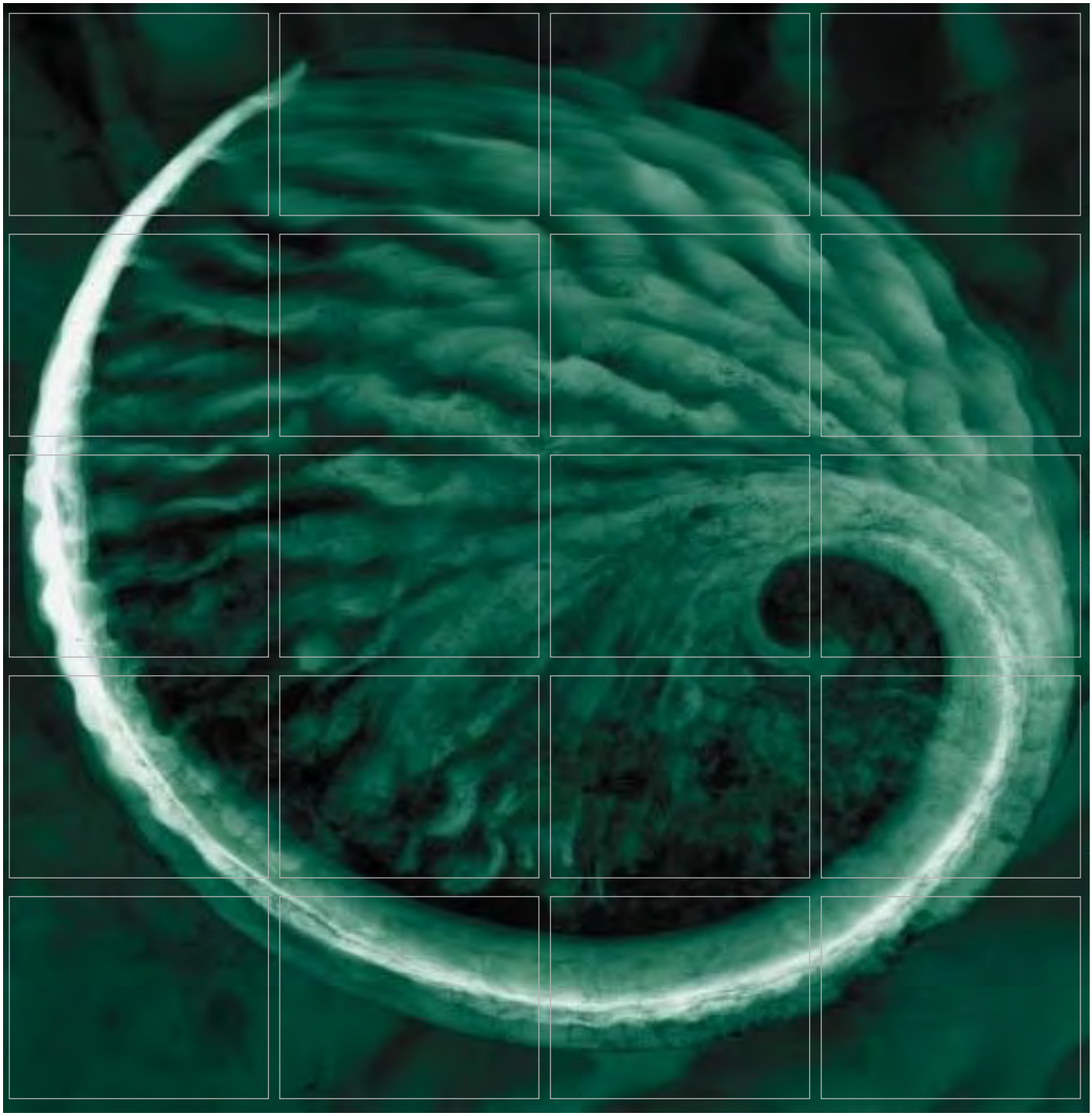

Operable Unit 1
Site Management Plan

Fulton Avenue Superfund Site
150 Fulton Avenue
Garden City Park, Nassau County, New York

August 2018

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LIST OF ACRONYMS

ACRONYM	DEFINITION
AOC	Administrative Order on Consent
AS	Air Sparge (ing)
ARARs	Applicable or Relevant and Appropriate Requirements
BGS	Below Ground Surface
BRA	Baseline Risk Assessment
CERCLA	Comprehensive Environmental Response Compensation and Liability Act
CFR	Code of Federal Regulations
CJ	Consent Judgment
DART	Days Away from Work, Restricted Time or Transfer from Job
EMR	Experience Modification Rate
EPA	United States Environmental Protection Agency
ERM	Environmental Resources Management (ERM) Consulting & Engineering, Inc.
FAPG	Federal-Aid Policy Guide
FS	Feasibility Study
FSWD	Franklin Square Water District
GAC	Granular Activated Carbon
Garden City	Incorporated Village of Garden City
GCPIA	Garden City Park Industrial Area
HASCP	Health and Safety Contingency Plan
Settling Defendant	Genesco Inc.
GPM	Gallons Per Minute
GRP	Green Remediation Plan
IRM	Interim Remedial Measure
ISCO	In-Situ Chemical Oxidation
LIPA	Long Island Power Authority
OSWER	Office of Solid Waste and Emergency Response
MCLs	Maximum Contaminant Levels
MGD	Million Gallons Per Day
NAICS	North American Industry Classification System
NCDPW	Nassau County Department of Public Works
NCP	National Contingency Plan
NPL	National Priorities List
NYS	New York State
NYSDEC	New York State Department of Environmental Conservation

ACRONYM	DEFINITION
OM&M	Operations, Maintenance and Monitoring
OU1	Operable Unit No. 1
PCE	Perchloroethene a.k.a. (Tetrachloroethene)
PRAP	Proposed Remedial Action Plan
PRPs	Potentially Responsible Parties
QA	Quality Assurance
QAO	Quality Assurance Officer
QAPP	Quality Assurance Project Plan
QC	Quality Control
RI	Remedial Investigation
ROD	Record Of Decision
SMP	Site Management Plan
SPDES	State Pollution Discharge Elimination System
SVE	Soil Vapor Extraction
TBC	To Be Considered
TCE	Trichloroethene
TRIR	Total Recordable Incidence Rate
TNH	Town of North Hempstead
USGS	United States Geological Survey
VGC	Incorporated Village of Garden City
VOC	Volatile Organic Compound
VP	Vertical Profile

1.0 INTRODUCTION

This Site Management Plan (SMP) is the central, comprehensive guiding document for implementation of the Fulton Avenue Superfund Site (Site) first operable unit (OU1), interim remedial action (RA) in accordance with the OU1 remedy selected in the U.S. Environmental Protection Agency's (EPA's) 30 September 2015 OU1 Record of Decision Amendment (Amended OU1 ROD) for the Site.

The OU1 RA activities (the Work) will be implemented in accordance with the revised OU1 Consent Judgment (2016 CJ) and revised OU1 Statement of Work (2016 SOW) approved by the Court on 15 August 2016. Copies of the Amended OU1 ROD, 2016 CJ and 2016 SOW are presented in Appendix A.

This SMP sets forth the objectives, performance standards, guidelines and scopes of work for implementation of the OU1 RA. During 2016-2017, new groundwater monitoring wells were installed, guiding documents were updated and approved by EPA, required evaluations were completed and resultant deliverables submitted to EPA, and thus, remaining significant OU1 RA activities for which the Settling Defendant is responsible are limited to long-term groundwater monitoring and reporting, and maintenance of the associated groundwater monitoring wells and the sub-slab depressurization/venting system (SSDS) at the 150 Fulton Avenue property. Operation of Village of Garden City (VGC) supply wells 13 & 14 and the associated air stripper treatment systems are not under the Settling Defendant's control.

Key supporting documents of this SMP include:

1. Groundwater Monitoring Plan;
2. Garden City Country Club Access Agreement – Appendix B
3. Quality Assurance Project Plan (QAPP) – Appendix C;
4. Health and Safety Contingency Plan – Appendix D;
5. Contractor Procurement Plan;
6. Operations, Maintenance & Monitoring (OM&M) Plan;
7. Institutional/Engineering Control Certifications Plan; and
8. Green Remediation Plan (GRP).

1.1 SITE DEFINITION & CHARACTERISTICS

1.1.1 Site Definition

The property located at 150 Fulton Avenue, Garden City Park, Nassau County, New York (Fulton Property) is owned by Gordon Atlantic Corporation. It is located within the Garden City Park Industrial Area

(GCPIA), Village of Garden City Park, Town of North Hempstead (TNH), Nassau County, New York. The Fulton Property is currently occupied by a business machine support company. Figure 1 shows the location of the Fulton Property.

Operations at the Fulton Property from approximately 1 January 1965 through approximately 31 December 1974 are alleged to have included dry-cleaning of fabric with tetrachloroethylene (PCE). The Fulton Property has been identified as a contributing source of PCE contamination of groundwater beneath the Site creating a plume of PCE-dominant groundwater contamination in the Upper Glacial and Magothy aquifers which extends to the southwest, impacting certain public supply wells owned by the VGC.

The Fulton Property was listed on the Registry of Inactive Hazardous Waste Disposal Sites in New York State (Registry) as Site Number 130073 in 1996. EPA also included the Fulton Property on the National Priorities List (NPL) of Federal Superfund Sites as part of EPA's larger Fulton Avenue Superfund Site in April 1998.

The NYSDEC defines the Site as the 0.8-acre Fulton Property and environmental conditions, including groundwater contamination that has migrated beyond the property boundary (the NYSDEC Site).

In contrast, the EPA Amended OU1 ROD states:

> *"The Fulton Avenue Superfund Site (the Site) includes a 0.8-acre property located at 150 Fulton Avenue, Garden City Park, Nassau County, New York (hereinafter, the Fulton Property). In addition, the Site includes all locations impacted by contamination released at the Fulton Property, and all other contamination impacting the groundwater and indoor air in the vicinity of the Fulton Property. The Site also includes an overlapping groundwater plume, primarily contaminated with trichloroethene (TCE) in the Upper Glacial and Magothy aquifers, the origin(s) of which are not fully known but are under study by EPA as part of the second operable unit (OU2) for the Site."*

For clarity, it should be noted that EPA views the VOC impacts in groundwater at VGC public supply wells Nos. 9, 13 & 14 as the result of one regional plume containing contamination from multiple sources, some known and some unknown as reported in the 2005 Remedial Investigation (RI) Report for the Site.

The EPA is investigating the TCE-dominant portion of the plume as well as possible other sources of PCE and TCE as part of OU2 for the Site. The EPA currently is performing a Remedial Investigation and Feasibility Study (RI/FS) for OU2, and expects to issue a ROD for OU2 that will constitute the final groundwater remedy for the Site and that will serve as a final decision

for OU1. The general historical outlines of the PCE- and TCE-dominant portions of the plume are shown in Figure 2.

1.1.2 General Site Characteristics

The Site is situated in the outwash plain on Long Island, New York which is relatively flat, with local relief of approximately 12 feet over a distance of 2,600 feet. Nearer to the Fulton Property, the area is slightly sloping with local relief of approximately five feet.

The soil at the Site is classified as urban land (defined as areas where at least 88% of the surface is covered with asphalt, concrete, or other paving material). Approximately 500 feet of interbedded sands and limited clay lenses overlay Precambrian bedrock. Soils underlying the Site are classified as a sandy loam. There are three aquifers that exist beneath the Site, two of which are affected. The Upper Glacial aquifer is the surficial unit which overlies the Magothy aquifer. The Magothy is the primary source for public water in the area. The Upper Glacial and Magothy aquifers are in hydraulic communication, i.e., as groundwater flows southwesterly beneath the Site, it also moves downward into the Magothy aquifer.

The land uses within the Site are a mix of residential, commercial, and industrial. The GCPIA is an industrial/commercial area and the area south of the Long Island Railroad tracks is largely residential. Approximately 208,000 people live within three miles of the Fulton Property. There are about 20,000 people living within one mile of the Fulton Property. Residents within the area obtain their drinking water from public supply wells. The vicinity of the Fulton Property is industrial but residential areas are immediately adjacent to the industrial area.

Storm water runoff from the GCPIA and VGC streets is collected into storm drains and recharged to the Upper Glacial aquifer via local recharge basins. The Garden City Country Club (GCCC) lies south of the residential area. Its manicured grassland surrounds a pond which accepts storm water runoff from VGC streets surrounding the golf course.

Detailed information concerning the Site geology, hydrogeology, and the nature and extent of impacts to soil and groundwater is presented in the 2005 RI Report, Part 2 of the Amended OU1 ROD, as well as numerous technical documents submitted to EPA during 2011 - 2015 listed in the Administrative Record of the Amended OU1 ROD.

1.2 SITE INVESTIGATIVE, REMEDIAL & ADMINISTRATIVE HISTORY

An overview of the Site investigative, remedial and administrative history is presented below. Greater detail can be found in the Amended OU1 ROD (Appendix A).

1.2.1 Investigative Summary

Beginning in 1986, numerous investigations were conducted by the Nassau County Departments of Health and Public Works to identify the source(s) of VOCs impacting public supply wells in Nassau County located downgradient of the GCPIA. Subsequent investigations undertaken by NYSDEC identified the Fulton Property as one of several contributing sources of PCE contamination of groundwater beneath the NYSDEC Site which led to listing the Fulton Property on the NYS Registry as well as the NPL.

Although NYSDEC initially assumed the role of lead regulatory agency, the NYSDEC and EPA cooperatively oversaw the implementation of an RI/FS and a Soil Interim Remedial Measure (Soil IRM) described below. NYSDEC and EPA agreed that EPA would be designated as the lead agency for the Fulton Avenue Site at the conclusion of the RI/FS process.

The source of PCE contamination at the Fulton Property was identified as a former drywell which was subject to a Soil IRM that involved soil/sediment removal, air sparging (AS) and soil vapor extraction (SVE). The former dry well was closed as part of the Soil IRM. The system was operated until NYSDEC Technical and Administrative Guidance Memorandum (TAGM) soil cleanup levels were achieved. The Soil IRM removed an estimated 10,000 pounds of PCE during its period of operation (1999 – 2001). The completion of the Soil IRM was approved by NYSDEC and the dismantling of the SVE system was authorized on 2 January 2002. A SSDS was installed beneath the building at the conclusion of the Soil IRM to mitigate the potential for intrusion of soil vapor containing residual PCE into the existing building. This system remains in operation to protect the indoor air quality.

Between 1999 – 2006, an RI/FS that included an Exposure Pathways Analysis and Baseline Risk Assessment was performed under a NYSDEC Administrative Order on Consent (AOC), Index # W1-0707-94-08. The RI/FS focused on environmental conditions at the Fulton Property and contamination that had migrated beyond the property boundary.

1.2.2 2007 Record of Decision/2009 Consent Judgment & Statement of Work

The RI and FS Reports were reviewed by NYSDEC and EPA, and approved under the AOC. After approval, lead-agency status changed from NYSDEC to EPA. EPA subsequently developed a Proposed Remedial Action Plan (PRAP) for OU1 which, following a public comment period, was finalized and presented as a selected remedy in a Record of Decision issued on 28 September 2007 (2007 ROD). The 2007 ROD described EPA's preferred action to address the PCE-dominant portion of the plume which included among other things:

- In-Situ Chemical Oxidation (ISCO) treatment of source contamination in groundwater at and near 150 Fulton Avenue; and
- Construction and operation of an intercepting groundwater extraction and treatment system midway along the spine of the PCE-dominant portion of the plume.

Thereafter, EPA invited two potentially responsible parties (PRPs) to negotiate an agreement to implement the remedy set forth in the 2007 ROD. One of the identified PRPs, Genesco Inc. (Settling Defendant) agreed to implement the OU1 RA and executed a CJ with EPA.

The CJ (EPA CJ No. CV–09–3917) (2009 CJ) and attached SOW (2009 SOW) were lodged with the United States District Court for the Eastern District of New York on 10 September 2009. Notice of the same inviting public comment was published in the Federal Register /Vol. 74, No. 179, 17 September 2009. On 18 November 2009, EPA issued notice to proceed initiating the OU1 RD and subsequent implementation of the OU1 RA. On 17 June 2011, the United States requested entry of the Consent Judgment. The Court did not rule on the government's motion.

1.2.3 2015 Record of Decision/2016 Consent Judgment & Statement of Work

In March of 2012, while the remedial design was underway, the Village and the Settling Defendant proposed modifications to the 2007 ROD that would, among other things, eliminate the interim groundwater extraction and treatment system while ensuring the continued operation of the wellhead treatment systems on VGC water supply wells 13 and 14.

Following the Settling Defendant's submittal of several technical evaluations prepared at EPA's request, and after EPA's further evaluation of conditions at the Site, EPA determined that it would be appropriate to amend the 2007 ROD.

EPA subsequently developed a new PRAP for OU1 which, following a public comment period, was finalized and presented the current selected remedy in the Amended OU1 ROD for the Site. Therein, the EPA concluded that eliminating the groundwater extraction and treatment system from the OU1 remedy would be appropriate at this time because PCE levels in groundwater reaching the intakes of wells 13 and 14, which had been increasing at the time of the 2007 ROD, instead have been declining since the summer of 2007. The lower PCE levels in groundwater suggest that the extraction well system contemplated in the 2007 ROD is not needed to help prevent more highly elevated levels of contamination from reaching wells 13 and 14. The existing treatment systems at water supply wells 13 and 14 have been and are expected to continue to effectively provide a safe drinking water supply. The attenuating nature of the PCE-dominant portion of the plume indicates that the source of the PCE may be depleting and that the highest levels of

contamination have already passed through the well head treatment systems at supply wells 13 and 14. A final decision regarding the groundwater contamination will be made following the EPA's completion of additional investigations at the Site.

In addition, RD sampling conducted by the Settling Defendant at and in the area around the Fulton Property did not identify PCE source material in the shallow aquifer in the immediate vicinity of the former drywell nor immediately downgradient of the Fulton Property. Consequently, the Amended OU1 ROD also eliminated ISCO treatment of the shallow aquifer at or immediately downgradient of the Fulton Property.

PCE concentrations are generally declining while elevated levels of PCE continue to be present in one monitoring well approximately 400 feet downgradient of the Fulton Property. The EPA expects to continue the investigation of potential source material.

During 2015-2016, the 2016 CJ and 2016 SOW were signed by the Settling Defendant and EPA, and filed with the Court on 15 August 2016. Further, the VGC and the Settling Defendant have entered into a separate agreement in ***Incorporated Village of Garden City v. Genesco Inc. and Gordon Atlantic Corp.,*** Civil Action No. 07-cv-5244 (E.D.N.Y.) whereby the Village has agreed to, among other things:

- Operate VGC water supply wells 13 and 14 with the air stripper treatment systems for 30 years at pumping levels consistent with the 2009 operation of those wells;
- Not to take any action that would reduce the volume, level of treatment or hydraulic control at the wells except with the consent of EPA regardless of whether those wells are needed for a potable water supply; and
- Operate, maintain, repair, and replace equipment of, as necessary, the two air strippers on those wells as called for in the Amended OU1 ROD.

The aforementioned agreement will facilitate the Settling Defendant's performance of the Work in accordance with the Amended OU1 ROD, and the 2016 CJ with attached 2016 SOW, including all terms, conditions and schedules set forth herein or developed and approved thereunder.

1.2.4 Remedial Design Actions 2016-2017

1.2.4.1 Amended OU1 Remedial Design Work Plan

An amended OU1 RD Work Plan was prepared and submitted to EPA on 14 October 2016 in accordance with the requirements of the revised August 2016 OU1 CJ and revised OU1 SOW.

The amended OU1 RD Work Plan sets forth the objectives, performance standards, scopes of work, required deliverables and schedules for the OU1 RD activities, and subsequent implementation of the OU1 RA.

EPA subsequently requested a revised version of the previously EPA-approved QAPP and additional groundwater monitoring well design details be submitted for review and approval prior to any groundwater sampling or well installations.

QAPP: A revised and conformed QAPP for the Site was submitted to EPA on 5 January 2017 for review and approval. On 20 March, EPA issued written comments regarding the revised QAPP. The document was revised and resubmitted to EPA on 11 May 2017. On 1 June 2017, EPA issued an additional set of written comments on the May 2017 QAPP. The document was further revised and submitted for final approval on 20 June. On 27 June 2017, EPA provided notification that the QAPP was approved.

Groundwater Monitoring Well Design: A Supplemental Groundwater Monitoring Well Specification Package was submitted to EPA on 13 January 2017 and subsequently approved on 25 January 2017 authorizing the well installation activities discussed further below (Remedial Construction Activities).

On 14 July 2017, a final draft of the amended OU1 RD Work Plan was submitted to EPA for review and approval. The document was revised to address EPA comments communicated in a letter dated 20 June 2017. The document included additional key appendices including:

- Appendix B: Supplemental Groundwater Monitoring Well Specifications – previously approved By EPA on 25 January 2017;
- Appendix C: Quality Assurance Project Plan – previously approved by EPA on 27 June 2017;
- Appendix D: Health and Safety Contingency Plan; and
- Appendix E: NCDOH Approvals For The Air Stripping Units For Village of Garden City Well Nos 13-14.

On 3 August 2017, EPA issued a letter conditionally approving the amended OU1 RD Work Plan. Minor revisions were effected in accordance with the letter including updated schedules for the OU1 RD/RA activities, and a final document was submitted to EPA on 16 August 2017.

1.2.4.2 *VGC Public Supply Well Nos. 13 & 14 Air Stripper Treatment Systems Evaluation/Report*

The evaluation was completed and the VGC Public Supply Well Nos. 13 & 14 Air Stripper Treatment Systems Evaluation/Report was prepared and submitted to EPA on 15 September 2017. The report presented the results of

an engineering evaluation to determine if replacing components of, or repairing or upgrading, such existing systems for VGC water supply wells 13 and 14 is necessary to ensure the protection of human health.

This evaluation consisted of a physical inspection of VGC wells 13 & 14 air stripper treatment systems, review of relevant sampling data and other information including technical specifications, treatment capacities, and presented the following conclusions/recommendations:

- The air stripping treatment systems are ten years old, regularly maintained, and in good physical condition and working order. According to VGC, the air strippers have a life expectancy of approximately 30 years. Based on the data provided, the air strippers are functioning as designed, achieving removal efficiencies greater than 99%.
- The VGC is obliged to operate wells 13 & 14 and associated air strippers in accordance with the Settlement Agreement, and is investing significant monies to implement the ongoing electrical system upgrade/well rehabilitation project that once completed should ensure continued reliable operation for years to come.
- Recommendations are as follow:
  1. The VGC complete the electrical system upgrade/well rehabilitation project as soon as possible.
  2. The VGC continue their regular inspection, preventative maintenance (e.g., lubrication, blower belt changes, pump/well rehabilitation, etc.) and repair programs.
  3. A similar inspection should be performed and an Air Stripper Evaluation Report be submitted to EPA every 5 years, during the year preceding EPA Five-Year review cycles.
  4. Operational information furnished by the VGC should be summarized and reported in each Quarterly Progress Report to EPA with a determination that the VGC is meeting their obligations in accordance with the Settlement Agreement or identification of excursions with recommended corrective action.
  5. Monitor and discuss in advance with the VGC any potential excursions from meeting the Settlement Agreement obligations.

1.2.4.3 Vapor Phase Evaluation Report

The evaluation was completed and the Air Stripper Vapor Phase Evaluation Report was prepared and submitted to EPA on 15 September 2017. The report presented the results of an engineering evaluation to determine whether a vapor-phase carbon unit is needed to capture and treat VOCs discharged from the air stripper treatment units on VGC wells 13 and 14 in order to comply with NYSDEC's DAR-1. In summary, the report concludes:

- That the air stripper treatment units on VGC wells 13 and 14 are not currently exceeding the short-term or annual guideline concentration

(SGC or AGC) values for PCE or TCE that are shown in NYSDEC DAR-1. It is highly unlikely that a condition would arise in the future to cause such an exceedance.

- The modeling analysis presented therein demonstrates that the VGC will be able to operate wells 13 and 14 at 2009 pumpage levels as required by the 2016 Settlement Agreement without exceeding the SGC/AGC values for PCE or TCE.
- Because current and future anticipated operations will be below the SGCs and AGCs in NYSDEC's DAR-1, a vapor-phase carbon unit is not needed to capture and treat VOCs discharged from the air stripper treatment units on VGC public water supply wells 13 and 14.

1.2.4.4 Remedial Construction Activities

During 2017, new deep multi-level groundwater monitoring well MW28A-H was drilled, installed and completed to a depth of 495 feet below ground surface on the GCCC golf course. The Waterloo eight-zone multi-level well system was subsequently installed within the well, tested, and determined to be fully functional for long-term groundwater monitoring.

In addition, conventional well MW21D was installed to supplement the existing well cluster (MW21 A-C) on Wickham Road just north of Stewart Avenue located approximately 1,200 feet directly upgradient of VGC water supply wells 13 and 14. The deepest well in the quadruplet cluster, the screen for MW21D was set at 448-458 feet below ground surface. Well development and demobilization activities concluded in early October and an initial groundwater sample was collected on 5 November 2017.

1.2.4.5 Groundwater Monitoring

EPA's approval of the amended OU1 RD Work Plan and construction of wells MW21D and MW28A-H triggered commencement of the long-term groundwater monitoring program in accordance with Attachment 1 of the 2016 SOW (Monitoring Well Sampling Program). The first sampling event was completed during September 2017, and included sampling all wells in Groups 1-3 with the exception of new well MW21D discussed above. As discussed in Section 2.1 – Groundwater Monitoring Plan, long-term groundwater monitoring will continue in accordance with the groups/schedules established in the 2016 SOW. These activities will sample collection, laboratory analysis, data validation, data evaluation/reporting, and disposal of the investigative derived waste (IDW), i.e., monitoring well purge water.

1.2.5 150 Fulton Avenue Sub-Slab Depressurization System

On 20 June 2017, EPA forwarded the results of sub-slab soil vapor/indoor air quality (IAQ) samples collected from beneath and within the building at the

Fulton Property in February 2017. EPA indicated in the accompanying letter to Gordon Atlantic Corporation (the owner of the property) that the wind-driven SSDS should be upgraded by the addition of a continuously operating, electrically-powered fan. Following discussion with the EPA, the Settling Defendant voluntarily agreed to install a fan. EPA requested submission of a work plan for review and approval prior to any modification of the SSDS.

On 22 September 2017, the Sub Slab Depressurization System Modification Work Plan was submitted to EPA for review and approval. The work plan proposed upgrade of the existing SSDS currently operating at the Fulton Property by the addition of a continuously operating, electrically-powered fan.

On 27 November 2017, EPA issued a letter conditionally approving the Sub Slab Depressurization System Modification Work Plan. EPA's letter seeks a semi-annual sub-slab soil vapor/IAQ sampling and reporting program to be undertaken for a minimum of 2 years (4 events) after which time EPA will decide if further work should be done.

On 1 December 2017, the Settling Defendant offered an alternate scope to include a sub-slab soil vapor/indoor air sampling event such that the next steps would be:

- Installation of the fan (as originally planned);
- Collection of sub-slab vacuum measurements (as originally planned);
- Performance of one (1) sub-slab soil vapor/IAQ sampling event at EPA's February 2017 sampling locations approximately six months after the fan installation (new expanded scope) – seasonality is immaterial as the building HVAC systems are positive pressure and the building is closed all year round;
- Submittal of a letter report that would document the fan installation, vacuum measurements and sub-slab soil vapor/IAQ sampling results (as originally planned but expanded to include those sampling results); and
- Based on those results, a potential scope and frequency of future monitoring would then be considered and discussed with EPA to establish an appropriate monitoring/reporting program.

The Settling Defendant is coordinating access/schedules with the owner of the Fulton Property and contractors to install the fan and have it operating in January 2018.

1.3 SUMMARY OF REMEDIAL ACTION

1.3.1 Objectives/Performance Standards

The OU1 RA Objectives/Performance Standards set forth in the Amended OU1 ROD as elaborated in the 2016 SOW are:

- Minimize and/or eliminate potential, current, and future human exposures, including inhalation of vapors and ingestion of groundwater contaminated with volatile organic compounds;
- Help to reduce further migration of groundwater contaminated with PCE and TCE in the PCE-dominant portion of the groundwater plume; and
- Compliance with all applicable or relevant and appropriate requirements (ARARs) as set forth in the Amended OU1 ROD.

1.3.2 Regulatory Requirements

In accordance with the 2016 CJ and appended 2016 SOW, the OU1 Objectives & Performance Standards will be met through implementation of the OU1 RA selected in the Amended OU1 ROD. The 2016 CJ requires Settling Defendant to finance and perform the OU1 RA in accordance with the Amended OU1 ROD, and the 2016 SOW, including all terms, conditions and schedules set forth therein.

1.3.2.1 Applicable or Relevant & Appropriate Requirements

Table 1 presents potential ARARs, which may govern remedial actions for the PCE-dominant portion of the plume. This table lists: the citation; a description of the ARAR; ARAR type (i.e., chemical, action or location specific); and, reason the ARAR is listed (e.g., remedy selection and/or remedial action) and how it applies to the remedy evaluation. Also included are other criteria To Be Considered (TBCs). In addition to ARARs, the National Contingency Plan (NCP) defines other advisories, criteria or guidance as well as proposed standards issued by federal or state agencies that do not meet the definition of an ARAR as TBC information NCP at 40 Code of Federal Regulations (CFR) 300.400(g)(3)). The preamble to the NCP states that TBCs are to be used on an as appropriate basis.

1.3.2.2 Supervising Contractor

ERM Consulting & Engineering, Inc. (ERM) was previously approved as the Site Supervising Contractor by EPA on 19 November 2009.

1.3.2.3 Project Coordinator

Settling Defendant's Project and Alternate Project Coordinators are Mr. Chris Wenczel (ERM) and Mr. Jim Perazzo (ERM), respectively. EPA's Project and Alternate Project Coordinators are Mr. Kevin Willis and Mr. Doug Garbarini, respectively.

1.3.2.4 Progress Reporting

Quarterly progress reports for the OU1 RA are required to be submitted to EPA on or before the 10th day of each third month which are January, April, July and October.

2.0 KEY OU1 RA PLANS

2.1 GROUNDWATER MONITORING PLAN

Groundwater monitoring/reporting will be performed to confirm the long-term effectiveness of the OU1 remedy, including assessing whether the concentrations and extent of groundwater contaminants related to OU1 are continuing to decrease or whether they pose a risk of exceeding the treatment capacity of the VGC water supply wells 13 and 14 so as to warrant upgrades to the treatment systems.

In accordance with the requirements set forth in the 2016 SOW, the Groundwater Monitoring Plan shall include, but not be limited to, the following:

1. At a minimum, groundwater samples shall be collected and analyzed from the following wells at the Site: MW15A-B, MW20A-C, MW21A-D, MW22A-C, MW23A-D, GCP-08, GCP-15S, GCP-01S/D and GCP-18S/D, MW26A-H, MW27A-H and MW28A-H (Figure 2). Most of the wells designated as part of the long-term groundwater monitoring program are located in the public rights-of-way (streets) within the VGC and Garden City Park. The remaining multi-level wells (MWs 26A-H, 27A-H and 28A-H) are located on the GCCC golf course and access is was established through an access agreement between the Settling Defendant and the GCCC dated 20 November 2003, a copy of which is presented in Appendix B.
2. Each groundwater monitoring well identified in the preceding subparagraph shall be sampled at the frequency identified on Attachment 1 to the 2016 SOW (Monitoring Well Sampling Program) incorporated herein this SMP as Table 2. The groundwater monitoring and reporting activities will be performed in accordance with the specifications and requirements set forth in the QAPP (Section 2.2).

   Sampling and analysis may be performed less frequently if approved by EPA, or more frequently if required by EPA. Any decision by EPA to increase the sampling frequency shall be made by the Chief of EPA Region 2's New York Remediation Branch or a more senior EPA official. Any decision by EPA to increase the sampling frequency prior to the issuance of EPA's report for the first periodic review of the OU1 Remedial Action pursuant to CERCLA Section 121(c), 42 U.S.C. § 9621(c), shall not be subject to dispute resolution pursuant to Section XIX of the 2016 CJ. However, the Settling Defendant may invoke dispute resolution pursuant to Section XIX after the issuance of EPA's report for the first such periodic review with respect to (i) any sampling frequency in effect at the time that EPA issues such report and that is

more frequent than the sampling frequency provided for the corresponding well(s) in Attachment 1 to the 2016 SOW or (ii) any EPA decision to increase the sampling frequency after such report is issued.

3. All groundwater samples shall be analyzed for Target Compound List volatile organic compounds using EPA Method 8260B or another method as required by EPA.

4. IDW generated from the groundwater monitoring activities is anticipated to consist of the following:

   - Water - decontamination fluids, monitoring well development water, and purge water from monitoring well sampling; and
   - Disposables - personal protective equipment (PPE), tubing used for groundwater sampling, paper towels, and plastic.

IDW generated from the field sampling efforts will be placed in Department of Transportation (DOT) approved 55-gallon steel drums or other appropriate containers and staged in the secure fenced area at the Fulton Property for as-required waste characterization sampling in advance of disposal. All containers of IDW will be labeled with generator name, address, contents, container number, waste determination status, and accumulation start date.

2.2 QUALITY ASSURANCE PROJECT PLAN

The existing, EPA-approved Site-specific QAPP has been updated for the long-term groundwater monitoring activities required by the 2016 SOW and conformed to the format of the March 2012 Uniform Federal Policy for Quality Assurance Project Plans (UFP-QAPP) Optimized UFP-QAPP Worksheets, a copy of which is presented as Appendix C. This document was previously submitted as a separate deliverable which EPA reviewed and approved on 27 June 2017.

The purpose and objective of the QAPP is to ensure that the analytical results are accurate and representative of field conditions. The UFP-QAPP is a workbook that consists of a collection of templates or worksheets that, once completed, addresses all required elements of a QAPP. While use of the term QAPP has been retained, the information contained in the worksheets captures the elements that would comprise related project-planning documents, such as a Sampling and Analysis Plan, Work Plan, and Field Sampling Plan. Hence, the QAPP is designed to be a stand-alone document containing certain background supporting information (Worksheet #10: Conceptual Site Model), specifications, and procedures necessary for project personnel to carry out their assigned responsibilities. For example, the field team should be able to rely on the QAPP for complete sampling instructions/standard operating procedures, including how to sample, where to sample, how many samples to collect, the types of bottles, preservatives, related QC, etc.

The QAPP is an integral part of this OU1 SMP for long-term management of the Site that is a dynamic document which will be subject to revision from time to time during the course of the OU1 RA. Revisions will likely be required to address changes in regulatory requirements or field conditions to ensure the scope of the QAPP is aligned with the needs of the OU1 RA, and that data goals are met including the accuracy and representativeness of all analytical results.

2.3 HEALTH AND SAFETY CONTINGENCY PLAN

The existing, Site-specific Health and Safety Contingency Plan (HASCP) has been updated for the field activities required by the 2016 SOW (well installations and long-term groundwater monitoring) and conformed to ERM's current required corporate format, a copy of which is presented as Appendix D.

The HASCP establishes ERM's occupational health and safety requirements, responsibilities and procedures to protect workers and the public health and safety, and the response to contingencies that could impact public health, safety, and the environment during the OU1 RA activities. The HASCP is a dynamic document that will be subject to revision from time to time, as required in the future. Revisions could be required to address changes in regulatory requirements, ERM's required corporate format or field conditions to ensure the protection of Site workers and the public.

2.4 CONTRACTOR PROCUREMENT PLAN

This plan describes the contractor selection process to be used for subcontractor procurement to support implementation of the OU1 RA.

Both competitive bidding and sole-source processes will be used to procure appropriate contractors and vendors for the various phases of the OU1 RA implementation. Regardless of what procurement process is used, all contractors will have to meet ERM's minimum insurance requirements, and will have to be prequalified and approved to perform work for ERM.

