenogenes	CEQ/mL	-	NA	NA	NA	5	2 J
Dehalobacter	GC/mL	-	NA	100	NA	9,000	2,000
Hardness (as CaCO3)	MG/L	-	455	436	356	455	NA
Nitrogen, Nitrate	MG/L	10	0.047 U	0.047 U	0.11	0.047 U	NA
Nitrogen, Nitrite	MG/L	1	0.043 J	0.038 J	0.049 J	0.0041 U	NA
Nitrogen, Nitrate-Nitrite	MG/L	10	NA	NA	NA	NA	NA
Sulfate	MG/L	250	6.5	10.8	10.5	10.8	10.2
Total Organic Carbon	MG/L	-	12.7	9.2	10	81.0	NA
Ferrous Iron (lab)	MG/L	-	NA	NA	NA	NA	NA

*Criteria- NYSDEC TOGS (1.1.1), Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations, Class GA, Revised April 2000.

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Concentration Exceeds Criteria

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TABLE 2
GROUNDWATER ANALYTICAL RESULTS
FORMER EMCA SITE, MAMARONECK, NEW YORK

Location ID			MW-02	MW-02	MW-02	MW-02	MW-02
Sample ID			DUP04162014	20140701MW-02V09N	Dup20140701	20141027MW-02V09N	20141124MW-02V09N
Matrix			Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Depth Interval (ft)			-	-	-	-	-
Date Sampled			04/16/14	07/01/14	07/01/14	10/27/14	11/24/14
Parameter	**Units**	**Criteria***	Field Duplicate (1-1)		Field Duplicate (1-1)		
Volatile Fatty Acids							
Acetic Acid	MG/L	-	NA	NA	NA	NA	NA
Formic Acid	MG/L	-	NA	NA	NA	NA	NA
Lactic Acid	MG/L	-	NA	NA	NA	NA	NA
n-Butyric Acid	MG/L	-	NA	NA	NA	NA	NA
Propionic Acid	MG/L	-	NA	NA	NA	NA	NA
Pyruvic Acid	MG/L	-	NA	NA	NA	NA	NA
Field Parameter							
Dissolved Oxygen	MG/L	-	NA	2.38	NA	2.45	1.72
Ferrous Iron	MG/L	-	NA	3.0	NA	7.8	NA
Oxidation-Reduction Potential	mV	-	NA	-85	NA	-134	-143
pH	S.U.	-	NA	6.49	NA	6.50	6.85
Specific Conductance	MS/CM	-	NA	2.13	NA	2.48	2.59
Temperature	DEG C	-	NA	15.87	NA	17.27	17.18
Turbidity	NTU	-	NA	2.7	NA	0.7	0 U

*Criteria- NYSDEC TOGS (1.1.1), Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations, Class GA, Revised April 2000.

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Concentration Exceeds Criteria

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TABLE 2
GROUNDWATER ANALYTICAL RESULTS
FORMER EMCA SITE, MAMARONECK, NEW YORK

Location ID			MW-02	MW-02	MW-02	MW-02	MW-02
Sample ID			20141222MW-02V09N	20150304MW-02	20150422MW-02	20151008MW-02	20160427MW-02
Matrix			Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Depth Interval (ft)			-	-	-	-	-
Date Sampled			12/22/14	03/04/15	04/22/15	10/08/15	04/27/16
Parameter	**Units**	**Criteria***					
Volatiles							
Chlorotrifluoroethene (Freon-1113)	UG/L	5	56	300	310	260	940
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon-113)	UG/L	5	0.080 U	45	24	21	960 J
1,2-Dichloro-1,1,2-trifluoroethane (Freon-123A)	UG/L	5	1.7	67	22	7.7	220
Dissolved Gases							
Methane	UG/L	-	2,900	NA	6,200	12,000	2,600
Total Metals							
Iron	UG/L	300	NA	NA	60,500	61,800	63,100
Miscellaneous Parameters							
Alkalinity, Total (as CaCO3)	MG/L	-	NA	NA	432	292	261
Alkalinity, Bicarbonate (as CaCO3)	MG/L	-	NA	NA	432	292	261
Alkalinity, Carbonate (as CaCO3)	MG/L	-	NA	NA	5.0 U	5.0 U	5.0 U
Alkalinity, Hydroxide	MG/L	-	NA	NA	5.0 U	5.0 U	5.0 U
Dehalococcoides ethenogenes	CEQ/mL	-	1 J	NA	20 J	1 J	40
Dehalobacter	GC/mL	-	NA	90	200	300	80 J
Hardness (as CaCO3)	MG/L	-	NA	NA	525	424	400
Nitrogen, Nitrate	MG/L	10	NA	NA	0.026 U	0.026 U	0.026 U
Nitrogen, Nitrite	MG/L	1	NA	NA	0.0061 U	0.034 J	0.085 J
Nitrogen, Nitrate-Nitrite	MG/L	10	NA	NA	0.010 U	NA	NA
Sulfate	MG/L	250	4.3 J	NA	17.3	25.6	41.3
Total Organic Carbon	MG/L	-	NA	NA	13.8	6.2	6.0
Ferrous Iron (lab)	MG/L	-	NA	NA	12.5 J	2.5 J	NA

*Criteria- NYSDEC TOGS (1.1.1), Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations, Class GA, Revised April 2000.

Flags assigned during chemistry validation are shown.

Concentration Exceeds Criteria

Detection Limits shown are MDL

TABLE 2
GROUNDWATER ANALYTICAL RESULTS
FORMER EMCA SITE, MAMARONECK, NEW YORK

Location ID			MW-02	MW-02	MW-02	MW-02	MW-02
Sample ID			20141222MW-02V09N	20150304MW-02	20150422MW-02	20151008MW-02	20160427MW-02
Matrix			Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Depth Interval (ft)			-	-	-	-	-
Date Sampled			12/22/14	03/04/15	04/22/15	10/08/15	04/27/16
Parameter	**Units**	**Criteria***					
Volatile Fatty Acids							
Acetic Acid	MG/L	-	NA	NA	NA	NA	NA
Formic Acid	MG/L	-	NA	NA	NA	NA	NA
Lactic Acid	MG/L	-	NA	NA	NA	NA	NA
n-Butyric Acid	MG/L	-	NA	NA	NA	NA	NA
Propionic Acid	MG/L	-	NA	NA	NA	NA	NA
Pyruvic Acid	MG/L	-	NA	NA	NA	NA	NA
Field Parameter							
Dissolved Oxygen	MG/L	-	1.01	0.58	0.93	0.38	0.66
Ferrous Iron	MG/L	-	NA	NA	5.5	7.0	4.5
Oxidation-Reduction Potential	mV	-	-127	-114	-135	-131	-102
pH	S.U.	-	6.78	6.80	6.60	5.36	6.14
Specific Conductance	MS/CM	-	2.60	2.53	2.86	2.52	2.71
Temperature	DEG C	-	13.95	7.98	9.86	19.70	12.03
Turbidity	NTU	-	0 U	0 U	8.0	0 U	7.2

*Criteria- NYSDEC TOGS (1.1.1), Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations, Class GA, Revised April 2000.

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Concentration Exceeds Criteria

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TABLE 2
GROUNDWATER ANALYTICAL RESULTS
FORMER EMCA SITE, MAMARONECK, NEW YORK

Location ID			MW-02	MW-02	MW-02	MW-03	MW-03
Sample ID			20161005MW-02	20170418MW-02	20170718MW-02	20120411MW-03V09N	20120924MW-03V09N
Matrix			Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Depth Interval (ft)			-	-	-	-	-
Date Sampled			10/05/16	04/18/17	07/18/17	04/11/12	09/24/12
Parameter	**Units**	**Criteria***					
Volatiles							
Chlorotrifluoroethene (Freon-1113)	UG/L	5	1,000	1,300	470	150 J	130
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon-113)	UG/L	5	940	2,200	2,100	20 J	1.1
1,2-Dichloro-1,1,2-trifluoroethane (Freon-123A)	UG/L	5	37	170	68	36	3.2
Dissolved Gases							
Methane	UG/L	-	2,400	5,800	1,200	15,000	7,600
Total Metals							
Iron	UG/L	300	53,800	61,800	48,300	NA	21,800
Miscellaneous Parameters							
Alkalinity, Total (as CaCO3)	MG/L	-	250	281	325	NA	292
Alkalinity, Bicarbonate (as CaCO3)	MG/L	-	250	281	325	NA	292
Alkalinity, Carbonate (as CaCO3)	MG/L	-	5.0 U	5.0 U	5.0 U	NA	5.0 U
Alkalinity, Hydroxide	MG/L	-	5.0 U	5.0 U	5.0 U	NA	5.0 U
Dehalococcoides ethenogenes	CEQ/mL	-	90	400 J	NA	NA	NA
Dehalobacter	GC/mL	-	30	3.0 U	NA	NA	700
Hardness (as CaCO3)	MG/L	-	470	410	420	NA	248
Nitrogen, Nitrate	MG/L	10	0.28	0.010 UJ	0.010 U	NA	0.047 U
Nitrogen, Nitrite	MG/L	1	0.037 J	0.049 J-	0.42 J	NA	NA
Nitrogen, Nitrate-Nitrite	MG/L	10	NA	NA	NA	NA	NA
Sulfate	MG/L	250	27.2	36.2	30.3	63.1	45.4
Total Organic Carbon	MG/L	-	6.2	7.1	10.8	NA	7.2
Ferrous Iron (lab)	MG/L	-	0.25 J	NA	NA	NA	NA

*Criteria- NYSDEC TOGS (1.1.1), Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations, Class GA, Revised April 2000.

Flags assigned during chemistry validation are shown.

Concentration Exceeds Criteria

Detection Limits shown are MDL

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TABLE 2
GROUNDWATER ANALYTICAL RESULTS
FORMER EMCA SITE, MAMARONECK, NEW YORK

Location ID			MW-02	MW-02	MW-02	MW-03	MW-03
Sample ID			20161005MW-02	20170418MW-02	20170718MW-02	20120411MW-03V09N	20120924MW-03V09N
Matrix			Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Depth Interval (ft)			-	-	-	-	-
Date Sampled			10/05/16	04/18/17	07/18/17	04/11/12	09/24/12
Parameter	**Units**	**Criteria***					
Volatile Fatty Acids							
Acetic Acid	MG/L	-	NA	NA	NA	NA	NA
Formic Acid	MG/L	-	NA	NA	NA	NA	NA
Lactic Acid	MG/L	-	NA	NA	NA	NA	NA
n-Butyric Acid	MG/L	-	NA	NA	NA	NA	NA
Propionic Acid	MG/L	-	NA	NA	NA	NA	NA
Pyruvic Acid	MG/L	-	NA	NA	NA	NA	NA
Field Parameter							
Dissolved Oxygen	MG/L	-	0.40	0 U	1.07	0 U	0 U
Ferrous Iron	MG/L	-	11	11	7.0	NA	3.5
Oxidation-Reduction Potential	mV	-	-151	-6	-134	-63	-84
pH	S.U.	-	6.49	6.40	6.59	6.64	6.64
Specific Conductance	MS/CM	-	2.69	2.23	2.63	1.02	0.697
Temperature	DEG C	-	18.91	11.27	19.18	13.35	23.57
Turbidity	NTU	-	0.1	0 U	5.2	0 U	0 U

*Criteria- NYSDEC TOGS (1.1.1), Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations, Class GA, Revised April 2000.

Flags assigned during chemistry validation are shown.