In order to manage risks posed by high-hazard activities performed by ERM subcontractors, ERM has instituted a subcontractor health and safety prequalification process. The activities to be performed by the selected subcontractor may expose subcontractor personnel to hazardous chemicals or waste in the performance of their tasks. Therefore, requirements up to, and possibly including, OSHA standard 29 CFR 1910.120 (entitled Hazardous Waste Operations and Emergency Response) may be applicable to subcontractor services. The Subcontractor is required to recognize and comply with any OSHA or other regulatory requirements applicable to the services they provide to ERM. All prequalified subcontractors must complete

an initial application to be reviewed by ERM's North American Health & Safety Team, and if approved, annual recertification is required.

Minimum ERM safety criteria are as follows:

- No fatalities in the past 5 years;
- A total recordable incidence rate (TRIR) at or below the industry average for the past 3 years based on North American Industry Classification System (NAICS) code;
- A lost/restricted rate (DART) at or below the industry average for the past 3 years based on NAICS code;
- Experience Modification Rate (EMR) at or below 1.0 for the past 3 years; and
- No open regulatory citations or willful OSHA citations received within the past 3 years.

2.5 OPERATIONS, MAINTENANCE AND MONITORING PLAN

2.5.1 Village of Garden City Public Supply Well Nos. 13 &14 Operations and Treatment

The VGC controls the operation of public supply wells 13 and 4, and the existing treatment systems associated with these wells. The VGC relies on internal and external engineering support to maintain wells 13 & 14, including the design, installation, OM&M, and periodic evaluations of treatment systems intended to remove VOCs from influent groundwater before conveying the water into the public supply system. Consequently, any such OM&M plans for operation of the wells and the existing treatment systems associated with these wells are incorporated by reference as noted in the 2016 SOW.

As noted in Section 1.2.4.2 and further elaborated in VGC Public Supply Well Nos. 13 & 14 Air Stripper Treatment Systems Evaluation/Report, wells 13 and 14, and associated air stripping treatment systems are regularly maintained, and in good physical condition and working order. According to VGC, the air strippers have a life expectancy of approximately 30 years. Based on the data provided, the air strippers are functioning as designed, achieving removal efficiencies greater than 99%.

The VGC is obliged to operate wells 13 & 14 and associated air strippers in accordance with the Settlement Agreement, and is investing significant monies to implement the ongoing electrical system upgrade/well rehabilitation project that once completed, should ensure continued reliable operation for years to come.

The air stripping treatment systems will be reevaluated every 5 years and in sufficient time for EPA to conclude its Five-Year review for the Site. These evaluations will include:

- Inspections completed by personnel familiar with such systems;
- Evaluation of supply well air stripper influent/effluent sampling results to confirm the air strippers are functioning as designed; and
- Preparation of an Air Stripper Evaluation Report to be reviewed by the Project Coordinator and submitted to EPA.

2.5.2 Groundwater Monitoring Wells

During each groundwater sampling event, the field sampling team will complete an EPA Region 2 Superfund Well Assessment Checklist for each well sampled and photographs taken of each well top to ensure continued integrity and function for long-term groundwater level/quality monitoring. The results thereof will then be evaluated by the Project Coordinator to determine maintenance actions (well top repairs and/or redevelopment) by a qualified subcontractor.

If well roadway box replacements are required, road opening will be coordinated and communicated with the VGC Department of Public Works.

If measured total well depths indicate sediment accumulation filling more than 25% of the well screen interval, those wells will be vacuumed and redeveloped using the airlift redevelopment methodology. Compressors used for well vacuuming/redevelopment activities must be outfitted with oil vapor filters on the air discharge to the downhole airlift assembly. Standard redevelopment monitoring methodologies will be followed that will include measurements of turbidity, pH, conductivity, dissolved oxygen (DO), specific conductivity (SP), oxidation-reduction potential (ORP) and temperature.

EPA will be provided advance notice of such activities and the results thereof will be reported in the Quarterly Progress Reports.

2.5.3 150 Fulton Avenue Sub-Slab Depressurization System

The SSDS will be checked monthly to verify that it is operating. Any electrical faults or fan failures will be corrected by a NY State-licensed electrical contractor. Any needed access will be coordinated with the Fulton Property owner and building tenant.

As noted in Section 1.2.5, initial sub-slab vacuum measurements will be collected following the fan installation. Six months thereafter, one (1) sub-slab soil vapor/IAQ sampling event will be performed at EPA's February 2017 sampling locations. A letter report will be submitted to EPA documenting the fan installation, vacuum measurements and sub-slab soil

vapor/IAQ sampling results. Based on those results, a potential scope and frequency of future monitoring would then be considered and discussed with EPA to establish an appropriate future monitoring/reporting program.

2.5.4 Institutional/Engineering Control Certifications

Institutional and engineering controls are presently in-place at the Site. Certifications that any institutional and engineering controls are in place and are being complied with will be required by the party(ies) implementing the remedy every five years to coincide with the EPA 5-Year Reviews.

2.5.4.1 Institutional Controls

Institutional controls include local laws that restrict future use of groundwater at the Site. Specifically, Part 5 of the Nassau County Sanitary Code prevents installation of a private potable water supply well in areas served by a public water supply system. This prevents contact with the PCE-dominant portion of the plume before VOCs are extracted and treated at VGC wells 13 and 14.

In addition, the commercial facility at the Fulton Property is zoned for industrial use, and EPA does not anticipate any changes to the lands in the foreseeable future. If a change in land use is proposed, additional investigation of soils may be necessary to determine whether the change in land use could affect exposure risks at the Fulton Property.

2.5.4.2 Engineering Controls

Engineering controls include the treatment systems on VGC wells 13 and 14 that limit exposure to impacted groundwater, and the SSDS operating at the Fulton Property to mitigate the potential for intrusion of soil vapor containing residual PCE into the existing building.

2.5.4.3 5-Year Reviews

Due to the interim nature of the OU1 RA, it may take longer than five years to achieve the performance standards. Consequently, EPA will conduct a periodic review of Site conditions no less often than once every five years.

2.6 GREEN REMEDIATION PLAN

2.6.1 Introduction

The Site is located in EPA Region 2, which established touchstone practices for green remediation policies. Region 2 set forth the Clean and Green Policy (EPA, 2009, updated in 2012) which is applicable to Superfund cleanup sites and establishes a preference for green remediation options. Accordingly, this

Green Remediation Plan (GRP) considers and specifies how the OU1 RA can be implemented using the principles in EPA Region 2's Clean and Green Policy to reduce the carbon footprint and operating costs of the OU1 RA.

New groundwater monitoring wells MWs 21D and 28A-H have been installed and remaining significant OU1 RA activities for which the Settling Defendant is responsible are limited to long-term groundwater monitoring and reporting, maintenance of the associated groundwater monitoring wells and maintenance of the SSDS at the Fulton Property. Operation of VGC supply wells 13 and 14 and the associated air stripper treatment systems are not under the Settling Defendant's control. Hence there are limited opportunities for significant green remedial strategies beyond basic approaches such as mindful/efficient use of resources, vehicles and selective recycling of wastes generated by the OM&M of the OU1 RA.

The EPA, NYSDEC and CLU-IN have published guidance on measures for reducing the environmental impact of remediation activities. The principles and suggested methods in the guidance were used to analyze the work activities and make recommendations on the most-likely and highest-impact contributors to potential environmental impact.

2.6.2 Approach

The green remediation analyses included the following steps:

- Define scope of the analysis;
- Define a Green Remediation framework for analysis and recommendations;
- Assess impact of project activities according to this framework;
- Identify beneficial (green) alternatives; and
- Recommend actions toward reduction of environmental footprint, including adoption of beneficial alternatives

2.6.3 Scope:

The Green Remediation analysis considered groundwater sampling/monitoring/maintenance activities that include:

- Planning
  - Sample planning
  - Assignment of personnel
  - Ordering equipment
- Mobilization
  - Personnel transportation
  - Equipment transportation, including sample bottles
- Sampling
  - Purging

- Sample collection
- De-mobilization
  - Sample delivery to lab
  - Decontamination
  - Equipment return
  - Personnel transportation
- Well Repairs/Redevelopment

2.6.4 Green Remediation Framework

The EPA's framework for green remediation considers "five core elements" (EPA, 2012).

The groundwater monitoring activities are evaluated according to their impact on each element. The availability of more sustainable practices and technologies were considered, and alternative approaches to sampling activities will be sought to reduce waste and pollution. (DEC, 2010)

Element	**Evaluation Criteria** (DEC, 2010)	**Tangible Actions** (DEC, 2010)
Materials & Waste	• Material use/reuse volumes • Waste generated, hazardous & non-hazardous • Recycling participation/percentage	• Beneficially reuse materials that would otherwise be waste • "Emphasis instead is placed on reducing onsite materials use, increasing the recycled content in the materials that are used, reducing onsite waste generation, and recycling or reusing materials that have served their purpose." (EPA, 2012)
Energy	• Fuel usage • Energy use & efficiency • Energy sources (renewable participation)	• Reduce energy usage • Use renewable energy or purchase renewable energy credits to offset 100% of the electricity demand • Use of Ultra Low Sulfur Diesel or Biodiesel

Element	Evaluation Criteria (DEC, 2010)	Tangible Actions (DEC, 2010)
Air & Atmosphere	• Emissions of GHGs, direct and indirect • Emissions from combustion of fuels on site or for transportation	• Reduce CO2/GHG emissions • Reduce vehicle idling: turn off vehicles when not in use for more than 5 minutes
Water	• Water uses, sources – volume • Negative impacts on water resources	• Reduce usage of water • Reuse water • Minimize fresh water consumption
Land & Ecosystems	• Impact to land and aquifer, creating habitat or working landscapes, sustainable redevelopment	• Reduce habitat disturbance • Create habitat / usable land

2.6.5 Impact Assessment

Element/ Task	Planning	Mobilization	Sampling	De-Mobilization
Materials & Waste	Immaterial impact	Immaterial impact	Tubing Nitrile gloves Sample bottles Paper forms	Immaterial impact
Energy	Immaterial impact	Fuel consumption	Battery or compressed gas, e.g., nitrogen	Fuel consumption
Air & Atmosphere	Immaterial impact	Vehicle emissions	Immaterial impact	Vehicle emissions
Water	Immaterial impact	Immaterial impact	Purged water	Decontamination water
Land & Ecosystems	Immaterial impact	Immaterial impact	Immaterial impact	Immaterial impact

The three primary impacts are determined to be:

1. Fuel consumption and vehicle emissions related to transportation of people, equipment and materials;
2. Materials and waste associated with sampling; and
3. Treatment of purged water and use of water for decontamination.

2.6.6 *Beneficial Alternatives and Recommendations*

Targeted Impact	Targeted Core Element(s)	Beneficial Alternative
Fuel Consumption & Vehicle Emissions Related To Transportation Of People, Equipment & Materials	**Energy Air & Atmosphere**	• Conduct sample planning to minimize driving during sampling, including: o Efficient sequencing of wells according to proximity o Assigning local resources and ordering materials from local suppliers • Investigate feasibility of using Low Emission, Ultra Low Sulfur Diesel or Biodiesel vehicles for transport • Turn off vehicles when not in use for more than 5 minutes **Proposed Metrics:** o Miles driven o Gallons of gasoline used (adjust for any differences in sample planning)
Materials & Waste Associated With Sampling	**Materials & Waste**	• Re-use tubing: retain dedicated dropline for each well • Install multi-level wells going forward, where economically feasible and where it meets project requirements • Train staff to conduct sampling in a way that minimizes disposal of gloves **Proposed Metrics:** o Feet of tubing used o Pairs of gloves used
	Energy	• Evaluate and select most energy-efficient method of driving pumps (nitrogen, gas generator, battery); investigate renewable energy source
Treatment Of Purged Water & Use Of Water For Decontamination	**Water**	• Not applicable: a relatively minimal amounts of wastewater (~3 gallons per well per sampling event) is generated. **Proposed Metrics:** o Gallons of purge water o Gallons of decontamination water

Proposed Metrics: Establish benchmarks based on first two 2018 groundwater sampling events (March & June), implement measures to reduce impact in subsequent sampling events and measure the effectiveness of the changes implemented. Make adjustments or implement additional improvements and continue measurements in subsequent sampling periods to monitor the impact on metrics.

Works Cited:

DEC, N. Y. (2010). *DER-31 / Green Remediation*. DEC Office of Remediation and Materials Management.

EPA. (2012). *Methodology for Understanding and Reducing a Project's Environmental Footprint.* EPA.

3.0 REMEDIAL ACTION SCHEDULE

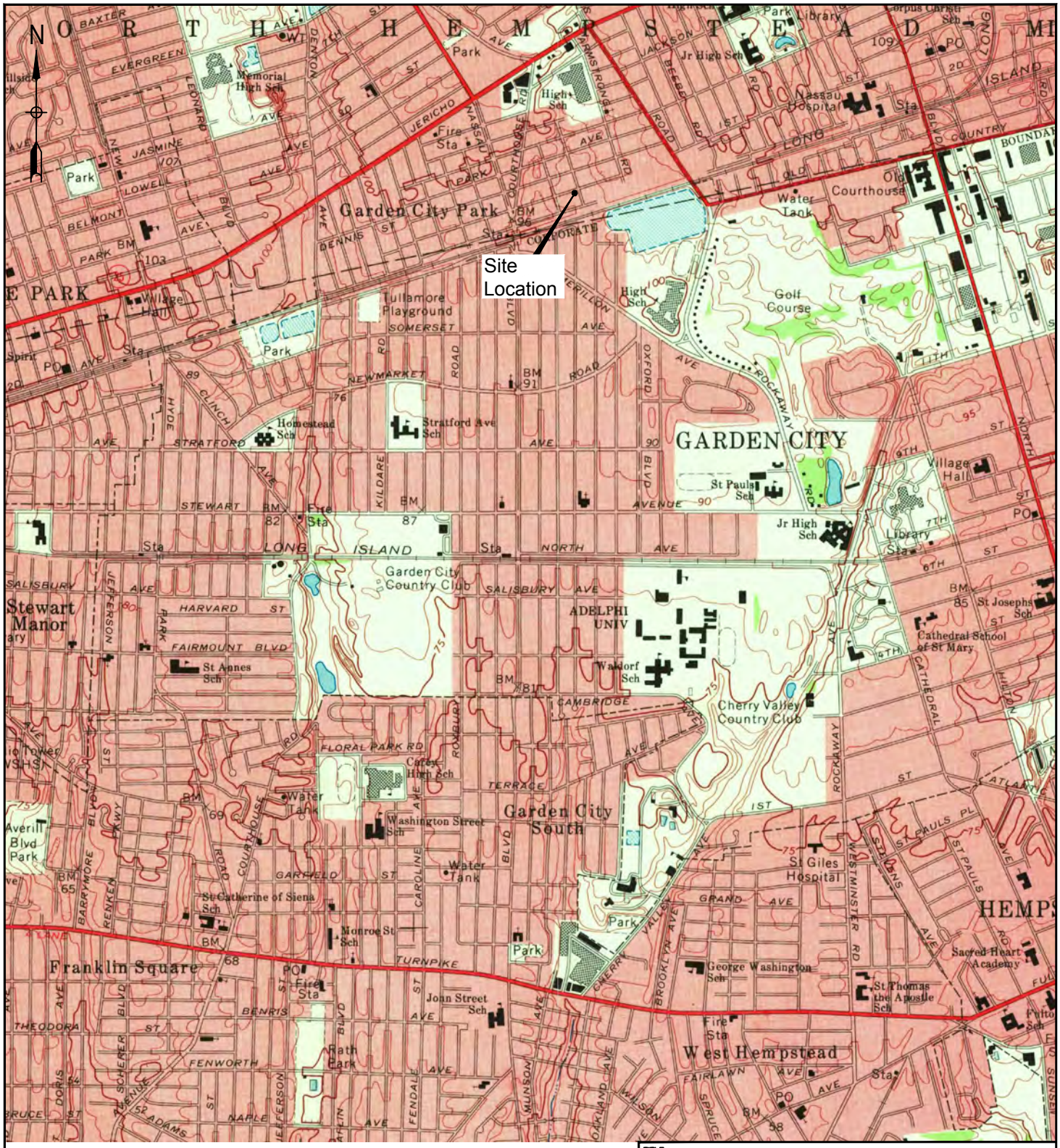
A Gantt-format schedule showing the major OU1 RA activities including critical path activities and expected regulatory review and approval time periods is presented in Figure 3. The schedule shows completion and submittal to EPA of the Final OU1 RA Report within six months of EPA's written notification of approval of the OU1 RD Report.

LIST OF FIGURES

1 Site Location Map

2 Long-Term Groundwater Monitoring Well Network & New Well Locations

3 Remedial Action and Monitoring Schedule



Scale (1"=2000")

1000' 0 1000' 2000' 4000'

Graphic Scale in Feet

SOURCE: U.S.G.S. QUADRANGLE MAPS, LYNBROOK, N.Y., 1969

TITLE

Site Location Map
150 Fulton Avenue
Garden City Park, NY

PREPARED FOR

Genesco Inc.

Environmental Resources Management

FIGURE 1

DRAWN BY	SCALE	DATE	JOB NO.
EMF	AS SHOWN	07/13/16	0097881

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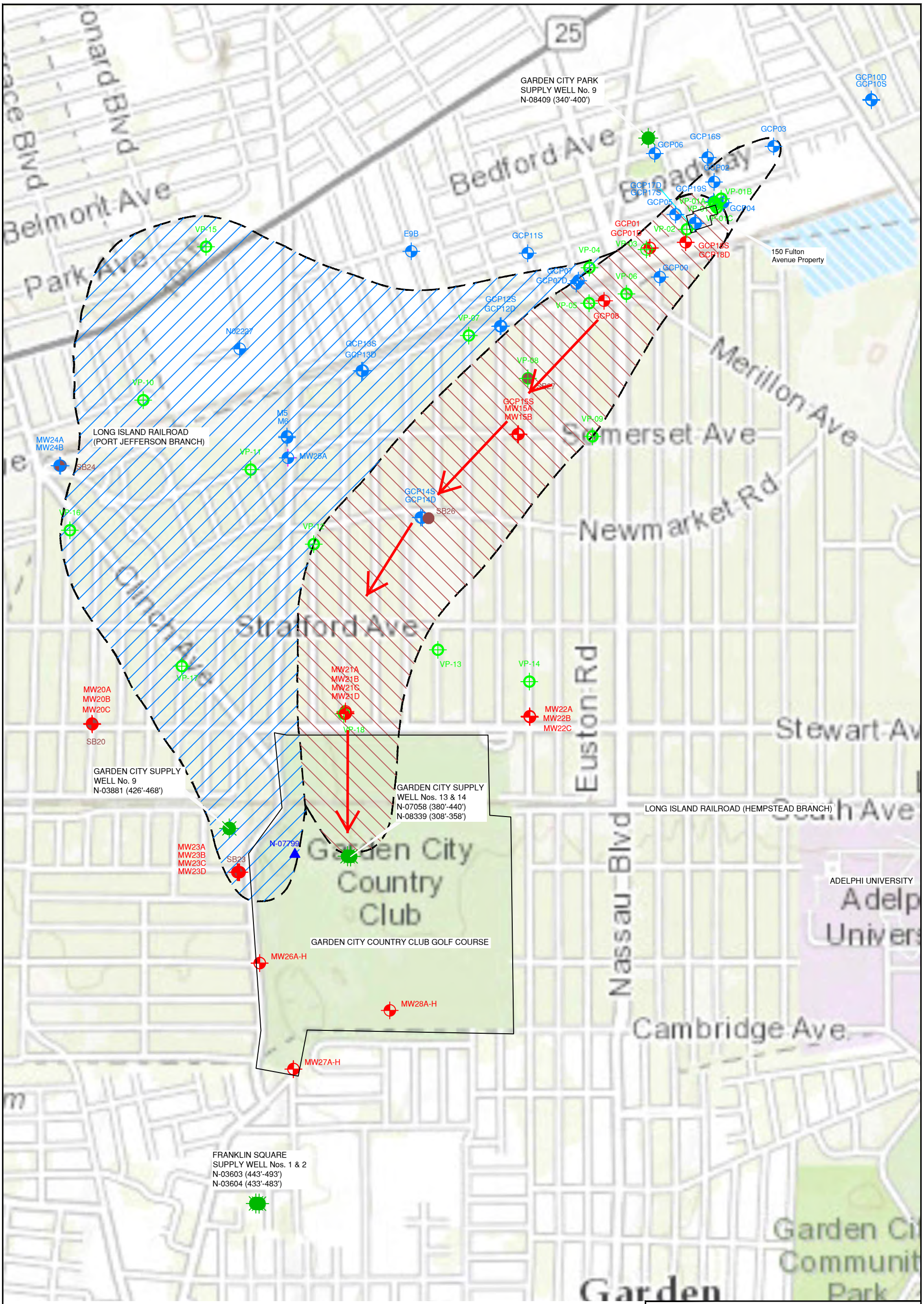

TITLE

Long-Term Groundwater Monitoring Well Network Locations Fulton Avenue Superfund Site Garden City/Garden City Park, NY

PREPARED FOR

Genesco Inc.

Environmental Resources Management

FIGURE 2

DRAWN BY	SCALE	DATE	JOB NO.
EMF	AS SHOWN	10/04/16	0097881

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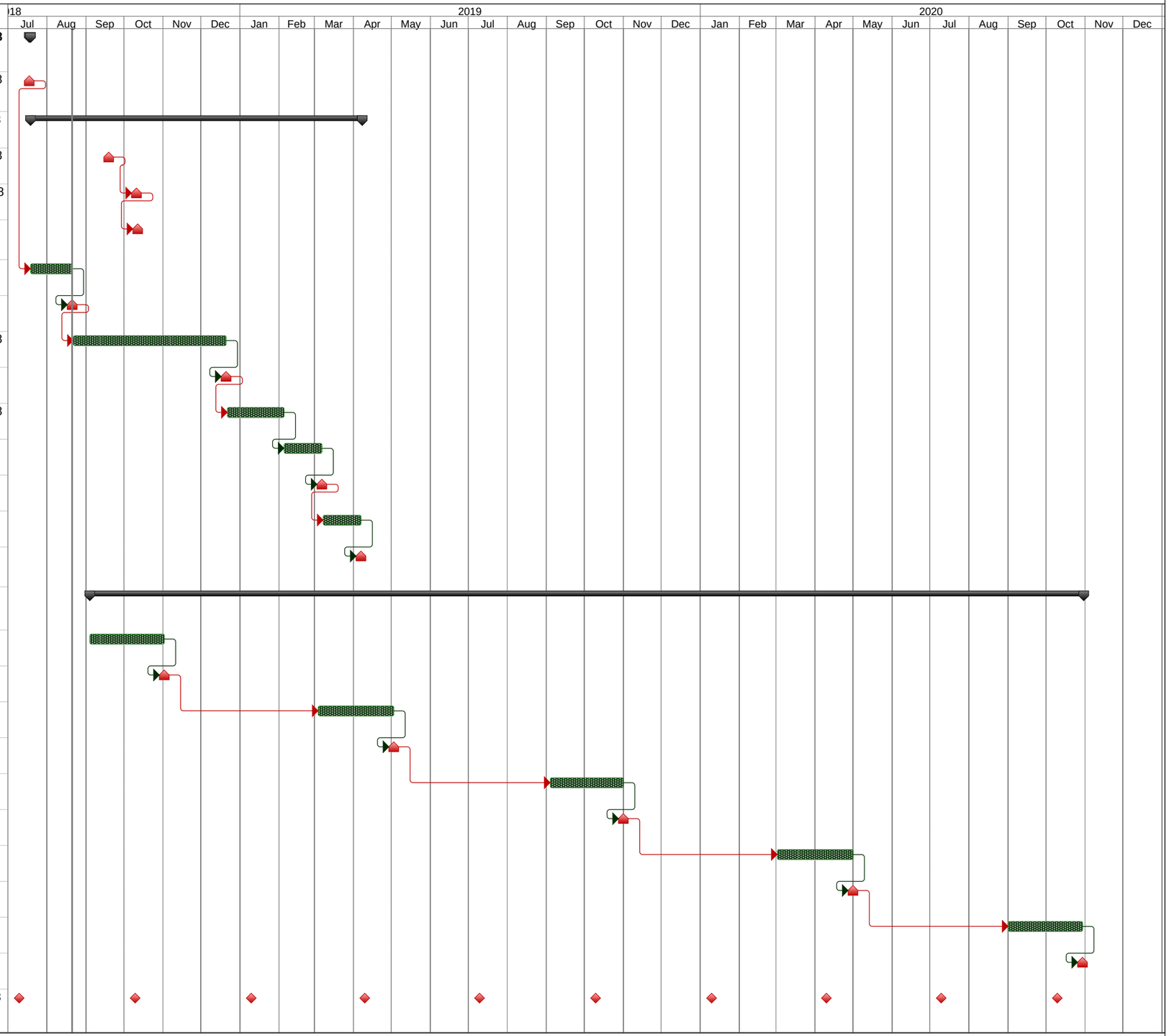
FIGURE 3
REMEDIAL ACTION AND MONITORING SCHEDULE
FULTON AVENUE SUPERFUND SITE : OPERABLE UNIT 1
NASSAU COUNTY, NEW YORK

ID	Task Name	Duration	Start
1	**Remedial Action**	**1 day**	**Wed 7/18/18**
2	**EPA Approval of OU1 Remedial Design Report/Package**	1 day	Wed 7/18/18
3	**Inspections and RA Report**	**263 days**	**Thu 7/19/18**
4	Pre-Final Construction Inspection	1 day	Wed 9/19/18
5	Final Construction Inspection	1 day	Thu 10/11/18
6	**EPA Approval of Construction**	1 day	Fri 10/12/18
7	Update Site Management Plan	33 days	Thu 7/19/18
8	Submit Site Management Plan To USEPA	1 day	Tue 8/21/18
9	Preparation of Draft RA Report	121 days	Wed 8/22/18
10	Submit Draft RA Report To USEPA	1 day	Fri 12/21/18
11	USEPA Review of Draft RA Report	45 days	Sat 12/22/18
12	Finalization of Draft RA Report	30 days	Tue 2/5/19
13	Submit Revised RA Report To USEPA	1 day	Thu 3/7/19
14	USEPA Review of Revised RA Report	30 days	Fri 3/8/19
15	**USEPA Approval of Revised RA Report**	1 day	Sun 4/7/19
16	**Groundwater Monitoring**	**788 days**	**Tue 9/4/18**
17	Group 2/3Sampling, Laboratory Analysis, Validation #5	59 days	Tue 9/4/18
18	Submit Group 2/3 Sampling Results To EPA #5	1 day	Fri 11/2/18
19	Group 2/3Sampling, Laboratory Analysis, Validation #6	60 days	Mon 3/4/19
20	Submit Group 2/3 Sampling Results To EPA #6	1 day	Fri 5/3/19
21	Group 1/2/3Sampling, Laboratory Analysis, Validation #7	58 days	Wed 9/4/19
22	Submit Group 1/2/3 Sampling Results To EPA #7	1 day	Fri 11/1/19
23	Group 2/3Sampling, Laboratory Analysis, Validation #8	60 days	Mon 3/2/20
24	Submit Group 2/3 Sampling Results To EPA #8	1 day	Fri 5/1/20
25	Group 2/3Sampling, Laboratory Analysis, Validation #9	59 days	Tue 9/1/20
26	Submit Group 2/3 Sampling Results To EPA #9	1 day	Fri 10/30/20
27	**Quarterly Progress Reports**	**824 days**	**Tue 7/10/18**



Date: Tue 8/21/18 | Task | Milestone | Recurring Task | Summary

LIST OF TABLES

1 Listing of ARARs and TBCs

2 OU1 Long-Term Monitoring Well Sampling Program

Table 1A: Chemical-Specific Applicable or Relevant and Appropriate Requirements (ARARs); Advisories, Criteria and Guidance to be Considered (TBCs); and Other Guidelines

Statute/Regulation/Guideline	Citation	Requirement Synopsis
Safe Drinking Water Act, National Primary Drinking Water Standards	Safe Drinking Water Act (SDWA), 42 U.S.C. §§ 300f – 300j-26; 40 CFR Part 141	Establishes federal maximum contaminant levels (MCLs), which are enforceable standards for contaminants in water delivered to a user of a public water system. The MCLs for PCE and TCE are 5 parts per billion (ppb).
New York State Department of Health Drinking Water Regulations for Public Water Systems	10 NYCRR Part 5, Subpart 5-1 - Tables	Establishes state MCLs and monitoring requirements for contaminants in a public water system.
Resource Conservation and Recovery Act (RCRA) Identification and Listing of Hazardous Waste	42 U.S.C. §§ 6905, 6912, 6921-6922; 40 CFR Part 261	Part 261 identifies, among other things, those solid wastes which are subject to regulation as hazardous wastes under specified RCRA regulations, including 40 CFR Parts 262, 263, 264 and 268. Applicable to the identification of hazardous wastes that may be generated, treated, stored, or disposed during remedial activities.
New York State Regulations for Identification and Listing of Hazardous Waste	New York State Environmental Conservation Law (ECL) Article 27, Title 9; 6 NYCRR Part 371	Establishes procedures for identifying solid wastes which are subject to regulation as hazardous wastes.

Table 1B: Location-Specific ARARs, TBCs, and Other Guidelines

Statute/Regulation/Guideline	Citation	Requirement Synopsis
National Historic Preservation Act	16 U.S.C. §§ 470-470x-6; 36 C.F.R. Part 800	CERCLA remedial actions are required to take into account the effects of remedial activities on any historic properties (including objects) included on or eligible for inclusion on the National Register of Historic Places. Substantive requirements of the National Historic Preservation Act will be met for any cultural resources that may be impacted by the drilling of monitoring wells at the Site.

Table 1C: Action-Specific ARARs, TBCs, and Other Guidelines

Statute/Regulation/Guideline	Citation	Requirement Synopsis
RCRA Standards Applicable to Generators of Hazardous Waste	42 U.S.C. §§ 6901-6992k; 40 C.F.R. Part 262	Includes manifest, record keeping and other requirement applicable to generators of hazardous wastes.
RCRA Preparedness and Prevention	42 U.S.C. §§ 6905, 6912(a), 6924, and 6925; 40 CFR §§ 264.30 - 264.31	Contains requirements for safety equipment and spill control when treating, handling and/or storing hazardous wastes.
RCRA Contingency Plan and Emergency Procedures	42 U.S.C. §§ 6905, 6912(a), 6924, and 6925; 40 CFR §§ 264.50 - 264.56	Provides emergency procedures to be used following explosions, fires, etc. when storing hazardous wastes.
RCRA Land Disposal Restrictions	42 U.S.C. §§ 6921 and 6924; 40 CFR Part 376	Identifies hazardous wastes for which land disposal is restricted and provides a set of numerical constituent concentration criteria at which hazardous waste is restricted from land disposal (without treatment).
New York Hazardous Waste Management System – General	New York State ECL Article 27, Title 9 6 NYCRR Part 370	Provides definitions of terms and general instructions for the Part 370 series of hazardous waste management.
U.S. Department of Transportation Rules for Transportation of Hazardous Materials	49 CFR Parts 107, 171, 172, 177 to 179	Outlines procedures for the packaging, labeling, manifesting, and transporting hazardous materials. Any company contracted to transport hazardous material from the site will be required to comply with these regulations.
RCRA Standards Applicable to Transporters of Hazardous Waste	40 CFR Part 263	Establishes standards for hazardous waste transporters. Any company contracted to transport hazardous material from the site will be required to comply with these regulations.
New York Hazardous Waste Manifest System and Related Standards for Generators, Transporters and Facilities	6 NYCRR Part 372	Establishes record keeping requirements and standards related to the manifest system for hazardous wastes. Any company contracted to transport hazardous material from the site will be required to comply with these regulations.

Table 1C: Action-Specific ARARs, TBCs, and Other Guidelines (Cont'd)

Statute/Regulation/Guideline	Citation	Requirement Synopsis
New York Waste Transporter Permit Program	6 NYCRR Part 364	Establishes permit requirements for transportations of regulated waste. In accordance with CERCLA Section 121(e), a permit is not required for on-site CERCLA response actions, although the on-site transportation of regulated waste will comply with substantive requirements of these regulations.
Federal Directive – Control of Air Emissions from Superfund Air Strippers	EPA OSWER \Directive 9355.0-28	Guidance on the use of controls for Superfund site air strippers as well as other vapor extraction techniques in attainment and non- attainment areas for ozone.
New York State Prevention and Control of Air Contamination and Air Pollution, General Prohibitions	6 NYCRR Part 211	Prohibits emissions of air contaminants to the outdoor atmosphere of such quantity, characteristic or duration which are injurious to human, plant or animal life or to property, or which unreasonably interfere with the comfortable enjoyment of life or property.
New York Division of Air Resources DAR-1 (Air Guide-1) AGC/SGC Tables		Guideline concentrations for toxic ambient air contaminants. Emissions from air strippers will comply with Air Guide-1.

Table 2
OU1 Long-Term Monitoring Well Sampling Program
Fulton Avenue Superfund Site
Garden City Park, New York

Per 2016 SOW Attachment 1: Monitoring Well Sampling Program

Group 1 Wells are as follows:

GCP-01 S/D
GCP 08
GCP-18 S/D
GCP-15S
MW15 A-B
MW20 A-C
MW22 A-C
MW23 A-D

Group 1 Wells shall be sampled and analyzed at the following frequency:

The first sampling round shall commence within 20 days of EPA approval of the RD Work Plan, and sampling shall be performed every 24 months thereafter.

Group 2 Wells are as follows:

MW21 A-D

Group 2 Wells shall be sampled and analyzed at the following frequency:

Year 1 – quarterly, to commence approximately 30 days after completion of construction of MW21 D and MW28 A-H
Year 2 – semi-annually (every six months)
Year 3 – semi-annually (every six months)
Year 4 – no sampling and analysis
Year 5 (and beyond) – once in year 5 and every 24 months thereafter.

Group 3 Wells are as follows:

MW26 A-H
MW27 A-H
MW28 A-H

Group 3 Wells shall be sampled and analyzed at the following frequency:

Year 1 – quarterly, to commence approximately 30 days after completion of construction of MW21 D and MW28 A-H
Year 2 –9 of 24 zones with EPA approval of the specific zones, semi-annually (every six months)
Year 3 – 9 of 24 zones with EPA approval of the specific zones, semi-annually (every six months)
Year 4 – no sampling and analysis
Year 5 (and beyond) – once in year 5 and every 24 months thereafter.

LIST OF APPENDICES

A *30 September 2015 OU1 Record of Decision Amendment, 2016 Consent Judgment & 2016 Statement of Work*

B *20 November 2003 Garden City Country Club Access Agreement*

C *OU 1 Quality Assurance Project Plan*

D *OU 1 Health and Safety Contingency Plan*

APPENDIX A

30 September 2015 OU1 Record of Decision Amendment

2016 Consent Judgment & 2016 Statement of Work

RECORD OF DECISION AMENDMENT

Fulton Avenue Superfund Site
First Operable Unit

Nassau County, New York

United States Environmental Protection Agency
Region 2
New York, New York
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PART 1: DECLARATION

SITE NAME AND LOCATION

Fulton Avenue Superfund Site
Nassau County, New York
Superfund Identification Number: NY0000110247

STATEMENT OF BASIS AND PURPOSE

This Record of Decision (ROD) Amendment presents the amended interim remedial action for Operable Unit 1 (OU1) of the Fulton Avenue Superfund Site (the Site) located in the towns of North Hempstead and Hempstead in Nassau County, New York. This remedy was chosen in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended (CERCLA), 42 U.S.C. §§ 9601-9675, and to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 CFR Part 300. This decision document explains the factual and legal basis for selecting the amended OU1 remedy. The attached index (see Appendix III) identifies the items that compose the Administrative Record upon which the selected amended remedy is based.

The New York State Department of Environmental Conservation (NYSDEC) was consulted on the proposed amended remedy in accordance with CERCLA Section 121(f), 42 U.S.C. Section 9621(f), and concurs with the amended remedy (see Appendix IV).

ASSESSMENT OF THE SITE

The response action selected in this ROD Amendment is necessary to protect public health or welfare or the environment from actual or threatened releases of hazardous substances into the environment at the Site.

DESCRIPTION OF THE SELECTED REMEDY

The selected amended remedy is an interim remedy that provides for the continued protection of Village of Garden City (the Village) potable supply wells 13 and 14 from the OU1 portion of the groundwater contamination at the Site, which is primarily contaminated with tetrachloroethylene (PCE). This decision document amends the interim OU1 remedy selected in the U.S. Environmental Protection Agency’s (EPA’s) September 28, 2007 ROD by eliminating, in the interim, the groundwater pumping and

treatment system and the application of in-situ chemical oxidation (ISCO) that were part of the 2007 ROD. A final decision regarding groundwater restoration at the Site is expected to be made as part of OU2. The selected amended remedy for the Site includes the following major components:

- Continued operation, maintenance and monitoring (O&M) of the air stripping treatment systems currently installed on Village wells 13 and 14 in order to protect the public from exposure to Site-related volatile organic compounds (VOCs), including PCE, in groundwater entering those wells. These treatment systems will be maintained and replaced or upgraded as needed in order to ensure that water distributed to the public from wells 13 and 14 complies with applicable or relevant and appropriate requirements (ARARs), including the federal maximum contaminant levels (MCLs) under the federal Safe Drinking Water Act or, if more stringent, New York State drinking water standards at 10 NYCRR Part 5, Subpart 5-1. If needed, a vapor-phase carbon unit will be added to capture and treat VOCs being discharged from the air stripper treatment units. The pumping of supply wells 13 and 14 provides an incidental benefit of helping to reduce the mobility of contaminants in the OU1 portion of the plume. This ROD Amendment assumes the continued operation of Village wells 13 and 14 until those wells no longer are impacted by contaminants above the MCLs for PCE and trichloroethylene (TCE).

- A monitoring plan that will include groundwater sampling to monitor contaminant levels in groundwater at the Site. The monitoring program will include monitoring of contamination that is entering wells 13 and 14, monitoring of groundwater upgradient, sidegradient and downgradient of wells 13 and 14, and graphic depictions of the results.

- Institutional controls in the form of local laws that restrict future use of groundwater at the Site and limit exposure at the commercial facility located at 150 Fulton Avenue in Garden City Park, New York (the Fulton Property), a source of the groundwater contamination at the Site. Specifically, the Nassau County Sanitary Code regulates installation of private potable water supply wells in Nassau County. In addition, the commercial facility at the Fulton Property is zoned for industrial use, and the EPA does not anticipate any changes to the land use in the

foreseeable future. If a change in land use is proposed, additional investigation of soils may be necessary to determine whether the change in land use could affect exposure risks at the Fulton Property.

- A vapor intrusion evaluation of structures that are in the vicinity of the Fulton Property and that could potentially be affected by the OU1 portion of the groundwater contamination plume. An appropriate response action (such as sub-slab ventilation systems) may be implemented based on the results of the investigation. The O&M of the existing sub-slab ventilation system at the Fulton Property will continue to be operated and maintained.

- A site management plan (SMP) that will provide for the proper management of all OU1 remedy components, including compliance with institutional controls. The SMP will include: (a) O&M of the treatment systems on Village wells 13 and 14 as well as monitoring of Site groundwater upgradient, sidegradient and downgradient of wells 13 and 14; (b) conducting an evaluation of the potential for vapor intrusion, and an appropriate response action, if necessary, in the event of future construction at the Fulton Property; and (c) periodic certifications by the party(ies) implementing the remedy that any institutional and engineering controls are in place and being complied with.

DECLARATION OF STATUTORY DETERMINATIONS

The selected amended remedy satisfies the statutory requirements of CERCLA § 121(b), 42 U.S.C. § 9601(b), as follows: This interim action is protective of human health and the environment in the short term and is intended to provide adequate protection until a final remedy for the Site is implemented; complies with those federal and state requirements that are applicable or relevant and appropriate for this limited-scope action; and is cost-effective. This OU1 action is an interim action only, and is not intended to utilize permanent solutions and alternative treatment (or resource recovery) technologies to the maximum extent practicable. Because this action does not constitute the final remedy for the Site, the statutory preference for remedies that employ treatment that reduces toxicity, mobility, or volume as a principal element will be addressed by the final response action decision for the Site. Subsequent actions are will be

evaluated to address fully the threats posed by conditions at the Site.

Because this remedy will result in hazardous substances remaining on-Site above health-based levels, a review will be conducted at least once every five years to ensure that the remedy continues to provide adequate protection of human health and the environment. Because this is an interim action ROD Amendment, review of the Site and this remedy will be ongoing as the EPA continues to develop remedial alternatives for the final response action.

ROD DATA CERTIFICATION CHECKLIST

The following information is included in the cited sections of the Decision Summary of this ROD Amendment. Additional information can be found in the Administrative Record file for the Site, the index of which is at Appendix III of this document.

- Contaminants of concern and their respective concentrations: Appendix II Tables 1 and 2;
- Baseline risk represented by the contaminants of concern: Summary of Site Risks and Appendix II Tables 3-8;
- Cleanup levels established for contaminants of concern and the basis for these levels: Remedial Action Objectives;
- A discussion of source materials constituting principal threats: Principal Threat Waste.
- Current and reasonably-anticipated future land use assumptions and current and potential future beneficial uses of groundwater used in the baseline risk assessment: Summary of Site Risks, Exposure Assessment;
- Potential land and groundwater use that will be available at the Site as a result of the selected remedy: Remedial Action Objectives;
- Estimated capital, annual operation and maintenance, and total present-worth costs, discount rate, and the number of years over which the remedy cost estimates are projected: Description of Alternatives, Comparative Analysis of Alternatives, Cost, Summary of Estimated Remedy Costs, and Appendix II, Table 9; and
- Key factors that led to selecting the remedy (*i.e.*, how the selected remedy provides the best balance of tradeoffs with respect to the balancing and modifying criteria,

emphasizing criteria key to the decision): Summary of the Rationale for the selected remedy.

Walter E. Mugdan, Director
Emergency and Remedial Response Division
USEPA Region 2

9/30/2015
Date

PART 2: DECISION SUMMARY

SITE NAME, LOCATION, AND DESCRIPTION

The Fulton Avenue Superfund Site (the Site) includes a 0.8-acre property located at 150 Fulton Avenue, Garden City Park, Nassau County, New York (the Fulton Property). In addition, the Site includes all locations impacted by contamination released at the Fulton Property, and all other contamination impacting the groundwater and indoor air in the vicinity of the Fulton Property. The Site also includes an overlapping groundwater contamination plume, primarily contaminated with trichloroethylene (TCE), in the Upper Glacial and Magothy aquifers, the origin(s) of which are not fully known but are under study by the EPA as part of the second operable unit (OU2) for the Site.

The Fulton Property is owned by Gordon Atlantic Corporation. It is located within the Garden City Park Industrial Area (GCPIA), Village of Garden City Park, Town of North Hempstead, Nassau County, New York (see Figure 1). A fabric-cutting mill operated at the Fulton Property from approximately January 1, 1965 through approximately December 31, 1974, and these operations included dry-cleaning of fabric with tetrachloroethylene (PCE). Currently, the Fulton Property is occupied by a business support company.

Approximately 208,000 people live within three miles of the Fulton Property. There are about 20,000 people living within a mile of the Fulton Property. Residents within the area obtain their drinking water from public supply wells. The vicinity of the Fulton Property is industrial but residential areas are immediately adjacent to the industrial area.

The Site is situated in the outwash plain on Long Island, New York. Approximately 500 feet of interbedded sands and limited clay lenses overlay Precambrian bedrock. There are three aquifers that exist beneath the Site, two of which are affected. The Upper Glacial aquifer is the surficial unit which overlies the Magothy aquifer. The Magothy is the primary source for public water in the area. No impeding clays were observed between the Upper Glacial and Magothy aquifers within the area investigated during the Operable Unit 1 (OU1) Remedial Investigation (RI), as described below.

SITE HISTORY AND ENFORCEMENT ACTIVITIES

Beginning in 1986, numerous investigations were conducted by the Nassau County Departments of Health and Public Works to identify the source(s) of VOCs impacting public supply wells in Nassau County located downgradient of the GCPIA. Based on the results of these investigations, the New York State Department of Environmental Conservation (NYSDEC) placed the Fulton Property on the Registry of Inactive Hazardous Waste Disposal Sites.

On March 6, 1998, the EPA placed the Site on the National Priorities List (NPL) of sites under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). At that time, NYSDEC was the lead regulatory agency overseeing the implementation of the RI and Feasibility Study (FS), and an Interim Remedial Measure (IRM) that is described below.

Genesco Inc., a potentially responsible party (PRP) for the Site, conducted the IRM from August 1998 to December 2001 to remove contaminants from a drywell on the Fulton Property in order to address a significant source of contamination that was impacting indoor air at the Fulton Property and the groundwater. During the IRM, contaminated soils were excavated, after which a soil vapor extraction (SVE) system was installed to address residual soil contamination at the bottom of the drywell. The system was operated until NYSDEC Technical and Administrative Guidance Memorandum (TAGM) soil cleanup levels were achieved. Over 10,000 pounds of PCE were estimated to have been removed from the source area during the operation of the SVE system. The completion of the IRM was approved by NYSDEC and the dismantling of the SVE system was authorized on January 2, 2002.

Following the IRM, Genesco installed a sub-slab ventilation system under the Fulton Property to protect occupants from exposure to VOC vapors that may enter the Fulton Property from beneath the building. This system remains in operation to protect the indoor air quality.

In 1999, under an Administrative Order with NYSDEC, Genesco contracted with an environmental consulting firm, Environmental Resources Management (ERM), to conduct an RI/FS under state law. Between March 2000 and May 2003, 20 monitoring wells were installed and sampled in the RI/FS study area. The RI Report was approved by NYSDEC in November 2005. An FS Report was approved by NYSDEC on February 15, 2007. The EPA prepared an addendum to

the FS Report in February 2007, and became the lead agency for the Site at that time.

A Proposed Plan for OU1 at the Site was released by the EPA for public comment on February 23, 2007, and the public comment period ran from that date through March 31, 2007. The EPA selected the OU1 interim remedy in the 2007 Record of Decision (ROD). The selected remedy included the following elements:

- In-Situ Chemical Oxidation (ISCO) treatment of source contamination in groundwater at and near 150 Fulton Avenue;
- Construction and operation of a groundwater extraction and treatment system midway along the spine of the PCE-dominant portion of the contaminant plume;
- Evaluation of the Village of Garden City's (Village's) 2007 upgrade to treatment systems on wells 13 and 14 to determine whether the upgrade was fully protective;
- Investigation and remediation, if necessary, of vapor intrusion into structures within the vicinity of the Fulton Property; and
- Institutional controls to restrict future use of groundwater at the Site.

On September 10, 2009, the United States filed for public comment, United States v. Genesco Inc., No. CV–09–3917 (E.D.N.Y.), a consent judgment in which Genesco agreed to implement the interim OU1 remedy selected in the 2007 ROD. The consent judgment has not been approved by the Court. Pursuant to the consent judgment, however, Genesco began the remedial design of that remedy after the consent judgment was filed. The Village, which had filed its own lawsuit against Genesco and Gordon Atlantic Corporation, raised concerns about the settlement in comments filed with the court, and the consent judgment remains filed with the court but not entered. Discussions between and among the EPA, Genesco, and the Village have been ongoing since then.

In March of 2012, while the remedial design was underway, the Village and Genesco proposed modifications to the 2007 ROD that would, among other things, eliminate the interim groundwater extraction and treatment system while ensuring the continued operation of the wellhead treatment systems on Village water supply wells 13 and 14.

COMMUNITY PARTICIPATION

The Proposed Plan for this amended remedy and supporting documentation for the Site were made available to the public on April 24, 2015, at the EPA Region 2 Administrative Record File Room in New York, NY, the Garden City Public Library in Garden City; and at the Shelter Rock Public Library in Albertson, New York. The EPA issued a public notice in the Garden City News on April 24, 2015, which informed the public of the duration of the public comment period, the date of the public meeting, and the availability of the Proposed Plan and the Administrative Record file. The public comment period was held from April 24, 2015, through May 26, 2015. A public meeting was held on May 12, 2015, at the Garden City Village Hall, 351 Stewart Avenue, in Garden City, New York. The purpose of the meeting was to inform interested citizens and local officials about the Superfund process, to discuss and receive comments on the Proposed Plan, and to respond to questions from the public and other interested parties. Responses to comments and questions received at the public meeting are included in the Responsiveness Summary, which is part of this Record of Decision (Appendix V). The EPA did not receive any public comments on the Proposed Plan other than the comments presented at the public meeting.

SCOPE AND ROLE OF RESPONSE ACTION

This ROD Amendment addresses the remediation of a portion of the contaminated groundwater at the Site as an interim action. Section 300.5 of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 C.F.R. Section 300.5, defines an operable unit as a discrete action that is an incremental step toward comprehensively addressing a site's problems. A discrete portion of a remedial response eliminates or mitigates a release, a threat of release, or pathway of exposure. Cleanup of a site can be divided into number of OUs, depending on the complexity of the problems associated with the Site. The EPA also uses interim actions to address areas or contaminated media, such as groundwater, that ultimately may be included in the final record of decision for a site. Interim actions are used, for example, to institute temporary measures to stabilize a site or operable unit and/or prevent further migration of contaminants or further environmental degradation.

The Fulton Avenue Site is being addressed by the EPA in two operable units. This ROD Amendment selects an interim action to address protection of the public water supply and incidentally, migration of portions of the groundwater at the Site that are

primarily contaminated with PCE. The EPA has designated this action as OU1 of the Site remediation. The Fulton Avenue Site also includes TCE contamination in groundwater surrounding the PCE-dominant portion of the groundwater contamination being addressed in OU1. The EPA currently is investigating the TCE contamination as well as possible sources of PCE and TCE as part of OU2 for the Site. The EPA currently is performing an RI/FS for OU2, and expects to issue a ROD for OU2 that will constitute the final groundwater remedy for the Site and that will serve as a final decision for OU1. This OU1 interim remedial action will assure the provision of a safe drinking water supply from Village potable supply wells 13 and 14 while the Site-wide groundwater investigation continues.

This amended remedy modifies the scope and role of the response action identified in the 2007 ROD, which included a groundwater extraction and treatment system that was intended to work towards restoring the groundwater to its beneficial use. (See 2007 ROD at p.4.) The EPA concluded that eliminating the groundwater extraction and treatment system from the OU1 remedy would be appropriate at this time because PCE levels in groundwater reaching the intakes of wells 13 and 14, which had been increasing at the time of the 2007 ROD, instead have been declining since the summer of 2007. The lower PCE levels in groundwater suggest that the extraction well system contemplated in the 2007 ROD is not needed to help prevent more highly elevated levels of contamination from reaching wells 13 and 14, because such high levels of contamination are unlikely to be present in the future. The existing treatment systems at water supply wells 13 and 14 have been and are expected to continue to effectively provide a safe drinking water supply. The attenuating nature of the PCE-dominant portion of the groundwater plume indicates that the source of the PCE in the PCE-dominant portion of the plume may be depleting and that the highest levels of contamination may have already passed through the well head treatment systems at supply wells 13 and 14. A final decision regarding the groundwater contamination will be made following the EPA’s completion of additional investigations at the Site.

In addition, remedial design sampling conducted by Genesco’s contractor in the area around the Fulton Property did not identify PCE source material in the shallow aquifer in the immediate vicinity of the former drywell into which the EPA believes PCE was historically disposed. This ROD Amendment therefore does not call for ISCO to be applied to the shallow aquifer at that location. The EPA has, however, identified

fluctuating high levels of PCE (as high as approximately 50,000 parts per billion (ppb) in 1986) in groundwater in shallow monitoring well GCP-01. This monitoring well is located on Atlantic Avenue approximately 400 feet southwest of the Fulton Property and is used to monitor the shallow aquifer. While concentrations have fluctuated significantly over the sampling period, concentrations are generally declining. A sample at GCP-01 collected in March 2015 contained 210 ppb PCE. High PCE levels detected in GCP-01 suggest the existence of PCE source material in that vicinity. The EPA expects to continue the investigation of potential source material.

The 2007 ROD noted that the OU1 portion of the contamination plume would be restored to its beneficial use only when the TCE-dominant contamination is addressed in OU2. Since the nature and extent of the contamination present in the OU1 and OU2 portions of the plume – including sources of TCE - have not yet been fully characterized, the EPA does not have sufficient information at this time to determine whether the aquifer at the Site can be fully restored. Accordingly, aquifer restoration is not an objective of the amended OU1 interim remedy. The EPA will conduct additional investigations as part of OU2. Currently, groundwater restoration is one of the EPA's goals for the final Site remedy. The OU1 interim remedy will neither be inconsistent with, nor preclude, implementation of a final remedy for the Site.

SITE CHARACTERISTICS

Physical Characteristics

The Site is relatively flat, with local relief of approximately 12 feet over a distance of 2,600 feet. Nearer to the Fulton Property, the area is slightly sloping with local relief of approximately five feet. The soil at the Site is classified as urban land (defined as areas where at least 88% of the surface is covered with asphalt, concrete, or other paving material). The land uses within the Site are a mix of residential, commercial, and industrial. The GCPIA is an industrial/commercial area and the area south of the Long Island Railroad tracks is largely residential. Soils underlying the Site are classified as a sandy loam. Runoff from the streets goes into storm drains. The Garden City Country Club lies south of the residential area. Its manicured grassland surrounds a pond which accepts runoff from the golf course.

Geology

The Site is located in western Nassau County, Long Island. Long Island is situated within the Atlantic Coastal Plain physiographic province, which is underlain by a wedge of unconsolidated sediments that thickens and dips to the southeast toward the Atlantic Ocean. The unconsolidated deposits, which underlie the Site, range in age from late Cretaceous (65 million years ago) to recent.

The geology in the Site area is composed of approximately 500 feet of unconsolidated materials, mostly siliceous sands with interbedded limited layers of clay or lignites (fossilized organic material). These unconsolidated materials overlay Precambrian crystallized bedrock.

Three aquifers are present beneath the Site: the Upper Glacial Aquifer, the Magothy Aquifer and the Lloyd Sand Member Aquifer. These aquifers are designated as Long Island's sole-source aquifer system, with NYSDEC Class GA designations as sources of potable water supply. For the purpose of this ROD Amendment, only the Upper Glacial aquifer and the Magothy aquifer will be discussed because those two aquifers are the primary sources of potable water supply within Nassau County.

The depositional environments of the aquifer system create great variations (heterogeneity) in the hydrogeology of the Site. These variations in the aquifer matrix are shown as interbedding of lenses and layers of materials ranging in size from clays to medium sands to gravels (coarser-grained deposits), which cause significant variations in the hydraulic conductivity between strata and create preferential groundwater flow pathways within this aquifer system. The coarser-grained deposits that represent more transmissive strata presumably are responsible for preferential transport of groundwater and any dissolved contamination.

Upper Glacial Aquifer

The Pleistocene deposits contain the water table aquifer in this region of Long Island, which is referred to as the Upper Glacial aquifer. Within the Site, depth to water ranges between 45 to 60 feet below land surface, and the saturated thickness of the Upper Glacial aquifer can range anywhere between 40 and 85 feet. The published hydraulic conductivity values for the Upper Glacial aquifer range between 270 to 335 feet/day. Values collected during the RI show that a more accurate horizontal

hydraulic conductivity value for the Upper Glacial aquifer in this region of Nassau County is 380 feet/day. The average hydraulic gradient in the Upper Glacial aquifer within this area of Nassau County is 0.0017 feet/foot. The Upper Glacial aquifer is in hydraulic communication with, and provides groundwater recharge to, the underlying Magothy aquifer.

Magothy Aquifer

The Magothy formation is fully saturated. The hydraulic conductivity value for the Magothy aquifer in this region of Nassau County is 100 feet/day. The average hydraulic gradient in the Magothy aquifer within this area of Nassau County is 0.0019 feet/foot.

The Magothy aquifer receives groundwater recharge from the overlying Upper Glacial aquifer. The Fulton Property and the currently known extent of the OU1 portion of the groundwater contaminant plume are located within an area designated as the deep flow recharge zone of the Magothy aquifer.

Nature and Extent of Contamination

Site investigations were performed prior to and subsequent to the 2007 ROD. Investigations performed prior to the 2007 ROD are briefly summarized below and described in more detail in the 2007 RI report and the 2007 ROD. The information provided below focuses on results of investigations performed after the 2007 ROD.

Soil

NYSDEC investigations in the 1990s identified a drywell immediately adjacent to the building at the Fulton Property as the primary source of PCE-dominant contamination migrating downgradient from the Fulton Property. This drywell was connected to a pipe that received dry cleaning waste from inside the building. The primary contaminant identified in drywell sediments, adjacent soil, and shallow groundwater beneath the drywell was PCE. TCE was also detected in soils on the Fulton Property at lower levels. Under an administrative consent order with NYSDEC, Genesco conducted the IRM from August 1998 to December 2001 to remove contaminants from the original drywell on the Fulton Property in order to prevent further contaminant migration into the aquifer and into the indoor air at the facility. Following the excavation of contaminated soils from the bottom of the drywell, Genesco installed a Soil Vapor

Extraction (SVE) system to address residual soil contamination. The SVE system operated until the soil vapor contaminant concentrations met NYSDEC TAGMs. Over 10,000 pounds of PCE were removed from the source area during the operation of the SVE system. Following this action, Genesco installed a sub-slab depressurization system under the building at the Fulton Property to provide additional protection of the occupants from exposure to the contamination. This system remains in operation.

In 2011 and 2013, Genesco's consultant, ERM, conducted sampling to identify PCE source materials in groundwater in the vicinity of the Fulton Property, including in the area near well GCP-01, that would be amenable to treatment with the ISCO that was selected as part of the 2007 ROD. Source material was not found in the shallow (Upper Glacial) aquifer in that area. The EPA intends to investigate the potential existence of possible source material in the deeper Magothy aquifer below the GCPIA (in the vicinity of GCP-01) as part of future investigations at the Site. The investigation of whether a deeper source of Site-related PCE contamination is present in the Magothy aquifer is beyond the scope of the interim action selected in this ROD Amendment.

Genesco conducted additional investigatory work in order to identify a source or sources responsible for the high PCE concentrations seen in monitoring well GCP-01. The investigation, however, did not identify sources of that contamination. The EPA is continuing to investigate additional areas for possible sources that may need to be addressed.

Groundwater

The OU1 groundwater sampling program prior to the 2007 ROD included sampling of 20 groundwater monitoring wells located at the Site and analysis of samples for organic and inorganic compounds. The highest PCE concentration observed in monitoring well (MW) cluster 21 prior to the ROD was 3,330 ppb, detected in MW 21C in 2006. The MW 21 cluster is located approximately 1,200 feet upgradient of Village supply wells 13 and 14. As part of this investigation, the EPA concluded that high levels of TCE observed predominantly in the western portion of the study area were not from the same source as the PCE in the PCE-dominant portion of the observed plume. The EPA decided that a separate investigation was necessary to address this TCE-dominant portion of the plume, leading to the designation of OU2 for the Site.

Since the 2007 ROD, sampling of the monitoring wells in the OU1 portion of the plume, as well as data gathered by the Village during its operation of Village supply wells 13 and 14, show that concentrations of PCE have steadily diminished in the OU1 portion of the contaminant plume. The Village collects samples on a monthly basis.

Prior sampling work included samples collected by Genesco in November 2011, by the EPA in June 2013, by Genesco in March 2015, and by Genesco again in May 2015.

PCE concentrations in MW 21C (located on Wickham Avenue near Stewart Avenue) have trended downward from the pre-ROD peak of 3,330 ppb in 2006 to 6.1 ppb PCE detected by the EPA in June 2013. More recently, sampling conducted by Genesco in March 2015 identified 1.5 ppb PCE in MW 21B and 1.3 ppb PCE in MW 21C, which are the lowest PCE levels detected in those well intervals since MW 21 was constructed in 2001. Samples collected in May 2015 identified 1,470 ppb PCE in MW 21B and 318 ppb PCE in MW 21C. Although the May 2015 analytical results are higher than the March 2015 results, they are not inconsistent with the overall downward trend in contamination observed in the OU1 area.

TCE concentrations in MW 21B and MW 21C declined from 80.7 ppb in 2011 to 1.1 ppb in 2015 in MW 21B, and from 48.4 ppb in 2011 to 0.0 ppb (non-detect) in 2015 in MW 21C. TCE samples collected in May 2015 identified 154 ppb in MW 21B and 18.8 ppb in MW 21C.

A downward trend has also been observed in Village supply wells 13 and 14, where the concentration of PCE in groundwater entering those wells decreased from a high of 1,020 ppb in June 2007 in well 13 to a concentration of 170 ppb detected in well 14 in both May and November, 2014. Samples collected in April 2015 detected 436 ppb PCE in groundwater entering well 13, and 250 ppb PCE in groundwater entering well 14. It should be noted that there are fluctuations in the PCE levels entering wells 13 and 14, though an overall downward trend is evident since 2007, when PCE concentrations in those wells peaked.

In MW 15A, located approximately midway between MW 21 and the Fulton Property, PCE levels have declined from 1,120 ppb PCE in November 2011 to 399 ppb in May 2015.

Sampling conducted since 2004 at MW 26, located generally between Village supply wells 13 and 14 and Franklin Square Water

District wells 1 and 2, has sporadically shown low levels of PCE-dominant contamination. The majority of the contamination in MW 26 generally has been TCE. When compared to 2011 analytical results, the May 2015 samples collected from MW 26 show higher PCE concentrations relative to TCE concentrations in several of the MW 26 screening levels (MW 26B at 271 feet, MW26C at 325 feet, MW 26D at 350.5 feet, 26E at 377 feet and 26F at 410.5 feet), with a maximum 2015 PCE concentration of 30.9 ppb detected in MW 26F. PCE-dominant contamination has not been detected in MW 27, located south of MW 26 and between the Village's supply wells 13 and 14 and the Franklin Square supply wells, nor has PCE been detected in Franklin Square supply wells 1 and 2. These data suggest that Village supply wells 13 and 14 are helping to reduce the migration of the OU1 portion of the groundwater plume (see Table 2 in Appendix II).

All data collected prior to and since the 2007 ROD and any future data will be utilized in the evaluation of a final groundwater remedy for the Site.

Contaminant Fate and Transport

The greatest potential for transport of VOCs at the Site is via groundwater migration. The PCE-dominant part of the plume was found to extend approximately 6,500 feet downgradient of the Fulton Property. The average width of the PCE-dominant part of the plume was estimated in the 2007 ROD to be about 1,000 feet. PCE in the OU1 portion of the contamination plume extends to a depth of approximately 420 feet, exhibiting an average thickness of approximately 250 feet.

CURRENT AND POTENTIAL FUTURE SITE AND RESOURCE USES

The land uses within the Site are a mix of residential, commercial, and industrial. All groundwater in New York State is classified as GA, which is groundwater suitable as a source of drinking water. Groundwater in the immediate vicinity of the Site is currently used as a source of drinking water. Village of Garden City supply wells 13 and 14 are approximately 1 mile south of the Fulton Property. Public water supply wells of the Nassau County Water Authority are located approximately one mile southwest of the Fulton Property and Franklin Square Potable Supply Wells 1 and 2 are approximately 1/2 mile south of Village of Garden City supply wells 13 and 14.

SUMMARY OF SITE RISKS

As part of the OU1 remedial investigation, a baseline risk assessment was conducted in 2005 to estimate the current and future effects of contaminants on human health and the environment. A baseline risk assessment is an analysis of the potential adverse human health and ecological effects caused by hazardous substance releases from a site in the absence of any actions to control or mitigate such releases, under current and anticipated future land and resource use. The baseline risk assessment includes a human health risk assessment (HHRA) and an ecological risk assessment. It provides the basis for taking action and identifies the contaminants and exposure pathways that need to be addressed by the remedial action.

Since the original baseline HHRA for the Site was finalized, toxicity values for both risk driving chemicals (TCE and PCE), along with several exposure parameters have been updated. A Supplemental Risk Evaluation, dated August XX, 2015, was conducted by EPA to determine if the conclusions of the 2005 HHRA remained valid. The memorandum looked at the most conservative receptor evaluated in the original HHRA, the child and adult resident, and recalculated the resultant cancer and non-cancer risks for the two risk driving chemicals using the originally derived exposure point concentrations(EPCs)and currently available toxicity and exposure information. Based on the results of this evaluation the memorandum determined that the conclusions of the 2005 HHRA have not changed substantially and the need to take an action at the Site remains valid.

This section of the ROD summarizes the results of the baseline risk assessment as supplemented by EPA's 2015 Risk Evaluation Memo for the Site. The comprehensive baseline HHRA document along with EPA's 2015 memorandum documenting the supplemental risk evaluation are available in the Administrative Record for the Site.

Human Health Risk Assessment

The HHRA for the Site focused on two areas, the Fulton Property, and the residential and commercial/industrial properties within the RI study area.

A four-step process is used for assessing Site-related human health risks for a reasonable maximum exposure scenario:

Hazard Identification – uses the analytical data collected to identify the contaminants of potential concern at the Site for each medium, with consideration of a number of factors explained below;

Exposure Assessment - estimates the magnitude of actual and/or potential human exposures, the frequency and duration of these exposures, and the pathways (e.g., ingesting contaminated well-water) by which humans are potentially exposed;

Toxicity Assessment - determines the types of adverse health effects associated with chemical exposures, and the relationship between magnitude of exposure (dose) and severity of adverse effects (response); and

Risk Characterization - summarizes and combines outputs of the exposure and toxicity assessments to provide a quantitative assessment of site-related risks. The risk characterization also identifies contamination with concentrations which exceed acceptable levels, defined by the NCP as an excess lifetime cancer risk greater than 1 x 10^{-6} – 1 x 10^{-4} or a Hazard Index greater than 1; contaminants at these concentrations are considered contaminants of concern (COCs) and are typically those that will require remediation at a site. Also included in this section is a discussion of the uncertainties associated with these risks.

Hazard Identification

In this step, the contaminants of potential concern (COPCs) at the Site in various media are identified based on such factors such as toxicity, frequency of detection, and fate and transport of the contaminants in the environment. In accordance with EPA guidance, a screening assessment is performed during which all chemicals are compared to EPA's risk-based screening levels (RSLs). The chemicals that are detected above the media- and chemical-specific RSLs are retained as COPCs and evaluated quantitatively in the remainder of the HHRA. As mentioned in the previous paragraph, the *Risk Characterization* section of the risk assessment provides a quantitative assessment of site-related risks. Based on the results of the *Risk Characterization* section, COPCs that exceed EPA's threshold values of 10^{-4} (for cancer risks) or a Hazard Index (HI) greater than 1 (for non-cancer health hazards) are considered COCs.

A comprehensive list of all COPCs can be found in the 2005 HHRA which is available in the Administrative Record. EPA has identified PCE and TCE as the COCs for OU1. Only the COCs, or those chemicals requiring remediation at the Site, are listed in Appendix II, Table 3.

Exposure Assessment

Consistent with Superfund policy and guidance the HHRA is a baseline human health risk assessment and therefore assumes no remediation or institutional controls are in place to control or mitigate exposure to hazardous substance releases under current and anticipated future land uses. Cancer risks and non-cancer hazard indices were calculated based on an estimate of the reasonable maximum exposure (RME) expected to occur under current and future conditions at the Site.

The *Exposure Assessment* step evaluated the current and future land use, the potential receptor populations, and the potential routes of exposure. These are summarized in Appendix II, Table 4. The current land use of the Fulton Property is commercial/industrial, and it is not expected that the land use will change in the foreseeable future. The surrounding properties are also expected to retain their current land use, which is commercial/industrial and residential. The area is served by municipal water and it is not likely that the groundwater underlying the Fulton Property or the surrounding commercial/industrial or residential areas will be used privately by individuals for potable purposes in the foreseeable future; however, since the groundwater downgradient of the Fulton Property is used for municipal water supplies and the regional groundwater is designated as a drinking water source, exposure to groundwater through potable uses was evaluated. The other media that were evaluated included the potential for vapor intrusion into buildings and the potential for future contamination in the irrigation holding pond at the nearby golf course.

Exposure pathways were identified for each population potentially exposed to contaminated groundwater associated with the Site. Exposure pathways assessed in the 2005 HHRA for groundwater included: ingestion of, dermal contact with and inhalation of vapors released during showering and bathing by current and future residents (child and adult); inhalation of indoor air by current and future residents (child and adult), along with a current/future commercial worker’s exposure to indoor air on and off the Fulton Property; ingestion of

groundwater by a current/future worker at the Site but off the Fulton Property; and inhalation of volatiles released from the nearby irrigation holding pond by future golf course employees/landscapers.

Although the original HHRA quantitatively evaluated all the receptors summarized in Table 4 of Appendix II, EPA's Supplemental Risk Evaluation Memorandum looked at the most conservative receptor only (i.e., a child and adult resident). Consistent with current risk assessment practices, the 2015 Memorandum calculated cancer risks for the resident based on the integrated child-adult residential exposure scenario which considers exposure to a chemical over a lifetime. This is done by adding the resultant cancer risks of a child to that of an adult.

As previously stated, the summary of all exposure pathways evaluated in the original HHRA can be found in Appendix II, Table 4. Typically, exposures are evaluated using a statistical estimate of the exposure point concentration (EPC), which is usually an upper-bound estimate of the average concentration for each contaminant, but in some cases may be the maximum detected concentration. The EPCs for PCE and TCE in tap water and at the shower head can be found in Appendix II, Table 3, while a comprehensive list of the exposure point concentrations for all COPCs identified in the *Hazard Identification* step can be found in the original 2005 HHRA.

Toxicity Assessment

In this step, the types of adverse health effects associated with contaminant exposures and the relationship between magnitude of exposure and severity of adverse health effects are determined. Potential health effects are contaminant-specific and may include the risk of developing cancer over a lifetime, or other non-cancer health effects such as changes in the normal function of organs within the body (*e.g.*, changes in the effectiveness of the immune system). Some contaminants are capable of causing both cancer and non-cancer health effects.

Under current EPA guidelines, the likelihood of carcinogenic risks and non-cancer hazards due to exposure to site chemicals are considered separately. Consistent with current EPA policy, it was assumed that the toxic effects of the Site-related chemicals would be additive. Thus, cancer and non-cancer risks associated with exposures to individual COPCs were summed to indicate the potential risks and hazards associated with

mixtures of potential carcinogens and non-carcinogens, respectively.

Toxicity data for the HHRA documents were provided by the Integrated Risk Information System (IRIS) database, the Provisional Peer Reviewed Toxicity Database (PPRTV), or another source considered an appropriate reference for toxicity values based on EPA guidance. The Supplemental Risk Evaluation for the Site used currently available IRIS toxicity values for TCE and PCE when recalculating the estimated risks and hazards to the residential receptor. The toxicity information used in the supplemental risk evaluation is presented in Appendix II, Table 5 (Cancer Toxicity Data Summary) and Appendix II, Table 6 (Non-cancer Toxicity Data Summary). Specific details of toxicity information and exposure assumptions used for risk quantification of all other receptors and COPCs considered in the original HHRA are available in the Administrative record.

Risk Characterization

This step summarized and combined outputs of the exposure and toxicity assessments to provide a quantitative assessment of Site risks. Exposures were evaluated based on the potential risk of developing cancer and the potential for non-cancer health hazards.

Non-carcinogenic risks were assessed using a hazard index (HI) approach, based on a comparison of expected contaminant intakes and benchmark comparison levels of intake (reference doses, reference concentrations). Reference doses (RfDs) and reference concentrations (RfCs) are estimates of daily exposure levels for humans (including sensitive individuals) which are thought to be safe over a lifetime of exposure. The estimated intake of chemicals identified in environmental media (*e.g.*, the amount of a chemical ingested from contaminated drinking water) is compared to the RfD or the RfC to derive the hazard quotient (HQ) for the contaminant in the particular medium. The HI is obtained by adding the hazard quotients for all compounds within a particular medium that impacts a particular receptor population.