Concentration Exceeds Criteria

Detection Limits shown are MDL

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TABLE 2
GROUNDWATER ANALYTICAL RESULTS
FORMER EMCA SITE, MAMARONECK, NEW YORK

Location ID			MW-03	MW-03	MW-03	MW-03	MW-03
Sample ID			20130409MW-03V10N	20131022MW-03V12N	20140416MW-03V12N	20140701MW-03V012N	20141027MW-03V12N
Matrix			Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Depth Interval (ft)			-	-	-	-	-
Date Sampled			04/09/13	10/22/13	04/16/14	07/01/14	10/27/14
Parameter	**Units**	**Criteria***					
Volatiles							
Chlorotrifluoroethene (Freon-1113)	UG/L	5	160 J	58	96	170	96
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon-113)	UG/L	5	27	0.080 U	100	120	0.81 J
1,2-Dichloro-1,1,2-trifluoroethane (Freon-123A)	UG/L	5	30	0.84 U	62	100	1.3
Dissolved Gases							
Methane	UG/L	-	11,000	11,000	14,000	15,000	4,500
Total Metals							
Iron	UG/L	300	27,900	29,400	19,700	26,800	26,600
Miscellaneous Parameters							
Alkalinity, Total (as CaCO3)	MG/L	-	367	237	220	253	329
Alkalinity, Bicarbonate (as CaCO3)	MG/L	-	367	NA	220	253	329
Alkalinity, Carbonate (as CaCO3)	MG/L	-	5.0 U	NA	5.0 U	5.0 U	5.0 U
Alkalinity, Hydroxide	MG/L	-	5.0 U	NA	5.0 U	5.0 U	5.0 U
Dehalococcoides ethenogenes	CEQ/mL	-	NA	NA	NA	500	NA
Dehalobacter	GC/mL	-	40	100	10	20	50
Hardness (as CaCO3)	MG/L	-	396	65.3	249	337	386
Nitrogen, Nitrate	MG/L	10	0.21 J	0.23 J	0.40	0.047 U	0.047 U
Nitrogen, Nitrite	MG/L	1	NA	0.025 J	0.038 J	0.017 J	0.0041 U
Nitrogen, Nitrate-Nitrite	MG/L	10	NA	NA	NA	NA	NA
Sulfate	MG/L	250	39.4	40.7	43.0	52.0	25.8
Total Organic Carbon	MG/L	-	8.7	5.6	6.3	7.0	27.1
Ferrous Iron (lab)	MG/L	-	NA	NA	NA	NA	NA

*Criteria- NYSDEC TOGS (1.1.1), Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations, Class GA, Revised April 2000.

Flags assigned during chemistry validation are shown.

Concentration Exceeds Criteria

Detection Limits shown are MDL

TABLE 2
GROUNDWATER ANALYTICAL RESULTS
FORMER EMCA SITE, MAMARONECK, NEW YORK

Location ID			MW-03	MW-03	MW-03	MW-03	MW-03
Sample ID			20130409MW-03V10N	20131022MW-03V12N	20140416MW-03V12N	20140701MW-03V12N	20141027MW-03V12N
Matrix			Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Depth Interval (ft)			-	-	-	-	-
Date Sampled			04/09/13	10/22/13	04/16/14	07/01/14	10/27/14
Parameter	**Units**	**Criteria***					
Volatile Fatty Acids							
Acetic Acid	MG/L	-	NA	NA	NA	NA	NA
Formic Acid	MG/L	-	NA	NA	NA	NA	NA
Lactic Acid	MG/L	-	NA	NA	NA	NA	NA
n-Butyric Acid	MG/L	-	NA	NA	NA	NA	NA
Propionic Acid	MG/L	-	NA	NA	NA	NA	NA
Pyruvic Acid	MG/L	-	NA	NA	NA	NA	NA
Field Parameter							
Dissolved Oxygen	MG/L	-	2.23	0.63	4.86	1.47	0.45
Ferrous Iron	MG/L	-	26.0	16.9	5.5	4.5	8.3
Oxidation-Reduction Potential	mV	-	-93	-119	-101	-72	-107
pH	S.U.	-	6.39	6.21	6.85	6.69	6.54
Specific Conductance	MS/CM	-	3.37	1.35	1.12	1.26	1.72
Temperature	DEG C	-	15.42	19.3	10.69	19.59	17.99
Turbidity	NTU	-	17.9	0.4	0 U	5.4	0.2

*Criteria- NYSDEC TOGS (1.1.1), Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations, Class GA, Revised April 2000.

Flags assigned during chemistry validation are shown.

Concentration Exceeds Criteria

Detection Limits shown are MDL

TABLE 2
GROUNDWATER ANALYTICAL RESULTS
FORMER EMCA SITE, MAMARONECK, NEW YORK

Location ID			MW-03	MW-03	MW-03	MW-03	MW-03
Sample ID			20141124MW-03V12N	20141222MW-03V12N	20150304MW-03	20150422MW-03	20151008MW-03
Matrix			Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Depth Interval (ft)			-	-	-	-	-
Date Sampled			11/24/14	12/22/14	03/04/15	04/22/15	10/08/15
Parameter	**Units**	**Criteria***					
Volatiles							
Chlorotrifluoroethene (Freon-1113)	UG/L	5	86	150	110	120	140
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon-113)	UG/L	5	0.080 U	0.080 U	18	25	0.52 J
1,2-Dichloro-1,1,2-trifluoroethane (Freon-123A)	UG/L	5	0.84 U	1.7	17	25	1.7
Dissolved Gases							
Methane	UG/L	-	3,800	4,600	NA	4,000	10,000
Total Metals							
Iron	UG/L	300	NA	NA	NA	19,600	29,500
Miscellaneous Parameters							
Alkalinity, Total (as CaCO3)	MG/L	-	NA	NA	NA	196	279
Alkalinity, Bicarbonate (as CaCO3)	MG/L	-	NA	NA	NA	196	279
Alkalinity, Carbonate (as CaCO3)	MG/L	-	NA	NA	NA	5.0 U	5.0 U
Alkalinity, Hydroxide	MG/L	-	NA	NA	NA	5.0 U	5.0 U
Dehalococcoides ethenogenes	CEQ/mL	-	500	20	NA	NA	NA
Dehalobacter	GC/mL	-	10	NA	3	7	2 J
Hardness (as CaCO3)	MG/L	-	NA	NA	NA	242	368
Nitrogen, Nitrate	MG/L	10	NA	NA	NA	0.026 U	0.026 U
Nitrogen, Nitrite	MG/L	1	NA	NA	NA	0.0061 U	0.021 J
Nitrogen, Nitrate-Nitrite	MG/L	10	NA	NA	NA	0.010 U	NA
Sulfate	MG/L	250	23.0	33.8	NA	32.5	48.2
Total Organic Carbon	MG/L	-	NA	NA	NA	5.1	7.1
Ferrous Iron (lab)	MG/L	-	NA	NA	NA	0.048 UJ	1.7 J

*Criteria- NYSDEC TOGS (1.1.1), Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations, Class GA, Revised April 2000.

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Concentration Exceeds Criteria

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TABLE 2
GROUNDWATER ANALYTICAL RESULTS
FORMER EMCA SITE, MAMARONECK, NEW YORK

Location ID			MW-03	MW-03	MW-03	MW-03	MW-03
Sample ID			20141124MW-03V12N	20141222MW-03V12N	20150304MW-03	20150422MW-03	20151008MW-03
Matrix			Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Depth Interval (ft)			-	-	-	-	-
Date Sampled			11/24/14	12/22/14	03/04/15	04/22/15	10/08/15
Parameter	**Units**	**Criteria***					
Volatile Fatty Acids							
Acetic Acid	MG/L	-	NA	NA	NA	NA	NA
Formic Acid	MG/L	-	NA	NA	NA	NA	NA
Lactic Acid	MG/L	-	NA	NA	NA	NA	NA
n-Butyric Acid	MG/L	-	NA	NA	NA	NA	NA
Propionic Acid	MG/L	-	NA	NA	NA	NA	NA
Pyruvic Acid	MG/L	-	NA	NA	NA	NA	NA
Field Parameter							
Dissolved Oxygen	MG/L	-	1.30	0.87	1.24	0.65	0.39
Ferrous Iron	MG/L	-	NA	NA	NA	6.0	6.5
Oxidation-Reduction Potential	mV	-	-104	-115	-82	-100	-84
pH	S.U.	-	6.68	6.58	6.84	6.69	5.27
Specific Conductance	MS/CM	-	1.28	1.38	1.82	1.06	1.69
Temperature	DEG C	-	17.52	14.88	8.58	11.87	19.94
Turbidity	NTU	-	0 U	0 U	0 U	1.7	0 U

*Criteria- NYSDEC TOGS (1.1.1), Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations, Class GA, Revised April 2000.

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Concentration Exceeds Criteria

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TABLE 2
GROUNDWATER ANALYTICAL RESULTS
FORMER EMCA SITE, MAMARONECK, NEW YORK

Location ID			MW-03	MW-03	MW-03	MW-03	MW-04
Sample ID			20160427MW-03	20161005MW-03	20170418MW-03	20170718MW-03	20120411MW-04V08N
Matrix			Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Depth Interval (ft)			-	-	-	-	-
Date Sampled			04/27/16	10/05/16	04/18/17	07/18/17	04/11/12
Parameter	**Units**	**Criteria***					
Volatiles							
Chlorotrifluoroethene (Freon-1113)	UG/L	5	180	290	230	160	7.2 J
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon-113)	UG/L	5	42	11	140	80	0.08 UJ
1,2-Dichloro-1,1,2-trifluoroethane (Freon-123A)	UG/L	5	30	3.3	52	17	0.84 U
Dissolved Gases							
Methane	UG/L	-	2,100	2,300	1,500	1,200	2,700
Total Metals							
Iron	UG/L	300	23,700	22,200	24,200	24,700	NA
Miscellaneous Parameters							
Alkalinity, Total (as CaCO3)	MG/L	-	313	297	264	276	NA
Alkalinity, Bicarbonate (as CaCO3)	MG/L	-	313	297	264	276	NA
Alkalinity, Carbonate (as CaCO3)	MG/L	-	5.0 U	5.0 U	5.0 U	5.0 U	NA
Alkalinity, Hydroxide	MG/L	-	5.0 U	5.0 U	5.0 U	5.0 U	NA
Dehalococcoides ethenogenes	CEQ/mL	-	NA	NA	NA	NA	NA
Dehalobacter	GC/mL	-	4 J	10	6	NA	NA
Hardness (as CaCO3)	MG/L	-	400	420	390	376	NA
Nitrogen, Nitrate	MG/L	10	0.026 U	0.13	0.010 U	0.010 U	NA
Nitrogen, Nitrite	MG/L	1	0.076 J	0.036 J	0.031 J	0.034 J	NA
Nitrogen, Nitrate-Nitrite	MG/L	10	NA	NA	NA	NA	NA
Sulfate	MG/L	250	78.2	56.1	56.6	48.3	18.7
Total Organic Carbon	MG/L	-	7.6	5.8	6.0	6.4	NA
Ferrous Iron (lab)	MG/L	-	NA	0.35 J	NA	NA	NA

*Criteria- NYSDEC TOGS (1.1.1), Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations, Class GA, Revised April 2000.

Flags assigned during chemistry validation are shown.

Concentration Exceeds Criteria

Detection Limits shown are MDL

TABLE 2
GROUNDWATER ANALYTICAL RESULTS
FORMER EMCA SITE, MAMARONECK, NEW YORK

Location ID			MW-03	MW-03	MW-03	MW-03	MW-04
Sample ID			20160427MW-03	20161005MW-03	20170418MW-03	20170718MW-03	20120411MW-04V08N
Matrix			Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Depth Interval (ft)			-	-	-	-	-
Date Sampled			04/27/16	10/05/16	04/18/17	07/18/17	04/11/12
Parameter	**Units**	**Criteria***					
Volatile Fatty Acids							
Acetic Acid	MG/L	-	NA	NA	NA	NA	NA
Formic Acid	MG/L	-	NA	NA	NA	NA	NA
Lactic Acid	MG/L	-	NA	NA	NA	NA	NA
n-Butyric Acid	MG/L	-	NA	NA	NA	NA	NA
Propionic Acid	MG/L	-	NA	NA	NA	NA	NA
Pyruvic Acid	MG/L	-	NA	NA	NA	NA	NA
Field Parameter							
Dissolved Oxygen	MG/L	-	0.54	0.32	0 U	1.35	0 U
Ferrous Iron	MG/L	-	6.5	5.5	10	6.0	NA
Oxidation-Reduction Potential	mV	-	-88	-125	18	-119	-87
pH	S.U.	-	6.31	6.52	6.51	6.55	6.80
Specific Conductance	MS/CM	-	2.08	2.03	1.63	1.96	1.38
Temperature	DEG C	-	13.90	20.15	12.91	19.12	14.07
Turbidity	NTU	-	4.5	0 U	0 U	0 U	8.9

*Criteria- NYSDEC TOGS (1.1.1), Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations, Class GA, Revised April 2000.