The HQ for oral and dermal exposures was calculated as shown below. The HQ for inhalation exposures was calculated using a similar model that incorporates the RfC, rather than the RfD.

HQ = Intake/RfD

Where: HQ = hazard quotient
Intake = estimated intake for a chemical (mg/kg-day)
RfD = reference dose (mg/kg-day)

The intake and the RfD will represent the same exposure period (i.e., chronic, subchronic, or acute).

The key concept for a noncancer HI is that a “threshold level” (measured as an HI of less than 1) exists below which non-cancer health effects are not expected to occur.

As previously stated, the HI is calculated by summing the HQs for likely exposure scenarios for all chemicals with respect to a specific population. An HI greater than 1 indicates that the potential exists for non-carcinogenic health effects to occur as a result of site-related exposures, with the potential for health effects increasing as the HI increases. When the HI calculated for all chemicals for a specific population exceeds 1, separate HI values are then calculated for those chemicals which are known to act on the same target organ. These discrete HI values are then compared to the acceptable limit of 1 to evaluate the potential for non-cancer health effects on a specific target organ. The HI provides a useful reference point for gauging the potential significance of multiple contaminant exposures within a single medium or across media. A summary of the non-carcinogenic risks associated with PCE and TCE for each exposure pathway is contained in Appendix II, Table 8; however, as per current EPA guidance, only the exposure pathways with non-cancer estimates exceeding the threshold value of 1 are included in the table. The table reflects the residential non-cancer risks as calculated in EPA’s 2015 Supplemental Risk Evaluation Memorandum. For the commercial/industrial worker the non-cancer estimates calculated in the original HHRA document were used.

As summarized in Appendix II, Table 8, the HI totals for non-cancer effects for the current/future child resident, adult resident and an adult commercial worker present at the Site but working off the Fulton Property were 34.7, 29.8 and 2.4, respectively. For the child resident, the noncancer hazard of 34.7 was driven by ingestion, dermal contact and inhalation of PCE in groundwater, along with ingestion and inhalation of TCE contaminated groundwater. The adult non-cancer hazard index total of 29.8 was driven by ingestion and inhalation of PCE and TCE in groundwater. The non-cancer risks for the off-Fulton Property

commercial worker were driven by ingestion of TCE-contaminated groundwater.

For carcinogens, risks are generally expressed as the incremental probability of an individual developing cancer over a lifetime as a result of exposure to a carcinogen under the conditions described in the *Exposure Assessment*, using the cancer slope factor (SF) for oral and dermal exposures and the inhalation unit risk (IUR) for inhalation exposures. Excess lifetime cancer risk for oral and dermal exposures is calculated from the following equation, while the equation for inhalation exposures uses the IUR, rather than the SF:

Risk = LADD x SF

Where: Risk = a unitless probability (1×10^{-6}) of an individual developing cancer
LADD = lifetime average daily dose averaged over 70 years (mg/kg-day)
SF = cancer slope factor, expressed as 1/(mg/kg-day)

These risks are probabilities that are usually expressed in scientific notation (such as 1×10^{-4} or 1E-04). An excess lifetime cancer risk of 1×10^{-4} indicates that one additional incidence of cancer may occur in a population of 10,000 people who are exposed under the conditions identified in the *Exposure Assessment*. As stated in the NCP, the acceptable cancer risk range for site-related exposure is 10^{-6} to 10^{-4}, with 10^{-6} being the point of departure.

As summarized in Table 7 of Appendix II, the estimated cancer risks for the current/future aggregate child-adult resident and off-Fulton Property commercial worker exceeded the EPA's target risk range of 10^{-4} to 10^{-6} (E-04 to E-06). The estimated cancer risk for the child-adult resident exposed to groundwater was 1.8×10^{-4} with the major risk driving chemicals identified as TCE and PCE. For the off-Fulton Property commercial worker, the estimated cancer risk were equal to 6.8×10^{-4} and was driven by ingestion of PCE-contaminated groundwater.

In summary, TCE and PCE were identified as the non-cancer and cancer risk driving chemicals present in Site groundwater. The quantitative estimate of non-cancer hazards and cancer risks for all receptors and all COPCs can be found in the baseline HHRA document. Updated risk estimates for the residential child and adult receptors are summarized in the 2015 Memorandum entitled

"Supplemental Risk Evaluation for the Fulton Avenue Superfund Site". The response action selected in this ROD Amendment is necessary to protect the public health or welfare of the environment from actual or threatened releases of contaminants into the environment.

Uncertainties

The procedures and inputs used to assess risks in this evaluation, as in all such assessments, are subject to a wide variety of uncertainties. In general, the main sources of uncertainty include:

- environmental chemistry sampling and analysis
- environmental parameter measurement
- fate and transport modeling
- exposure parameter estimation
- toxicological data

Uncertainty in environmental sampling arises in part from the potentially uneven distribution of chemicals in the media sampled. Consequently, there is uncertainty as to the actual levels present. Environmental chemistry-analysis error can stem from several sources, including the errors inherent in the analytical methods and characteristics of the matrix being sampled.

Uncertainties in the exposure assessment are related to estimates of how often an individual would actually come in contact with the chemicals of concern, the period of time over which such exposure would occur, and in the models used to estimate the concentrations of the chemicals of concern at the point of exposure.

Uncertainties in toxicological data occur in extrapolating both from animals to humans and from high to low doses of exposure, as well as from the difficulties in assessing the toxicity of a mixture of chemicals. These uncertainties are addressed by making conservative assumptions concerning risk and exposure parameters throughout the assessment. As a result, the risk assessment provides upper-bound estimates of the risks to populations near the Site, and is highly unlikely to underestimate actual risks related to the Site.

Noteworthy uncertainties in the HHRA for the Site deal with the fact that the original risk assessment was conducted in 2005. Since the HHRA was finalized, toxicity values for both risk

driving chemicals (TCE and PCE), along with several exposure parameters have been updated. To account for the changes in toxicity data and exposure assumptions EPA conducted a supplemental risk evaluation for the residential receptor at the Site. All other receptors evaluated in the original 2005 HHRA are considered to be less conservative receptors than the resident and were not reevaluated. Based on the results of this evaluation, it was determined that the conclusions of the 2005 HHRA have not changed substantially and there is a continuing need for a response action at the Site.

More specific information concerning the human health risks at the Site is presented in the HHRA and in the EPA's Supplemental Risk Evaluation, both of which are available in the Administrative Record.

Ecological Risk Assessment

The potential risk to ecological receptors was evaluated by ERM in the baseline risk assessment. For there to be an exposure, there must be a pathway through which a receptor (e.g., animal) comes into contact with one or more of the COCs. Without a complete pathway or receptor, there is no exposure and hence, no risk.

Based on a review of existing data, there are no potential exposure pathways for ecological receptors at the Site. As noted above, the Fulton Property itself is less than 1 acre in size and is located in the GCPIA within a highly developed area. The entire Fulton Property is paved or covered with buildings. The depth to groundwater at the Site (the medium of concern) is approximately 50 feet and groundwater is unlikely to affect any surface water bodies.

REMEDIAL ACTION OBJECTIVES

Remedial action objectives (RAOs) are specific goals to protect human health and the environment. These objectives are based on available information and standards such as applicable or relevant and appropriate requirements (ARARs) for drinking water and groundwater, Site-specific risk-based levels, and the reasonably anticipated future land use for the Site (*e.g.*, commercial/industrial or residential).

The following RAOs were established for OU1 in the 2007 ROD:

- Reduce contaminant levels in the drinking water aquifer to ARARs.

- Prevent further migration of contaminated groundwater.

The selected remedy in this ROD Amendment is intended to prevent exposure to contaminated groundwater and to help reduce migration of contaminated groundwater in the aquifer, and is not inconsistent with the RAOs identified in the 2007 ROD.

The response action selected in the 2007 ROD, which included a groundwater extraction and treatment system, was intended to work towards restoring the groundwater to its beneficial use. (See 2007 ROD at page 4). The ROD (page 23) indicated that the groundwater extraction system was expected to "more expeditiously meet chemical-specific ARARs (e.g., MCLs) for the groundwater." Data collected since 2007, however, show that PCE levels are declining in the OU1 portion of the groundwater plume, and that the treatment systems currently installed on wells 13 and 14 are effectively removing PCE and other VOCs from groundwater entering the wells. Further, modeling analyses conducted in 2012 raised uncertainties as to whether the groundwater extraction system would significantly shorten the time to achieve the MCL for PCE in groundwater.

The 2007 ROD also called for the application of ISCO technology, in which an oxidant such as potassium permanganate would be injected underground near the former drywell at the Fulton Property, which is a major source of the OU1 PCE groundwater contamination. The purpose of the ISCO injections was to convert organic contamination into nonhazardous compounds, thereby accelerating restoration of the groundwater to the MCLs. Investigations performed during the OU1 remedial design, however, did not identify the location of any PCE source material in the shallow aquifer in the immediate vicinity of the Fulton Property. Therefore, ISCO will not be applied to the shallow aquifer at that location. The EPA will continue to investigate additional areas for possible source material that may need to be addressed (by ISCO or another remedial approach), including source(s) of elevated PCE observed in nearby monitoring well GCP-01 located southwest and downgradient of the Fulton Property.

In the 2007 ROD, the EPA indicated that the OU1 portion of the contamination plume would be restored to its beneficial use when the TCE-dominant contamination is addressed in OU2. Because the nature and extent of the contamination present in the OU1 and

OU2 portions of the plume – including sources of TCE - has not yet been fully identified, the EPA does not have sufficient information at this time to determine whether the aquifer at the Site can be fully restored, and will conduct additional investigations as part of OU2 prior to making a Site-wide determination regarding restoration of the groundwater.

In view of the above, in this ROD Amendment the EPA has established RAOs for this interim remedy as follows:

- Minimize and/or eliminate the potential for future human exposure to Site contaminants via contact with contaminated drinking water.

- Help reduce migration of contaminated groundwater.

The proposed change to the 2007 ROD is not inconsistent with the RAOs identified in the 2007 ROD, because the continued pumping and treatment of Village wells 13 and 14 will ensure a potable water supply, and this pumping and treatment provides the incidental benefit of helping to reduce migration of contaminated groundwater. While the proposed modification also will have the incidental benefit of reducing contaminant levels in groundwater, the primary purposes of this proposed modification are to prevent exposure to contaminated groundwater and to help reduce migration of contaminated groundwater.

DESCRIPTION OF ALTERNATIVES

CERCLA Section 121(b)(1), 42 U.S.C. § 9621(b)(1), requires remedial actions to be protective of human health and the environment, cost-effective, and utilize permanent solutions and alternative treatment technologies and resource recovery alternatives to the maximum extent practicable. Section 121(b)(1) also establishes a preference for remedial actions which employ, as a principal element, treatment to permanently and significantly reduce the volume, toxicity, or mobility of the hazardous substances, pollutants and contaminants at a site. CERCLA Section 121(d), 42 U.S.C. § 9621(d), further specifies that a remedial action must attain a level or standard of control of the hazardous substances, pollutants, and contaminants, which at least attains ARARs under federal and state laws, unless a waiver can be justified pursuant to CERCLA Section 121(d)(4), 42 U.S.C. § 9621(d)(4).

Common Elements for All Alternatives

Under each of the two alternatives presented, the existing treatment systems on Village supply wells 13 and 14 would continue to operate and protect the public from exposure to contamination in the OU1 portion of the groundwater plume. Each alternative requires and includes the operation, monitoring and maintenance (O&M) of the existing treatment systems, and assumes the continued operation of Village wells 13 and 14, until supply wells 13 and 14 no longer are impacted by contaminants above the MCLs. Neither alternative requires any modification to the current pumping rates or volumes of water pumped by Village supply wells 13 and 14.

In addition, both alternatives include institutional controls in the form of local laws that restrict future use of groundwater at the Site. Specifically, the Nassau County Sanitary Code regulates installation of private potable water supply wells in Nassau County.

Both alternatives also include institutional controls in the form of local zoning laws in that the Fulton Property is zoned for industrial use, and changes to the land use are not anticipated in the foreseeable future. If a change in land use is proposed, additional investigation of soils at the Fulton Property may be necessary to determine whether the change in land use could affect exposure risks at the property.

For each alternative, a Site management plan (SMP) would provide for the proper management of all OU1 remedy components, including institutional controls. The SMP would include: (a) O&M of Village supply wells 13 and 14 as well as monitoring of Site groundwater upgradient, sidegradient and downgradient of wells 13 and 14; (b) conducting an evaluation of the potential for vapor intrusion, and appropriate response action, if necessary, in the event of future construction at the Fulton Property; and (c) periodic certifications by the party(ies) implementing the remedy that any institutional and engineering controls are in place and being complied with.

Each alternative also includes a vapor intrusion evaluation of structures that are in the vicinity of the Fulton Property and that could potentially be affected by the OU1 portion of the groundwater contamination plume. An appropriate response action (such as sub-slab ventilation systems) may be implemented based on the results of the investigation. The O&M of the existing

sub-slab ventilation system at 150 Fulton Avenue would continue under both alternatives.

Below is a description of the two alternatives considered for this ROD Amendment:

GW-1: Continued Operation of Existing Treatment Systems on Village Wells 13 and 14.

Capital Cost	$1,118,578[1]
O & M Cost	$2,920,610
Present Worth Cost	$4,039,188
Construction Time	N/A
Duration	30 years

This alternative relies upon the continued operation and maintenance of the existing air stripper treatment units on Village wells 13 and 14 in order to protect the public from exposure to hazardous substances in groundwater, and to provide a safe drinking water supply. The costs associated with this alternative include the costs of replacing existing air strippers as the equipment wears out. This alternative includes the addition of a vapor-phase carbon unit, if needed, to capture and treat VOCs being discharged from the air stripper treatment units. This alternative also includes monitoring of contamination in groundwater entering wells 13 and 14.

For cost estimating purposes, a 30-year time frame was assumed as the duration of this alternative. The EPA expects, however, that PCE and TCE levels in the groundwater may exceed their

[1] The cost estimates in the 2007 ROD for this alternative were refined during the design of the 2007 remedy.

respective MCLs for greater than 30 years and, as a result, the treatment systems on Village wells 13 and 14 may need to be operated for greater than 30 years.

Because this alternative would result in contaminants remaining on Site above levels that would allow for unlimited use and unrestricted exposure, CERCLA requires that the Site be reviewed at least once every five years.

GW-2: Continued Operation of Existing Treatment Systems on Village wells 13 and 14, and Groundwater Extraction and Treatment

Capital Cost	$6,296,578
O & M Cost	$7,415,610
Present Worth Cost	$13,712,188
Construction Time	10 months
Duration	30 years

Alternative GW-2 was a component of the remedy chosen in the 2007 ROD. This alternative includes a separate groundwater extraction and treatment system that would be constructed in the OU1 portion of the groundwater plume, upgradient of Village wells 13 and 14. In the 2007 ROD, the EPA anticipated that the system would be constructed in the “Estate” area of the Village, and would pump and treat groundwater for discharge into the existing infiltration basin at the Garden City Bird Sanctuary for recharge to groundwater.

The 2007 ROD included the application of ISCO technology to address potential PCE source material in the shallow aquifer in the vicinity of the Fulton Property. As explained above, however, during the remedial design, the location of source

material amenable to treatment with ISCO was not identified in the immediate vicinity of the Fulton Property. The cost estimate for GW-2, therefore, does not include the cost of the ISCO injections that were included in the 2007 ROD remedy.

For cost-estimating purposes, a 30-year time frame was assumed as the duration of this alternative. The EPA expects, however, that PCE and TCE levels in the groundwater may exceed their respective MCLs for greater than 30 years and, as a result, the treatment systems on Village wells 13 and 14 and the separate groundwater extraction and treatment system may need to be operated for greater than 30 years.

Because this alternative would result in contaminants remaining on Site above levels that would allow for unlimited use and unrestricted exposure, CERCLA requires that the Site be reviewed at least once every five years.

COMPARATIVE ANALYSIS OF ALTERNATIVES

In selecting a remedy for a site, the EPA considers the factors set forth in CERCLA Section 121, 42 U.S.C. § 9621, by conducting a detailed analysis of the viable remedial alternatives pursuant to the NCP at 40 C.F.R. § 300.430(e)(9), the EPA's *Guidance for Conducting Remedial Investigations and Feasibility Studies*, OSWER Directive 9355.3-01, and the EPA's *A Guide to Preparing Superfund Proposed Plans, Records of Decision, and Other Remedy Selection Decision Documents*, OSWER 9200.1-23.P. The detailed analysis consists of an assessment of the individual alternatives against each of the following nine evaluation criteria at 40 C.F.R. § 300.430(e)(9)(iii) and a comparative analysis focusing upon the relative performance of each alternative against those criteria.

- Overall protection of human health and the environment addresses whether a remedy provides adequate protection and describes how risks posed through each exposure pathway (based on a reasonable maximum exposure scenario) are eliminated, reduced, or controlled through treatment, engineering controls, or institutional controls.

- Compliance with ARARs addresses whether a remedy would meet all of the applicable or relevant and appropriate requirements of other federal and state environmental statutes and regulations, or provide grounds for invoking a waiver.

- Long-term effectiveness and permanence refers to the ability of a remedy to maintain reliable protection of human health and the environment over time, once cleanup goals have been met. It also addresses the magnitude and effectiveness of the measures that may be required to manage the risk posed by treatment residuals and/or untreated wastes.

- Reduction of toxicity, mobility, or volume through treatment evaluates an alternative's use of treatment to reduce the harmful effects of principal contaminants, their ability to move in the environment, and the amount of contamination present.

- Short-term effectiveness addresses the period of time needed to achieve protection and any adverse impacts on human health and the environment that may be posed during the construction and implementation period until cleanup goals are achieved.

- Implementability considers the technical and administrative feasibility of implementing the alternative, including factors such as the relative availability of goods and services.

- Cost includes estimated capital and operation and maintenance costs, and net present-worth costs. Present worth cost is the total cost of an alternative over time in terms of today's dollar value. Cost estimates are expected to be accurate within a range of +50 to -30 percent.

- State acceptance considers whether the State agrees with the EPA's analyses and recommendations, as described in the RI/FS and Proposed Plan.

- Community acceptance is assessed in the ROD, and considers whether the local community agrees with the EPA's analyses and preferred alternative. Comments received on the Proposed Plan are an important indicator of community acceptance.

The first two criteria above (overall protection of human health and the environment and compliance with ARARs) are known as “threshold criteria” because they are the minimum requirements that each response measure must meet in order to be eligible for selection as a remedy. The next five Superfund criteria (long-

term protectiveness and permanence, reduction of toxicity, mobility, or volume through treatment, short-term effectiveness, implementability and cost) are known as “primary balancing criteria” and are factors with which tradeoffs between response measures are assessed so that the best option will be chosen, given site-specific data and conditions. The final two evaluation criteria (state acceptance and community acceptance) are called “modifying criteria” because new information or comments from the state or the community on the Proposed Plan may cause the EPA to modify the preferred response measure or cause another response measure to be considered.

In keeping with EPA guidance, this modification of the OU1 remedial action is an interim remedy that will be protective of human health and the environment in the short term and is intended to provide adequate protection until a final remedy for the Site is implemented.

This section evaluates the relative performance of each of the two remedial alternatives discussed above against the nine criteria.

1. Overall Protection of Human Health and the Environment

Both alternatives include the continued operation and maintenance of the existing treatment systems installed on Village wells 13 and 14 as an interim remedy, and as such overall protection would not be achieved until the final remedy for the Site is selected. Nevertheless, the treatment systems will continue to protect the public from exposure to PCE and other VOCs in the OU1 portion of the groundwater contamination plume by providing a safe drinking water supply for the Village. The institutional controls will further restrict exposure to contaminants in groundwater.

The groundwater extraction and treatment system in GW-2 is also an interim remedy and would remove some VOC contamination from groundwater upgradient of Village wells 13 and 14. Analyses performed during the remedial design, however, raised uncertainties as to whether the extraction system selected in the 2007 ROD would significantly shorten the time needed to reach the MCL for PCE in the OU1 portion of the groundwater plume.

2. Compliance with ARARs

ARARs related to the Village supply wells 13 and 14 include the federal Safe Drinking Water Act (SDWA), 42 U.S.C. Sections 42 U.S.C. §§ 300f-300j-26 and the New York State Sanitary Code at 10 NYCRR Subpart 5-1, which relates to public water supply systems. Under both alternatives, the wellhead treatment systems for Village wells 13 and 14 would continue to achieve ARARs, including the federal MCLs for PCE, TCE and other VOCs in treated water as required under the SDWA or if more stringent, the state drinking water standards at 10 NYCRR Subpart 5-1.

The effluent from the pump-and-treat system called for in GW-2 would also achieve the federal MCLs for PCE and TCE, or if more stringent, the state drinking water standards. Restoration of the aquifer to MCLs will be addressed as part of the final Site remedy in OU2, and is not within the scope of this interim response action. Therefore, neither alternative identifies remediation goals for PCE and TCE in the groundwater for OU1 at this time.

3. Long-Term Effectiveness and Permanence

As indicated above, interim remedies are intended to be protective of human health and the environment in the short term, and to provide adequate protection until a final ROD is issued. This interim remedy, therefore, is not intended to provide a permanent remedy for OU1.

For both alternatives, the O&M of the treatment systems on Village wells 13 and 14 will continue to protect the public from exposure to contaminants in groundwater entering those wells. The OU1 remedy will be consistent with, and not preclude, a final remedy for the Site.

4. Reduction of Toxicity, Mobility, or Volume through Treatment

Because this action does not constitute the final remedy for the Site, the statutory preference for remedies that employ treatment that reduce toxicity, mobility or volume as a principal element will be fully addressed by the final response action.

The pumping of supply wells 13 and 14 provides an incidental benefit of helping to reduce the mobility of contaminants in the OU1 portion of the plume. The groundwater extraction and treatment system in Alternative GW-2 would provide additional

reduction in the toxicity, mobility, and volume of volatile organic contaminants in groundwater through removal and treatment of VOCs from the OU1 portion of the plume.

5. Short-Term Effectiveness

While minimal short-term impacts associated with the construction of new monitoring wells for the groundwater monitoring program will occur for both alternatives, Alternative GW-1 would not result in short-term impacts to human health and the environment because no construction is involved with respect to the existing treatment systems on Village supply wells 13 and 14. The GW-1 treatment systems already are in place and are protecting the public from impacts to human health. Alternative GW-2 would potentially result in greater short-term exposure to workers who may come into contact with contamination during more significant construction of the groundwater extraction and treatment system.

Installation of the extraction wells and associated piping for Alternative GW-2 would be completed in approximately 8-12 months. While efforts would be made to minimize the impacts, some disturbances would result from disruption of traffic, excavation activities on public and private land, noise, and fugitive dust emissions. Proper health and safety precautions and fugitive dust mitigation measures would help control these impacts.

6. Implementability

The technologies presented in Alternatives GW-1 and GW-2 have been used at other Superfund sites and are considered technically feasible.

The goods and services needed to implement GW-1 and GW-2 are readily available. Both alternatives are administratively implementable as well. No permits would be required for on-Site work pursuant to the permit exemption at Section 121(e)(1) of CERCLA, 42 U.S.C. § 9621(e)(1), although substantive requirements of otherwise-needed permits would be met.

7. Cost

The estimated capital, annual O&M (including monitoring), and present-worth costs for each of the alternatives are presented below:

Alternative	Capital Cost	Annual O&M	Present Worth
GW-1	$1,118,578	$2,920,610	$4,039,188
GW-2	$6,296,578	$7,415,610	$13,712,188

GW-1 has lower capital and O&M present worth costs than GW-2. The cost estimate for GW-1 is based on the "No Further Action – Limited Action" alternative described in the 2007 ROD, as updated by Genesco on November 18, 2014 and by the Village on January 14, 2015. The cost estimate for GW-2 is based on the cost estimate for the corresponding groundwater extraction and treatment system presented in the 2007 ROD, as adjusted based on updated cost information provided by Genesco during the remedial design of the 2007 remedy.

The cost estimates are order-of-magnitude engineering cost estimates that are expected to be within +50% to -30% of the actual cost of the project.

For cost-estimating purposes only, a 30-year time frame was used as the duration of each alternative. The EPA expects, however, that PCE and TCE levels in the aquifer may exceed their respective MCLs for greater than 30 years and, as a result, the treatment systems on Village supply wells 13 and 14 may need to be operated for greater than 30 years.

The GW-1 and GW-2 cost estimates do not include a separate cost item for the vapor intrusion response actions. Because the scope of the vapor intrusion-related work would be the same under both alternatives, the vapor intrusion response actions do not change the relative cost effectiveness of each of those alternatives. In addition, the costs of vapor intrusion response actions are relatively low, and the EPA does not expect the vapor intrusion response action costs to affect whether the actual remedy costs are within +50% to -30% of the cost estimates.

8. State Acceptance

The State of New York supports the selected remedy.

9. Community Acceptance

No comments were received other than those submitted at the May 12, 2015, public meeting. At the public meeting, the public expressed general support for the remedy proposed by the EPA in

the Proposed Plan (GW-1). In addition, the Nassau County Department of Health Services and the Village of Garden City expressed support for GW-1. The EPA's responses to significant public comments received on the Proposed Plan are provided in the attached Responsiveness Summary.

PRINCIPAL THREAT WASTE

The NCP establishes an expectation that the EPA will use treatment to address the principal threats posed by a Site whenever practicable (NCP Section 300.430(a)(1)(iii)(A)). The "principal threat" concept is applied to the characterization of "source materials" at a Superfund site. A source material is material that includes or contains hazardous substances, pollutants, or contaminants, such as dense nonaqueous phase liquid in soil, that act as a reservoir for the migration of contamination to groundwater, surface water, or air, or act as a source for direct exposure. Principal threat wastes are those source materials considered to be highly toxic or highly mobile that generally cannot be reliably contained or would present a significant risk to human health or the environment in the event exposure should occur. The decision to treat these wastes is made on a site-specific basis through a detailed analysis of alternatives, using the remedy selection criteria which are described above. The manner in which principal threat wastes are addressed provides a basis for making a statutory finding that the remedy employs treatment as a principal element.

No materials which meet the definition of "principal threat wastes" were identified during the OU1 RI/FS or during subsequent further investigations conducted as part of the remedial design activities since 2007.

AMENDED REMEDY

The EPA's selected remedy which amends the 2007 interim ROD is Alternative GW-1 (Continued Operation of Existing Treatment Systems on Village Wells 13 and 14). This remedy includes the following:

- Continued operation, maintenance and monitoring (O&M) of the air stripping treatment systems currently installed on Village wells 13 and 14 in order to protect the public from exposure to Site-related volatile organic compounds (VOCs), including PCE, in groundwater entering those wells. These treatment systems will be maintained and replaced or upgraded as needed in order to ensure that water

distributed to the public from wells 13 and 14 complies with ARARs, including MCLs under the federal Safe Drinking Water Act or, if more stringent, New York State drinking water standards at 10 NYCRR Part 5, Subpart 5-1. If needed, a vapor-phase carbon unit will be added to capture and treat VOCs being discharged from the air stripper treatment units. The pumping of supply wells 13 and 14 provides an incidental benefit of helping to reduce the mobility of contaminants in the OU1 portion of the plume. This ROD Amendment assumes the continued operation of Village wells 13 and 14 until those wells no longer are impacted by contaminants above the MCLs for PCE and TCE.

- A monitoring plan that will include groundwater sampling to monitor contaminant levels in groundwater at the Site. The monitoring program will include monitoring of contamination that is entering wells 13 and 14, monitoring of groundwater upgradient, sidegradient and downgradient of wells 13 and 14, and graphic depictions of the results.

- Institutional controls in the form of local laws that restrict future use of groundwater at the Site and limit exposure at the commercial facility located at 150 Fulton Avenue in Garden City Park, New York (the Fulton Property), a source of the groundwater contamination at the Site. Specifically, the Nassau County Sanitary Code regulates installation of private potable water supply wells in Nassau County. In addition, the commercial facility at the Fulton Property is zoned for industrial use, and the EPA does not anticipate any changes to the land use in the foreseeable future. If a change in land use is proposed, additional investigation of soils may be necessary to determine whether the change in land use could affect exposure risks at the Fulton Property.

- A vapor intrusion evaluation of structures that are in the vicinity of the Fulton Property and that could potentially be affected by the OU1 portion of the groundwater contamination plume. An appropriate response action (such as sub-slab ventilation systems) may be implemented based on the results of the investigation. The O&M of the existing sub-slab ventilation system at the Fulton Property will continue to be operated and maintained.

- A site management plan (SMP) that will provide for the proper management of all OU1 remedy components, including compliance with institutional controls. The SMP will

include: (a) O&M of the treatment systems on Village wells 13 and 14 as well as monitoring of Site groundwater upgradient, sidegradient and downgradient of wells 13 and 14; (b) conducting an evaluation of the potential for vapor intrusion, and an appropriate response action, if necessary, in the event of future construction at the Fulton Property; and (c) periodic certifications by the party(ies) implementing the remedy that any institutional and engineering controls are in place and being complied with.

SUMMARY OF THE RATIONALE FOR THE SELECTED REMEDY

The selected interim remedy will be protective of human health and the environment until a final remedy is implemented for the Site, will comply with the ARARs identified for this interim action, and is cost-effective. Although this interim action is not intended to address fully the statutory mandates for overall protection, permanence, and treatment to the maximum extent practicable, this interim action does utilize treatment at the Village wells, and thus supports part of the statutory mandate.

The selected alternative GW-1 (present-worth cost of approximately $4,039,188) is more cost-effective than GW-2. The GW-2 extraction and treatment system has a present-worth cost of approximately $13.7 million. GW-1 also would have fewer short-term impacts to workers and the community, and is more readily implementable because it does not involve the construction of an extraction and treatment system. The well head treatment systems of Alternative GW-1 are in place and, therefore, are already protecting the public from drinking water impacts to human health.

The continued operation of Village wells 13 and 14 will continue to help reduce migration of the OU1 portion of the groundwater plume toward the Franklin Square Water District wells. The Village wells 13 and 14 treatment systems also will have the incidental benefit of removing and treating contaminants in groundwater that enter those wells, and thereby reducing the mass and mobility of VOCs in the OU1 part of the groundwater plume.

The environmental benefits of the selected remedial alternative may be enhanced by employing design technologies and practices that are sustainable in accordance with the EPA Region 2’s Clean and Green Energy Policy, available at: http://epa.gov/region2/superfund/green_remediation.

Summary of the Estimated Remedy Costs

The estimated capital, annual O&M, and total present-worth costs for the selected remedy are $1,118,578, $2,920,610, and $4,039,188. A detailed cost estimate for the selected remedy is summarized in Appendix VI. The information in the cost estimate summary table is based on the best available information regarding the anticipated scope of the remedial alternative. This is an order-of-magnitude engineering cost estimate that is expected to be within +50% to -30% of the actual project cost.

Expected Outcomes of the Selected Remedy

The results of the human health risk assessment indicated that there is an unacceptable hazard from exposure to groundwater through ingestion and inhalation.

The selected remedy will:

- Prevent potential, current, and future human exposures including inhalation and ingestion of VOC-contaminated groundwater by effectively treating contaminants in groundwater entering Village water supply wells 13 and 14 so that distributed water is at levels that are protective of human health;
- Continue to help to prevent the OU1 portion of the groundwater plume from reaching the Franklin Square Water District wells;
- Allow time for additional efforts to be undertaken to identify more fully delineate the nature and extent of TCE and PCE contamination in the groundwater at the Site and also allow for a comprehensive evaluation of alternatives for Site-wide restoration of the aquifer; and
- Incidentally make some progress toward ultimately restoring groundwater to levels which meet ARARs within the aquifer.

The results of the risk assessment indicate that PCE and TCE pose an excess lifetime cancer risk above the EPA reference cancer risk range, and also pose unacceptable noncancer health hazards. PCE and TCE in the aquifer serve as sources of contamination to the groundwater. All scenarios involving the use of groundwater as a drinking water source showed considerably elevated risks, due primarily to the presence of PCE and TCE in the groundwater. Under the selected remedy, the removal of the PCE and TCE from the water supply wells will

address the excess lifetime cancer risk and noncancer hazards posed by PCE and TCE.

The selected remedy will ensure that the water supply obtained from Village wells 13 and 14 is protected until a final groundwater remedy is implemented for the Site.

STATUTORY DETERMINATIONS

Section 121(b)(1) of CERCLA mandates that a remedial action must be protective of human health and the environment, be cost-effective, and utilize permanent solutions and alternative treatment or resource recovery technologies to the maximum extent practicable. Section 121(b)(1) also establishes a preference for remedial actions which employ treatment to permanently and significantly reduce the volume, toxicity, or mobility of the hazardous substances, pollutants, or contaminants at the Site. Section 121(d) of CERCLA further specifies that a remedial action must attain a degree of cleanup that satisfies ARARs under federal and state laws, unless a waiver can be justified pursuant to Section 121(d)(4) of CERCLA. This selected interim remedy will ensure that the treatment systems will continue to effectively treat contaminants in groundwater entering Village wells 13 and 14 so that distributed water is at levels that are protective of human health.

In the 2007 ROD, the EPA indicated that the OU1 portion of the contamination plume would be restored to its beneficial use when the TCE-dominant contamination is addressed in OU2. Because the nature and extent of the contamination present in the OU1 and OU2 portions of the plume – including sources of TCE - have not yet been fully identified, the EPA does not have sufficient information at this time to determine whether groundwater at the Site can be fully restored, and will conduct additional investigations as part of OU2. Currently, groundwater restoration is one of the EPA's goals for the final Site remedy. The OU1 interim remedy will neither be inconsistent with, nor preclude, implementation of a final remedy for the Site.

Overall Protection of Human Health and the Environment

The selected remedy will protect human health and the environment until a final remedy can be selected and implemented, through removal of contaminants from the groundwater entering Village supply wells 13 and 14. This will be monitored, and the treatment systems will be maintained and replaced or upgraded as needed in order to ensure that water

distributed to the public from Village wells 13 and 14 complies with ARARs and to help to limit the migration of contaminants in the groundwater.

Compliance with ARARs

The ARARs for the selected interim OU1 remedy include the SDWA and New York State Sanitary Code at 10 NYCRR Subpart 5-1, which relates to public water supply systems. The primary standards include federal MCLs, which are enforceable standards for specific contaminants based on public health factors as well as the technical and economic feasibility of removing the contaminants from the water supply. The MCL for both PCE and TCE is 5 ppb. ARARs and other environmental criteria, advisories or guidance for this interim action are presented in Appendix II Table 10.

This OU1 remedy will immediately comply with these ARARs because the well 13 and 14 treatment systems currently are operating and effectively removing VOCs from groundwater prior to public distribution.

Cost-Effectiveness

A cost effective remedy is one whose costs are proportional to its overall effectiveness (NCP Section 300.430(f)(ii)(D)). Overall effectiveness is based on the evaluations of the following three evaluation criteria: long-term effectiveness and permanence; reduction of toxicity, mobility, and volume through treatment; and short-term effectiveness. The selected remedy provides adequate protection of the public, the pumping and treatment of supply wells 13 and 14 provides an incidental benefit of helping to reduce the toxicity, mobility, and volume of contaminants in the OU1 portion of the plume, and the selected remedy is immediately protective (because the well 13 and 14 treatment systems are currently operating) while having minimal short-term impacts. The costs of the selected remedy are proportional to its overall effectiveness, and the selected remedy therefore is cost effective.

Utilization of Permanent Solutions and Alternative Treatment Technologies to the Maximum Extent Practicable

The selected remedy is an interim remedy that is not intended to utilize permanent solutions and alternative treatment (or resource recovery) technologies to the maximum extent

practicable. Subsequent actions will be evaluated to address fully the threats posed by conditions at the Site.

Preference for Treatment as a Principal Element

Because this action does not constitute the final remedy for the Site, the statutory preference for remedies that employ treatment that reduces toxicity, mobility, or volume as a principal element will be addressed by the final response action.

The Village wells 13 and 14 treatment systems will have the incidental benefit of removing and treating contaminants in groundwater that enters those wells, and thereby reducing the mass and mobility of VOCs in the OU1 part of the groundwater plume.

Five-Year Review Requirements

Due to the interim nature of this remedy and because contamination will remain on Site at levels that do not allow for unlimited use and unrestricted exposure, a review of Site conditions will be conducted at least once every five years.

DOCUMENTATION OF SIGNIFICANT CHANGES

The Proposed Plan for the Fulton Avenue Superfund Site was released for public comment on April 24, 2015, and the public comment period ran from that date through May 26, 2015. The Proposed Plan identified Groundwater Alternative GW-1 as the preferred alternative. The Proposed Plan was presented at a public meeting on May 12, 2015.

All written and verbal comments submitted during the public comment period were reviewed by the EPA. Upon review of these comments, the EPA has determined that no significant changes to the remedy, as it was originally identified in the Proposed Plan, are necessary.

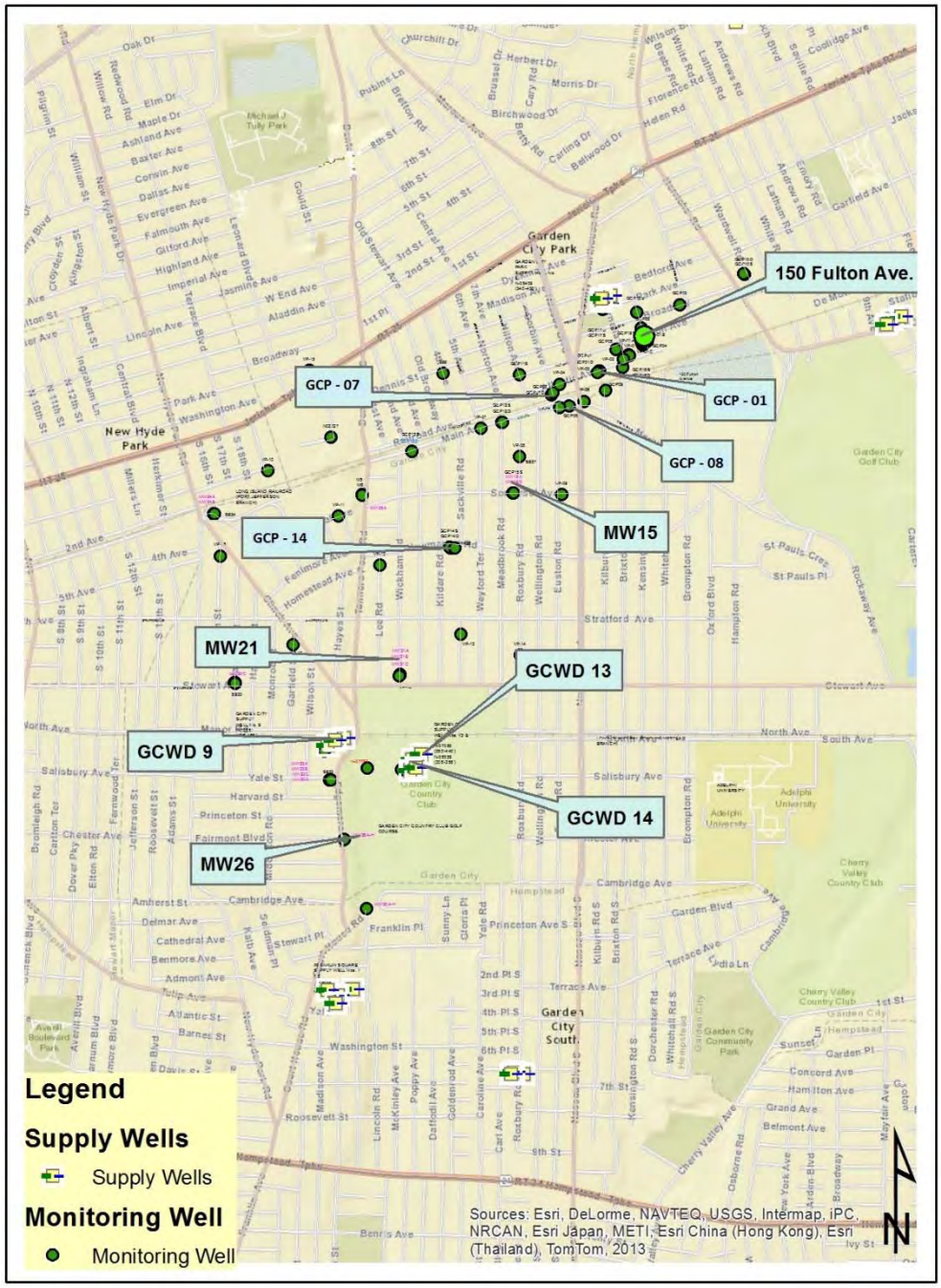
APPENDIX I

FIGURES

APPENDIX I

FIGURES

Fulton Ave. Site OU-1



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APPENDIX II

TABLES

Table 1 – Summary of May 2015 Groundwater Sample Results

Table 2 – Summary of Historic Groundwater Monitoring Well Sample Results

Table 3 - Summary of Contaminants of Concern and Medium-Specific Exposure Point Concentrations

Table 4 - Selection of Exposure Pathways

Table 5 - Cancer Toxicity Data Summary

Table 6 – Non-Cancer Toxicity Data Summary

Table 7 - Risk Characterization Summary – Carcinogens

Table 8 - Risk Characterization Summary - Non-Carcinogens

Table 9 – Cost Estimate for Fulton Avenue Superfund Site

Table 10 - ARARs, TBCs, and Other Guidelines

- Table 10a – Chemical-Specific ARARs, TBCs, and Other Guidelines
- Table 10b – Location-Specific ARARs, TBCs, and Other Guidelines
- Table 10c – Action-Specific ARARs, TBCs, and Other Guidelines

Table 1
Summary of May 2015 Groundwater Sample Results
150 Fulton Avenue Site, Garden City Park, New York

Well/Boring/Sample ID:	NYS AWQS & GV [1]	GCP08-64.2	GCP155-51	GCP18-8.5	GCP18D-118	DUP050715	MS-445	MW-20A-145	MW-20B-249	MW-20C-405	MW-22A-125	MW-22B-275
Lab Sample ID:		JB94230-3	JB93889-5	JB93889-1	JB94230-2	JB94230-4	JB93989-2	JB93700-4	JB93700-3	JB93700-5	JB94552-1	JB93885-3
Date Sampled:		5/7/2015	5/5/2015	5/7/2015	5/7/2015	5/7/2015	5/6/2015	4/30/2015	4/30/2015	4/30/2015	5/6/2015	5/4/2015
Matrix:		Groundwater	Groundwater	Groundwater	Groundwater	Blind Dupe of GCP18D	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
GC/MS Volatiles (SW846 8260B)												
1,1,1-Trichloroethane	5	ND (0.12)	ND (0.12)		ND (0.12)	ND (0.12)	ND (0.12)	ND (0.12) J	ND (0.12)	ND (0.12)	ND (0.12)	ND (0.12)
1,1,2,2-Tetrachloroethane	5	ND (0.086)	ND (0.086)		ND (0.086)	ND (0.086)	ND (0.086)	ND (0.086)	ND (0.086)	ND (0.086)	ND (0.086)	ND (0.086)
1,1,2-Trichloroethane	1	ND (0.11)	ND (0.11)		ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)
1,1-Dichloroethane	5	ND (0.097)	ND (0.097)		ND (0.097)	ND (0.097)	ND (0.097)	ND (0.097)	ND (0.097)	ND (0.097)	ND (0.097)	ND (0.097)
1,1-Dichloroethene	5	ND (0.14)	ND (0.14)		ND (0.14)	ND (0.14)	ND (0.14)	ND (0.14) J	ND (0.14)	ND (0.14)	ND (0.14)	ND (0.14)
1,2,4-Trichlorobenzene	5	ND (0.11)	ND (0.11)		ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)
1,2-Dibromo-3-chloropropane	0.04	ND (0.51)	ND (0.51)		ND (0.51)	ND (0.51)	ND (0.51)	ND (0.51)	ND (0.51)	ND (0.51)	ND (0.51)	ND (0.51)
1,2-Dibromoethane	0.0006	ND (0.13)	ND (0.13)		ND (0.13)	ND (0.13)	ND (0.13)	ND (0.13)	ND (0.13)	ND (0.13)	ND (0.13)	ND (0.13)
1,2-Dichlorobenzene	3	ND (0.063)	ND (0.063)		ND (0.063)	ND (0.063)	ND (0.063)	ND (0.063)	ND (0.063)	ND (0.063)	ND (0.063)	ND (0.063)
1,2-Dichloroethane	0.6	ND (0.087)	ND (0.087)		ND (0.087)	ND (0.087)	ND (0.087)	ND (0.087)	ND (0.087)	ND (0.087)	ND (0.087)	ND (0.087)
1,2-Dichloropropane	1	ND (0.10)	ND (0.10)		ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)
1,3-Dichlorobenzene	3	ND (0.11)	ND (0.11)		ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)
1,4-Dichlorobenzene	3	ND (0.061)	ND (0.061)		ND (0.061)	ND (0.061)	ND (0.061)	ND (0.061)	ND (0.061)	ND (0.061)	ND (0.061)	ND (0.061)
1,4-Dioxane	3	ND (10)	ND (10)		ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)
2-Butanone (MEK)	50	ND (1.2)	ND (1.2)		ND (1.2)	ND (1.2)	ND (1.2)	ND (1.2)	ND (1.2)	ND (1.2)	ND (1.2)	ND (1.2)
2-Hexanone	50	ND (1.4)	ND (1.4)		ND (1.4)	ND (1.4)	ND (1.4)	ND (1.4)	ND (1.4)	ND (1.4)	ND (1.4)	ND (1.4)
4-Methyl-2-pentanone(MIBK)		ND (0.19)	ND (0.19)		ND (0.19)	ND (0.19)	ND (0.19)	ND (0.19)	ND (0.19)	ND (0.19)	ND (0.19)	ND (0.19)
Acetone	50	ND (1.7)	ND (1.7)		ND (1.7)	ND (1.7)	ND (1.7)	ND (1.7)	2.8	ND (1.7)	ND (1.7)	ND (1.7)
Benzene	1	ND (0.050)	ND (0.050)		ND (0.050)	ND (0.050)	ND (0.050)	ND (0.050)	ND (0.050)	ND (0.050)	0.6	ND (0.050)
Bromochloromethane	5	ND (0.15)	ND (0.15)		ND (0.15)	ND (0.15)	ND (0.15)	ND (0.15)	ND (0.15)	ND (0.15)	ND (0.15)	ND (0.15)
Bromodichloromethane	50	ND (0.11)	ND (0.11)		ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)
Bromoform	50	ND (0.081)	ND (0.081)		ND (0.081)	ND (0.081)	ND (0.081)	ND (0.081)	ND (0.081)	ND (0.081)	ND (0.081)	ND (0.081)
Bromomethane	5	ND (0.10)	ND (0.10)		ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)
Carbon disulfide	60	ND (0.18)	ND (0.18)		ND (0.18)	ND (0.18)	ND (0.18)	ND (0.18)	0.75 J	ND (0.18)	ND (0.18)	ND (0.18)
Carbon tetrachloride	5	ND (0.096)	ND (0.096)		ND (0.096)	ND (0.096)	ND (0.096)	ND (0.096) J	ND (0.096)	ND (0.096)	ND (0.096)	ND (0.096)
Chlorobenzene	5	ND (0.086)	ND (0.086)		ND (0.086)	ND (0.086)	ND (0.086)	ND (0.086)	ND (0.086)	ND (0.086)	ND (0.086)	ND (0.086)
Chloroethane	5	ND (0.15)	ND (0.15)		ND (0.15)	ND (0.15)	ND (0.15)	ND (0.15)	ND (0.15)	ND (0.15)	ND (0.15)	ND (0.15)
Chloroform	7	ND (0.086)	ND (0.086)		ND (0.086)	ND (0.086)	ND (0.086)	ND (0.086)	ND (0.086)	ND (0.086)	ND (0.086)	ND (0.086)
Chloromethane	5	ND (0.12)	ND (0.12)		ND (0.12)	ND (0.12)	ND (0.12)	ND (0.12)	ND (0.12)	ND (0.12)	ND (0.12)	ND (0.12)
cis-1,2-Dichloroethene	5	2	ND (0.14)		ND (0.14)	ND (0.14)	ND (0.14)	ND (0.14)	ND (0.14)	ND (0.14)	ND (0.14)	ND (0.14)
cis-1,3-Dichloropropene	0.4	ND (0.078)	ND (0.078)		ND (0.078)	ND (0.078)	ND (0.078)	ND (0.078)	ND (0.078)	ND (0.078)	ND (0.078)	ND (0.078)
Dibromochloromethane	50	ND (0.12)	ND (0.12)		ND (0.12)	ND (0.12)	ND (0.12)	ND (0.12)	ND (0.12)	ND (0.12)	ND (0.12)	ND (0.12)
Ethylbenzene	5	ND (0.20)	ND (0.20)		ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)
Methylene chloride	5	ND (0.11)	ND (0.11)		ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)
Styrene	5	ND (0.053)	ND (0.053)		ND (0.053)	ND (0.053)	ND (0.053)	ND (0.053)	ND (0.053)	ND (0.053)	ND (0.053)	ND (0.053)
Tetrachloroethene	5	1.7	ND (0.12)		ND (0.12)	ND (0.12)	0.6 J	ND (0.12)	ND (0.12)	0.72 J	0.73 J	ND (0.12)
Toluene	5	ND (0.064)	ND (0.064)		ND (0.064)	ND (0.064)	ND (0.064)	ND (0.064)	ND (0.064)	ND (0.064)	ND (0.064)	ND (0.064)
trans-1,2-Dichloroethene	5	ND (0.24)	ND (0.24)		ND (0.24)	ND (0.24)	ND (0.24)	ND (0.24)	ND (0.24)	ND (0.24)	ND (0.24)	ND (0.24)
trans-1,3-Dichloropropene	0.4	ND (0.11)	ND (0.11)		ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)
Trichloroethene	5	0.63	ND (0.084)		ND (0.084)	ND (0.084)	ND (0.084)	ND (0.084)	ND (0.084)	1.9	ND (0.084)	ND (0.084)
Vinyl chloride	2	ND (0.10)	ND (0.10)		ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)
Xylene (total)	5	ND (0.12)	ND (0.12)		ND (0.12)	ND (0.12)	ND (0.12)	ND (0.12)	ND (0.12)	ND (0.12)	ND (0.12)	ND (0.12)
Total VOCs		3.960.67	2.1	0	0.63	0	0	0.3	3.25	444.00	73.16	0	6.05	1.62	37.00	1007.44	841.53	936.85	0.7	0
Total VOC TICs		0	0	0	10.41	0	0	0	0	0	0	0	0	0	7.11	0	0	0	0	0

Legend: All concentrations are in ug/L.

1. AWQS - NYS Ambient Groundwater Quality Standards for Class GA (potable) ground water as listed in TOGS 1.1.1 (June 1998) and in 6 NYCRR 703.5.
2. AWQGV - NYS Ambient Groundwater Quality Guidance Values for Class GA (potable) ground water as listed in TOGS 1.1.1 (June 1998) and in 6 NYCRR 703.5.

Not detected at the specified reporting limit.
Compound was detected at the indicated concentration.
Results flagged as "Exceed" if any of the selected criteria exceeded (most stringent).
J = Estimated value
TIC = Tentatively Identified Compounds based on a search of organic compound mass spectra.

Table 1
Summary of May 2015 Groundwater Sample Results
150 Fulton Avenue Site, Garden City Park, New York

Well/Boring/Sample ID:	NYS AWQS & GV [1,2]	MW2[illegible]-315	DUP050415	MW23A-265	MW23B-350	MW23C-403	MW23D-447	M[illegible]50	MW2[illegible]B-[illegible]20	MW[illegible]45	MW2[illegible]B-271.5	MW26C-325	MW26D-350.5	[illegible]77	[illegible]8.5	MW26G-443	MW26[illegible]-478.5	MW27A-197	MW27B-241.5	MW27C-289
Lab Sample ID:		[illegible]	JB93886-7	JB93750-1	JB93885-1	JB937[illegible]0-2	JB93885-2	[illegible]-5	JB9[illegible]6	[illegible]1	JB94107-2	JB94107-3	JB94107-4	[illegible]	[illegible]	JB94107-7	JB94107-8	JB94230-5	JB94230-6	JB94230-7
Date Sampled:		[illegible]	5/4/2015	4/30/2015	5/4/2015	4/30/2015	5/4/2015	[illegible]	5/[illegible]/2015	[illegible]	5/6/2015	5/6/2015	5/6/2015	[illegible]	[illegible]	5/6/2015	5/6/2015	5/7/2015	5/7/2015	5/7/2015
Matrix:		Groundwater	Blind Dupe of MW-22C	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
GC/MS Volatiles (SW846 8260B)																				
1,1,1-Trichloroethane	5	[illegible]	ND (0.12)	ND (0.12)	ND (0.12)	ND (0.12)	ND (0.12)	[illegible]	ND (0.12)	[illegible]	ND (0.12)	ND (0.12)	ND (0.12)	[illegible]	[illegible]	ND (0.12)	ND (0.12)	ND (0.12)	ND (0.12)	ND (0.12)
1,1,2,2-Tetrachloroethane	5	[illegible]	ND (0.096)	ND (0.096)	ND (0.096)	ND (0.096)	ND (0.096)	[illegible]	ND (0.096)	[illegible]	ND (0.096)	ND (0.096)	ND (0.096)	[illegible]	[illegible]	ND (0.096)	ND (0.096)	ND (0.096)	ND (0.096)	ND (0.096)
1,1,2-Trichloroethane	1	[illegible]	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	[illegible]	ND (0.11)	[illegible]	ND (0.11)	ND (0.11)	ND (0.11)	[illegible]	[illegible]	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)
1,1-Dichloroethane	5	[illegible]	ND (0.097)	ND (0.097)	ND (0.097)	ND (0.097)	ND (0.097)	[illegible]	ND (0.097)	[illegible]	ND (0.097)	ND (0.097)	ND (0.097)	[illegible]	[illegible]	ND (0.097)	ND (0.097)	ND (0.097)	ND (0.097)	ND (0.097)
1,1-Dichloroethene	5	[illegible]	ND (0.14)	ND (0.14)	ND (0.14)	ND (0.14)	ND (0.14)	[illegible]	ND (0.14)	[illegible]	ND (0.14)	ND (0.14)	ND (0.14)	[illegible]	[illegible]	ND (0.14)	ND (0.14)	ND (0.14)	ND (0.14)	ND (0.14)
1,2,4-Trichlorobenzene	5	[illegible]	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	[illegible]	ND (0.11)	[illegible]	ND (0.11)	ND (0.11)	ND (0.11)	[illegible]	[illegible]	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)
1,2-Dibromo-3-chloropropane	0.04	[illegible]	ND (0.51)	ND (0.51)	ND (0.51)	ND (0.51)	ND (0.51)	[illegible]	ND (0.51)	[illegible]	ND (0.51)	ND (0.51)	ND (0.51)	[illegible]	[illegible]	ND (0.51)	ND (0.51)	ND (0.51)	ND (0.51)	ND (0.51)
1,2-Dibromoethane	0.0006	[illegible]	ND (0.13)	ND (0.13)	ND (0.13)	ND (0.13)	ND (0.13)	[illegible]	ND (0.13)	[illegible]	ND (0.13)	ND (0.13)	ND (0.13)	[illegible]	[illegible]	ND (0.13)	ND (0.13)	ND (0.13)	ND (0.13)	ND (0.13)
1,2-Dichlorobenzene	3	[illegible]	ND (0.063)	ND (0.063)	ND (0.063)	ND (0.063)	ND (0.063)	[illegible]	ND (0.063)	[illegible]	ND (0.063) J	ND (0.063)	ND (0.063)	[illegible]	[illegible]	ND (0.063)	ND (0.063)	ND (0.063)	ND (0.063)	ND (0.063)
1,2-Dichloroethane	0.6	[illegible]	ND (0.087)	ND (0.087)	ND (0.087)	ND (0.087)	ND (0.087)	[illegible]	ND (0.087)	[illegible]	ND (0.087)	ND (0.087)	ND (0.087)	[illegible]	[illegible]	ND (0.087)	ND (0.087)	ND (0.087)	ND (0.087)	ND (0.087)
1,2-Dichloropropane	1	[illegible]	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	[illegible]	ND (0.10)	[illegible]	ND (0.10) J	ND (0.10)	ND (0.10)	[illegible]	[illegible]	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)
1,3-Dichlorobenzene	3	[illegible]	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	[illegible]	ND (0.11)	[illegible]	ND (0.11)	ND (0.11)	ND (0.11)	[illegible]	[illegible]	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)
1,4-Dichlorobenzene	3	[illegible]	ND (0.061)	ND (0.061)	ND (0.061)	ND (0.061)	ND (0.061)	[illegible]	ND (0.061)	[illegible]	ND (0.061)	ND (0.061)	ND (0.061)	[illegible]	[illegible]	ND (0.061)	ND (0.061)	ND (0.061)	ND (0.061)	ND (0.061)
1,4-Dioxane		[illegible]	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	[illegible]	ND (10)	[illegible]	ND (10)	ND (10)	ND (10)	[illegible]	[illegible]	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)
2-Butanone (MEK)	50	[illegible]	ND (1.2)	ND (1.2)	ND (1.2)	ND (1.2)	ND (1.2)	[illegible]	ND (1.2)	[illegible]	ND (1.2)	ND (1.2)	ND (1.2)	[illegible]	[illegible]	ND (1.2)	ND (1.2)	ND (1.2)	ND (1.2)	ND (1.2)
2-Hexanone	50	[illegible]	ND (1.4)	ND (1.4)	ND (1.4)	ND (1.4)	ND (1.4)	[illegible]	ND (1.4)	[illegible]	ND (1.4)	ND (1.4)	ND (1.4)	[illegible]	[illegible]	ND (1.4)	ND (1.4)	ND (1.4)	ND (1.4)	ND (1.4)
4-Methyl-2-pentanone(MIBK)		[illegible]	ND (0.19)	ND (0.19)	ND (0.19)	ND (0.19)	ND (0.19)	[illegible]	ND (0.19)	[illegible]	ND (0.19)	ND (0.19)	ND (0.19)	[illegible]	[illegible]	ND (0.19)	ND (0.19)	ND (0.19)	ND (0.19)	ND (0.19)
Acetone	50	[illegible]	ND (1.7)	ND (1.7)	ND (1.7)	ND (1.7)	ND (1.7)	[illegible]	ND (1.7)	[illegible]	ND (1.7)	ND (1.7)	ND (1.7)	[illegible]	[illegible]	ND (1.7)	ND (1.7)	ND (1.7)	ND (1.7)	ND (1.7)
Benzene	1	[illegible]	ND (0.090)	[illegible]	ND (0.090)	ND (0.090)	ND (0.090)	[illegible]	3.7	[illegible]	ND (0.090)	ND (0.090)	ND (0.090)	[illegible]	[illegible]	ND (0.090)	ND (0.090)	ND (0.090)	ND (0.090)	ND (0.090)
Bromochloromethane	5	[illegible]	ND (0.15)	ND (0.15)	ND (0.15)	ND (0.15)	ND (0.15)	[illegible]	ND (0.15)	[illegible]	ND (0.15) J	ND (0.15)	ND (0.15)	[illegible]	[illegible]	ND (0.15)	ND (0.15)	ND (0.15)	ND (0.15)	ND (0.15)
Bromodichloromethane	50	[illegible]	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	[illegible]	ND (0.11)	[illegible]	ND (0.11) J	ND (0.11)	ND (0.11)	[illegible]	[illegible]	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)
Bromoform	50	[illegible]	ND (0.081)	ND (0.081)	ND (0.081)	ND (0.081)	ND (0.081)	[illegible]	ND (0.081)	[illegible]	ND (0.081)	ND (0.081)	ND (0.081)	[illegible]	[illegible]	ND (0.081)	ND (0.081)	ND (0.081)	ND (0.081)	ND (0.081)
Bromomethane	5	[illegible]	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	[illegible]	ND (0.10)	[illegible]	ND (0.10)	ND (0.10)	ND (0.10)	[illegible]	[illegible]	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)
Carbon disulfide	60	[illegible]	ND (0.18)	ND (0.18)	ND (0.18)	ND (0.18)	ND (0.18)	[illegible]	ND (0.18)	[illegible]	ND (0.18)	ND (0.18)	ND (0.18)	[illegible]	[illegible]	ND (0.18)	ND (0.18)	ND (0.18)	ND (0.18)	ND (0.18)
Carbon tetrachloride	5	[illegible]	ND (0.096)	ND (0.096)	ND (0.096)	ND (0.096)	ND (0.096)	[illegible]	ND (0.096)	[illegible]	[illegible]	ND (0.096)	ND (0.096)	[illegible]	[illegible]	ND (0.096)	ND (0.096)	ND (0.096)	ND (0.096)	ND (0.096)
Chlorobenzene	5	[illegible]	ND (0.086)	ND (0.086)	ND (0.086)	ND (0.086)	ND (0.086)	[illegible]	ND (0.086)	[illegible]	ND (0.086)	ND (0.086)	ND (0.086)	[illegible]	[illegible]	ND (0.086)	ND (0.086)	ND (0.086)	ND (0.086)	ND (0.086)
Chloroethane	5	[illegible]	ND (0.15)	ND (0.15)	ND (0.15)	ND (0.15)	ND (0.15)	[illegible]	ND (0.15)	[illegible]	ND (0.15)	ND (0.15)	ND (0.15)	[illegible]	[illegible]	ND (0.15)	ND (0.15)	ND (0.15)	ND (0.15)	ND (0.15)
Chloroform	7	[illegible]	ND (0.086)	ND (0.086)	ND (0.086)	ND (0.086)	ND (0.086)	[illegible]	ND (0.086)	[illegible]	ND (0.086)	ND (0.086)	ND (0.086)	[illegible]	[illegible]	ND (0.086)	ND (0.086)	[illegible]	ND (0.086)	ND (0.086)
Chloromethane	5	[illegible]	ND (0.12)	ND (0.12)	ND (0.12)	ND (0.12)	ND (0.12)	[illegible]	ND (0.12)	[illegible]	ND (0.12)	ND (0.12)	ND (0.12)	[illegible]	[illegible]	ND (0.12)	ND (0.12)	[illegible]	ND (0.12)	ND (0.12)
cis-1,2-Dichloroethene	5	[illegible]	ND (0.14)	ND (0.14)	0.25 J	0.53 J	0.93 J	[illegible]	[illegible]	[illegible]	ND (0.14) J	ND (0.14)	[illegible]	[illegible]	[illegible]	1.2	0.31 J	ND (0.14)	ND (0.14)	ND (0.14)
cis-1,3-Dichloropropene	0.4	[illegible]	ND (0.078)	ND (0.078)	ND (0.078)	ND (0.078)	ND (0.078)	[illegible]	ND (0.078)	[illegible]	ND (0.078) J	ND (0.078)	ND (0.078)	[illegible]	[illegible]	ND (0.078)	ND (0.078)	ND (0.078)	ND (0.078)	ND (0.078)
Dibromochloromethane	50	[illegible]	ND (0.12)	ND (0.12)	ND (0.12)	ND (0.12)	ND (0.12)	[illegible]	ND (0.12)	[illegible]	ND (0.12) J	ND (0.12)	ND (0.12)	[illegible]	[illegible]	ND (0.12)	ND (0.12)	ND (0.12)	ND (0.12)	ND (0.12)
Ethylbenzene	5	[illegible]	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	[illegible]	ND (0.20)	[illegible]	ND (0.20)	ND (0.20)	ND (0.20)	[illegible]	[illegible]	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)
Methylene chloride	5	[illegible]	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	[illegible]	ND (0.11)	[illegible]	ND (0.11)	ND (0.11)	ND (0.11)	[illegible]	[illegible]	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)
Styrene	5	[illegible]	ND (0.053)	ND (0.053)	ND (0.053)	ND (0.053)	ND (0.053)	[illegible]	ND (0.053)	[illegible]	ND (0.053) J	ND (0.053)	ND (0.053)	[illegible]	[illegible]	ND (0.053)	ND (0.053)	ND (0.053)	ND (0.053)	ND (0.053)
Tetrachloroethene	5	[illegible]	ND (0.12)	ND (0.12)	3.5	4.8	9.4	[illegible]	4.8	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	8.4	1.5	ND (0.12)	ND (0.12)	ND (0.12)
Toluene	5	[illegible]	ND (0.064)	ND (0.064)	ND (0.064)	ND (0.064)	ND (0.064)	[illegible]	ND (0.064)	[illegible]	ND (0.064)	ND (0.064)	ND (0.064)	[illegible]	[illegible]	ND (0.064)	0.29 J	ND (0.064)	ND (0.064)	ND (0.064)
trans-1,2-Dichloroethene	5	[illegible]	ND (0.24)	ND (0.24)	ND (0.24)	ND (0.24)	ND (0.24)	[illegible]	ND (0.24)	[illegible]	ND (0.24)	ND (0.24)	ND (0.24)	[illegible]	[illegible]	ND (0.24)	ND (0.24)	ND (0.24)	ND (0.24)	ND (0.24)
trans-1,3-Dichloropropene	0.4	[illegible]	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	[illegible]	ND (0.11)	[illegible]	ND (0.11)	ND (0.11)	ND (0.11)	[illegible]	[illegible]	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)
Trichloroethene	5	[illegible]	ND (0.084)	[illegible]	37.2	38.6	84.1	[illegible]	[illegible]	[illegible]	ND (0.084)	ND (0.084)	[illegible]	[illegible]	[illegible]	27.7	[illegible]	ND (0.084)	ND (0.084)	ND (0.084)
Vinyl chloride	2	[illegible]	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	[illegible]	ND (0.10)	[illegible]	ND (0.10)	ND (0.10)	ND (0.10)	[illegible]	[illegible]	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)
Xylene (total)	5	[illegible]	ND (0.12)	ND (0.12)	ND (0.12)	ND (0.12)	ND (0.12)	[illegible]	ND (0.12)	[illegible]	ND (0.12)	ND (0.12)	ND (0.12)	[illegible]	[illegible]	ND (0.12)	ND (0.12)	ND (0.12)	ND (0.12)	ND (0.12)
Total VOCs		[illegible]	0	0.7	40.95	44.93	94.03	[illegible]	14.52	[illegible]	0.81	0.36	3.37	[illegible]	[illegible]	47.3	20.27	0.55	0	0
Total VOC TICs		0	0	5.1 J	0	0	0	[illegible]	0	[illegible]	0	0	0	[illegible]	[illegible]	0	0	0	0	0

Legend: **All concentrations are in ug/l.**

1. AWQS - NYS Ambient Groundwater Quality Standards for Class GA (potable) ground water as listed in TOGS 1.1.1 (June 1998) and in 6 NYCRR 703.5.
2. AWQGV - NYS Ambient Groundwater Quality Guidance Values for Class GA (potable) ground water as listed in TOGS 1.1.1 (June 1998) and in 6 NYCRR 703.5.

ND (x) - Not detected at the specified reporting limit.
Detected - Compound was detected at the indicated concentration.
Exceed - Results flagged as "Exceed" if any of the selected criteria exceeded (most stringent).
J - Estimated value
TIC - Tentatively Identified Compounds based on a search of organic compound mass spectra.