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Concentration Exceeds Criteria

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TABLE 2
GROUNDWATER ANALYTICAL RESULTS
FORMER EMCA SITE, MAMARONECK, NEW YORK

Location ID			MW-04	MW-04	MW-04	MW-04	MW-04
Sample ID			20120924MW-04V08ED	20120924MW-04V08N	20130409MW-04V09N	20131022MW-04V09N	20140428MW-04V09N
Matrix			Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Depth Interval (ft)			-	-	-	-	-
Date Sampled			09/24/12	09/24/12	04/09/13	10/22/13	04/28/14
Parameter	**Units**	**Criteria***	Field Duplicate (1-1)				
Volatiles							
Chlorotrifluoroethene (Freon-1113)	UG/L	5	2.1	2.5	4.4 J	12	0.18 U
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon-113)	UG/L	5	0.080 U	0.080 U	0.080 U	0.080 U	0.080 U
1,2-Dichloro-1,1,2-trifluoroethane (Freon-123A)	UG/L	5	0.84 U	0.84 U	0.84 U	0.84 U	0.84 U
Dissolved Gases							
Methane	UG/L	-	570	550	1,700	1,600	340
Total Metals							
Iron	UG/L	300	7,430	7,280	16,100	17,700	18,900
Miscellaneous Parameters							
Alkalinity, Total (as CaCO3)	MG/L	-	211	210	5.0 U	243	239
Alkalinity, Bicarbonate (as CaCO3)	MG/L	-	211	210	5.0 U	NA	239
Alkalinity, Carbonate (as CaCO3)	MG/L	-	5.0 U	5.0 U	5.0 U	NA	5.0 U
Alkalinity, Hydroxide	MG/L	-	5.0 U	5.0 U	5.0 U	NA	5.0 U
Dehalococcoides ethenogenes	CEQ/mL	-	NA	NA	NA	NA	NA
Dehalobacter	GC/mL	-	NA	0 U	3 U	3 U	3 U
Hardness (as CaCO3)	MG/L	-	188	185	426	73.3	525
Nitrogen, Nitrate	MG/L	10	0.047 U	0.047 U	0.047 UJ	0.047 UJ	0.047 U
Nitrogen, Nitrite	MG/L	1	NA	NA	NA	0.014 J	0.0041 U
Nitrogen, Nitrate-Nitrite	MG/L	10	NA	NA	NA	NA	NA
Sulfate	MG/L	250	12.3	12.0	15.6	23.2	12.2
Total Organic Carbon	MG/L	-	10.2	10	7.2	7.0	8.4
Ferrous Iron (lab)	MG/L	-	NA	NA	NA	NA	NA

*Criteria- NYSDEC TOGS (1.1.1), Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations, Class GA, Revised April 2000.

Flags assigned during chemistry validation are shown.

Concentration Exceeds Criteria

Detection Limits shown are MDL

TABLE 2
GROUNDWATER ANALYTICAL RESULTS
FORMER EMCA SITE, MAMARONECK, NEW YORK

Location ID			MW-04	MW-04	MW-04	MW-04	MW-04
Sample ID			20120924MW-04V08ED	20120924MW-04V08N	20130409MW-04V09N	20131022MW-04V09N	20140428MW-04V09N
Matrix			Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Depth Interval (ft)			-	-	-	-	-
Date Sampled			09/24/12	09/24/12	04/09/13	10/22/13	04/28/14
Parameter	**Units**	**Criteria***	Field Duplicate (1-1)				
Volatile Fatty Acids							
Acetic Acid	MG/L	-	NA	NA	NA	NA	NA
Formic Acid	MG/L	-	NA	NA	NA	NA	NA
Lactic Acid	MG/L	-	NA	NA	NA	NA	NA
n-Butyric Acid	MG/L	-	NA	NA	NA	NA	NA
Propionic Acid	MG/L	-	NA	NA	NA	NA	NA
Pyruvic Acid	MG/L	-	NA	NA	NA	NA	NA
Field Parameter							
Dissolved Oxygen	MG/L	-	NA	0 U	2.13	0.25	9.51
Ferrous Iron	MG/L	-	NA	27.7	14.9	13.9	7.0
Oxidation-Reduction Potential	mV	-	NA	-96	-78	-94	-102
pH	S.U.	-	NA	6.91	6.43	6.44	6.76
Specific Conductance	MS/CM	-	NA	0.519	3.98	1.27	2.65
Temperature	DEG C	-	NA	25.40	16.39	19.44	12.11
Turbidity	NTU	-	NA	8.0	1.7	5.7	0 U

*Criteria- NYSDEC TOGS (1.1.1), Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations, Class GA, Revised April 2000.

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Concentration Exceeds Criteria

Detection Limits shown are MDL

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TABLE 2
GROUNDWATER ANALYTICAL RESULTS
FORMER EMCA SITE, MAMARONECK, NEW YORK

Location ID			MW-04	MW-04	MW-04	MW-04	MW-04
Sample ID			20140701MW-04V09N	20141028MW-04V09N	20150422MW-04	20151008MW-04	20160427MW-04
Matrix			Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Depth Interval (ft)			-	-	-	-	-
Date Sampled			07/01/14	10/28/14	04/22/15	10/08/15	04/27/16
Parameter	**Units**	**Criteria***					
Volatiles							
Chlorotrifluoroethene (Freon-1113)	UG/L	5	0.18 U	1.2	2.1	4.4	0.52 J
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon-113)	UG/L	5	0.080 U	0.080 U	0.38 J	0.34 U	0.34 U
1,2-Dichloro-1,1,2-trifluoroethane (Freon-123A)	UG/L	5	0.84 U	0.84 U	0.17 U	0.17 U	0.17 U
Dissolved Gases							
Methane	UG/L	-	1,300	87	1,000	2,100	610
Total Metals							
Iron	UG/L	300	17,900	8,820	28,000	15,800	16,700
Miscellaneous Parameters							
Alkalinity, Total (as CaCO3)	MG/L	-	295	208	338	303	255
Alkalinity, Bicarbonate (as CaCO3)	MG/L	-	295	208	338	303	255
Alkalinity, Carbonate (as CaCO3)	MG/L	-	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Alkalinity, Hydroxide	MG/L	-	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Dehalococcoides ethenogenes	CEQ/mL	-	NA	NA	NA	NA	NA
Dehalobacter	GC/mL	-	3 U	3	3.0 U	3.0 U	3.0 U
Hardness (as CaCO3)	MG/L	-	614	267	882	523	450
Nitrogen, Nitrate	MG/L	10	0.047 U	0.047 U	0.026 U	0.026 U	0.026 U
Nitrogen, Nitrite	MG/L	1	0.013 J	0.0041 U	0.0061 U	0.016 J	0.052 J
Nitrogen, Nitrate-Nitrite	MG/L	10	NA	NA	0.010 U	NA	NA
Sulfate	MG/L	250	9.1	11.5	29.8	7.4	1.5 U
Total Organic Carbon	MG/L	-	11.4	8.4	12.3	11.8	9.2
Ferrous Iron (lab)	MG/L	-	NA	NA	0.10 J	0.33 J	NA

*Criteria- NYSDEC TOGS (1.1.1), Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations, Class GA, Revised April 2000.

Flags assigned during chemistry validation are shown.

Concentration Exceeds Criteria

Detection Limits shown are MDL

TABLE 2
GROUNDWATER ANALYTICAL RESULTS
FORMER EMCA SITE, MAMARONECK, NEW YORK

Location ID			MW-04	MW-04	MW-04	MW-04	MW-04
Sample ID			20140701MW-04V09N	20141028MW-04V09N	20150422MW-04	20151008MW-04	20160427MW-04
Matrix			Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Depth Interval (ft)			-	-	-	-	-
Date Sampled			07/01/14	10/28/14	04/22/15	10/08/15	04/27/16
Parameter	**Units**	**Criteria***					
Volatile Fatty Acids							
Acetic Acid	MG/L	-	NA	NA	NA	NA	NA
Formic Acid	MG/L	-	NA	NA	NA	NA	NA
Lactic Acid	MG/L	-	NA	NA	NA	NA	NA
n-Butyric Acid	MG/L	-	NA	NA	NA	NA	NA
Propionic Acid	MG/L	-	NA	NA	NA	NA	NA
Pyruvic Acid	MG/L	-	NA	NA	NA	NA	NA
Field Parameter							
Dissolved Oxygen	MG/L	-	1.72	0.55	1.05	0.32	0.54
Ferrous Iron	MG/L	-	6.5	5.2	5.5	6.0	5.5
Oxidation-Reduction Potential	mV	-	-67	-93	-92	-95	-79
pH	S.U.	-	6.62	6.57	6.73	5.42	6.33
Specific Conductance	MS/CM	-	2.47	1.62	4.47	3.05	2.90
Temperature	DEG C	-	21.90	17.78	11.71	21.26	14.79
Turbidity	NTU	-	52.9	2.1	1.1	0 U	0 U

*Criteria- NYSDEC TOGS (1.1.1), Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations, Class GA, Revised April 2000.

Flags assigned during chemistry validation are shown.

Concentration Exceeds Criteria

Detection Limits shown are MDL

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[LOGDATE] >= #1/1/2012# AND [MATRIX] = 'WG' AND ([SACODE] = 'N' OR [SACODE] = 'FD'

TABLE 2
GROUNDWATER ANALYTICAL RESULTS
FORMER EMCA SITE, MAMARONECK, NEW YORK

Location ID			MW-04	MW-04	MW-04	MW-06	MW-06
Sample ID			20161005MW-04	20170418MW-04	20170718MW-04	20120411MW-06V13N	20120924MW-06V13N
Matrix			Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Depth Interval (ft)			-	-	-	-	-
Date Sampled			10/05/16	04/18/17	07/18/17	04/11/12	09/24/12
Parameter	**Units**	**Criteria***					
Volatiles							
Chlorotrifluoroethene (Freon-1113)	UG/L	5	4.3	0.30 U	0.90 J	230 J	140
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon-113)	UG/L	5	0.34 U	0.34 U	0.34 U	82 J	3.3
1,2-Dichloro-1,1,2-trifluoroethane (Freon-123A)	UG/L	5	0.17 U	0.17 U	0.17 U	28	3.6
Dissolved Gases							
Methane	UG/L	-	1,000	770	210	5,300	1,300
Total Metals							
Iron	UG/L	300	10,900	21,700	17,600	NA	12,100
Miscellaneous Parameters							
Alkalinity, Total (as CaCO3)	MG/L	-	277	400	323	NA	304
Alkalinity, Bicarbonate (as CaCO3)	MG/L	-	277	400	323	NA	304
Alkalinity, Carbonate (as CaCO3)	MG/L	-	5.0 U	5.0 U	5.0 U	NA	5.0 U
Alkalinity, Hydroxide	MG/L	-	5.0 U	5.0 U	5.0 U	NA	5.0 U
Dehalococcoides ethenogenes	CEQ/mL	-	NA	NA	NA	NA	NA
Dehalobacter	GC/mL	-	3.0 U	3.0 U	NA	NA	1 J
Hardness (as CaCO3)	MG/L	-	320	540	420	NA	308
Nitrogen, Nitrate	MG/L	10	0.010 U	0.010 U	0.010 U	NA	0.047 U
Nitrogen, Nitrite	MG/L	1	0.046 J	0.028 J	0.042 J	NA	NA
Nitrogen, Nitrate-Nitrite	MG/L	10	NA	NA	NA	NA	NA
Sulfate	MG/L	250	7.2	1.4 U	7.3	119	52.2
Total Organic Carbon	MG/L	-	9.8	13.2	12.6	NA	6.9
Ferrous Iron (lab)	MG/L	-	0.048 UJ	NA	NA	NA	NA

*Criteria- NYSDEC TOGS (1.1.1), Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations, Class GA, Revised April 2000.