Table 1
Summary of May 2016 Groundwater Sample Results
150 Fulton Avenue Site, Garden City Park, New York

ERM

Well/Boring/Sample ID:	NYS AWQS & GV [1,2]	MW27-389.5	MW27F-389	MW27F-413.5	MW27G-440	MW27I-476.5	TB043015	TB050115	TB050415	TB050515	TB050615	TB050715	TB050815	FB043015	FB050115	FB050415	FB050515	FB050615	FB050715	FB050815
Lab Sample ID:		JB94230-8	JB94230-9	JB94230-10	JB94230-11	JB94230-12	JB93700-6	JB93787-7	JB93885-5	JB93889-6	JB94107-11	JB94230-13	JB94352-3	JB93700-7	JB93787-8	JB93885-6	JB93885-7	JB94107-10	JB94230-14	JB94352-2
Date Sampled:		5/7/2015	5/7/2015	5/7/2015	5/7/2015	5/7/2015	4/30/2015	5/1/2015	5/4/2015	5/5/2015	5/6/2015	5/7/2015	5/8/2015	4/30/2015	5/1/2015	5/4/2015	5/5/2015	5/6/2015	5/7/2015	5/8/2015
Matrix		Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Trip Blank Water	Trip Blank Water	Trip Blank Water	Trip Blank Water	Trip Blank Water	Trip Blank Water	Trip Blank Water	Field Blank Water	Field Blank Water	Field Blank Water	Field Blank Water	Field Blank Water	Field Blank Water	Field Blank Water
GCMS Volatiles (SW846 8260B)																				
1,1,1-Trichloroethane	5	ND (0.12)	ND (0.12)	ND (0.12)	ND (0.12)	ND (0.12)	ND (0.12)	ND (0.12)	ND (0.12)	ND (0.12)	ND (0.12)	ND (0.12)	ND (0.12)	ND (0.12)	ND (0.12)	ND (0.12)	ND (0.12)	ND (0.12)	ND (0.12)	ND (0.12)
1,1,2,2-Tetrachloroethane	5	ND (0.096)	ND (0.096)	ND (0.096)	ND (0.096)	ND (0.096)	ND (0.096)	ND (0.096)	ND (0.096)	ND (0.096)	ND (0.096)	ND (0.096)	ND (0.096)	ND (0.096)	ND (0.096)	ND (0.096)	ND (0.096)	ND (0.096)	ND (0.096)	ND (0.096)
1,1,2-Trichloroethane	1	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)
1,1-Dichloroethane	5	ND (0.097)	ND (0.097)	ND (0.097)	ND (0.097)	ND (0.097)	ND (0.097)	ND (0.097)	ND (0.097)	ND (0.097)	ND (0.097)	ND (0.097)	ND (0.097)	ND (0.097)	ND (0.097)	ND (0.097)	ND (0.097)	ND (0.097)	ND (0.097)	ND (0.097)
1,1-Dichloroethene	5	ND (0.14)	ND (0.14)	ND (0.14)	ND (0.14)	ND (0.14)	ND (0.14)	ND (0.14)	ND (0.14)	ND (0.14)	ND (0.14)	ND (0.14)	ND (0.14)	ND (0.14)	ND (0.14)	ND (0.14)	ND (0.14)	ND (0.14)	ND (0.14)	ND (0.14)
1,2,4-Trichlorobenzene	5	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)
1,2-Dibromo-3-chloropropane	0.04	ND (0.51)	ND (0.51)	ND (0.51)	ND (0.51)	ND (0.51)	ND (0.51)	ND (0.51)	ND (0.51)	ND (0.51)	ND (0.51)	ND (0.51)	ND (0.51)	ND (0.51)	ND (0.51)	ND (0.51)	ND (0.51)	ND (0.51)	ND (0.51)	ND (0.51)
1,2-Dibromoethane	0.0006	ND (0.13)	ND (0.13)	ND (0.13)	ND (0.13)	ND (0.13)	ND (0.13)	ND (0.13)	ND (0.13)	ND (0.13)	ND (0.13)	ND (0.13)	ND (0.13)	ND (0.13)	ND (0.13)	ND (0.13)	ND (0.13)	ND (0.13)	ND (0.13)	ND (0.13)
1,2-Dichlorobenzene	3	ND (0.063)	ND (0.063)	ND (0.063)	ND (0.063)	ND (0.063)	ND (0.063)	ND (0.063)	ND (0.063)	ND (0.063)	ND (0.063)	ND (0.063)	ND (0.063)	ND (0.063)	ND (0.063)	ND (0.063)	ND (0.063)	ND (0.063)	ND (0.063)	ND (0.063)
1,2-Dichloroethane	0.6	ND (0.097)	ND (0.097)	ND (0.097)	ND (0.097)	ND (0.097)	ND (0.097)	ND (0.097)	ND (0.097)	ND (0.097)	ND (0.097)	ND (0.097)	ND (0.097)	ND (0.097)	ND (0.097)	ND (0.097)	ND (0.097)	ND (0.097)	ND (0.097)	ND (0.097)
1,2-Dichloropropane	1	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)
1,3-Dichlorobenzene	3	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)
1,4-Dichlorobenzene	3	ND (0.061)	ND (0.061)	ND (0.061)	ND (0.061)	ND (0.061)	ND (0.061)	ND (0.061)	ND (0.061)	ND (0.061)	ND (0.061)	ND (0.061)	ND (0.061)	ND (0.061)	ND (0.061)	ND (0.061)	ND (0.061)	ND (0.061)	ND (0.061)	ND (0.061)
1,4-Dioxane		ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)
2-Butanone (MEK)	50	ND (1.2)	ND (1.2)	ND (1.2)	ND (1.2)	ND (1.2)	ND (1.2)	ND (1.2)	ND (1.2)	ND (1.2)	ND (1.2)	ND (1.2)	ND (1.2)	ND (1.2)	ND (1.2)	ND (1.2)	ND (1.2)	ND (1.2)	ND (1.2)	ND (1.2)
2-Hexanone	50	ND (1.4)	ND (1.4)	ND (1.4)	ND (1.4)	ND (1.4)	ND (1.4)	ND (1.4)	ND (1.4)	ND (1.4)	ND (1.4)	ND (1.4)	ND (1.4)	ND (1.4)	ND (1.4)	ND (1.4)	ND (1.4)	ND (1.4)	ND (1.4)	ND (1.4)
4-Methyl-2-pentanone(MIBK)		ND (0.19)	ND (0.19)	ND (0.19)	ND (0.19)	ND (0.19)	ND (0.19)	ND (0.19)	ND (0.19)	ND (0.19)	ND (0.19)	ND (0.19)	ND (0.19)	ND (0.19)	ND (0.19)	ND (0.19)	ND (0.19)	ND (0.19)	ND (0.19)	ND (0.19)
Acetone	50	ND (1.7)	ND (1.7)	ND (1.7)	ND (1.7)	ND (1.7)	ND (1.7)	ND (1.7)	ND (1.7)	1.9 J	ND (1.7)	ND (1.7)	ND (1.7)	ND (1.7)	ND (1.7)	ND (1.7)	2.1 J	ND (1.7)	ND (1.7)	ND (1.7)
Benzene	1	ND (0.090)	ND (0.090)	ND (0.090)	ND (0.090)	ND (0.090)	ND (0.090)	ND (0.090)	ND (0.090)	ND (0.090)	ND (0.090)	ND (0.090)	ND (0.090)	ND (0.090)	ND (0.090)	ND (0.090)	ND (0.090)	ND (0.090)	ND (0.090)	ND (0.090)
Bromochloromethane	5	ND (0.15)	ND (0.15)	ND (0.15)	ND (0.15)	ND (0.15)	ND (0.15)	ND (0.15)	ND (0.15)	ND (0.15)	ND (0.15)	ND (0.15)	ND (0.15)	ND (0.15)	ND (0.15)	ND (0.15)	ND (0.15)	ND (0.15)	ND (0.15)	ND (0.15)
Bromodichloromethane	50	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)
Bromoform	50	ND (0.081)	ND (0.081)	ND (0.081)	ND (0.081)	ND (0.081)	ND (0.081)	ND (0.081)	ND (0.081)	ND (0.081)	ND (0.081)	ND (0.081)	ND (0.081)	ND (0.081)	ND (0.081)	ND (0.081)	ND (0.081)	ND (0.081)	ND (0.081)	ND (0.081)
Bromomethane	5	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)
Carbon disulfide	60	ND (0.18)	ND (0.18)	ND (0.18)	ND (0.18)	0.49 J	ND (0.18)	ND (0.18)	ND (0.18)	ND (0.18)	ND (0.18)	ND (0.18)	ND (0.18)	ND (0.18)	ND (0.18)	ND (0.18)	ND (0.18)	ND (0.18)	ND (0.18)	ND (0.18)
Carbon tetrachloride	5	ND (0.096)	ND (0.096)	ND (0.096)	ND (0.096)	ND (0.096)	ND (0.096)	ND (0.096)	ND (0.096)	ND (0.096)	ND (0.096)	ND (0.096)	ND (0.096)	ND (0.096)	ND (0.096)	ND (0.096)	ND (0.096)	ND (0.096)	ND (0.096)	ND (0.096)
Chlorobenzene	5	ND (0.088)	ND (0.088)	ND (0.088)	ND (0.088)	ND (0.088)	ND (0.088)	ND (0.088)	ND (0.088)	ND (0.088)	ND (0.088)	ND (0.088)	ND (0.088)	ND (0.088)	ND (0.088)	ND (0.088)	ND (0.088)	ND (0.088)	ND (0.088)	ND (0.088)
Chloroethane	5	ND (0.15)	ND (0.15)	ND (0.15)	ND (0.15)	ND (0.15)	ND (0.15)	ND (0.15)	ND (0.15)	ND (0.15)	ND (0.15)	ND (0.15)	ND (0.15)	ND (0.15)	ND (0.15)	ND (0.15)	ND (0.15)	ND (0.15)	ND (0.15)	ND (0.15)
Chloroform	7	ND (0.088)	ND (0.088)	ND (0.088)	ND (0.088)	ND (0.088)	ND (0.088)	ND (0.088)	ND (0.088)	ND (0.088)	ND (0.088)	ND (0.088)	ND (0.088)	ND (0.088)	ND (0.088)	ND (0.088)	ND (0.088)	ND (0.088)	ND (0.088)	ND (0.088)
Chloromethane	5	ND (0.12)	ND (0.12)	ND (0.12)	ND (0.12)	ND (0.12)	ND (0.12)	ND (0.12)	ND (0.12)	0.48 J	ND (0.12)	ND (0.12)	ND (0.12)	ND (0.12)	ND (0.12)	ND (0.12)	ND (0.12)	ND (0.12)	ND (0.12)	ND (0.12)
cis-1,2-Dichloroethene	5	ND (0.14)	ND (0.14)	ND (0.14)	ND (0.14)	0.45 J	ND (0.14)	ND (0.14)	ND (0.14)	ND (0.14)	ND (0.14)	ND (0.14)	ND (0.14)	ND (0.14)	ND (0.14)	ND (0.14)	ND (0.14)	ND (0.14)	ND (0.14)	ND (0.14)
cis-1,3-Dichloropropene	0.4	ND (0.078)	ND (0.078)	ND (0.078)	ND (0.078)	ND (0.078)	ND (0.078)	ND (0.078)	ND (0.078)	ND (0.078)	ND (0.078)	ND (0.078)	ND (0.078)	ND (0.078)	ND (0.078)	ND (0.078)	ND (0.078)	ND (0.078)	ND (0.078)	ND (0.078)
Dibromochloromethane	50	ND (0.12)	ND (0.12)	ND (0.12)	ND (0.12)	ND (0.12)	ND (0.12)	ND (0.12)	ND (0.12)	ND (0.12)	ND (0.12)	ND (0.12)	ND (0.12)	ND (0.12)	ND (0.12)	ND (0.12)	ND (0.12)	ND (0.12)	ND (0.12)	ND (0.12)
Ethylbenzene	5	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)
Methylene chloride	5	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)
Styrene	5	ND (0.053)	ND (0.053)	ND (0.053)	ND (0.053)	ND (0.053)	ND (0.053)	ND (0.053)	ND (0.053)	ND (0.053)	ND (0.053)	ND (0.053)	ND (0.053)	ND (0.053)	ND (0.053)	ND (0.053)	ND (0.053)	ND (0.053)	ND (0.053)	ND (0.053)
Tetrachloroethene	5	ND (0.12)	ND (0.12)	ND (0.12)	0.69 J	ND (0.12)	ND (0.12)	ND (0.12)	ND (0.12)	ND (0.12)	ND (0.12)	ND (0.12)	ND (0.12)	ND (0.12)	ND (0.12)	ND (0.12)	ND (0.12)	ND (0.12)	ND (0.12)	ND (0.12)
Toluene	5	ND (0.054)	ND (0.054)	0.21 J	0.83 J	0.81 J	ND (0.054)	ND (0.054)	ND (0.054)	ND (0.054)	ND (0.054)	ND (0.054)	ND (0.054)	ND (0.054)	ND (0.054)	ND (0.054)	ND (0.054)	ND (0.054)	ND (0.054)	ND (0.054)
trans-1,2-Dichloroethene	5	ND (0.24)	ND (0.24)	ND (0.24)	ND (0.24)	ND (0.24)	ND (0.24)	ND (0.24)	ND (0.24)	ND (0.24)	ND (0.24)	ND (0.24)	ND (0.24)	ND (0.24)	ND (0.24)	ND (0.24)	ND (0.24)	ND (0.24)	ND (0.24)	ND (0.24)
trans-1,3-Dichloropropene	0.4	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)
Trichloroethene	5	ND (0.084)	ND (0.084)	ND (0.084)	0.31 J	0.64 J	ND (0.084)	ND (0.084)	ND (0.084)	ND (0.084)	ND (0.084)	ND (0.084)	ND (0.084)	ND (0.084)	ND (0.084)	ND (0.084)	ND (0.084)	ND (0.084)	ND (0.084)	ND (0.084)
Vinyl chloride	2	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)
Xylenes (total)	5	ND (0.12)	ND (0.12)	ND (0.12)	ND (0.12)	ND (0.12)	ND (0.12)	ND (0.12)	ND (0.12)	ND (0.12)	ND (0.12)	ND (0.12)	ND (0.12)	ND (0.12)	ND (0.12)	ND (0.12)	ND (0.12)	ND (0.12)	ND (0.12)	ND (0.12)
Total VOCs		0	0	0.29	2.84	2.98	0	0	0	2.15	0	0	0	0	0	0	2.1	0	0	0
Total VOC TICs		0	0	0	0	7.03	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Legend: All concentrations are in ug/l

	1. AWQS - NYS Ambient Groundwater Quality Standards for Class GA (potable) ground water as listed in TOGS 1.1.1 (June 1998) and in 6 NYCRR 703.5.
	2. AWQGV - NYS Ambient Groundwater Quality Guidance Values for Class GA (potable) ground water as listed in TOGS 1.1.1 (June 1998) and in 6 NYCRR 703.5.
(#) U	Not detected at the specified reporting limit.
Detected	Compound was detected at the indicated concentration
Exceed	Results flagged as "Exceed" if any of the selected criteria exceeded (most stringent).

J: Estimated value

TIC: Tentatively Identified Compounds based on a search of organic compound mass spectra.

Table 2
Summary of Historic Ground Water Monitoring Well Sample Results for Select Predominant Compounds
150 Fulton Avenue, Garden City Park, New York

ERM

GCP01			
Date	PCE	TCE	cis-1,2-DCE
12/30/94	3,700.0	0.0	0.0
03/27/95	3,400.0	4.0	0.0
12/18/95	36,000.0	350.0	1,400.0
01/17/96	50,000.0	360.0	780.0
04/19/96	3,700.0	160.0	140.0
11/26/96	980.0	0.0	0.0
01/17/97	1,400.0	14.0	1.0
06/18/97	18,000.0	79.0	66.0
09/27/99	20,000.0	3,100.0	660.0
04/21/04	2,400.0	340.0	0.0
05/10/05	3,100.0	110.0	0.0
08/16/05	3,300.0	110.0	0.0
06/12/08	1,200.0	61.0	0.0
10/22/01	2,900.0	2,200.0	360.0
05/13/03	5,600.0	110.0	180.0
12/17/03	910.0	180.0	760.0
05/10/04	910.0	88.0	38.0
12/08/04	5,600.0	180.0	0.0
06/20/05	810.0	19.0	0.0
11/03/05	880.0	180.0	0.0
06/07/06	995.0	11.0	0.0
12/22/06	1,400.0	89.0	0.0
12/18/08	1,600.0	1,600.0	34.0
11/14/11	100.0	98.7	28.0
12/19/11	884.0	180.0	38.0
01/28/14	2,400.0	1,700.0	560.0
01/28/14	2,400.0	1,600.0	540.0
03/13/15	210.0	13.0	0.0
06/26/15	1,600.0	364.0	284.0
Min	100.0	0.0	0.0
Max	50,000.0	3,100.0	1,400.0
Average	5,000.1	448.7	200.4

GCP01D			
Date	PCE	TCE	cis-1,2-DCE
09/18/95	145.0	0.0	0.0
09/09/98	0.0	0.0	0.0
10/02/01	16.0	0.0	0.0
07/14/03	15.0	0.0	0.0
05/13/03	28.0	0.0	0.0
12/19/03	3.0	0.0	0.0
05/10/04	4.0	0.0	0.0
12/08/04	5.0	0.0	0.0
05/20/05	4.0	0.0	0.0
11/03/05	16.0	0.0	0.0
05/07/06	2.8	0.0	0.0
12/22/06	5.3	0.0	0.0
12/18/08	42.8	0.0	0.0
11/14/11	13.8	0.7	0.0
03/02/15	2.0	0.0	0.0
Min	0.0	0.0	0.0
Max	145.0	0.0	0.0
Average	20.4	0.0	0.0

GCP02			
Date	PCE	TCE	cis-1,2-DCE
12/30/94	180.0	440.0	0.0
03/27/95	17.0	88.0	0.0
12/18/95	200.0	98.0	14.0
04/26/96	170.0	80.0	5.0
11/26/96	46.0	7.0	0.0
01/08/01	230.0	8.0	12.0
01/17/02	43.0	16.0	8.0
06/18/02	44.0	46.0	20.0
09/25/02	16.0	80.0	11.0
04/21/04	15.0	36.0	17.0
05/09/05	2.4	11.0	0.0
06/19/06	4.0	8.0	0.0
03/21/01	8.0	8.0	0.0
Min	0.0	0.0	0.0
Max	230.0	440.0	14.0
Average	72.3	91.2	3.2

GCP03			
Date	PCE	TCE	cis-1,2-DCE
11/28/95	0.0	0.0	0.0
12/30/95	240.0	82.0	18.0
04/27/96	8.0	230.0	87.0
10/12/00	4.0	24.0	10.0
03/26/01	2.0	24.0	12.0
07/05/01	2.0	17.0	8.0
01/13/02	4.0	12.0	4.0
09/16/02	12.0	69.0	56.0
09/26/03	6.0	31.0	28.0
04/21/04	5.8	42.0	24.0
05/10/05	2.4	38.0	9.0
09/21/01	2.0	32.0	19.0
Min	0.0	0.0	0.0
Max	240.0	230.0	87.0
Average	24.1	60.1	26.8

GCP04			
Date	PCE	TCE	cis-1,2-DCE
11/27/95	300.0	40.0	NS
12/19/95	120.0	28.0	14.0
10/12/00	8.0	3.0	1.0
07/05/01	120.0	10.0	14.0
01/17/02	28.0	120.0	2.0
09/16/02	92.0	620.0	6.0
09/25/03	84.0	300.0	13.0
04/21/04	36.0	55.0	3.0
05/10/05	610.0	41.0	NS
09/07/06	15.4	11.5	1.5
09/10/01	10.0	20.0	3.0
11/15/11	1.9	0.0	0.0
03/04/15	1.0	0.0	0.0
Min	1.0	0.0	0.0
Max	610.0	620.0	14.0
Average	127.5	95.0	5.0

GCP05			
Date	PCE	TCE	cis-1,2-DCE
11/27/95	490.0	550.0	NA
12/19/95	310.0	210.0	0.0
10/12/00	300.0	71.0	5.0
07/05/01	98.0	40.0	5.0
01/15/02	67.0	24.0	5.0
09/17/02	55.0	21.0	3.0
09/25/03	47.0	19.0	4.0
04/21/04	110.0	25.0	0.0
05/10/05	27.0	4.2	NA
09/29/01	0.9	3.0	1.0
Min	0.0	3.0	0.0
Max	490.0	550.0	5.0
Average	148.3	124.8	2.9

GCP06			
Date	PCE	TCE	cis-1,2-DCE
11/27/95	0.0	0.0	NA
12/20/95	0.0	0.0	0.0
04/25/96	0.0	1.0	0.0
11/09/00	3.0	0.0	0.0
01/08/01	5.0	0.0	0.0
01/13/02	11.0	23.0	0.0
09/17/02	11.0	23.0	0.0
09/23/03	9.0	14.0	0.0
04/25/04	0.0	0.0	0.0
09/12/01	5.0	4.0	0.1
Min	0.0	0.0	0.0
Max	11.0	23.0	0.1
Average	4.7	6.5	0.0

GCP07S			
Date	PCE	TCE	cis-1,2-DCE
11/21/95	1,700.0	50.0	38.0
12/19/95	2,900.0	160.0	68.0
04/19/96	90.0	90.0	9.0
06/21/00	29,000.0	900.0	830.0
10/02/00	10,000.0	470.0	180.0
01/02/01	3,900.0	100.0	76.0
01/22/02	480.0	15.0	6.0
06/18/02	280.0	8.0	8.0
09/27/03	84.0	14.0	1.0
04/22/04	16.0	8.7	2.5
06/16/05	0.0	1.2	0.0
09/07/01	1.0	0.0	0.0
03/09/15	0.0	0.0	0.0
Min	0.0	0.0	0.0
Max	29,000.0	900.0	830.0
Average	3,919.9	133.1	91.2

GCP07D			
Date	PCE	TCE	cis-1,2-DCE
01/22/02	343.0	10.0	7.0
06/18/02	170.0	16.0	9.0
09/29/03	190.0	0.0	24.0
04/21/04	44.0	0.0	0.0
06/16/05	220.0	11.0	18.0
09/02/99	0.0	0.0	0.0
09/07/01	8.0	0.0	0.0
03/09/15	6.5	0.0	0.0
Min	0.0	0.0	0.0
Max	343.0	16.0	24.0
Average	122.7	5.3	8.3

GCP08			
Date	PCE	TCE	cis-1,2-DCE
01/21/95	9.0	0.0	0.0
12/19/95	2,900.0	1.0	0.0
04/26/96	3,900.0	0.0	0.0
09/21/00	67.0	1.0	0.0
12/31/00	28.0	0.0	0.0
01/10/02	7.2	1.0	0.0
06/18/02	1,600.0	47.0	480.0
09/26/03	470.0	86.0	570.0
04/26/04	660.0	110.0	500.0
06/20/05	1,600.0	12.0	2.0
06/18/03	940.0	37.0	44.0
12/17/03	380.0	17.0	11.0
05/10/04	210.0	40.0	88.0
12/08/04	74.0	44.0	170.0
05/19/05	520.0	36.0	130.0
11/04/05	210.0	36.0	87.0
06/07/06	120.0	8.8	16.0
12/22/06	21.6	2.8	1.0
12/18/08	92.9	4.0	100.0
11/14/11	4.8	0.5	0.4
01/28/14	1.6	0.0	0.4
03/03/15	1.0	0.0	0.5
05/27/15	1.1	0.0	1.0
Min	1.1	0.0	0.0
Max	1,600.0	110.0	570.0
Average	371.0	26.1	95.6

GCP09			
Date	PCE	TCE	cis-1,2-DCE
11/21/95	16.0	0.0	0.0
12/19/95	36.0	0.0	0.0
09/21/00	17.0	0.0	0.0
12/31/00	4.0	0.0	0.0
01/08/01	14.0	0.0	0.0
01/13/02	4.0	0.0	0.0
09/18/02	11.0	0.0	0.0
04/26/04	24.0	0.0	0.0
09/22/05	110.0	0.0	14.0
10/31/01	47.0	0.0	0.0
11/14/11	0.0	0.0	0.0
03/06/15	0.0	0.0	0.0
Min	0.0	0.0	0.0
Max	110.0	0.0	14.0
Average	22.5	0.0	1.2

GCP10S			
Date	PCE	TCE	cis-1,2-DCE
01/06/92	6.6	0.0	0.0
06/10/92	0.0	0.0	0.0
09/16/93	0.0	0.0	0.0
04/26/04	0.8	42.0	24.0
01/28/99	0.0	0.0	0.0
09/05/01	0.0	0.0	0.0
Min	0.0	0.0	0.0
Max	6.6	42.0	24.0
Average	2.3	7.0	4.0

GCP10D			
Date	PCE	TCE	cis-1,2-DCE
01/03/92	6.2	0.0	0.0
06/10/92	0.0	0.0	0.0
09/16/93	0.0	0.0	0.0
04/25/94	0.0	0.0	0.0
01/28/99	2.9	0.0	0.0
09/07/01	6.0	0.8	0.0
Min	0.0	0.0	0.0
Max	6.2	0.8	0.0
Average	2.5	0.1	0.0

GCP11S			
Date	PCE	TCE	cis-1,2-DCE
01/03/92	23.6	0.0	0.0
06/04/98	0.0	0.0	0.0
09/07/01	0.0	3.0	0.0
Min	0.0	0.0	0.0
Max	23.6	3.0	0.0
Average	8.9	1.2	0.0

All values are in µg/L
0.0 = Not detected at the listed detection
Values in blue text are for total 1,2-dichloroethene
LNA

Table 2
Summary of Historic Ground Water Monitoring Well Sample Results for Select Predominant Compounds
150 Fulton Avenue, Garden City Park, New York

ERM

GCP12S			
Date	PCE	TCE	cis-1,2 DCE
03/08/95	0.0	0.0	0.0
09/04/96	0.0	0.0	0.0
09/17/01	0.0	0.0	0.0
Min	0.0	0.0	0.0
Max	0.0	0.0	0.0
Average	0.0	0.0	0.0

GCP12D			
Date	PCE	TCE	cis-1,2 DCE
01/08/92	100.0	0.0	0.0
06/10/96	71.0	0.7	0.0
05/11/00	69.0	0.0	0.0
09/17/01	100	1.1	0.7
Min	0.0	0.0	0.0
Max	100.0	1.1	0.7
Average	71.0	0.6	0.2

GCP13S			
Date	PCE	TCE	cis-1,2 DCE
01/07/92	10.0	1.0	1.0
11/19/96	1.4	0.0	0.0
08/18/97	1.3	3.0	0.0
07/06/99	1.3	2.2	0.0
09/19/01	0.0	1.0	0.0
Min	0.0	1.0	0.0
Max	10.0	4.0	1.0
Average	2.9	2.5	0.7

GCP13D			
Date	PCE	TCE	cis-1,2 DCE
01/07/92	56.0	105.0	1.0
06/10/96	24.0	42.6	0.0
05/11/00	13.0	0.0	0.0
09/19/01	10.0	17.0	0.0
Min	10.0	0.0	0.0
Max	56.0	105.0	1.0
Average	26.0	41.2	0.5

GCP14S			
Date	PCE	TCE	cis-1,2 DCE
01/07/92	0.0	0.0	0.0
12/03/96	0.0	0.0	0.0
08/25/01	0.0	0.0	0.0
03/04/15	0.0	0.0	0.0
Min	0.0	0.0	0.0
Max	0.0	0.0	0.0
Average	0.0	0.0	0.0

GCP14D			
Date	PCE	TCE	cis-1,2 DCE
01/07/92	10.0	4.0	1.0
12/03/96	0.0	0.0	0.0
08/25/01	0.0	1.0	1.0
03/04/15	0.0	0.0	0.0
Min	0.0	0.0	0.0
Max	10.0	4.0	1.0
Average	10.0	5.0	0.7

GCP15S			
Date	PCE	TCE	cis-1,2 DCE
01/08/92	0.0	0.0	0.0
12/03/96	0.0	0.0	0.0
08/25/01	0.0	0.0	0.0
05/21/03	0.1	0.0	0.0
06/13/03	1.0	0.0	0.0
12/16/03	0.3	0.0	0.0
06/07/04	0.0	0.0	0.0
12/09/04	0.4	0.0	0.0
05/17/05	2.0	0.0	0.0
11/13/05	2.0	0.0	0.0
05/31/06	0.0	0.0	0.0
12/21/06	0.0	0.0	0.0
12/19/08	0.0	0.0	0.0
11/11/11	0.0	0.0	0.0
03/03/15	0.0	0.0	0.0
05/05/15	0.0	0.0	0.0
Min	0.0	0.0	0.0
Max	10.0	0.0	0.0
Average	1.4	0.0	0.0

MW15A			
Date	PCE	TCE	cis-1,2 DCE
07/20/01	1.0	0.0	0.0
09/26/01	0.0	0.0	0.0
12/03/01	2.0	0.0	0.0
05/21/03	78.0	0.0	0.0
06/13/03	400.0	67.0	10.0
12/16/03	0.0	0.0	0.0
06/07/04	2.0	0.0	0.0
12/09/04	1,100.0	190.0	68.0
05/17/05	1,400.0	180.0	64.0
11/13/05	2,800.0	390.0	89.0
05/31/06	1,800.0	170.0	66.0
12/21/06	2,400.0	160.0	78.6
12/19/08	1,410.0	95.0	78.0
11/11/11	1,130.0	81.0	80.5
03/04/15	240.0	16.0	14.0
05/05/15	350.0	21.0	21.0
Min	0.0	0.0	0.0
Max	2,800.0	390.0	89.0
Average	994.1	73.4	30.9

MW15B			
Date	PCE	TCE	cis-1,2 DCE
07/20/01	1,500.0	97.0	0.0
09/26/01	80.0	0.0	0.0
12/03/01	1,240.0	68.0	0.0
05/21/03	600.0	43.0	0.0
06/11/03	580.0	60.0	0.0
12/16/03	440.0	64.0	4.0
06/07/04	470.0	58.0	4.0
12/09/04	140.0	44.0	4.0
05/17/05	310.0	64.0	4.0
11/02/05	280.0	58.0	8.5
05/31/06	284.0	51.4	8.1
12/21/06	250.0	37.7	6.1
12/19/08	174.0	29.7	1.8
11/11/11	180.0	19.0	0.0
03/03/15	0.0	0.0	0.0
05/05/15	17.2	4.0	0.5
Min	0.0	0.0	0.0
Max	1,500.0	97.0	8.5
Average	411.2	42.9	3.3

GCP16S			
Date	PCE	TCE	cis-1,2 DCE
01/13/92	9.0	25.0	0.7
04/26/94	0.0	0.0	0.0
11/20/96	9.7	9.8	0.0
09/06/01	1.6	19.0	0.0
Min	0.0	0.0	0.0
Max	9.7	25.0	0.7
Average	2.7	8.0	0.2

GCP17S			
Date	PCE	TCE	cis-1,2 DCE
08/22/95	5,600.0	0.0	0.0
05/18/98	2,000.0	34.0	0.0
09/09/98	29,000.0	500.0	58.0
10/04/01	21.0	10.0	12.0
12/16/11	1.4	0.0	0.0
Min	1.4	0.0	0.0
Max	29,000.0	500.0	58.0
Average	7,324.5	128.0	14.0

GCP17D			
Date	PCE	TCE	cis-1,2 DCE
08/22/95	7,100.0	0.0	0.0
09/04/96	9.0	1.0	0.0
12/01/01	4.0	0.0	0.0
12/16/11	0.1	0.1	0.0
Min	0.1	0.0	0.0
Max	7,100.0	1.0	0.0
Average	1,778.0	0.3	0.1

GCP18S			
Date	PCE	TCE	cis-1,2 DCE
08/17/05	700.0	300.0	5,700.0
05/18/06	400.0	200.0	2,000.0
09/05/06	1,100.0	200.0	6,400.0
05/18/01	200.0	60.0	785.0
06/14/03	80.0	80.0	3,000.0
12/15/03	40.0	0.0	2,000.0
05/10/04	60.0	0.0	3,100.0
12/08/04	40.0	1.0	40.0
05/18/05	0.0	0.0	2,000.0
11/03/05	20.0	70.0	680.0
06/07/06	2.0	0.0	1.1
12/22/06	60.0	4.0	170.0
12/16/08	50.0	10.0	260.0
11/14/11	2.0	0.0	0.0
12/15/11	0.4	0.0	0.0
05/07/15	1.0	0.0	0.1
Min	0.0	0.0	0.0
Max	1,100.0	300.0	6,400.0
Average	206.5	60.2	1,670.1

GCP16D			
Date	PCE	TCE	cis-1,2 DCE
08/17/95	4.2	0.0	4.2
05/19/98	0.0	0.0	0.0
09/19/01	2.0	0.0	0.4
06/14/03	1.0	0.2	0.0
12/16/03	0.0	0.0	0.0
05/18/04	1.0	0.0	0.0
12/08/04	0.0	0.0	0.0
05/18/05	1.0	0.0	0.0
11/03/05	0.4	0.0	0.0
06/07/06	0.0	0.0	0.0
12/22/06	0.0	0.0	0.0
12/19/08	0.7	0.0	0.0
11/14/11	0.0	0.0	0.4
05/07/15	0.0	0.0	0.0
Min	0.0	0.0	0.0
Max	4.2	0.0	4.2
Average	0.7	0.0	0.4

GCP19S			
Date	PCE	TCE	cis-1,2 DCE
08/17/95	2,800.0	0.0	0.0
09/19/96	2,100.0	29.0	0.0
01/12/95	350.0	28.1	0.0
05/07/20	17.0	0.0	0.0
09/19/01	0.0	41.0	1.0
11/16/11	1.1	0.0	0.0
Min	1.1	0.0	0.0
Max	2,800.0	41.0	1.0
Average	1,053.3	13.0	0.2

MW20A			
Date	PCE	TCE	cis-1,2 DCE
04/24/01	0.0	0.0	0.0
09/18/01	0.0	0.0	0.0
04/30/15	0.0	0.0	0.0
Min	0.0	0.0	0.0
Max	0.0	0.0	0.0
Average	0.0	0.0	0.0

MW20B			
Date	PCE	TCE	cis-1,2 DCE
05/15/01	0.0	54.0	0.1
09/18/01	0.0	12.0	0.0
04/30/15	0.0	0.0	0.0
Min	0.0	0.0	0.0
Max	0.0	54.0	0.1
Average	0.0	15.3	0.1

MW20C			
Date	PCE	TCE	cis-1,2 DCE
05/14/01	0.0	0.0	0.0
09/18/01	0.0	0.0	0.0
04/30/15	0.5	1.1	0.0
Min	0.0	0.0	0.0
Max	0.5	1.1	0.0
Average	0.2	0.4	0.0

MW21A			
Date	PCE	TCE	cis-1,2 DCE
05/25/01	4.0	0.0	0.0
09/24/01	9.0	0.2	0.0
05/22/03	14.0	0.0	0.0
06/14/03	19.0	0.0	0.0
12/15/03	14.0	0.0	0.0
12/13/04	14.0	0.0	0.0
05/09/04	8.0	0.0	0.0
12/07/04	14.0	0.0	0.0
05/13/05	18.0	0.0	0.0
11/01/05	8.0	0.0	0.0
06/01/06	10.3	0.0	0.0
12/20/06	6.7	0.0	0.0
06/21/07	9.0	0.0	0.0
12/15/08	1.8	0.0	0.0
06/02/09	1.8	0.0	0.0
01/05/10	1.8	0.0	0.0
05/12/10	0.8	0.0	0.0
10/28/10	0.8	0.0	0.0
11/09/11	0.8	0.0	0.0
03/05/15	0.8	0.0	0.0
05/01/15	0.0	0.0	0.0
Min	0.0	0.0	0.0
Max	19.0	0.2	0.0
Average	7.1	0.1	0.0

MW21B			
Date	PCE	TCE	cis-1,2 DCE
05/25/01	300.0	42.0	0.5
09/24/01	180.0	4.0	0.0
06/23/03	490.0	33.0	0.0
06/12/03	490.0	28.0	0.0
12/15/03	460.0	29.0	0.0
06/08/04	2,000.0	91.0	0.0
12/07/04	1,900.0	97.0	0.0
05/13/05	1,800.0	86.0	0.0
11/01/05	1,800.0	88.0	0.0
06/01/06	1,130.0	88.5	0.7
12/20/06	1,940.0	100.0	0.0
06/21/07	2,110.0	97.7	1.0
12/15/08	2,070.0	104.0	0.0
06/02/09	2,690.0	208.0	14.1
01/05/10	1,870.0	183.6	9.1
05/12/10	2,600.0	217.0	10.6
10/28/10	2,190.0	208.0	24.6
11/09/11	1,930.0	88.1	9.5
03/05/15	1.0	1.1	0.5
05/01/15	1,870.0	183.0	14.5
Min	1.0	1.1	0.0
Max	2,870.0	217.0	24.6
Average	1,364.4	97.0	7.2

MW21C			
Date	PCE	TCE	cis-1,2 DCE
07/19/01	990.0	1.0	0.0
09/24/01	27.0	1.0	0.0
05/22/03	1,600.0	0.0	0.0
06/12/03	1,600.0	0.0	0.0
12/15/03	990.0	0.0	0.0
05/07/04	1,600.0	0.0	0.0
12/07/04	1,300.0	0.0	0.0
05/13/05	3,100.0	21.0	0.0
11/01/05	880.0	0.0	0.0
06/01/06	3,000.0	28.7	7.4
12/20/06	2,410.0	32.4	10.0
06/21/07	9.0	0.0	1.0
12/15/08	2,020.0	53.1	8.4
06/02/09	2,620.0	54.6	10.8
01/05/10	458.0	25.6	10.8
05/12/10	2,200.0	78.9	8.6
10/28/10	194.0	12.4	4.0
11/09/11	850.0	48.4	7.5
03/05/15	1.0	0.0	0.0
05/01/15	818	18.8	2.0
Min	1.0	0.0	0.0
Max	3,100.0	54.6	10.8
Average	1,164.6	24.1	4.0

Color Not detected at the limit of detection
Values in blue font are for total 1,2-dichloroethene.
ERM

Table 2
Summary of Historic Ground Water Monitoring Well Sample Results for Select Predominant Compounds
150 Fulton Avenue, Garden City Park, New York

ERM

MW22A			
Date	PCE	TCE	cis-1,2-DCE
05/15/01	1.0	0.0	0.0
09/21/01	0.0	0.0	0.0
05/08/15	0.7	0.0	0.0
Min	0.7	0.0	0.0
Max	1.0	0.0	0.0
Average	0.9	0.0	0.0

MW22B			
Date	PCE	TCE	cis-1,2-DCE
05/15/01	1.0	0.0	0.0
09/21/01	0.0	0.0	0.0
10/04/01	0.0	0.0	0.0
05/04/15	0.0	0.0	0.0
Min	0.0	0.0	0.0
Max	1.0	0.0	0.0
Average	0.5	0.0	0.0

MW22C			
Date	PCE	TCE	cis-1,2-DCE
05/16/01	0.4	0.0	0.0
09/21/01	0.5	0.4	0.0
05/04/15	0.7	0.0	0.0
Min	0.7	0.0	0.0
Max	0.5	0.4	0.0
Average	0.6	0.1	0.0

MW23A			
Date	PCE	TCE	cis-1,2-DCE
05/24/01	0.4	2.0	0.0
09/20/01	0.7	0.0	0.0
05/05/04	0.0	0.0	0.0
12/06/04	0.0	0.0	0.0
05/18/05	2.0	0.0	0.0
10/31/05	0.0	4.0	0.0
05/06/06	0.0	5.5	0.0
12/20/06	0.0	4.0	0.0
06/22/07	0.0	5.7	0.0
12/22/08	0.0	0.5	0.0
11/10/11	0.0	0.0	0.0
04/30/15	0.0	0.3	0.0
Min	0.0	0.0	0.0
Max	2.0	5.5	0.0
Average	0.3	1.1	0.0