Flags assigned during chemistry validation are shown.

Concentration Exceeds Criteria

Detection Limits shown are MDL

TABLE 2
GROUNDWATER ANALYTICAL RESULTS
FORMER EMCA SITE, MAMARONECK, NEW YORK

Location ID			MW-04	MW-04	MW-04	MW-06	MW-06
Sample ID			20161005MW-04	20170418MW-04	20170718MW-04	20120411MW-06V13N	20120924MW-06V13N
Matrix			Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Depth Interval (ft)			-	-	-	-	-
Date Sampled			10/05/16	04/18/17	07/18/17	04/11/12	09/24/12
Parameter	**Units**	**Criteria***					
Volatile Fatty Acids							
Acetic Acid	MG/L	-	NA	NA	NA	NA	NA
Formic Acid	MG/L	-	NA	NA	NA	NA	NA
Lactic Acid	MG/L	-	NA	NA	NA	NA	NA
n-Butyric Acid	MG/L	-	NA	NA	NA	NA	NA
Propionic Acid	MG/L	-	NA	NA	NA	NA	NA
Pyruvic Acid	MG/L	-	NA	NA	NA	NA	NA
Field Parameter							
Dissolved Oxygen	MG/L	-	0.28	0 U	1.01	0 U	0 U
Ferrous Iron	MG/L	-	6.0	8.0	7.0	NA	9.9
Oxidation-Reduction Potential	mV	-	-106	20	-117	-48	-80
pH	S.U.	-	6.61	6.56	6.60	6.81	6.82
Specific Conductance	MS/CM	-	2.02	2.15	2.49	1.06	0.636
Temperature	DEG C	-	21.54	13.83	21.81	14.04	22.01
Turbidity	NTU	-	1.5	0 U	9.5	0 U	0 U

*Criteria- NYSDEC TOGS (1.1.1), Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations, Class GA, Revised April 2000.

Flags assigned during chemistry validation are shown.

Concentration Exceeds Criteria

Detection Limits shown are MDL

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TABLE 2
GROUNDWATER ANALYTICAL RESULTS
FORMER EMCA SITE, MAMARONECK, NEW YORK

Location ID			MW-06	MW-06	MW-06	MW-06	MW-06
Sample ID			20130409MW-06V12N	20131022MW-06V15N	20140416MW-06V15N	20140701MW-06V15N	20141027MW-06V15N
Matrix			Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Depth Interval (ft)			-	-	-	-	-
Date Sampled			04/09/13	10/22/13	04/16/14	07/01/14	10/27/14
Parameter	**Units**	**Criteria***					
Volatiles							
Chlorotrifluoroethene (Freon-1113)	UG/L	5	61 J	27	75	84	51
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon-113)	UG/L	5	0.19 J	0.080 U	26	0.080 U	0.080 U
1,2-Dichloro-1,1,2-trifluoroethane (Freon-123A)	UG/L	5	4.9	0.84 U	33	2.7	0.84 U
Dissolved Gases							
Methane	UG/L	-	9,500	4,100	11,000	11,000	3,400
Total Metals							
Iron	UG/L	300	24,700	20,500	20,900	17,100	31,000
Miscellaneous Parameters							
Alkalinity, Total (as CaCO3)	MG/L	-	244	245	240	259	740
Alkalinity, Bicarbonate (as CaCO3)	MG/L	-	244	NA	240	259	740
Alkalinity, Carbonate (as CaCO3)	MG/L	-	5.0 U	NA	5.0 U	5.0 U	5.0 U
Alkalinity, Hydroxide	MG/L	-	5.0 U	NA	5.0 U	5.0 U	5.0 U
Dehalococcoides ethenogenes	CEQ/mL	-	NA	NA	NA	NA	NA
Dehalobacter	GC/mL	-	3 U	2 J	3 U	3 U	80
Hardness (as CaCO3)	MG/L	-	337	99.0	370	317	297
Nitrogen, Nitrate	MG/L	10	0.25 J	0.047 UJ	0.047 UJ	0.047 U	0.047 U
Nitrogen, Nitrite	MG/L	1	NA	0.017 J	0.051 J	0.0092 J	0.0041 U
Nitrogen, Nitrate-Nitrite	MG/L	10	NA	NA	NA	NA	NA
Sulfate	MG/L	250	38.4	29.2	36.1	38.8	2.2 U
Total Organic Carbon	MG/L	-	5.9	5.6	5.8	6.0	314
Ferrous Iron (lab)	MG/L	-	NA	NA	NA	NA	NA

*Criteria- NYSDEC TOGS (1.1.1), Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations, Class GA, Revised April 2000.

Flags assigned during chemistry validation are shown.

Concentration Exceeds Criteria

Detection Limits shown are MDL

TABLE 2
GROUNDWATER ANALYTICAL RESULTS
FORMER EMCA SITE, MAMARONECK, NEW YORK

Location ID			MW-06	MW-06	MW-06	MW-06	MW-06
Sample ID			20130409MW-06V12N	20131022MW-06V15N	20140416MW-06V15N	20140701MW-06V15N	20141027MW-06V15N
Matrix			Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Depth Interval (ft)			-	-	-	-	-
Date Sampled			04/09/13	10/22/13	04/16/14	07/01/14	10/27/14
Parameter	**Units**	**Criteria***					
Volatile Fatty Acids							
Acetic Acid	MG/L	-	NA	NA	NA	NA	NA
Formic Acid	MG/L	-	NA	NA	NA	NA	NA
Lactic Acid	MG/L	-	NA	NA	NA	NA	NA
n-Butyric Acid	MG/L	-	NA	NA	NA	NA	NA
Propionic Acid	MG/L	-	NA	NA	NA	NA	NA
Pyruvic Acid	MG/L	-	NA	NA	NA	NA	NA
Field Parameter							
Dissolved Oxygen	MG/L	-	0.33	0.37	3.99	1.82	2.67
Ferrous Iron	MG/L	-	23.7	3.6	6.0	5.0	6.7
Oxidation-Reduction Potential	mV	-	-102	-108	-92	-80	-130
pH	S.U.	-	6.47	6.45	7.02	6.78	6.66
Specific Conductance	MS/CM	-	2.91	1.4	1.73	1.33	2.34
Temperature	DEG C	-	16.34	18.41	12.71	19.20	17.32
Turbidity	NTU	-	0.2	1.4	0 U	7.3	5.6

*Criteria- NYSDEC TOGS (1.1.1), Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations, Class GA, Revised April 2000.

Flags assigned during chemistry validation are shown.

Concentration Exceeds Criteria

Detection Limits shown are MDL

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TABLE 2
GROUNDWATER ANALYTICAL RESULTS
FORMER EMCA SITE, MAMARONECK, NEW YORK

Location ID			MW-06	MW-06	MW-06	MW-06	MW-06
Sample ID			DUP20141027	20150422MW-06	20151008MW-06	20160427MW-06	20161005MW-06
Matrix			Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Depth Interval (ft)			-	-	-	-	-
Date Sampled			10/27/14	04/22/15	10/08/15	04/27/16	10/05/16
Parameter	**Units**	**Criteria***	Field Duplicate (1-1)				
Volatiles							
Chlorotrifluoroethene (Freon-1113)	UG/L	5	44	110	51	51	68
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon-113)	UG/L	5	0.080 U	1.6	0.34 U	0.34 U	0.34 U
1,2-Dichloro-1,1,2-trifluoroethane (Freon-123A)	UG/L	5	0.84 U	8.1	0.17 U	1.1	0.28 J
Dissolved Gases							
Methane	UG/L	-	2,700	5,200	7,200	890	280
Total Metals							
Iron	UG/L	300	33,200	26,400	20,200	20,600	14,900
Miscellaneous Parameters							
Alkalinity, Total (as CaCO3)	MG/L	-	726	311	312	277	256
Alkalinity, Bicarbonate (as CaCO3)	MG/L	-	726	311	312	277	256
Alkalinity, Carbonate (as CaCO3)	MG/L	-	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Alkalinity, Hydroxide	MG/L	-	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Dehalococcoides ethenogenes	CEQ/mL	-	NA	NA	NA	NA	NA
Dehalobacter	GC/mL	-	NA	3.0 U	1 J	3 J	4
Hardness (as CaCO3)	MG/L	-	564	515	337	380	320
Nitrogen, Nitrate	MG/L	10	0.58 J	0.026 U	0.026 U	0.026 U	0.010 U
Nitrogen, Nitrite	MG/L	1	0.0041 U	0.0061 U	0.020 J	0.098 J	0.031 J
Nitrogen, Nitrate-Nitrite	MG/L	10	NA	0.010 U	NA	NA	NA
Sulfate	MG/L	250	2.2 U	29.9	16.7	36.3	30.7
Total Organic Carbon	MG/L	-	298	5.1	5.5	4.9	4.3
Ferrous Iron (lab)	MG/L	-	NA	0.90 J	0.44 J	NA	0.048 UJ

*Criteria- NYSDEC TOGS (1.1.1), Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations, Class GA, Revised April 2000.

Flags assigned during chemistry validation are shown.

Concentration Exceeds Criteria

Detection Limits shown are MDL

TABLE 2
GROUNDWATER ANALYTICAL RESULTS
FORMER EMCA SITE, MAMARONECK, NEW YORK

Location ID			MW-06	MW-06	MW-06	MW-06	MW-06
Sample ID			DUP20141027	20150422MW-06	20151008MW-06	20160427MW-06	20161005MW-06
Matrix			Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Depth Interval (ft)			-	-	-	-	-
Date Sampled			10/27/14	04/22/15	10/08/15	04/27/16	10/05/16
Parameter	**Units**	**Criteria***	Field Duplicate (1-1)				
Volatile Fatty Acids							
Acetic Acid	MG/L	-	NA	NA	NA	NA	NA
Formic Acid	MG/L	-	NA	NA	NA	NA	NA
Lactic Acid	MG/L	-	NA	NA	NA	NA	NA
n-Butyric Acid	MG/L	-	NA	NA	NA	NA	NA
Propionic Acid	MG/L	-	NA	NA	NA	NA	NA
Pyruvic Acid	MG/L	-	NA	NA	NA	NA	NA
Field Parameter							
Dissolved Oxygen	MG/L	-	NA	0.72	0.34	0.59	0.44
Ferrous Iron	MG/L	-	NA	4.5	7.0	7.0	4.5
Oxidation-Reduction Potential	mV	-	NA	-104	-110	-97	-102
pH	S.U.	-	NA	6.83	5.50	6.35	6.66
Specific Conductance	MS/CM	-	NA	2.67	1.60	1.97	1.59
Temperature	DEG C	-	NA	12.18	18.70	13.61	17.83
Turbidity	NTU	-	NA	4.1	0 U	0 U	0 U

*Criteria- NYSDEC TOGS (1.1.1), Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations, Class GA, Revised April 2000.

Flags assigned during chemistry validation are shown.

Concentration Exceeds Criteria

Detection Limits shown are MDL

TABLE 2
GROUNDWATER ANALYTICAL RESULTS
FORMER EMCA SITE, MAMARONECK, NEW YORK

Location ID			MW-06	MW-06	MW-07R	MW-07R	MW-07R
Sample ID			20170418MW-06	20170718MW-06	20120411MW-07RV15FD	20120411MW-07RV15N	20120924MW-07RV15N
Matrix			Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Depth Interval (ft)			-	-	-	-	-
Date Sampled			04/18/17	07/18/17	04/11/12	04/11/12	09/24/12
Parameter	**Units**	**Criteria***			Field Duplicate (1-1)		
Volatiles							
Chlorotrifluoroethene (Freon-1113)	UG/L	5	60	31	630 J	540 J	430
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon-113)	UG/L	5	5.5	4.4	67 J	59 J	5.9 J
1,2-Dichloro-1,1,2-trifluoroethane (Freon-123A)	UG/L	5	13	3.6	11	9.7	2.4 J
Dissolved Gases							
Methane	UG/L	-	3,100	560	6,400	6,600	3,900
Total Metals							
Iron	UG/L	300	20,200	16,000	NA	NA	29,900
Miscellaneous Parameters							
Alkalinity, Total (as CaCO3)	MG/L	-	290	252	NA	NA	335
Alkalinity, Bicarbonate (as CaCO3)	MG/L	-	290	252	NA	NA	335
Alkalinity, Carbonate (as CaCO3)	MG/L	-	5.0 U	5.0 U	NA	NA	5.0 U
Alkalinity, Hydroxide	MG/L	-	5.0 U	5.0 U	NA	NA	5.0 U
Dehalococcoides ethenogenes	CEQ/mL	-	NA	NA	NA	NA	NA
Dehalobacter	GC/mL	-	3.0 U	NA	NA	NA	10
Hardness (as CaCO3)	MG/L	-	360	304	NA	NA	414
Nitrogen, Nitrate	MG/L	10	0.010 U	0.010 U	NA	NA	0.047 U
Nitrogen, Nitrite	MG/L	1	0.024 J	0.051 J	NA	NA	NA
Nitrogen, Nitrate-Nitrite	MG/L	10	NA	NA	NA	NA	NA
Sulfate	MG/L	250	26.5	38.4	18.9	17.7	32.0
Total Organic Carbon	MG/L	-	5.1	4.3	NA	NA	11.8
Ferrous Iron (lab)	MG/L	-	NA	NA	NA	NA	NA

*Criteria- NYSDEC TOGS (1.1.1), Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations, Class GA, Revised April 2000.

Flags assigned during chemistry validation are shown.

Concentration Exceeds Criteria

Detection Limits shown are MDL

TABLE 2
GROUNDWATER ANALYTICAL RESULTS
FORMER EMCA SITE, MAMARONECK, NEW YORK

Location ID			MW-06	MW-06	MW-07R	MW-07R	MW-07R
Sample ID			20170418MW-06	20170718MW-06	20120411MW-07RV15FD	20120411MW-07RV15N	20120924MW-07RV15N
Matrix			Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Depth Interval (ft)			-	-	-	-	-
Date Sampled			04/18/17	07/18/17	04/11/12	04/11/12	09/24/12
Parameter	**Units**	**Criteria***			Field Duplicate (1-1)		
Volatile Fatty Acids							
Acetic Acid	MG/L	-	NA	NA	NA	NA	NA
Formic Acid	MG/L	-	NA	NA	NA	NA	NA
Lactic Acid	MG/L	-	NA	NA	NA	NA	NA
n-Butyric Acid	MG/L	-	NA	NA	NA	NA	NA
Propionic Acid	MG/L	-	NA	NA	NA	NA	NA
Pyruvic Acid	MG/L	-	NA	NA	NA	NA	NA
Field Parameter							
Dissolved Oxygen	MG/L	-	0 U	0.84	NA	0 U	0 U
Ferrous Iron	MG/L	-	6.0	7.0	NA	NA	30.4
Oxidation-Reduction Potential	mV	-	11	-116	NA	-82	-118
pH	S.U.	-	6.63	6.66	NA	6.72	6.69
Specific Conductance	MS/CM	-	1.76	1.63	NA	2.10	1.78
Temperature	DEG C	-	12.04	19.48	NA	13.63	22.35
Turbidity	NTU	-	0 U	0 U	NA	8.2	0 U

*Criteria- NYSDEC TOGS (1.1.1), Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations, Class GA, Revised April 2000.

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Concentration Exceeds Criteria

Detection Limits shown are MDL

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TABLE 2
GROUNDWATER ANALYTICAL RESULTS
FORMER EMCA SITE, MAMARONECK, NEW YORK

Location ID			MW-07R	MW-07R	MW-07R	MW-07R	MW-07R
Sample ID			20130409MW-07RV17N	20131022MW-07RV17N	20140416MW-07RV17N	20140701MW-07RV17N	20141027MW-07RV17N
Matrix			Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Depth Interval (ft)			-	-	-	-	-
Date Sampled			04/09/13	10/22/13	04/16/14	07/01/14	10/27/14
Parameter	**Units**	**Criteria***					
Volatiles							
Chlorotrifluoroethene (Freon-1113)	UG/L	5	310 J	390	2.4	69	130
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon-113)	UG/L	5	5.5	12	0.080 U	0.080 U	15
1,2-Dichloro-1,1,2-trifluoroethane (Freon-123A)	UG/L	5	2.6	1.1	0.84 U	1.2	2.2
Dissolved Gases							
Methane	UG/L	-	2,100	4,000	680	4,400	1,300
Total Metals							
Iron	UG/L	300	29,000	30,900	24,500	28,700	31,600
Miscellaneous Parameters							
Alkalinity, Total (as CaCO3)	MG/L	-	263	291	305	399	394
Alkalinity, Bicarbonate (as CaCO3)	MG/L	-	263	NA	305	399	394
Alkalinity, Carbonate (as CaCO3)	MG/L	-	5.0 U	NA	5.0 U	5.0 U	5.0 U
Alkalinity, Hydroxide	MG/L	-	5.0 U	NA	5.0 U	5.0 U	5.0 U
Dehalococcoides ethenogenes	CEQ/mL	-	NA	NA	70	NA	NA
Dehalobacter	GC/mL	-	4	5	3 U	4 U	3
Hardness (as CaCO3)	MG/L	-	515	208	594	545	574
Nitrogen, Nitrate	MG/L	10	0.066 J	0.36 J	0.047 U	0.076 J	0.047 U
Nitrogen, Nitrite	MG/L	1	NA	0.015 J	0.038 J	0.014 J	0.0041 U
Nitrogen, Nitrate-Nitrite	MG/L	10	NA	NA	NA	NA	NA
Sulfate	MG/L	250	19.1	7.4	17.9	13.8	8.4
Total Organic Carbon	MG/L	-	9.3	12.3	7.8	11.4	15.2
Ferrous Iron (lab)	MG/L	-	NA	NA	NA	NA	NA

*Criteria- NYSDEC TOGS (1.1.1), Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations, Class GA, Revised April 2000.

Flags assigned during chemistry validation are shown.

Concentration Exceeds Criteria

Detection Limits shown are MDL

TABLE 2
GROUNDWATER ANALYTICAL RESULTS
FORMER EMCA SITE, MAMARONECK, NEW YORK

Location ID			MW-07R	MW-07R	MW-07R	MW-07R	MW-07R
Sample ID			20130409MW-07RV17N	20131022MW-07RV17N	20140416MW-07RV17N	20140701MW-07RV17N	20141027MW-07RV17N
Matrix			Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Depth Interval (ft)			-	-	-	-	-
Date Sampled			04/09/13	10/22/13	04/16/14	07/01/14	10/27/14
Parameter	**Units**	**Criteria***					
Volatile Fatty Acids							
Acetic Acid	MG/L	-	NA	NA	NA	NA	NA
Formic Acid	MG/L	-	NA	NA	NA	NA	NA
Lactic Acid	MG/L	-	NA	NA	NA	NA	NA
n-Butyric Acid	MG/L	-	NA	NA	NA	NA	NA
Propionic Acid	MG/L	-	NA	NA	NA	NA	NA
Pyruvic Acid	MG/L	-	NA	NA	NA	NA	NA
Field Parameter							
Dissolved Oxygen	MG/L	-	0 U	0.36	4.43	1.74	2.86
Ferrous Iron	MG/L	-	27.5	15.3	6.0	6.0	4.65
Oxidation-Reduction Potential	mV	-	-89	-102	-77	-68	-107
pH	S.U.	-	6.35	6.31	6.89	6.64	6.56
Specific Conductance	MS/CM	-	4.84	1.84	3.31	2.58	2.69
Temperature	DEG C	-	17.93	19.42	11.39	19.41	18.94
Turbidity	NTU	-	53.9	0.2	0 U	20.7	8.7

*Criteria- NYSDEC TOGS (1.1.1), Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations, Class GA, Revised April 2000.

Flags assigned during chemistry validation are shown.

Concentration Exceeds Criteria

Detection Limits shown are MDL

TABLE 2
GROUNDWATER ANALYTICAL RESULTS
FORMER EMCA SITE, MAMARONECK, NEW YORK

Location ID			MW-07R	MW-07R	MW-07R	MW-07R	MW-07R
Sample ID			20150304MW-07R	20150422MW-07R	20151008MW-07R	20160427MW-07R	20161005MW-07R
Matrix			Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Depth Interval (ft)			-	-	-	-	-
Date Sampled			03/04/15	04/22/15	10/08/15	04/27/16	10/05/16
Parameter	**Units**	**Criteria***					
Volatiles							
Chlorotrifluoroethene (Freon-1113)	UG/L	5	130	10	46	22	65
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon-113)	UG/L	5	0.34 U	0.34 U	0.34 U	0.34 U	0.34 U
1,2-Dichloro-1,1,2-trifluoroethane (Freon-123A)	UG/L	5	0.78 J	0.39 J	0.17 U	0.17 U	0.17 U
Dissolved Gases							
Methane	UG/L	-	NA	1,700	9,800	2,400	2,500
Total Metals							
Iron	UG/L	300	NA	25,300	39,000	39,300	42,200
Miscellaneous Parameters							
Alkalinity, Total (as CaCO3)	MG/L	-	NA	240	450	357	374
Alkalinity, Bicarbonate (as CaCO3)	MG/L	-	NA	240	450	357	374
Alkalinity, Carbonate (as CaCO3)	MG/L	-	NA	5.0 U	5.0 U	5.0 U	5.0 U
Alkalinity, Hydroxide	MG/L	-	NA	5.0 U	5.0 U	5.0 U	5.0 U
Dehalococcoides ethenogenes	CEQ/mL	-	NA	NA	NA	NA	NA
Dehalobacter	GC/mL	-	300	90	20	7 J	5
Hardness (as CaCO3)	MG/L	-	NA	641	475	630	510
Nitrogen, Nitrate	MG/L	10	NA	0.16	0.026 U	0.026 U	0.010 U
Nitrogen, Nitrite	MG/L	1	NA	0.018 J	0.028 J	0.072 J	0.045 J
Nitrogen, Nitrate-Nitrite	MG/L	10	NA	0.18	NA	NA	NA
Sulfate	MG/L	250	NA	11.8	9.1	1.5 U	2.0 U
Total Organic Carbon	MG/L	-	NA	6.0	11.8	9.7	10.4
Ferrous Iron (lab)	MG/L	-	NA	2.2 J	0.49 J	NA	2.6 J

*Criteria- NYSDEC TOGS (1.1.1), Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations, Class GA, Revised April 2000.

Flags assigned during chemistry validation are shown.

Concentration Exceeds Criteria

Detection Limits shown are MDL

TABLE 2
GROUNDWATER ANALYTICAL RESULTS
FORMER EMCA SITE, MAMARONECK, NEW YORK

Location ID			MW-07R	MW-07R	MW-07R	MW-07R	MW-07R
Sample ID			20150304MW-07R	20150422MW-07R	20151008MW-07R	20160427MW-07R	20161005MW-07R
Matrix			Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Depth Interval (ft)			-	-	-	-	-
Date Sampled			03/04/15	04/22/15	10/08/15	04/27/16	10/05/16
Parameter	**Units**	**Criteria***					
Volatile Fatty Acids							
Acetic Acid	MG/L	-	NA	NA	NA	NA	NA
Formic Acid	MG/L	-	NA	NA	NA	NA	NA
Lactic Acid	MG/L	-	NA	NA	NA	NA	NA
n-Butyric Acid	MG/L	-	NA	NA	NA	NA	NA
Propionic Acid	MG/L	-	NA	NA	NA	NA	NA
Pyruvic Acid	MG/L	-	NA	NA	NA	NA	NA
Field Parameter							
Dissolved Oxygen	MG/L	-	0.91	0.91	0.37	0.53	0.31
Ferrous Iron	MG/L	-	NA	4.0	7.0	7.0	11
Oxidation-Reduction Potential	mV	-	-120	-75	-100	-95	-119
pH	S.U.	-	6.81	6.69	5.35	6.25	6.46
Specific Conductance	MS/CM	-	2.56	4.17	2.40	3.44	2.61
Temperature	DEG C	-	8.90	12.41	19.15	14.10	18.98
Turbidity	NTU	-	0 U	0.9	0 U	0 U	0 U

*Criteria- NYSDEC TOGS (1.1.1), Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations, Class GA, Revised April 2000.