MW23B			
Date	PCE	TCE	cis-1,2-DCE
04/24/01	20.0	310.0	0.0
09/20/01	3.0	31.0	0.0
12/13/04	8.0	79.0	0.0
05/18/05	2.0	11.0	2.0
11/02/05	12.0	170.0	0.0
05/06/06	12.0	181.0	0.88
12/20/06	12.0	170.0	0.88
06/22/07	11.0	168.0	0.0
12/22/08	8.4	107.0	0.0
11/10/11	8.0	96.0	0.5
05/04/15	4.6	49.0	0.0
Min	2.0	11.0	0.0
Max	20.0	310.0	2.0
Average	9.0	113.0	0.4

MW23C			
Date	PCE	TCE	cis-1,2-DCE
07/25/01	10.0	99.0	0.0
09/20/01	3.0	44.0	0.0
05/05/04	30.0	280.0	8.0
12/06/04	30.0	180.0	1.0
05/18/05	20.0	280.0	8.0
10/31/05	28.0	130.0	1.0
05/06/06	21.1	120.0	1.0
12/19/06	32.0	163.0	1.3
06/22/07	46.0	204.0	1.1
12/22/08	20.7	166.0	0.8
11/10/11	8.3	80.0	0.8
04/30/15	4.8	52.0	0.5
Min	3.0	4.0	0.0
Max	46.0	280.0	8.0
Average	20.4	137.1	1.3

MW23D			
Date	PCE	TCE	cis-1,2-DCE
07/23/01	0.0	10.0	0.0
09/20/01	0.0	0.4	0.0
05/05/04	0.0	0.0	0.0
12/06/04	0.4	3.0	0.0
05/18/05	2.0	0.0	0.0
11/02/05	0.0	0.0	0.0
05/06/06	10.5	62.0	0.0
12/19/06	0.0	51.1	0.38
06/22/07	1.5	10.0	0.000
12/22/08	0.0	73.2	0.38
11/10/11	0.7	69.0	0.79
05/04/15	0.4	60.1	0.00
Min	0.0	0.0	0.0
Max	10.5	69.0	0.8
Average	0.9	33.0	0.2

MW24A			
Date	PCE	TCE	cis-1,2-DCE
09/13/01	64.0	58.0	0.0
09/25/01	0.0	0.0	0.0
05/01/15	12.1	91.3	1.1
Min	0.0	0.0	0.0
Max	64.0	91.3	1.1
Average	19.4	49.1	0.4

MW24B			
Date	PCE	TCE	cis-1,2-DCE
09/14/01	6.0	0.0	0.0
09/25/01	91.0	39.0	0.0
05/01/15	4.9	6.0	0.2
Min	4.9	0.0	0.0
Max	91.0	39.0	0.2
Average	33.9	15.0	0.1

MW25A			
Date	PCE	TCE	cis-1,2-DCE
07/19/01	27.0	66.0	0.0
09/27/01	8.0	8.0	1.0
05/06/15	11.0	19.3	1.0
Min	11.0	19.3	1.0
Max	27.0	66.0	1.0
Average	15.7	31.1	0.7

MW25B			
Date	PCE	TCE	cis-1,2-DCE
05/22/89	264.4	66.4	0.0
06/16/89	33.0	66.0	0.0
07/11/90	41.4	66.0	0.0
08/20/90	70.0	110.0	1.0
04/18/91	37.7	66.7	0.0
01/15/92	23.0	66.0	0.0
05/20/92	42.2	261.0	1.2
07/06/93	32.2	108.0	1.3
11/02/94	66.4	66.7	1.5
02/06/97	0.0	0.0	0.0
06/03/98	1.5	2.5	0.0
08/27/01	19.0	14.0	0.2
05/05/15	1.3	1.1	0.0
Min	0.0	0.0	0.0
Max	70.0	261.0	1.3
Average	26.7	70.3	0.5

MW25C			
Date	PCE	TCE	cis-1,2-DCE
05/22/89	0.0	0.0	0.0
06/16/89	0.0	0.0	0.0
07/11/90	0.0	0.0	0.0
08/20/90	0.0	0.0	0.0
04/18/91	0.0	0.0	0.0
05/20/92	0.0	0.0	0.0
07/06/93	0.0	0.0	0.0
08/12/94	0.0	0.0	0.0
02/06/97	0.0	0.0	0.0
06/03/98	0.0	0.0	0.0
08/27/01	0.0	0.0	0.0
05/05/15	0.0	0.0	0.0
Min	0.0	0.0	0.0
Max	0.0	0.0	0.0
Average	0.0	0.0	0.0

MW25A			
Date	PCE	TCE	cis-1,2-DCE
05/04/04	0.0	0.0	0.0
12/03/04	0.0	0.0	0.0
05/18/05	0.0	0.0	0.0
10/31/05	0.0	0.0	0.0
05/05/06	0.0	0.0	0.0
12/18/06	0.0	0.0	0.0
06/20/07	0.0	0.0	0.0
12/17/08	0.0	0.0	0.0
06/01/09	0.0	0.0	0.0
01/07/10	0.0	0.0	0.0
05/10/10	0.0	0.0	0.0
11/07/11	0.0	0.0	0.0
Min	0.0	0.0	0.0
Max	0.0	0.0	0.0
Average	0.0	0.0	0.0

MW25B			
Date	PCE	TCE	cis-1,2-DCE
05/04/04	0.0	0.0	0.0
12/03/04	0.0	0.0	0.0
05/18/05	0.0	0.0	0.0
10/31/05	0.0	0.0	0.0
05/05/06	0.0	0.0	0.0
12/18/06	0.0	0.0	0.0
06/20/07	0.0	0.0	0.0
12/17/08	0.0	0.0	0.0
06/01/09	0.0	0.0	0.0
01/07/10	0.0	0.0	0.0
05/10/10	0.0	0.0	0.0
11/07/11	0.0	0.0	0.0
Min	0.0	0.0	0.0
Max	0.0	0.0	0.0
Average	0.0	0.0	0.0

MW26C			
Date	PCE	TCE	cis-1,2-DCE
05/04/04	0.0	0.0	0.0
12/03/04	0.0	0.0	0.0
05/18/05	0.0	0.0	0.0
10/31/05	0.0	0.0	0.0
05/05/06	0.0	0.0	0.0
12/18/06	0.0	0.0	0.0
06/20/07	0.0	0.0	0.0
12/17/08	0.0	0.0	0.0
06/01/09	0.0	0.0	0.0
01/07/10	0.0	0.0	0.0
05/10/10	0.0	0.0	0.0
11/07/11	0.0	0.0	0.0
05/05/15	0.4	0.0	0.0
Min	0.0	0.0	0.0
Max	0.4	0.0	0.0
Average	0.0	0.0	0.0

MW26D			
Date	PCE	TCE	cis-1,2-DCE
05/04/04	0.0	0.0	0.0
12/03/04	0.0	0.0	0.0
05/18/05	0.0	0.0	0.0
10/31/05	0.0	0.0	0.0
05/05/06	0.0	0.00	0.0
12/18/06	0.0	0.00	0.0
06/20/07	0.0	0.00	0.0
12/17/08	1.0	0.0	0.0
06/01/09	0.00	0.00	0.0
01/07/10	0.00	0.00	0.0
05/10/10	0.00	1.0	0.0
11/07/11	0.00	0.0	0.0
05/05/15	2.30	0.2	0.2
05/06/15	2.30	0.2	0.2
Min	0.0	0.0	0.0
Max	2.3	1.00	0.2
Average	0.6	0.2	0.0

MW26E			
Date	PCE	TCE	cis-1,2-DCE
05/05/04	0.0	0.0	0.0
12/03/04	0.0	0.0	0.0
05/18/05	0.0	0.0	0.0
10/31/05	0.0	0.0	0.0
05/05/06	0.0	0.00	0.0
12/18/06	0.0	0.00	0.0
06/20/07	0.0	0.00	0.0
12/17/08	0.0	0.00	0.0
06/01/09	0.01	0.00	0.0
01/07/10	0.0	0.0	0.0
05/10/10	0.0	7.7	0.0
11/07/11	12.0	7.0	2.0
05/05/15	24.1	0.1	1.0
05/06/15	15.1	3.4	2.1
Min	0.0	0.0	0.0
Max	24.1	0.1	2.0
Average	4.8	2.0	0.4

MW26F			
Date	PCE	TCE	cis-1,2-DCE
05/03/04	0.0	0.0	0.0
12/03/04	0.0	0.0	0.0
05/18/05	0.0	10.0	1.0
10/31/05	1.0	10.0	0.0
05/05/06	4.5	30.0	2.4
12/18/06	3.5	20.0	1.0
06/20/07	0.0	0.0	1.1
12/17/08	0.0	0.0	0.0
06/01/09	0.0	0.0	0.0
01/07/10	0.0	0.0	1.0
05/10/10	0.0	0.0	0.0
11/07/11	4.7	0.0	0.1
05/05/15	42.0	10.3	0.0
05/06/15	30.0	12.0	2.0
Min	0.0	0.0	0.0
Max	42.0	30.0	2.0
Average	6.4	6.0	0.9

MW26G			
Date	PCE	TCE	cis-1,2-DCE
05/03/04	0.0	0.0	0.0
12/03/04	0.0	0.0	0.0
05/18/05	0.0	0.0	0.0
10/31/05	0.0	0.0	0.0
05/05/06	0.0	0.0	0.0
12/18/06	0.0	0.0	0.0
06/20/07	0.0	0.0	0.0
12/17/08	0.0	0.0	0.0
06/01/09	0.0	0.0	0.0
01/07/10	0.0	0.0	0.0
05/10/10	0.0	0.0	0.0
11/07/11	0.0	0.0	0.0
Min	0.0	0.0	0.0
Max	0.0	0.0	0.0
Average	0.0	0.0	0.0

MW26H			
Date	PCE	TCE	cis-1,2-DCE
05/03/04	0.0	0.0	0.0
12/03/04	0.0	0.0	0.0
05/18/05	0.0	0.0	0.0
10/31/05	0.0	0.0	0.0
05/05/06	0.0	0.0	0.0
12/18/06	0.0	0.0	0.0
06/20/07	0.0	0.0	0.0
12/17/08	0.0	0.0	0.0
06/01/09	0.0	0.0	0.0
01/07/10	0.0	0.0	0.0
05/10/10	0.0	0.0	0.0
11/07/11	0.0	0.0	0.0
Min	0.0	0.0	0.0
Max	0.0	0.0	0.0
Average	0.0	0.0	0.0

MW27A			
Date	PCE	TCE	cis-1,2-DCE
05/03/04	0.0	0.0	0.0
12/02/04	0.0	0.0	0.0
05/12/06	0.0	0.0	0.0
11/01/06	0.0	0.0	0.0
05/02/06	0.0	0.0	0.0
12/15/06	0.0	0.0	0.0
06/23/07	0.0	0.0	0.0
12/16/08	0.0	0.0	0.0
06/01/09	0.0	0.0	0.0
01/06/10	0.0	0.0	0.0
05/11/10	0.0	0.0	0.0
11/07/11	0.0	0.0	0.0
05/07/15	0.0	0.0	0.0
Min	0.0	0.0	0.0
Max	0.0	0.0	0.0
Average	0.0	0.0	0.0

All values are in ug/l.
0.0 = Not detected at the limit of detection
Values in bold are for total 1,2 dichloroethene.
ERM

Table 2
Summary of Historic Ground Water Monitoring Well Sample Results for Select Predominant Compounds
150 Fulton Avenue, Garden City Park, New York

ERM

MW2FB			
Date	PCE	TCE	cis-1,2-DCE
05/03/04	0.0	0.0	0.0
12/02/04	0.0	0.0	0.0
05/12/05	0.0	0.0	0.0
11/1/2005	0.0	0.0	0.0
05/02/06	0.0	0.0	0.0
12/15/06	0.0	0.0	0.0
08/23/07	0.0	0.0	0.0
12/16/08	0.0	0.0	0.0
08/01/09	0.0	0.0	0.0
01/06/10	0.0	0.0	0.0
05/11/10	0.0	0.0	0.0
12/20/11	0.0	0.0	0.0
03/07/15	0.0	0.0	0.0
Min	0.0	0.0	0.0
Max	0.0	0.0	0.0
Average	0.0	0.0	0.0

MW2FC			
Date	PCE	TCE	cis-1,2-DCE
05/03/04	0.0	0.0	0.0
12/02/04	0.0	0.0	0.0
05/12/05	0.0	0.0	0.0
11/1/2005	0.0	0.0	0.0
05/02/06	0.0	0.0	0.0
12/15/06	0.0	0.0	0.0
08/23/07	0.0	0.0	0.0
12/16/08	0.0	0.0	0.0
08/01/09	0.0	0.0	0.0
01/06/10	0.0	0.0	0.0
05/11/10	0.0	0.0	0.0
12/20/11	0.0	0.0	0.0
03/07/15	0.0	0.0	0.0
Min	0.0	0.0	0.0
Max	0.0	0.0	0.0
Average	0.0	0.0	0.0

MW2FD			
Date	PCE	TCE	cis-1,2-DCE
05/03/04	0.0	0.0	0.0
12/02/04	0.0	0.0	0.0
05/12/05	0.0	0.0	0.0
11/1/2005	0.0	0.0	0.0
05/02/06	0.0	0.0	0.0
12/15/06	0.0	0.0	0.0
08/23/07	0.0	0.0	0.0
12/16/08	0.0	0.0	0.0
08/01/09	0.0	0.0	0.0
01/06/10	0.0	0.0	0.0
05/11/10	0.0	0.0	0.0
11/08/11	0.0	0.0	0.0
03/07/15	0.0	0.0	0.0
Min	0.0	0.0	0.0
Max	0.0	0.0	0.0
Average	0.0	0.0	0.0

MW2TE			
Date	PCE	TCE	cis-1,2-DCE
05/03/04	0.0	0.0	0.0
12/02/04	0.0	0.0	0.0
05/12/05	0.0	0.0	0.0
11/1/2005	0.0	0.0	0.0
05/02/06	0.0	0.0	0.0
12/15/06	0.0	0.0	0.0
08/23/07	0.0	0.0	0.0
12/16/08	0.0	0.0	0.0
08/01/09	0.0	0.0	0.0
01/06/10	0.0	0.0	0.0
05/11/10	0.0	0.0	0.0
11/08/11	0.0	0.0	0.0
05/07/15	0.0	0.0	0.0
Min	0.0	0.0	0.0
Max	0.0	0.0	0.0
Average	0.0	0.0	0.0

MW2TF			
Date	PCE	TCE	cis-1,2-DCE
05/03/04	0.0	0.0	0.0
12/02/04	0.0	0.0	0.0
05/12/05	0.0	0.0	0.0
11/1/2005	0.0	0.0	0.0
05/02/06	0.0	0.0	0.0
12/15/06	0.0	0.0	0.0
08/23/07	0.0	0.0	0.0
12/16/08	0.0	0.0	0.0
08/01/09	0.0	0.0	0.0
01/06/10	0.0	0.0	0.0
05/11/10	0.0	0.0	0.0
11/08/11	0.0	0.0	0.0
05/07/15	0.0	0.0	0.0
Min	0.0	0.0	0.0
Max	0.0	0.0	0.0
Average	0.0	0.0	0.0

MW2TG			
Date	PCE	TCE	cis-1,2-DCE
05/03/04	0.0	0.0	0.0
12/02/04	0.0	0.0	0.0
05/12/05	0.0	0.0	0.0
11/1/2005	0.0	0.0	0.0
05/02/06	0.0	0.0	0.0
12/15/06	0.0	1.6	0.0
08/23/07	0.0	0.0	0.0
12/16/08	0.0	2.2	0.0
08/01/09	0.07	0.8	
01/06/10	0.0	0.1	0.0
05/11/10	0.0	1.9	0.0
11/08/11	0.0	2.5	0.0
03/06/15	1.6	0.6	0.0
05/07/15	1.9	1.1	0.0
Min	0.0	0.0	0.0
Max	1.9	2.5	0.0
Average	0.3	1.0	0.0

MW2TH			
Date	PCE	TCE	cis-1,2-DCE
05/03/04	0.0	0.0	0.0
12/02/04	0.0	0.0	0.0
05/12/05	0.0	0.0	0.0
11/1/2005	0.0	0.0	0.0
05/02/06	0.0	0.0	0.0
12/15/06	0.0	0.0	0.0
08/23/07	0.0	0.0	0.0
12/16/08	0.0	0.0	0.0
08/01/09	0.0	0.0	0.0
01/06/10	0.0	0.0	0.0
05/11/10	0.0	0.0	0.0
11/08/11	0.0	1.0	0.0
03/06/15	0.0	1.6	0.7
05/07/15	0.0	0.0	1.6
Min	0.0	0.0	0.0
Max	0.0	1.6	1.6
Average	0.0	0.3	0.3

EBB			
Date	PCE	TCE	cis-1,2-DCE
07/17/98	91.4	86.0	0.0
02/04/97	19.0	18.1	0.0
07/25/96	0.0	0.0	0.0
07/21/99	9.0	0.0	0.0
10/13/98	1.8	0.8	0.0
08/21/00	5.1	1.5	0.0
08/24/01	0.0	0.0	0.0
01/09/92	14.0	1.1	0.0
01/09/92	2.8	1.5	0.0
07/28/94	1.8	0.8	0.0
02/25/97	0.8	0.0	0.0
09/12/01	2.0	0.8	0.8
Min	0.0	0.0	0.0
Max	91.4	86.0	0.8
Average	8.1	7.1	0.1

MS1			
Date	PCE	TCE	cis-1,2-DCE
10/22/93	0.0	4.8	0.0
08/15/94	0.9	12.0	0.6
03/03/99	0.0	7.6	0.0
09/25/01	0.0	6.0	0.0
Min	0.0	4.8	0.0
Max	0.9	12.0	0.6
Average	0.2	7.6	0.1

MS2			
Date	PCE	TCE	cis-1,2-DCE
10/22/93	0.0	0.0	0.0
08/15/94	2.9	0.0	1.1
02/25/97	1.9	0.0	0.0
09/25/01	0.7	0.3	0.0
Min	0.0	0.0	0.0
Max	2.9	0.3	1.1
Average	1.4	0.1	0.3

N-02/2T			
Date	PCE	TCE	cis-1,2-DCE
09/17/01	19.0	4.0	0.1
Min	19.0	4.0	0.1
Max	19.0	4.0	0.1
Average	19.0	4.0	0.1

VOW1D			
Date	PCE	TCE	cis-1,2-DCE
4/28/99	111.0	7.0	0.0
7/14/99	47.1	8.1	0.0
10/26/99	0.0	0.0	0.0
5/7/00	0.7	0.0	0.0
3/19/01	0.0	0.0	0.0
6/14/01	0.0	0.0	0.0
11/15/11	1.1	0.0	0.0
Min	1.1	0.0	0.0
Max	111.0	8.1	0.0
Average	23.8	2.2	0.0

VOW3D			
Date	PCE	TCE	cis-1,2-DCE
4/28/99	3280.0	264.0	1.0
7/14/99	1170.0	240.0	0.0
10/26/99	745.0	745.0	50.1
5/7/00	98.1	87.7	13.7
9/29/00	20.8	20.7	1.0
3/19/01	64.2	18.5	20.8
6/14/01	1.0	1.0	0.0
11/15/11	1.0	1.0	0.0
12/19/11	1.0	1.0	0.0
Min	1.0	1.0	0.0
Max	2280.0	240.0	50.1
Average	310.1	310.5	10.5

VOW4D			
Date	PCE	TCE	cis-1,2-DCE
4/28/99	53700.0	0.0	0.0
7/14/99	38700.0	1040.0	0.0
10/26/99	6800.0	2600.0	400.0
1/24/00	2180.0	438.0	1100.0
5/7/00	607.0	364.0	2413.7
9/29/00	194.0	86.0	1000.0
1/3/01	0.0	0.0	1100.0
3/19/01	0.0	14.0	1300.7
6/14/01	1.0	0.0	0.0
9/6/01	0.0	10.0	0.0
11/15/11	0.0	0.0	0.0
12/19/11	1.0	0.0	0.0
Min	0.0	0.0	0.0
Max	53700.0	2600.0	2413.7
Average	7713.3	1040.1	1100.2

VSW1			
Date	PCE	TCE	cis-1,2-DCE
11/15/11	0.0	0.0	0.0
12/19/11	0.1	0.0	0.0
Min	0.0	0.0	0.0
Max	0.1	0.0	0.0
Average	0.0	0.0	0.0

All values are in ug/l
0.0 = Not detected at the limit of detection
Values in blue bold are for total 1,2 dichloroethene.
ERM

TABLE 3
Summary of Contaminants of Concern and Medium-Specific Exposure Point Concentrations

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Groundwater

Exposure Point	Chemical of Concern	Concentration Detected		Concentration Units	Frequency of Detection	Exposure Point Concentration (EPC)[1]	EPC Units	Statistical Measure
		Min	Max					
Tap Water and Shower Head	Tetrachloroethene (PCE)	6.6	360	µg/L	19/19	360	µg/L	Max (UCL > Max)[2]
	Trichloroethene (TCE)	37	120	µg/L	19/19	73	µg/L	95% UCL-T

Footnotes:
(1) For non-detects, 1/2 the detection limit was used as the proxy concentration when calculating the EPC.
(2) The calculated 95% UCL exceeded the maximum detected concentration, therefore the maximum concentration was used.

Definitions:
µg/L = Micrograms per liter
Max = maximum detected concentration
UCL = upper confidence limit of mean
T- transformed

Summary of Chemicals of Concern and Medium-Specific Exposure Point Concentrations

This table presents the chemicals of concern (COCs) and exposure point concentrations (EPCs) for each of the COCs detected in groundwater (*i.e.*, the concentration that will be used to estimate the exposure and risk from each COC). The table includes the range of concentrations detected for each COC, as well as the frequency of detection (i.e., the number of times the chemical was detected in the samples collected at the site), the EPC and how it was derived. The EPCs derived in the 2005 HHRA document were used for risk quantification in the 2015 risk memorandum.

TABLE 4
Selection of Exposure Pathways

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Current/Future	Groundwater	Groundwater	Tapwater	Resident	Child (0-6 yr)	Ingestion	Quantitative	Selected to evaluate a real or hypothetical scenario in which an onsite private well is used for potable purposes or a municipal well is used without treatment.
						Dermal	Quantitative	
					Adult	Ingestion	Quantitative	
						Dermal	Quantitative	
				Off- Site Commercial Worker, South of RR	Adult	Ingestion	Quantitative	
			Vapors from Shower Head	Resident	Child (0-6 yr)	Inhalation	Quantitative	
					Adult	Inhalation	Quantitative	
			Indoor Air	Resident	Adult	Inhalation	Quantitative	Residential areas are located within the area of concern.
					Child (0-6 yr)	Inhalation	Quantitative	
				On-Site Commercial Worker	Adult	Inhalation	Quantitative	The site is used for commercial purposes.
				Off-Site Commercial Worker, North of RR	Adult	Inhalation	Quantitative	Commercial properties are located within the area of concern.
Future	Groundwater	Groundwater	Vapors from Irrigation Holding Pond	Landscaper, South of RR	Adult	Inhalation	Quantitative	Contaminated groundwater could potentially reach the golf course monitoring well and exposure could occur via volatilization from the water.

Summary of Selection of Exposure Pathways

This table describes the exposure pathways associated with groundwater that was evaluated in the original 2005 HHRA, and the rationale for the inclusion of each pathway. Exposure media, exposure points, and characteristics of each receptor populations are included. In August 2015, EPA conducted a Supplemental Risk Evaluation for the residential receptor at the Site; the resultant toxicity information and recalculated risk estimates for the resident are summarized in Tables 5 through 8.

TABLE 5
Cancer Toxicity Data Summary

Pathway: Oral/ Dermal

Chemical of Concern	Oral Cancer Slope Factor	Units	Absorbed Cancer Slope Factor for Dermal	Units	Weight of Evidence/ Cancer Guideline Description(1)	Source	Date
Tetrachloroethene (PCE)	2.1E-03	$(mg/kg\text{-}day)^{-1}$	2.1E-03	$(mg/kg\text{-}day)^{-1}$	likely to be carcinogenic to humans	IRIS	2/10/2012
Trichloroethene(2) (TCE)	4.6E-02	$(mg/kg\text{-}day)^{-1}$	4.6E-02	$(mg/kg\text{-}day)^{-1}$	carcinogenic to humans	IRIS	9/28/2011

Pathway: Inhalation

Chemical of Concern	Inhalation Unit Risk	Units	Inhalation Cancer Slope Factor	Units	Weight of Evidence/ Cancer Guideline Description(1)	Source	Date
Tetrachloroethene (PCE)	2.6E-07	$(\mu g/m^3)^{-1}$	NA	NA	likely to be carcinogenic to humans	IRIS	2/10/2012
Trichloroethene(3) (TCE)	4.1E-06	$(\mu g/m^3)^{-1}$	NA	NA	carcinogenic to humans	IRIS	9/28/2011

Footnotes:
(1) EPA Weight of Evidence (EPA, 2005):
"Carcinogenic to Humans": based on strong evidence of human carcinogenicity
"Likely to Be Carcinogenic to Humans": based on adequate carcinogenic potential to humans
(2) The slope factor is adult-based. TCE is carcinogenic by a mutagenic mode of action for induction of kidney tumors. The kidney lifetime oral slope factor is $9.3x10^{-3}$ $(mg/kg\text{-}day)^{-1}$.
(3) The inhalation unit risk is adult-based. TCE is carcinogenic by a mutagenic mode of action for induction of kidney tumors. The kidney lifetime unit risk is $1.0x10^{-6}$ per $\mu g/m^3$.

Definitions:
IRIS = Integrated Risk Information System
NA = Not available
$(\mu g/m^3)^{-1}$ = Per micrograms per cubic meter
$(mg/kg\text{-}day)^{-1}$ = Per milligrams per kilogram per day

Summary of Toxicity Assessment

This table provides carcinogenic risk information which is relevant to the contaminants of concern in groundwater. Toxicity data are provided for the ingestion, dermal and inhalation routes of exposure.

TABLE 6
Non-Cancer Toxicity Data Summary

Pathway: Oral/Dermal

Contaminants of Concern	Chronic/ Sub-chronic	Oral Reference Dose (RfD) Value	Oral RfD Units	Oral Absor-ption Efficiency for Dermal	Absorbed RfD for Dermal[(1)]	Adj. Dermal RfD Units	Primary Target Organ	Combined Uncertainty /Modifying Factors	Sources of RfD Target Organ	Dates of RfD
Tetrachloro-ethene (PCE)	Chronic	6.0E-03	mg/kg-day	100%	6.0E-03	mg/kg-day	Neurological	1,000	IRIS	2/10/2012
Trichloro-ethene (TCE)	Chronic	5.0E-04	mg/kg-day	100%	5.0E-04	mg/kg-day	Heart/Immune System/Developmental	10 to 1,000	IRIS	9/28/2011

Pathway: Inhalation

Contaminants of Concern	Chronic/ Sub-chronic	Inhalation RfC	Inhalation RfC Units	Primary Target Organ	Combined Uncertainty /Modifying Factors	Sources of RfC Target Organ	Dates of RfC
Tetrachloroethene (PCE)	Chronic	4.0E-02	mg/m^3	Neurological	100	IRIS	2/10/2012
Trichloroethene (TCE)	Chronic	2.0E-03	mg/m^3	Heart/Immune System	10 to 100	IRIS	9/28/2011

Footnotes:
(1) Adjusted RfD for Dermal = Oral RfD x Oral Absorption Efficiency for Dermal (RAGS E, 2004; EPA June 2015 RSL tables).

Definitions:
IRIS = Integrated Risk Information System
mg/m^3 = Milligrams per cubic meter
mg/kg-day = Milligrams per kilogram per day

Summary of Toxicity Assessment

This table provides non-carcinogenic risk information which is relevant to the contaminants of concern in groundwater. Toxicity data are provided for the ingestion, dermal and inhalation routes of exposure.

TABLE 7
Risk Characterization Summary - Carcinogens

Scenario Timeframe: Current/Future
Receptor Population: Resident
Receptor Age: Child/Adult

Medium	Exposure Medium	Exposure Point	Chemical Of Concern	Carcinogenic Risk			
				Ingestion	Dermal	Inhalation	Exposure Routes Total
Groundwater	Groundwater	Tap Water	Tetrachloroethylene (PCE)	9.70E-06	5.75E-06	1.67E-05	3.21E-05
			Trichloroethylene (TCE)	6.17E-05	1.02E-05	7.63E-05	1.48E-04
						Total Risk=	**1.80E-04**

Scenario Timeframe: Current/Future
Receptor Population: Commercial Worker Off-Site (South of RR)[1]
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Carcinogenic Risk			
				Ingestion	Dermal	Inhalation	Exposure Routes Total
Groundwater	Groundwater	Tap Water	Tetrachloroethene	6.8E-04	-----	-----	6.8E-04
						Total Risk[2]=	**6.8E-04**

Footnotes:
(1) The cancer risk estimates for the Off- Fulton Property Commercial Worker (south of the railroad tracks and to the east and west of the plume) were calculated using the toxicity information and assumptions as documented in the 2005 HHRA; more current toxicity information presented in preceding Table 6 was used for the current/future Resident calculations as documented in EPA's Supplemental Risk Evaluation Memorandum dated August 2015. Both risk documents are available in the Administrative record for the Site.
(2) Total Risks reflect the summed risks from the risk driving chemicals only (i.e., those that exceed the 1E-04 cancer risk level for this receptor); the cumulative risk from all COPCs for this receptor were equal to 7.8E-04 as documented in the 2005 HHRA.

Summary of Risk Characterization - Carcinogens

The table presents cancer risks for each route of exposure and for all routes of exposure combined. As stated in the National Contingency Plan, the acceptable risk range for site-related exposure is 10^{-6} to 10^{-4} (E-06 to E-04).

TABLE 8
Risk Characterization Summary - Non-Carcinogens

Scenario Timeframe: Current/Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical Of Concern	Primary Target Organ	Non-Carcinogenic Hazard Quotient			
					Ingestion	Dermal	Inhalation	Exposure Routes Total
Groundwater	Groundwater	Tap Water	Tetrachloroethylene (PCE)	Neurological	2.99	1.57	4.32	8.87
			Trichloroethylene (TCE)	Heart/ immune system/ developmental	7.28	1.06	17.5	25.8
							Groundwater Hazard Index Total=	**34.7**

Scenario Timeframe: Current/Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical Of Concern	Primary Target Organ	Non-Carcinogenic Hazard Quotient			
					Ingestion	Dermal	Inhalation	Exposure Routes Total
Groundwater	Groundwater	Tap Water	Tetrachloroethylene (PCE)	Neurological	1.80	1.10	4.32	7.22
			Trichloroethylene (TCE)	Heart/ immune system/ developmental	4.38	0.748	17.5	22.6
							Groundwater Hazard Index Total=	**29.8**

Scenario Timeframe: Current/Future
Receptor Population: Commercial Worker Off-Site (South of RR)[1]
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Primary Target Organ	Non-Carcinogenic Hazard Quotient			
					Ingestion	Dermal	Inhalation	Exposure Routes Total
Groundwater	Groundwater	Tap Water	Trichloroethylene (TCE)	Liver	2.4	-----	-----	2.4
							Groundwater Hazard Index Total=	**2.4**

Footnotes:
(1) Non-cancer Hazard Quotient and Index estimates for the Off- Fulton Property Commercial Worker (south of the railroad tracks and to the east and west of the plume) were calculated using the toxicity information and assumptions as documented in the 2005 HHRA; more current toxicity information presented in preceding Table 5 was used for the current/future Resident calculations as documented in EPA's Supplemental Risk Evaluation Memorandum dated August 2015. Both risk documents are available in the Administrative record for the Site.

Summary of Risk Characterization - Non-Carcinogens

The table presents hazard quotients (HQs) for each route of exposure and the hazard index (sum of hazard quotients) for all routes of exposure. The Risk Assessment Guidance for Superfund states that, generally, a hazard index (HI) greater than 1 indicates the potential for adverse non-cancer effects.

Table 9

Cost Estimate for Fulton Avenue Superfund Site, First Operable Unit

Alternative GW-1: Continued Operation of Existing Treatment Systems on Village Wells 13 and 14

Capital Costs:

Public water supply protection and mitigation plan	$50,000
Monitoring well network maintenance/expansion	$150,000
Replacement of existing air strippers	$255,796
Vapor phase granular activated carbon units for air stripper discharge	$300,000
Total construction capital cost	**$755,796**
Engineering oversight @ 15%	$113,369
Project management @ 8%	$60,464
Construction management @ 10%	$75,580
Contingency @ 15%	$113,369
Total Construction Capital & Oversight	**$1,118,578**

O&M Costs:

Groundwater monitoring/reporting	$10,712
Periodic groundwater model simulation updating/reporting	$6,000
Labor, utilities, analytical for existing air strippers	$121,630
Vapor phase granular activated carbon change outs	$15,000
Subtotal Annual cost	**$153,342**
30 years, O&M present value @ 5% discount rate	$2,475,093
Project management @ 8%	$198,007
Contingency @ 10%	$247,509
Total present worth of O&M	**$2,920,610**
Total GW-1 Capital and O&M Cost	**$4,039,188**

Table 10

ARARs, TBCs, and Other Guidelines

Table 10a: Chemical-Specific Applicable or Relevant and Appropriate Requirements (ARARs); Advisories, Criteria and Guidance to be Considered (TBCs); and Other Guidelines

Statute/Regulation/Guideline	Citation	Requirement Synopsis
Safe Drinking Water Act, National Primary Drinking Water Standards	Safe Drinking Water Act (SDWA), 42 U.S.C. §§ 300f – 300j-26; 40 CFR Part 141	Establishes federal maximum contaminant levels (MCLs), which are enforceable standards for contaminants in water delivered to a user of a public water system. The MCLs for PCE and TCE are 5 parts per billion (ppb).
New York State Department of Health Drinking Water Regulations for Public Water Systems	10 NYCRR Part 5, Subpart 5-1 - Tables	Establishes state MCLs and monitoring requirements for contaminants in a public water system.
Resource Conservation and Recovery Act (RCRA) Identification and Listing of Hazardous Waste	42 U.S.C. §§ 6905, 6912, 6921-6922; 40 CFR Part 261	Part 261 identifies, among other things, those solid wastes which are subject to regulation as hazardous wastes under specified RCRA regulations, including 40 CFR Parts 262, 263, 264 and 268. Applicable to the identification of hazardous wastes that may be generated, treated, stored, or disposed during remedial activities.
New York State Regulations for Identification and Listing of Hazardous Waste	New York State Environmental Conservation Law (ECL) Article 27, Title 9; 6 NYCRR Part 371	Establishes procedures for identifying solid wastes which are subject to regulation as hazardous wastes.

Table 10b: Location-Specific ARARs, TBCs, and Other Guidelines

Statute/Regulation/Guideline	Citation	Requirement Synopsis
National Historic Preservation Act	16 U.S.C. §§ 470-470x-6; 36 C.F.R. Part 800	CERCLA remedial actions are required to take into account the effects of remedial activities on any historic properties (including objects) included on or eligible for inclusion on the National Register of Historic Places. Substantive requirements of the National Historic Preservation Act will be met for any cultural resources that may be impacted by the drilling of monitoring wells at the Site.