Flags assigned during chemistry validation are shown.

Concentration Exceeds Criteria

Detection Limits shown are MDL

Advanced Selection: table 2
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[LOGDATE] >= #1/1/2012# AND [MATRIX] = 'WG' AND ([SACODE] = 'N' OR [SACODE] = 'FD'

TABLE 2
GROUNDWATER ANALYTICAL RESULTS
FORMER EMCA SITE, MAMARONECK, NEW YORK

Location ID			MW-07R	MW-07R
Sample ID			20170418MW-07R	20170718MW-07R
Matrix			Groundwater	Groundwater
Depth Interval (ft)			-	-
Date Sampled			04/18/17	07/18/17
Parameter	**Units**	**Criteria***		
Volatiles				
Chlorotrifluoroethene (Freon-1113)	UG/L	5	3.6	17
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon-113)	UG/L	5	0.34 U	0.34 U
1,2-Dichloro-1,1,2-trifluoroethane (Freon-123A)	UG/L	5	0.32 J	0.37 J
Dissolved Gases				
Methane	UG/L	-	990	830
Total Metals				
Iron	UG/L	300	29,800	33,000
Miscellaneous Parameters				
Alkalinity, Total (as CaCO3)	MG/L	-	321	376
Alkalinity, Bicarbonate (as CaCO3)	MG/L	-	321	376
Alkalinity, Carbonate (as CaCO3)	MG/L	-	5.0 U	5.0 U
Alkalinity, Hydroxide	MG/L	-	5.0 U	5.0 U
Dehalococcoides ethenogenes	CEQ/mL	-	NA	NA
Dehalobacter	GC/mL	-	3	NA
Hardness (as CaCO3)	MG/L	-	560	516
Nitrogen, Nitrate	MG/L	10	0.010 U	0.010 U
Nitrogen, Nitrite	MG/L	1	0.035 J	0.61 J
Nitrogen, Nitrate-Nitrite	MG/L	10	NA	NA
Sulfate	MG/L	250	5.4	10.2
Total Organic Carbon	MG/L	-	7.6	10.3
Ferrous Iron (lab)	MG/L	-	NA	NA

*Criteria- NYSDEC TOGS (1.1.1), Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations, Class GA, Revised April 2000.

Flags assigned during chemistry validation are shown.

Concentration Exceeds Criteria

Detection Limits shown are MDL

Advanced Selection: table 2
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[LOGDATE] >= #1/1/2012# AND [MATRIX] = 'WG' AND ([SACODE] = 'N' OR [SACODE] = 'FD'

TABLE 2
GROUNDWATER ANALYTICAL RESULTS
FORMER EMCA SITE, MAMARONECK, NEW YORK

Location ID			MW-07R	MW-07R
Sample ID			20170418MW-07R	20170718MW-07R
Matrix			Groundwater	Groundwater
Depth Interval (ft)			-	-
Date Sampled			04/18/17	07/18/17
Parameter	**Units**	**Criteria***		
Volatile Fatty Acids				
Acetic Acid	MG/L	-	NA	NA
Formic Acid	MG/L	-	NA	NA
Lactic Acid	MG/L	-	NA	NA
n-Butyric Acid	MG/L	-	NA	NA
Propionic Acid	MG/L	-	NA	NA
Pyruvic Acid	MG/L	-	NA	NA
Field Parameter				
Dissolved Oxygen	MG/L	-	0 U	1.53
Ferrous Iron	MG/L	-	10	9.0
Oxidation-Reduction Potential	mV	-	26	-125
pH	S.U.	-	6.43	6.48
Specific Conductance	MS/CM	-	3.53	3.11
Temperature	DEG C	-	12.47	18.22
Turbidity	NTU	-	0 U	0 U

*Criteria- NYSDEC TOGS (1.1.1), Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations, Class GA, Revised April 2000.

Flags assigned during chemistry validation are shown.

Concentration Exceeds Criteria

Detection Limits shown are MDL

APPENDIX A

PHOTOGRAPHS

PHOTOGRAPH OF REMEDIAL INJECTIONS COMPLETED IN 2014.

PHOTOGRAPH OF REMEDIAL INJECTIONS COMPLETED IN 2014 IN THE VICINITY OF MONITORING WELL MW-02.

PHOTOGRAPH OF GEOPROBE DRILL RIG USED FOR 2014 REMEDIAL INJECTIONS.

PHOTOGRAPH OF REMEDIAL INJECTION AREA IN THE VICINITY OF MONITORING WELL MW-03.

APPENDIX B

PLUMESTOP PRODUCT INFORMATION

PlumeStop® Liquid Activated Carbon™ Technical Description

PlumeStop Liquid Activated Carbon is an innovative groundwater remediation technology designed to rapidly remove and permanently degrade groundwater contaminants. PlumeStop is composed of very fine particles of activated carbon (1-2µm) suspended in water through the use of unique organic polymer dispersion chemistry. Once in the subsurface, the material behaves as a colloidal biomatrix, binding to the aquifer matrix, rapidly removing contaminants from groundwater, and expediting permanent contaminant biodegradation.

This unique remediation technology accomplishes treatment with the use of highly dispersible, fast-acting, sorption-based technology, capturing and concentrating dissolved-phase contaminants within its matrix-like structure. Once contaminants are sorbed onto the regenerative matrix, biodegradation processes achieve complete remediation at an accelerated rate.

Distribution of PlumeStop in water

To see a list of treatable contaminants with the use of PlumeStop, view the Range of Treatable Contaminants Guide.

Chemical Composition

- Water - CAS# 7732-18-5
- Colloidal Activated Carbon ≤2.5 - CAS# µm 7440-44-0
- Proprietary Additives

Properties

- Physical state: Liquid
- Form: Aqueous suspension
- Color: Black
- Odor: Odorless
- pH: 8 - 10

Storage and Handling Guidelines

Storage
Store in original tightly closed container
Store away from incompatible materials
Protect from freezing

Handling
Avoid contact with skin and eyes
Avoid prolonged exposure
Observe good industrial hygiene practices
Wash thoroughly after handling
Wear appropriate personal protective equipment

PlumeStop® Liquid Activated Carbon™ Technical Description

Applications

PlumeStop is easily applied into the subsurface through gravity-feed or low-pressure injection.

Health and Safety

Wash hands after handling. Dispose of waste and residues in accordance with local authority requirements. Please review the Material Safety Data Sheet for additional storage, usage, and handling requirements here: PlumeStop SDS.

REGENESIS

www.regenesis.com
1011 Calle Sombra, San Clemente CA 92673
949.366.8000

REGENESIS

Technology-Based Solutions for the Environment

SAFETY DATA SHEET

1. Identification

Product identifier	**PlumeSTOP®**
Other means of identification	None.
Recommended use	Soil and Groundwater Remediation.
Recommended restrictions	None known.

Manufacturer/Importer/Supplier/Distributor information

Company Name	Regenesis
Address	1011 Calle Sombra San Clemente, CA 92673
Telephone	949-366-8000
E-mail	CustomerService@regenesis.com
Emergency phone number	CHEMTREC® at 1-800-424-9300 (International)

2. Hazard(s) identification

Physical hazards	Not classified.
Health hazards	Not classified.
OSHA defined hazards	Not classified.

Label elements

Hazard symbol	None.
Signal word	None.
Hazard statement	The mixture does not meet the criteria for classification.
Precautionary statement	
Prevention	Observe good industrial hygiene practices.
Response	Wash hands after handling.
Storage	Store away from incompatible materials.
Disposal	Dispose of waste and residues in accordance with local authority requirements.
Hazard(s) not otherwise classified (HNOC)	None known.

3. Composition/information on ingredients

Mixtures

Chemical name	CAS number	%
Water	7732-18-5	>75
Colloidal activated carbon ≤2.5 µm	7440-44-0	<25
Proprietary additives		≤2

Composition comments All concentrations are in percent by weight unless otherwise indicated.

4. First-aid measures

Inhalation	Move to fresh air. Call a physician if symptoms develop or persist.
Skin contact	Wash off with soap and water. Get medical attention if irritation develops and persists.
Eye contact	Rinse with water. Get medical attention if irritation develops and persists.
Ingestion	Rinse mouth. Get medical attention if symptoms occur.
Most important symptoms/effects, acute and delayed	Direct contact with eyes may cause temporary irritation.

Indication of immediate medical attention and special treatment needed	Treat symptomatically.
General information	If you feel unwell, seek medical advice (show the label where possible). Show this safety data sheet to the doctor in attendance.

5. Fire-fighting measures

Suitable extinguishing media	Carbon dioxide, alcohol-resistant foam, dry chemical, water spray, or water fog.
Unsuitable extinguishing media	None known.
Specific hazards arising from the chemical	During fire, gases hazardous to health may be formed. Combustion products may include: carbon monoxide, carbon dioxide, sodium oxides, metal oxides.
Special protective equipment and precautions for firefighters	Use protective equipment appropriate for surrounding materials.
Fire fighting equipment/instructions	Move containers from fire area if you can do so without risk.
Specific methods	Use standard firefighting procedures and consider the hazards of other involved materials. Use water spray to keep fire-exposed containers cool.
General fire hazards	This material will not burn until the water has evaporated. Residue can burn. When dry may form combustible dust concentrations in air.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures	Keep unnecessary personnel away. Avoid contact with spilled material. For personal protection, see section 8 of the SDS.
Methods and materials for containment and cleaning up	This product is miscible in water. Large Spills: Stop the flow of material, if this is without risk. Dike the spilled material, where this is possible. Cover with plastic sheet to prevent spreading. Absorb in vermiculite, dry sand or earth and place into containers. Following product recovery, flush area with water. Small Spills: Wipe up with absorbent material (e.g. cloth, fleece). Clean surface thoroughly to remove residual contamination. Never return spills to original containers for re-use. For waste disposal, see section 13 of the SDS.
Environmental precautions	Avoid discharge into drains, water courses or onto the ground.

7. Handling and storage

Precautions for safe handling	Avoid contact with skin and eyes. Avoid prolonged exposure. Observe good industrial hygiene practices. Wash thoroughly after handling. Wear appropriate personal protective equipment (See Section 8).
Conditions for safe storage, including any incompatibilities	Store in original tightly closed container. Store away from incompatible materials (see Section 10 of the SDS). Protect from freezing.

8. Exposure controls/personal protection

Occupational exposure limits

US. OSHA Table Z-3 (29 CFR 1910.1000)

Components	Type	Value	Form
Colloidal activated carbon ≤2.5 µm (CAS 7440-44-0)	TWA	5 mg/m3	Respirable fraction.
		15 mg/m3	Total dust.

US. NIOSH: Pocket Guide to Chemical Hazards

Components	Type	Value	Form
Colloidal activated carbon ≤2.5 µm (CAS 7440-44-0)	TWA	2.5 mg/m3	Respirable.

Biological limit values	No biological exposure limits noted for the ingredient(s).
Appropriate engineering controls	Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level.

Individual protection measures, such as personal protective equipment

Eye/face protection	Wear approved chemical safety goggles.
Skin protection	
Hand protection	Rubber, neoprene or PVC gloves are recommended. Wash hands after handling.
Other	Avoid contact with the skin. Wear suitable protective clothing.
Respiratory protection	Not normally needed. In case of insufficient ventilation, wear suitable respiratory equipment. If engineering controls do not maintain airborne concentrations below recommended exposure limits (where applicable) or to an acceptable level (in countries where exposure limits have not been established), an approved respirator must be worn.
Thermal hazards	Wear appropriate thermal protective clothing, when necessary.
General hygiene considerations	Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants.

9. Physical and chemical properties

Appearance	
Physical state	Liquid.
Form	Aqueous suspension.
Color	Black.
Odor	Odorless.
Odor threshold	Not available.
pH	8 - 10
Melting point/freezing point	Not available.
Initial boiling point and boiling range	Not available.
Flash point	Not flammable.
Evaporation rate	Not available.
Flammability (solid, gas)	Not applicable.
Upper/lower flammability or explosive limits	
Flammability limit - lower (%)	Not available.
Flammability limit - upper (%)	Not available.
Explosive limit - lower (%)	Not available.
Explosive limit - upper (%)	Not available.
Vapor pressure	Not available.
Vapor density	Not available.
Relative density	1 - 1.2
Solubility(ies)	
Solubility (water)	Miscible
Partition coefficient (n-octanol/water)	Not available.
Auto-ignition temperature	Not available.
Decomposition temperature	Not available.
Viscosity	Not available.

10. Stability and reactivity

Reactivity	The product is stable and non-reactive under normal conditions of use, storage and transport.
Chemical stability	Material is stable under normal conditions.
Possibility of hazardous reactions	No dangerous reaction known under conditions of normal use.
Conditions to avoid	Contact with incompatible materials. Keep from freezing.
Incompatible materials	Strong oxidizing agents. Water reactive materials.

Hazardous decomposition products	Combustion may produce: carbon oxides.

11. Toxicological information

Information on likely routes of exposure

Inhalation	Prolonged inhalation may be harmful.
Skin contact	Prolonged or repeated skin contact may result in minor irritation.
Eye contact	Direct contact with eyes may cause temporary irritation.
Ingestion	Expected to be a low ingestion hazard.
Symptoms related to the physical, chemical and toxicological characteristics	Direct contact with eyes may cause temporary irritation.

Information on toxicological effects

Acute toxicity Not expected to be acutely toxic.

Components	Species	Test Results
Colloidal activated carbon ≤2.5 µm (CAS 7440-44-0)		
Acute		
Inhalation		
LC50	Rat	> 8500 mg/m³, air
Oral		
LD50	Rat	> 2000 mg/kg, (Female)

Skin corrosion/irritation	Prolonged skin contact may cause temporary irritation.
Serious eye damage/eye irritation	Direct contact with eyes may cause temporary irritation.
Respiratory or skin sensitization	
Respiratory sensitization	Not a respiratory sensitizer.
Skin sensitization	This product is not expected to cause skin sensitization.
Germ cell mutagenicity	No data available to indicate product or any components present at greater than 0.1% are mutagenic or genotoxic.
Carcinogenicity	This product is not considered to be a carcinogen by IARC, ACGIH, NTP, or OSHA.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not listed.

Reproductive toxicity	This product is not expected to cause reproductive or developmental effects.
Specific target organ toxicity - single exposure	Not classified.
Specific target organ toxicity - repeated exposure	Not classified.
Aspiration hazard	Not an aspiration hazard.
Chronic effects	Prolonged inhalation may be harmful.

12. Ecological information

Ecotoxicity	The product is not classified as environmentally hazardous. However, this does not exclude the possibility that large or frequent spills can have a harmful or damaging effect on the environment.
Persistence and degradability	No data is available on the degradability of this product.
Bioaccumulative potential	No data available.
Mobility in soil	Expected to be temporarily highly mobile in soil.
Other adverse effects	None known.

13. Disposal considerations

Disposal instructions	Collect and reclaim or dispose in sealed containers at licensed waste disposal site.
Local disposal regulations	Dispose in accordance with all applicable regulations.
Hazardous waste code	The waste code should be assigned in discussion between the user, the producer and the waste disposal company.

Waste from residues / unused products	Dispose of in accordance with local regulations. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner (see: Disposal instructions).
Contaminated packaging	Empty containers should be taken to an approved waste handling site for recycling or disposal. Since emptied containers may retain product residue, follow label warnings even after container is emptied.

14. Transport information

DOT

Not regulated as dangerous goods.

IATA

Not regulated as dangerous goods.

IMDG

Not regulated as dangerous goods.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code	Not established.

15. Regulatory information

US federal regulations

All components are listed on or exempt from the U.S. EPA TSCA Inventory List.
This product is not known to be a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)

Not regulated.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not listed.

CERCLA Hazardous Substance List (40 CFR 302.4)

Not listed.

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Hazard categories

Immediate Hazard - No
Delayed Hazard - No
Fire Hazard - No
Pressure Hazard - No
Reactivity Hazard - No

SARA 302 Extremely hazardous substance

Not listed.

SARA 311/312 Hazardous chemical	No

SARA 313 (TRI reporting)

Not regulated.

Other federal regulations

Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List

Not regulated.

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)

Not regulated.

Safe Drinking Water Act (SDWA)	Not regulated.

US state regulations

US. Massachusetts RTK - Substance List

Not regulated.

US. New Jersey Worker and Community Right-to-Know Act

Colloidal activated carbon ≤2.5 µm (CAS 7440-44-0)

US. Pennsylvania Worker and Community Right-to-Know Law

Not listed.

US. Rhode Island RTK

Not regulated.

US. California Proposition 65

Not Listed.

International Inventories

Country(s) or region	Inventory name	On inventory (yes/no)*
Australia	Australian Inventory of Chemical Substances (AICS)	Yes
Canada	Domestic Substances List (DSL)	Yes
Canada	Non-Domestic Substances List (NDSL)	No
China	Inventory of Existing Chemical Substances in China (IECSC)	Yes
Europe	European Inventory of Existing Commercial Chemical Substances (EINECS)	No
Europe	European List of Notified Chemical Substances (ELINCS)	No
Japan	Inventory of Existing and New Chemical Substances (ENCS)	No
Korea	Existing Chemicals List (ECL)	Yes
New Zealand	New Zealand Inventory	Yes
Philippines	Philippine Inventory of Chemicals and Chemical Substances (PICCS)	Yes
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

*A "Yes" indicates this product complies with the inventory requirements administered by the governing country(s).
A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

16. Other information, including date of preparation or last revision

Issue date 26-February-2015

Revision date -

Version # 01

Further information HMIS® is a registered trade and service mark of the American Coatings Association (ACA).

HMIS® ratings

Health: 0
Flammability: 0
Physical hazard: 0

NFPA ratings

Disclaimer

Regenesis cannot anticipate all conditions under which this information and its product, or the products of other manufacturers in combination with its product, may be used. It is the user's responsibility to ensure safe conditions for handling, storage and disposal of the product, and to assume liability for loss, injury, damage or expense due to improper use. The information in the sheet was written based on the best knowledge and experience currently available.

REGENESIS

Technology-Based Solutions for the Environment

SAFETY DATA SHEET

1. Identification

Product identifier	**PlumeSTOP® Nutrients**
Other means of identification	None.
Recommended use	Soil and Groundwater Remediation.
Recommended restrictions	None known.

Manufacturer/Importer/Supplier/Distributor information

Company Name	Regenesis
Address	1011 Calle Sombra San Clemente, CA 92673
Telephone	949-366-8000
E-mail	CustomerService@regenesis.com
Emergency phone number	CHEMTREC® at 1-800-424-9300 (International)

2. Hazard(s) identification

Physical hazards	Not classified.
Health hazards	Not classified.
OSHA defined hazards	Not classified.
Label elements	
Hazard symbol	None.
Signal word	None.
Hazard statement	The mixture does not meet the criteria for classification.
Precautionary statement	
Prevention	Observe good industrial hygiene practices.
Response	Wash hands after handling.
Storage	Store away from incompatible materials.
Disposal	Dispose of waste and residues in accordance with local authority requirements.
Hazard(s) not otherwise classified (HNOC)	None known.
Supplemental information	None.

3. Composition/information on ingredients

Mixtures

The manufacturer lists no ingredients as hazardous according to OSHA 29 CFR 1910.1200.

4. First-aid measures

Inhalation	Move to fresh air. Call a physician if symptoms develop or persist.
Skin contact	Wash off with soap and water. Get medical attention if irritation develops and persists.
Eye contact	Do not rub eyes. Rinse with water. Get medical attention if irritation develops and persists.
Ingestion	Rinse mouth. Get medical attention if symptoms occur.
Most important symptoms/effects, acute and delayed	Dusts may irritate the respiratory tract, skin and eyes.
Indication of immediate medical attention and special treatment needed	Treat symptomatically.
General information	Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves.

5. Fire-fighting measures

Suitable extinguishing media	Water fog. Foam. Dry chemical powder. Carbon dioxide (CO2). Apply extinguishing media carefully to avoid creating airborne dust.
Unsuitable extinguishing media	None known.
Specific hazards arising from the chemical	During fire, gases hazardous to health may be formed.
Special protective equipment and precautions for firefighters	Self-contained breathing apparatus and full protective clothing must be worn in case of fire.
Fire fighting equipment/instructions	Use water spray to cool unopened containers. Avoid dust formation.
Specific methods	Use standard firefighting procedures and consider the hazards of other involved materials.
General fire hazards	No unusual fire or explosion hazards noted.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures	Keep unnecessary personnel away. Wear appropriate protective equipment and clothing during clean-up. Use a NIOSH/MSHA approved respirator if there is a risk of exposure to dust/fume at levels exceeding the exposure limits. For personal protection, see section 8 of the SDS.
Methods and materials for containment and cleaning up	Avoid the generation of dusts during clean-up. Collect dust using a vacuum cleaner equipped with HEPA filter. This product is miscible in water. Stop the flow of material, if this is without risk. Large Spills: Wet down with water and dike for later disposal. Shovel the material into waste container. Following product recovery, flush area with water. Small Spills: Sweep up or vacuum up spillage and collect in suitable container for disposal. For waste disposal, see section 13 of the SDS.
Environmental precautions	Avoid discharge into drains, water courses or onto the ground.

7. Handling and storage

Precautions for safe handling	Minimize dust generation and accumulation. Provide appropriate exhaust ventilation at places where dust is formed. Practice good housekeeping.
Conditions for safe storage, including any incompatibilities	Store in original tightly closed container. Store in a well-ventilated place. Store away from incompatible materials (see Section 10 of the SDS).

8. Exposure controls/personal protection

Occupational exposure limits

US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000)

Components	Type	Value	Form
PlumeSTOP® Nutrients (as dust)	PEL	5 mg/m3	Respirable fraction.
		15 mg/m3	Total dust.

US. OSHA Table Z-3 (29 CFR 1910.1000)

Components	Type	Value	Form
PlumeSTOP® Nutrients (as dust)	TWA	5 mg/m3	Respirable fraction.
		15 mg/m3	Total dust.
		50 mppcf	Total dust.
		15 mppcf	Respirable fraction.

US. ACGIH Threshold Limit Values

Components	Type	Value	Form
PlumeSTOP® Nutrients (as dust)	TWA	3 mg/m3	Respirable particles.
		10 mg/m3	Inhalable particles.

Biological limit values	No biological exposure limits noted for the ingredient(s).
Appropriate engineering controls	Ensure adequate ventilation, especially in confined areas. Local exhaust is suggested for use, where possible, in enclosed or confined spaces.

Individual protection measures, such as personal protective equipment

Eye/face protection	Wear safety glasses with side shields (or goggles). Unvented, tight fitting goggles should be worn in dusty areas.
Skin protection	
Hand protection	Wear appropriate chemical resistant gloves. Suitable gloves can be recommended by the glove supplier.
Skin protection	
Other	Wear suitable protective clothing.
Respiratory protection	In case of inadequate ventilation, use MSHA/NIOSH approved dust respirator.
Thermal hazards	Wear appropriate thermal protective clothing, when necessary.
General hygiene considerations	Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants.

9. Physical and chemical properties

Appearance	
Physical state	Solid.
Form	Powder.
Color	White.
Odor	Odorless.
Odor threshold	Not available.
pH	Not available.
Melting point/freezing point	Not available.
Initial boiling point and boiling range	Not available.
Flash point	Not available.
Evaporation rate	Not available.
Flammability (solid, gas)	The product is non-combustible.
Upper/lower flammability or explosive limits	
Flammability limit - lower (%)	Not available.
Flammability limit - upper (%)	Not available.
Explosive limit - lower (%)	Not available.
Explosive limit - upper (%)	Not available.
Vapor pressure	Not available.
Vapor density	Not available.
Relative density	Not available.
Solubility(ies)	
Solubility (water)	Completely soluble.
Partition coefficient (n-octanol/water)	Not available.
Auto-ignition temperature	Not available.
Decomposition temperature	Not available.
Viscosity	Not available.
Other information	
Explosive properties	Not explosive.
Oxidizing properties	Not oxidizing.

10. Stability and reactivity

Reactivity	The product is stable and non-reactive under normal conditions of use, storage and transport.
Chemical stability	Material is stable under normal conditions.

Possibility of hazardous reactions	No dangerous reaction known under conditions of normal use. Ammonia fumes may be released upon heating.
Conditions to avoid	Contact with incompatible materials. Excessive heat.
Incompatible materials	Strong oxidizing agents. Bases.
Hazardous decomposition products	Ammonia fumes may be released upon heating.

11. Toxicological information

Information on likely routes of exposure

Inhalation	Dust may irritate respiratory system.
Skin contact	Dust or powder may irritate the skin.
Eye contact	Dust may irritate the eyes.
Ingestion	Expected to be a low ingestion hazard.
Symptoms related to the physical, chemical and toxicological characteristics	Dusts may irritate the respiratory tract, skin and eyes.

Information on toxicological effects

Acute toxicity	Not expected to be acutely toxic.
Skin corrosion/irritation	Prolonged skin contact may cause temporary irritation.
Serious eye damage/eye irritation	Direct contact with eyes may cause temporary irritation.

Respiratory or skin sensitization

Respiratory sensitization	Not a respiratory sensitizer.
Skin sensitization	This product is not expected to cause skin sensitization.
Germ cell mutagenicity	No data available to indicate product or any components present at greater than 0.1% are mutagenic or genotoxic.
Carcinogenicity	This product is not considered to be a carcinogen by IARC, ACGIH, NTP, or OSHA.

IARC Monographs. Overall Evaluation of Carcinogenicity

Not listed.

NTP Report on Carcinogens

Not listed.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not regulated.

Reproductive toxicity	This product is not expected to cause reproductive or developmental effects.
Specific target organ toxicity - single exposure	Not classified.
Specific target organ toxicity - repeated exposure	Not classified.
Aspiration hazard	Not an aspiration hazard.

12. Ecological information

Ecotoxicity	The product is not classified as environmentally hazardous. However, this does not exclude the possibility that large or frequent spills can have a harmful or damaging effect on the environment.
Persistence and degradability	No data is available on the degradability of this product.
Bioaccumulative potential	No data available.
Mobility in soil	This product is completely water soluble and will disperse in soil.
Other adverse effects	No other adverse environmental effects (e.g. ozone depletion, photochemical ozone creation potential, endocrine disruption, global warming potential) are expected from this component.

13. Disposal considerations

Disposal instructions	Collect and reclaim or dispose in sealed containers at licensed waste disposal site.
Local disposal regulations	Dispose in accordance with all applicable regulations.
Hazardous waste code	The waste code should be assigned in discussion between the user, the producer and the waste disposal company.

Waste from residues / unused products	Dispose of in accordance with local regulations. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner (see: Disposal instructions).
Contaminated packaging	Since emptied containers may retain product residue, follow label warnings even after container is emptied. Empty containers should be taken to an approved waste handling site for recycling or disposal.

14. Transport information

DOT

Not regulated as dangerous goods.

IATA

Not regulated as dangerous goods.

IMDG

Not regulated as dangerous goods.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code Not applicable.

15. Regulatory information

US federal regulations This product is not known to be a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)

Not regulated.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not regulated.

CERCLA Hazardous Substance List (40 CFR 302.4)

Not listed.

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Hazard categories

Immediate Hazard - No
Delayed Hazard - No
Fire Hazard - No
Pressure Hazard - No
Reactivity Hazard - No

SARA 302 Extremely hazardous substance

Not listed.

SARA 311/312 Hazardous chemical No

SARA 313 (TRI reporting)

Chemical name	CAS number	% by wt.
Ammonium sulfate	7783-20-2	40-50

Other federal regulations

Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List

Not regulated.

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)

Not regulated.

Safe Drinking Water Act (SDWA) Not regulated.

US state regulations

US. Massachusetts RTK - Substance List

Ammonium sulfate (CAS 7783-20-2)

US. New Jersey Worker and Community Right-to-Know Act

Not listed.

US. Pennsylvania Worker and Community Right-to-Know Law

Ammonium sulfate (CAS 7783-20-2)

US. Rhode Island RTK

Not regulated.

US. California Proposition 65

California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65): This material is not known to contain any chemicals currently listed as carcinogens or reproductive toxins.

International Inventories

Country(s) or region	Inventory name	On inventory (yes/no)*
Australia	Australian Inventory of Chemical Substances (AICS)	No
Canada	Domestic Substances List (DSL)	No
Canada	Non-Domestic Substances List (NDSL)	No
China	Inventory of Existing Chemical Substances in China (IECSC)	No
Europe	European Inventory of Existing Commercial Chemical Substances (EINECS)	No
Europe	European List of Notified Chemical Substances (ELINCS)	No
Japan	Inventory of Existing and New Chemical Substances (ENCS)	No
Korea	Existing Chemicals List (ECL)	No
New Zealand	New Zealand Inventory	No
Philippines	Philippine Inventory of Chemicals and Chemical Substances (PICCS)	No
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	No

*A "Yes" indicates this product complies with the inventory requirements administered by the governing country(s).
A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

16. Other information, including date of preparation or last revision

Issue date 07-January-2016

Revision date -

Version # 01

HMIS® ratings
Health: 1
Flammability: 0
Physical hazard: 0

NFPA ratings

Disclaimer

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APPENDIX C

REGENESIS DESIGN TOOL FOR PLUMESTOP INJECTIONS

REGENESIS

Project Info

Former EMCA Site
Mamaroneck, New York 10543

Prepared For:
Kevin Shanahan (AECOM)

Target Treatment Zone (TTZ) Info	Unit	Value
Treatment Area	ft^2	2,700
Top Treat Depth	ft	4.0
Bot Treat Depth	ft	28.0
Vertical Treatment Interval	ft	24.0
Treatment Zone Volume	ft^3	64,800
Treatment Zone Volume	cy	2,400
Soil Type	---	sand
Porosity	cm^3/cm^3	0.30
Effective Porosity	cm^3/cm^3	0.20
Treatment Zone Pore Volume	gals	145,421
Treatment Zone Effective Pore Volume	gals	96,948
Fraction Organic Carbon (foc)	g/g	0.002
Soil Density	g/cm^3	1.7
Soil Density	lb/ft^3	108
Soil Weight	lbs	7.0E+06
Hydraulic Conductivity	ft/day	25.0
Hydraulic Conductivity	cm/sec	8.82E-03
Hydraulic Gradient	ft/ft	0.003
GW Velocity	ft/day	0.38
GW Velocity	ft/yr	137

Sources of Hydrogen Demand	Unit	Value
Dissolved Phase Contaminant Mass	lbs	4
Sorbed Phase Contaminant Mass	lbs	18
Competing Electron Acceptor Mass	lbs	109
Total Mass Contributing to H_2 Demand	**lbs**	**131**

Stoichiometric Demand	Unit	Value
Stoichiometric H_2 Demand	lbs	7
Stoichiometric HRC Demand	**lbs**	**318**
Engineering/Safety Factor	--	**2**

Application Dosing	Unit	Value
Plume Stop to be Applied	**lbs**	**9,600**
HRC to be Applied : MW2 Area	**lbs**	**540**
BDI Plus to be Applied	**Liters**	**0**

PlumeStop® Application Design Summary

NO HRCBDI driller	
Application Method	**Direct Push**
Spacing Within Rows (ft)	11
Spacing Between Rows (ft)	11
Application Points	**22**
Areal Extent (square ft)	2,700
Top Application Depth (ft bgs)	4
Bottom Application Depth (ft bgs)	28
PlumeStop to be Applied (lbs)	**9,600**
PlumeStop per point (lbs)	436
PlumeStop per point (gals)	52
Mixing Water (gal)	**29,537**
Mixing Water (per pt)	1,343
Total Application Volume (gals)	**30,688**
Injection Volume per Point (gals)	1395
Anaerobic Bioremediation - HRC	
HRC Application Points	**6**
HRC to be Applied (lbs)	**540**
HRC per point (lbs)	90
Total Application Volume (gals)	**50**
Injection Volume per Point (gals)	8.3
Bioaugmentation - BDI Plus	
BDI Plus Application Points	**0**
BDI Plus to be Applied (Liters)	**0**
BDI Plus per point (Liters)	0.0

Technical Notes/Discussion

HRC applied 6 points around MW 2

Assumptions/Qualifications

In generating this preliminary estimate, Regenesis relied upon professional judgment and site specific information provided by others. Using this information as input, we performed calculations based upon known chemical and geologic relationships to generate an estimate of the mass of product and subsurface placement required to affect remediation of the site.

REGENESIS developed this Scope of Work in reliance upon the data and professional judgments provided by those whom completed the earlier environmental site assessment(s). The fees and charges associated with the Scope of Work were generated through REGENESIS' proprietary formulas and thus may not conform to billing guidelines, constraints or other limits on fees. REGENESIS does not seek reimbursement directly from any government agency or any governmental reimbursement fund (the "Government"). In any circumstance where REGENESIS may serve as a supplier or subcontractor to an entity which seeks reimbursement from the Government for all or part of the services performed or products provided by REGENESIS, it is the sole responsibility of the entity seeking reimbursement to ensure the Scope of Work and associated charges are in compliance with and acceptable to the Government prior to submission. When serving as a supplier or subcontractor to an entity which seeks reimbursement from the Government, REGENESIS does not knowingly present or cause to be presented any claim for payment to the Government.

Prepared by: Name

Date: 8/24/2017

Designate PlumeStop Dose		
Designate PlumeStop Dose for Model	**mg/L**	**1,556**
Active Ingredient	kgs	857
Active Ingredient	**lbs**	**1,888**
Product Concentration (as shipped)	mg/L	200,000
Product Mass (as shipped)	kgs	4,283
Product Mass (as shipped)	lbs	9,439
Product Mass (as shipped)	gals	1,131
Container Type	lbs each	**400**
Container Type	gals each	48
Number of Containers	#	23.6
Number of Containers Rounded	#	24.0
PlumeStop to be Shipped	**lbs**	**9,600**
PlumeStop to be Shipped	kgs	4,356
Plume Stop to be Shipped	gals	1,150
Plume Stop to be Shipped	L	4,356

REGENESIS

FIELD APPLICATION DESIGN			
Parameter	**Unit**	**Value**	**HRC Point Spacing**
PlumeStop Spacing within rows	ft	**11.0**	**11.0**
PlumeStop Spacing between rows	ft	**11.0**	**11.0**
Injection Points	**pts**	**22**	**22**
Injection Concentration	**mg/L**	**7,500**	
Injection Percentage	%	0.8%	
Solution Mass to be Injected	kgs	116,152	
Solution Density	g/cm3	1	
Solution Volume to be Injected	L	116,152	
Solution Volume to be Injected	gals	30,688	
Volume per Point	gal/pt	1,395	
Volume per Vertical Ft	**gal/ft**	**58**	
Pore Volume Occupancy			
Total Pore Volume Occupancy	%	21%	
Effective Pore Volume Occ	%	32%	
Volume per ft and Injection Radius Calcs			
Injection Porosity (DPT)	**---**	**0.06**	**0.06**
Injection Porosity (Wells)	---	**0.07**	
Injection Volume	gal/ft	58.1	
Injection Volume	ft3/ft	7.8	
Avg. Injection Radius (DPT)	**ft**	**6.4**	