Table 10c: Action-Specific ARARs, TBCs, and Other Guidelines

Statute/Regulation/Guideline	Citation	Requirement Synopsis
RCRA Standards Applicable to Generators of Hazardous Waste	42 U.S.C. §§ 6901-6992k; 40 C.F.R. Part 262	Includes manifest, record keeping and other requirement applicable to generators of hazardous wastes.
RCRA Preparedness and Prevention	42 U.S.C. §§ 6905, 6912(a), 6924, and 6925; 40 CFR §§ 264.30 - 264.31	Contains requirements for safety equipment and spill control when treating, handling and/or storing hazardous wastes.
RCRA Contingency Plan and Emergency Procedures	42 U.S.C. §§ 6905, 6912(a), 6924, and 6925; 40 CFR §§ 264.50 - 264.56	Provides emergency procedures to be used following explosions, fires, etc. when storing hazardous wastes.
RCRA Land Disposal Restrictions	42 U.S.C. §§ 6921 and 6924; 40 CFR Part 376	Identifies hazardous wastes for which land disposal is restricted and provides a set of numerical constituent concentration criteria at which hazardous waste is restricted from land disposal (without treatment).
New York Hazardous Waste Management System – General	New York State ECL Article 27, Title 9 6 NYCRR Part 370	Provides definitions of terms and general instructions for the Part 370 series of hazardous waste management.
U.S. Department of Transportation Rules for Transportation of Hazardous Materials	49 CFR Parts 107, 171, 172, 177 to 179	Outlines procedures for the packaging, labeling, manifesting, and transporting hazardous materials. Any company contracted to transport hazardous material from the site will be required to comply with these regulations.
RCRA Standards Applicable to Transporters of Hazardous Waste	40 CFR Part 263	Establishes standards for hazardous waste transporters. Any company contracted to transport hazardous material from the site will be required to comply with these regulations.
New York Hazardous Waste Manifest System and Related Standards for Generators, Transporters and Facilities	6 NYCRR Part 372	Establishes record keeping requirements and standards related to the manifest system for hazardous wastes. Any company contracted to transport hazardous material from the site will be required to comply with these regulations.

Table 10c: Action-Specific ARARs, TBCs, and Other Guidelines (Cont'd)

Statute/Regulation/Guideline	Citation	Requirement Synopsis
New York Waste Transporter Permit Program	6 NYCRR Part 364	Establishes permit requirements for transportations of regulated waste. In accordance with CERCLA Section 121(e), a permit is not required for on-site CERCLA response actions, although the on-site transportation of regulated waste will comply with substantive requirements of these regulations.
Federal Directive – Control of Air Emissions from Superfund Air Strippers	EPA OSWER Directive 9355.0-28	Guidance on the use of controls for Superfund site air strippers as well as other vapor extraction techniques in attainment and non-attainment areas for ozone.
New York State Prevention and Control of Air Contamination and Air Pollution, General Prohibitions	6 NYCRR Part 211	Prohibits emissions of air contaminants to the outdoor atmosphere of such quantity, characteristic or duration which are injurious to human, plant or animal life or to property, or which unreasonably interfere with the comfortable enjoyment of life or property.
New York Division of Air Resources DAR-1 (Air Guide-1) AGC/SGC Tables		Guideline concentrations for toxic ambient air contaminants. Emissions from air strippers will comply with Air Guide-1.

APPENDIX III

ADMINISTRATIVE RECORD INDEX

COMPREHENSIVE ADMINISTRATIVE RECORD INDEX OF DOCUMENTS

FINAL

09/23/2015 **REGION ID: 02**

Site Name: FULTON AVENUE
CERCLIS ID: NY0000110247
OUID: 01
SSID: 02JN
Action: ROD AMENDMENT

DocID:	Doc Date:	Title:	Image Count:	Doc Type:	Addressee Name:	Addressee Organization:	Author Name:	Author Organization:
718095	09/23/2015	COMPREHENSIVE ADMINISTRATIVE RECORD INDEX FOR OU1 FOR THE FULTON AVENUE SITE	44	[AR INDEX]	[]	[]	[,]	[US ENVIRONMENTAL PROTECTION AGENCY]
100909	01/01/1111	FULTON AVENUE SITE, OPERABLE UNIT ONE, ADMINISTRATIVE RECORD FILE, INDEX OF DOCUMENTS.	13	[INDEX]	[]	[]	[,]	[US ENVIRONMENTAL PROTECTION AGENCY]
100910	01/01/1111	FULTON AVENUE SITE, OPERABLE UNIT ONE, ADMINISTRATIVE RECORD FILE UPDATE, INDEX OF DOCUMENTS.	1	[INDEX]	[]	[]	[,]	[US ENVIRONMENTAL PROTECTION AGENCY]
108460	06/01/1998	Report: Remedial Investigation/Feasibility Study Work Plan, 150 Fulton Avenue, Garden City Park, NY, (Garden City Park Industrial Area Site Code #130073), prepared by Environmental Resources Management, prepared for Genesco Inc., June 1998.	268	[REPORT]	[,]	[GENESCO INCORPORATED]	[,]	[ENVIRONMENTAL RESOURCES MANAGEMENT INCORPORATED]
108461	11/01/1996	Report: Focused Remedial Investigation Report for the Fulton Avenue (Garden City Park Industrial Area) Site, Garden City Park, Nassau County, New York (Site Registry No. 1-30-073), prepared by Dvirka and Bartilucci Consulting Engineers, prepared for...	152	[REPORT]	[,]	[NEW YORK DEPARTMENT OF ENVIRONMENTAL CONSERVATION]	[,]	[DVIRKA & BARTILUCCI ENGINEERS]
108462	11/01/1996	Report: Engineering Report, Interim Remedial Measure Soil Vapor Extraction and Air Sparging Systems, Fulton Avenue Site (Garden City Park Industrial Area), Town of North Hempstead, Nassau County (Site Registry No. 1-30-073), prepared by Dvirka and...	59	[REPORT]	[,]	[NEW YORK DEPARTMENT OF ENVIRONMENTAL CONSERVATION]	[,]	[DVIRKA & BARTILUCCI ENGINEERS]

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DocID:	Doc Date:	Title:	Image Count:	Doc Type:	Addressee Name:	Addressee Organization:	Author Name:	Author Organization:
108463	12/02/1998	Report: Final Engineering Report, Air Sparge/Soil Vapor Extraction System, 150 Fulton Avenue, (Garden City Park, NY, Garden City Park Industrial Area Site Code #130073), prepared by Environmental...	217	[REPORT]	[,]	[GENESCO INCORPORATED]	[,]	[ENVIRONMENTAL RESOURCES MANAGEMENT INCORPORATED]
108464	09/01/2002	Report: Draft Exposure Pathway Analysis Report, 150 Fulton Avenue, Garden City Park, NY (Garden City Park Industrial Area) NYSDEC Site Code #130073, prepared by Environmental Resources Management, prepared for Genesco Inc., September 2002.	78	[REPORT]	[,]	[GENESCO INCORPORATED]	[,]	[ENVIRONMENTAL RESOURCES MANAGEMENT]
108465	12/01/2004	Report: Draft Baseline Risk Assessment Report, 150 Fulton Avenue Site, Garden City Park, NY, prepared by Environmental Resources Management, prepared for Genesco Inc., December 2004.	120	[REPORT]	[,]	[GENESCO INCORPORATED]	[,]	[ENVIRONMENTAL RESOURCES MANAGEMENT]
108466	08/01/2005	Report: Remedial Investigation Report, 150 Fulton Avenue, Garden City Park, NY, prepared by Environmental Resources Management, prepared for Genesco Inc., August 2005.	337	[REPORT]	[,]	[GENESCO INCORPORATED]	[,]	[ENVIRONMENTAL RESOURCES MANAGEMENT]
108467	05/10/2002	Letter to Mr. John Swartwout, P.E., Division of Environmental Remediation, New York State Department of Environmental Conservation, from Mr. Chris W. Wenczel, Senior Project Manager, Environmental Resources Management...	2	[REPORT]	[SWARTWOUT, JOHN]	[NEW YORK DEPARTMENT OF ENVIRONMENTAL CONSERVATION]	[WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]

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DocID:	Doc Date:	Title:	Image Count:	Doc Type:	Addressee Name:	Addressee Organization:	Author Name:	Author Organization:
108468	08/12/2002	Letter to Mr. John Swartwout, P.E., Division of Environmental Remediation, New York State Department of Environmental Conservation, from Mr. Chris W. Wenczel, Senior Project Manager, Environmental Resources Management...	2	[REPORT]	[SWARTWOUT, JOHN]	[NEW YORK DEPARTMENT OF ENVIRONMENTAL CONSERVATION]	[WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]
108469	09/10/2002	Letter to Mr. John Swartwout, P.E., Division of Environmental Remediation, New York State Department of Environmental Conservation, from Mr. Chris W. Wenczel, Senior Project Manager, Environmental Resources Management...	2	[REPORT]	[SWARTWOUT, JOHN]	[NEW YORK DEPARTMENT OF ENVIRONMENTAL CONSERVATION]	[WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]
108470	07/10/2003	Letter to Mr. John Swartwout, P.E., Division of Environmental Remediation, New York State Department of Environmental Conservation, from Mr. Chris W. Wenczel, Senior Project Manager, Environmental Resources Management...	14	[REPORT]	[SWARTWOUT, JOHN]	[NEW YORK DEPARTMENT OF ENVIRONMENTAL CONSERVATION]	[WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]
108471	08/11/2003	Letter to Mr. John Swartwout, P.E., Division of Environmental Remediation, New York State Department of Environmental Conservation, from Mr. Chris W. Wenczel, Senior Project Manager, Environmental Resources Management...	4	[REPORT]	[SWARTWOUT, JOHN]	[NEW YORK DEPARTMENT OF ENVIRONMENTAL CONSERVATION]	[WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]

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DocID:	Doc Date:	Title:	Image Count:	Doc Type:	Addressee Name:	Addressee Organization:	Author Name:	Author Organization:
108472	09/16/2003	Letter to Mr. John Swartwout, P.E., Division of Environmental Remediation, New York State Department of Environmental Conservation, from Mr. Chris W. Wenczel, Senior Project Manager, Environmental Resources Management...	4	[REPORT]	[SWARTWOUT, JOHN]	[NEW YORK DEPARTMENT OF ENVIRONMENTAL CONSERVATION]	[WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]
108473	09/19/2003	Letter to Mr. Steven Scharf, P.E., Senior Project Engineer, Remedial Action Bureau A, Division of Environmental Remediation, New York State Department of Environmental Conservation, from Mr. Russell Sirabian, P.E., Principal...	2	[LETTER]	[SCHARF, STEVEN]	[NY STATE DEPT OF ENVIRONMENTAL CONSERVATION (NYSDEC)]	[SIRABIAN, RUSSELL]	[ENVIRONMENTAL RESOURCES MANAGEMENT]
108474	09/19/2003	Letter to Mr. Kevin Willis, Project Manager, Eastern NY Remediation Section, USEPA, from Mr. Chris W. Wenczel, Senior Project Manager, Environmental Resources Management, re: Remedial Investigation/Feasibility Study (RI/FS)...	1	[LETTER]	[WILLIS, KEVIN]	[US ENVIRONMENTAL PROTECTION AGENCY]	[WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]
108475	10/08/2003	Letter to Mr. John Swartwout, P.E., Division of Environmental Remediation, New York State Department of Environmental Conservation, from Mr. John Mohlin, P.E., Project Manager - IRM, and Mr. Russell Sirabian, P.E., Senior Project Manager...	13	[REPORT]	[SWARTWOUT, JOHN]	[NEW YORK DEPARTMENT OF ENVIRONMENTAL CONSERVATION]	[MOHLIN, JOHN , SIRABIAN, RUSSELL]	[ENVIRONMENTAL RESOURCES MANAGEMENT]

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108476	10/10/2003	Letter to Mr. John Swartwout, P.E., Division of Environmental Remediation, New York State Department of Environmental Conservation, from Mr. Chris W. Wenczel, Senior Project Manager, Environmental Resources Management...	11	[REPORT]	[SWARTWOUT, JOHN]	[NEW YORK DEPARTMENT OF ENVIRONMENTAL CONSERVATION]	[WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]
108477	11/10/2003	Letter to Mr. Steven M. Scharf, P.E., New York State Department of Environmental Conservation, Division of Environmental Remediation, .Remedial Action, Bureau A, from Mr. Chris W. Wenczel, Group Manager/Senior Hydrogeologist, Environmental Resources...	6	[REPORT]	[SCHARF, STEVEN]	[NY STATE DEPT OF ENVIRONMENTAL CONSERVATION (NYSDEC)]	[WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]
108478	12/09/2003	Letter to Mr. Michael Alarcon, Nassau County Department of Health Services, from Mr. Chris W. Wenczel, Senior Project Manager, Environmental Resources Management, re: 150 Fulton Avenue Site Quarterly Ground Water Sampling...	3	[LETTER]	[ALARCON, MICHAEL]	[NASSAU COUNTY HEALTH DEPT]	[WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]
108479	12/10/2003	Letter to Mr. Steven M. Scharf, P.E., New York State Department of Environmental Conservation, Division of Environmental Remediation, Remedial Action, Bureau A, from Mr. Chris W. Wenczel, Group Manager/Senior Hydrogeologist, Environmental Resources...	3	[REPORT]	[SCHARF, STEVEN]	[NY STATE DEPT OF ENVIRONMENTAL CONSERVATION (NYSDEC)]	[WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]

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108480	03/10/2004	Letter to Mr. Steven M. Scharf, P.E., New York State Department of Environmental Conservation, Division of Environmental Remediation, Remedial Action, Bureau A, from Mr. Chris W. Wenczel, Group Manager/Senior Hydrogeologist, Environmental Resources...	45	[REPORT]	[SCHARF, STEVEN]	[NY STATE DEPT OF ENVIRONMENTAL CONSERVATION (NYSDEC)]	[WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]
108481	04/12/2004	Letter to Mr. Steven M. Scharf, P.E., New York State Department of Environmental Conservation, Division of Environmental Remediation, Remedial Action, Bureau A, from Mr. Chris W. Wenczel, Group Manager/Senior Hydrogeologist, Environmental Resources...	8	[REPORT]	[SCHARF, STEVEN]	[NY STATE DEPT OF ENVIRONMENTAL CONSERVATION (NYSDEC)]	[WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]
108482	04/23/2004	Letter to Mr. Steven M. Scharf, P.E., Division of Environmental Remediation, Remedial Action, Bureau A, New York State Department of Environmental Conservation, from Mr. Chris W. Wenczel, Senior Project Manager, and Mr. James A. Perazzo...	11	[LETTER]	[SCHARF, STEVEN]	[NY STATE DEPT OF ENVIRONMENTAL CONSERVATION (NYSDEC)]	[PERAZZO, JAMES A, WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]
108483	04/27/2004	Letter to Mr. Steven M. Scharf, P.E., Division of Environmental Remediation, Remedial Action, Bureau A, New York State Department of Environmental Conservation, from Mr. John Mohlin, P.E., Project Manager - IRM, and Mr. James Perazzo...	12	[LETTER]	[SCHARF, STEVEN]	[NY STATE DEPT OF ENVIRONMENTAL CONSERVATION (NYSDEC)]	[MOHLIN, JOHN , PERAZZO, JAMES A]	[ENVIRONMENTAL RESOURCES MANAGEMENT]

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108484	05/10/2004	Letter to Mr. Steven M. Scharf, P.E., New York State Department of Environmental Conservation, Division of Environmental Remediation, Remedial Action, Bureau A, from Mr. Chris W. Wenczel, Senior Project Manager, Environmental...	4	[REPORT]	[SCHARF, STEVEN]	[NY STATE DEPT OF ENVIRONMENTAL CONSERVATION (NYSDEC)]	[WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]
108485	05/26/2004	Letter to Residents from Mr. Chris W. Wenczel, Senior Project Manager, Environmental Resources Management, re: Remedial Investigation/Feasibility Study, Garden City, New York, May 26, 2004.	2	[LETTER]	[,]	[NONE]	[WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]
108486	06/10/2004	Letter to Mr. Steven M. Scharf, P.E., New York State Department of Environmental Conservation, Division of Environmental Remediation, Remedial Action, Bureau A, from Mr. Chris W. Wenczel, Senior Project Manager, Environmental Resources, Management...	28	[REPORT]	[SCHARF, STEVEN]	[NY STATE DEPT OF ENVIRONMENTAL CONSERVATION (NYSDEC)]	[WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]
108487	06/18/2004	Letter to Mr. Steven M. Scharf, P.E., New York State Department of Environmental Conservation, Division of Environmental Remediation, Remedial Action, Bureau A, and Mr. Kevin Willis, Eastern NY Remediation Section, USEPA, from Mr. Chris W. Wenczel...	4	[LETTER]	[SCHARF, STEVEN , WILLIS, KEVIN]	[NY STATE DEPT OF ENVIRONMENTAL CONSERVATION (NYSDEC), US ENVIRONMENTAL PROTECTION AGENCY]	[WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]

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108488	07/12/2004	Letter to Mr. Steven M. Scharf, P.E., New York State Department of Environmental Conservation, Division of Environmental Remediation, Remedial Action, Bureau A, from Mr. Chris W. Wenczel, Senior Project Manager, Environmental Resources Management...	7	[REPORT]	[SCHARF, STEVEN]	[NY STATE DEPT OF ENVIRONMENTAL CONSERVATION (NYSDEC)]	[WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]
108489	08/23/2004	Letter to Mr. Steven M. Scharf, P.E., New York State Department of Environmental Conservation, Division of Environmental Remediation, Remedial Action, Bureau A, from Mr. John Mohlin, P.E., Project Manager - IRM, and Mr. James Perazzo, Partner In Charge...	3	[LETTER]	[SCHARF, STEVEN]	[NY STATE DEPT OF ENVIRONMENTAL CONSERVATION (NYSDEC)]	[MOHLIN, JOHN , PERAZZO, JAMES A]	[ENVIRONMENTAL RESOURCES MANAGEMENT]
108490	09/10/2004	Letter to Mr. Steven M. Scharf, P.E., New York State Department of Environmental Conservation, Division of Environmental Remediation, Remedial Action, Bureau A, from Mr. Chris W. Wenczel, Senior Project Manager, Environmental Resources Management...	4	[REPORT]	[SCHARF, STEVEN]	[NY STATE DEPT OF ENVIRONMENTAL CONSERVATION (NYSDEC)]	[WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]
108491	10/12/2004	Letter to Mr. Steven M. Scharf, P.E., New York State Department of Environmental Conservation, Division of Environmental Remediation, Remedial Action, Bureau A, from Mr. Chris W. Wenczel, Senior Project Manager, Environmental Resources Management...	3	[REPORT]	[SCHARF, STEVEN]	[NY STATE DEPT OF ENVIRONMENTAL CONSERVATION (NYSDEC)]	[WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]

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108492	03/15/2005	Letter to Mr. Steven M. Scharf, P.E., New York State Department of Environmental Conservation, Division of Environmental Remediation, Remedial Action, Bureau A, from Mr. Chris W. Wenczel, Senior Project Manager, Environmental Resources Management...	3	[REPORT]	[SCHARF, STEVEN]	[NY STATE DEPT OF ENVIRONMENTAL CONSERVATION (NYSDEC)]	[WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]
108493	03/15/2005	Letter to Mr. Steven M. Scharf, P.E., New York State Department of Environmental Conservation, Division of Environmental Remediation, Remedial Action, Bureau A, from Mr. Chris W. Wenczel, Senior Project Manager, Environmental Resources Management...	49	[REPORT]	[SCHARF, STEVEN]	[NY STATE DEPT OF ENVIRONMENTAL CONSERVATION (NYSDEC)]	[WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]
108494	03/23/2005	Letter to Mr. Kevin Willis, U.S. EPA, Region 2, Emergency and Remedial Response Division, Eastern NY Remediation Section, and Mr. Steven M. Scharf, P.E., New York State Department of Environmental Conservation, Division of Environmental...	10	[LETTER]	[SCHARF, STEVEN , WILLIS, KEVIN]	[NY STATE DEPT OF ENVIRONMENTAL CONSERVATION (NYSDEC), US ENVIRONMENTAL PROTECTION AGENCY]	[WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]
108495	04/13/2005	Letter to Mr. Steven M. Scharf, P.E., New York State Department of Environmental Conservation, Division of Environmental Remediation, Remedial Action, Bureau A, from Mr. Chris W. Wenczel, Senior Project Manager, Environmental Resources Management...	3	[REPORT]	[SCHARF, STEVEN]	[NY STATE DEPT OF ENVIRONMENTAL CONSERVATION (NYSDEC)]	[WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]

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108496	07/13/2006	Report: Feasibility Study Report, 150 Fulton Avenue Garden City Park, Nassau County, New York, prepared by ERM, July 13, 2006.	267	[REPORT]	[]	[]	[,]	[ENVIRONMENTAL RESOURCES MANAGEMENT]
108497	01/01/1111	Costing of Limited ICSO portion of Alternative 4.	1	[REPORT]	[]	[]	[]	[]
108498	12/19/2003	Letter to Mr. Steven M. Scharf, P.E. New York State Department of Environmental Conservation, Division of Environmental Remediation, Remedial Action, Bureau A, from Mr. Chris W. Wenczel, Group Manager/Senior Hydrogeologist, Environmental Resources...	5	[LETTER]	[SCHARF, STEVEN]	[NY STATE DEPT OF ENVIRONMENTAL CONSERVATION (NYSDEC)]	[WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]
108499	02/14/2006	Letter to Mr. Chris Wenczel, ERM Inc., from Mr. Steven M. Scharf, P.E., Project Engineer, New York State Department of Environmental Conservation, Division of Environmental Remediation, Bureau of Remedial Action A, Section C...	11	[LETTER]	[WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]	[SCHARF, STEVEN]	[NY STATE DEPT OF ENVIRONMENTAL CONSERVATION (NYSDEC)]
108500	03/20/2006	Letter to Mr. Steven M. Scharf, P.E., Remedial Bureau A, Division of Environmental Remediation, New York .State Department of Environmental Conservation, from Mr. James Perazzo, Principal; Mr. Chris W. Wenczel, Senior Project Manager...	10	[LETTER]	[SCHARF, STEVEN]	[NY STATE DEPT OF ENVIRONMENTAL CONSERVATION (NYSDEC)]	[PERAZZO, JAMES A, WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]

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108501	06/10/2006	Letter to Mr. Steven M. Scharf, P.E., New York State Department of Environmental Conservation, Division of Environmental Remediation, Remedial Action, Bureau A, from Mr. Chris W. Wenczel, Senior Project Manager, Environmental Resources Management...	3	[REPORT]	[SCHARF, STEVEN]	[NY STATE DEPT OF ENVIRONMENTAL CONSERVATION (NYSDEC)]	[WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]
108502	07/10/2006	Letter to Mr. Steven M. Scharf, P.E., New York State Department of Environmental Conservation, Division of Environmental Remediation, Remedial Action, Bureau A, from Mr. Chris W. Wenczel, Senior Project Manager, Environmental Resources Management...	3	[REPORT]	[SCHARF, STEVEN]	[NY STATE DEPT OF ENVIRONMENTAL CONSERVATION (NYSDEC)]	[WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]
108503	08/10/2006	Letter to Mr. Steven M. Scharf, P.E., New York State Department of Environmental Conservation, Division of Environmental Remediation, Remedial Action, Bureau A, from Mr. Chris W. Wenczel, Senior Project Manager, Environmental Resources Management...	72	[REPORT]	[SCHARF, STEVEN]	[NY STATE DEPT OF ENVIRONMENTAL CONSERVATION (NYSDEC)]	[WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]
108504	09/12/2006	Letter to Mr. Steven M. Scharf, P.E., New York State Department of Environmental Conservation, Division of Environmental Remediation, Remedial Action, Bureau A, from Mr. Chris W. Wenczel, Senior Project Manager, Environmental Resources Management...	2	[REPORT]	[SCHARF, STEVEN]	[NY STATE DEPT OF ENVIRONMENTAL CONSERVATION (NYSDEC)]	[WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]

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108505	02/08/2007	Letter to Mr. Christopher Wenczel, ERM Inc., from Mr. Steven M. Scharf, P.E., Senior Project Engineer, Remedial Action Bureau A, Division of Environmental Remediation, New York State Department of Environmental Conservation...	11	[LETTER]	[WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]	[SCHARF, STEVEN]	[NY STATE DEPT OF ENVIRONMENTAL CONSERVATION (NYSDEC)]
108506	02/15/2007	Letter to Mr. Christopher Wenczel, ERM, from Mr. Kevin Willis, Remedial Project Manager, U.S. EPA, Region 2, re: Fulton Avenue Superfund Site, North Hempstead, New York, February 15, 2007.	7	[LETTER]	[WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]	[WILLIS, KEVIN]	[US ENVIRONMENTAL PROTECTION AGENCY]
108507	06/17/1999	Record of Decision, National Heatset Printing Site, Town of Babylon, Suffolk County, Site Number 1-52-140, prepared by New York State Department of Environmental Conservation, June 17, 1999.	73	[REPORT]	[]	[]	[,]	[NEW YORK DEPARTMENT OF ENVIRONMENTAL CONSERVATION]
108508	01/17/2006	Record of Decision, 100 Oser Avenue Site, Operable Unit 2, Smithtown, Suffolk County, New York, Site Number 1-52-162, prepared by New York State Department of Environmental Conservation, January 17, 2006.	49	[REPORT]	[]	[]	[,]	[NEW YORK DEPARTMENT OF ENVIRONMENTAL CONSERVATION]
108509	09/29/2006	Record of Decision, Lawrence Aviation Industries, Inc. Superfund Site, Suffolk County, New York, prepared by U.S. EPA, Region 2, September 29, 2006.	67	[REPORT]	[]	[]	[,]	[US ENVIRONMENTAL PROTECTION AGENCY]

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108510	09/18/1997	Order on Consent, Index # W1-0707-94-08, Site Code # 130073, State of New York: Department of Environmental Conservation, In the Matter of the Development and Implementation of a Remedial Investigation/Feasibility Study and Interim...	21	[ORDER]	[]	[]	[,]	[NY STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION]
108511	04/25/2002	Letter to Mr. Hal N. Pennington, President,Genesco Inc., from Mr. Richard Caspe, Director, Emergency and Remedial Response Division, U.S. EPA, Region 2, re: Fulton Avenue Superfund Site, North Hempstead, Nassau County, NY, Request for Information...	17	[LETTER]	[PENNINGTON, HAL N]	[GENESCO INCORPORATED]	[CASPE, RICHARD L]	[US ENVIRONMENTAL PROTECTION AGENCY]
108512	06/07/2002	Letter to Ms. Liliana Villatora, Asst. Regional Counsel, New York/Caribbean Superfund Branch, U.S. EPA, Region II, from Ms. April A. Ingram, Boult, Cummings, Conners & Berry, PLC, re: Fulton Ave. Superfund Site, Request for Information Pursuant...	110	[LETTER]	[VILLATORA, LILIANA]	[US ENVIRONMENTAL PROTECTION AGENCY]	[INGRAM, APRIL A]	[BOULT, CUMMINGS, CONNERS & PERRY]
108513	06/17/1975	Memorandum to Files from Ms. Sue Mackay and Mr. Michael Giovaniello, Nassau County Department of Health, re: Industrial Solid Waste Survey Halnit Finishers, 150 Fulton Ave., Garden City Park, June 17, 1975.	3	[MEMORANDUM]	[FILES,]	[NASSAU COUNTY HEALTH DEPT]	[GIOVANIELLO, MICHAEL , MACKAY, SUE]	[NASSAU COUNTY HEALTH DEPT]

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108514	06/17/1975	Memorandum to Files from Ms. Sue Mackay and Mr. Michael Giovaniello, Nassau County Department of Health, re: Industrial Solid Waste Survey - Halnit Finishers, 150 Fulton Ave., Garden City Park, June 17, 1975.	2	[MEMORANDUM]	[FILES,]	[NASSAU COUNTY HEALTH DEPT]	[GIOVANIELLO, MICHAEL , MACKAY, SUE]	[NASSAU COUNTY HEALTH DEPT]
108515	04/28/1993	Report: NCDH/NCDPW Cooperative Agreement Project, Garden City Park Groundwater Quality Study, Preliminary Report, prepared by Mr. James Rhodes, Project Manager, Bureau of Water Supply Protection, Nassau County Department of Health...	30	[REPORT]	[]	[]	[RHODES, JAMES , SCHNEIDER, BRIAN]	[NASSAU COUNTY DEPARTMENT OF PUBLIC WORKS, NASSAU COUNTY HEALTH DEPT]
108516	09/30/1994	Letter to Louis P. Oliva, Esq., New York State Department of Environmental Conservation, Division of Environmental Enforcement, from Mr. Stephen L. Gordon, Beveridge & Diamond, P.C...	5	[LETTER]	[OLIVA, LOUIS P]	[NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION]	[GORDON, STEPHEN L]	[BEVERIDGE & DIAMOND]
108517	10/11/1994	Letter to Louis P. Oliva, Esq., New York State Department of Environmental Conservation, Division of Environmental Enforcement, from Mr. Stephen L. Gordon, Beveridge & Diamond, P.C., re: Garden City Park Industrial Area...	8	[LETTER]	[OLIVA, LOUIS P]	[NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION]	[GORDON, STEPHEN L]	[BEVERIDGE & DIAMOND]
108518	12/22/1995	Report: Summary of PID Results, Gordon Atlantic Corporation, 150 Fulton Avenue, Garden City Park, New York, prepared by Groundwater Technology, December 22, 1995.	8	[REPORT]	[]	[]	[,]	[GROUNDWATER TECHNOLOGY INCORPORATED]

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108519	05/31/1996	Letter to Mr. Laurence Gordon, Gordon Atlantic Corporation, from Mr. Carl Leighton, Legal Intern, and Ms. Samara Swanston, Field Unit Leader, New York State Department of Environmental Conservation, Division of Environmental Enforcement...	9	[LETTER]	[GORDON, LAURENCE]	[GORDON ATLANTIC CORPORATION]	[LEIGHTON, CARL , SWANSTON, SAMARA]	[NYS DEPARTMENT OF ENVIRONMENTAL CONSERVATION, US ENVIRONMENTAL PROTECTION AGENCY]
109330	10/08/1999	Letter to Mr. Laurence Gordon, Gordon Broadway Corporation, from Mr. John B. Swartwout, P.E., Chief, Eastern Investigation Section, Bureau of Hazardous Site Control, Division of Environmental Remediation, New York State Department of Environmental...	1	[LETTER]	[GORDON, LAURENCE]	[GORDON BROADWAY CORPORATION]	[SWARTWOUT, JOHN]	[NEW YORK DEPARTMENT OF ENVIRONMENTAL CONSERVATION]
109331	12/18/2002	Letter to Mr. Laurence Gordon, Gordon Atlantic Corporation, from Mr. George Pavlou, Director, Emergency and Remedial Response Division, U.S. EPA, Region 2, re: Fulton Avenue Superfund Site, North Hempstead, Nassau County, NY...	18	[LETTER]	[GORDON, LAURENCE]	[GORDON ATLANTIC CORPORATION]	[PAVLOU, GEORGE]	[US ENVIRONMENTAL PROTECTION AGENCY]
109332	02/04/2003	Letter to Ms. Cynthia Psoras, U.S. EPA, Region 2, from Mr. Christopher J. McKenzie, Beveridge & Diamond, P.C., re: Gordon Atlantic Corporation, Fulton Avenue Site, February 4, 2003.	3	[LETTER]	[PSORAS, CYNTHIA]	[US ENVIRONMENTAL PROTECTION AGENCY]	[MCKENZIE, CHRISTOPHER J]	[BEVERIDGE & DIAMOND]
109333	03/27/2003	Letter to Ms. Cynthia Psoras, U.S. EPA, Region 2, from Mr. Christopher J. McKenzie, Beveridge & Diamond, P.C., re: Response to CERCLA Section 104 Information Request, Fulton Avenue Site, March 27, 2003.	13	[REPORT]	[PSORAS, CYNTHIA]	[US ENVIRONMENTAL PROTECTION AGENCY]	[MCKENZIE, CHRISTOPHER J]	[BEVERIDGE & DIAMOND]

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109334	07/08/2002	Report: Public Health Assessment, 150 Fulton Avenue/Garden City Park Industrial Area, Garden City Park, Nassau County, New York, prepared by New York State Department of Health Center for Environmental Health, prepared under a Cooperative...	110	[REPORT]	[]	[]	[,]	[NEW YORK STATE DEPARTMENT OF HEALTH CENTER FOR ENVIRONMENTAL HEALTH]
109335	01/01/1999	Fact Sheet, Environmental Investigations in Garden City Park Industrial Area (GCPIA), prepared by New York State Department of Environmental Conservation, January 1999	7	[REPORT]	[]	[]	[,]	[NEW YORK DEPARTMENT OF ENVIRONMENTAL CONSERVATION]
109336	02/01/2007	Fulton Avenue Superfund Site (OU1), Garden City Park, Nassau County, New York, prepared by U.S. EPA, Region 2, February 2007.	9	[REPORT]	[]	[]	[,]	[US ENVIRONMENTAL PROTECTION AGENCY]
109337	02/12/2007	Letter to Mr. George Pavlou, P.E., Director, Emergency Remedial Response Division, U.S. EPA, Region 2, from Mr. Dale A. Desnoyers, Director, Division of Environmental Remediation, New York State Department of Environmental Conservation...	1	[LETTER]	[PAVLOU, GEORGE]	[US ENVIRONMENTAL PROTECTION AGENCY]	[DESNOYERS, DALE]	[NY STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION]
109338	01/01/1111	Report: Safeguarding a Sustainable Water Supply, prepared by Residents for a More Beautiful Port Washington as a reflection of the community water symposium of December 7, 2002, which was hosted by The Port Washington Public Library.	19	[REPORT]	[]	[]	[,]	[RESIDENTS FOR A MORE BEAUTIFUL PORT WASHINGTON]

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109339	09/28/2007	Record of Decision, Fulton Avenue Superfund Site, Nassau County, New York, prepared by U.S. EPA, Region 2, September 28, 2007.	234	[REPORT]	[]	[]	[,]	[US ENVIRONMENTAL PROTECTION AGENCY]
318989	01/01/1111	GC SUPPLY WELL-13-7058 THROUGH 05/2014 FOR THE FULTON AVENUE SITE	9	[OTHER]	[]	[]	[]	[]
318990	01/01/1111	GC SUPPLY WELL-14-8339 THROUGH 05-2014 FOR THE FULTON AVENUE SITE	6	[OTHER]	[]	[]	[]	[]
318972	07/01/1996	PRELIMINARY SITE ASSESSMENT REPORT FOR THE FULTON AVENUE SITE	157	[REPORT]	[,]	[NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION]	[,]	[DVIRKA & BARTILUCCI CONSULTING ENGINEERS]
318942	11/08/2007	GROUND WATER SAMPLING RESULTS FOR SAMPLING DURING THE WEEK OF 08/20/2007 FOR OU1 FOR THE FULTON AVENUE SITE	64	[LETTER]	[WILLIS, KEVIN]	[US ENVIRONMENTAL PROTECTION AGENCY]	[WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]
318977	12/16/2008	SAMPLING DATA JOB NO. JA8303 FOR PERIOD 12/16/2008 FOR THE FULTON AVENUE SITE	222	[REPORT]	[WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]	[,]	[ACCUTEST LABORATORIES]
319016	01/07/2009	SAMPLING DATA JOB NUMBER JA8137 FOR SAMPLING DATE 12/15/2008 FOR THE FULTON AVENUE SITE	173	[REPORT]	[WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]	[SPEIS, DAVID N]	[NEW JERSEY ACCUTEST]
319017	01/07/2009	SAMPLING DATA JOB NUMBER JA8342 FOR SAMPLING DATE 12/17/2008 FOR THE FULTON AVENUE SITE	236	[REPORT]	[WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]	[SPEIS, DAVID N]	[NEW JERSEY ACCUTEST]
319019	01/07/2009	SAMPLING DATA JOB NUMBER JA8543 FOR SAMPLING DATE 12/19/2008 FOR THE FULTON AVENUE SITE	192	[REPORT]	[WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]	[SPEIS, DAVID N]	[NEW JERSEY ACCUTEST]

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319018	01/08/2009	SAMPLING DATA JOB NUMBER JA8489 FOR SAMPLING DATE 12/18/2008 FOR THE FULTON AVENUE SITE	176	[REPORT]	[WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]	[SPEIS, DAVID N]	[NEW JERSEY ACCUTEST]
319020	01/12/2009	SAMPLING DATA JOB NUMBER JA8635 FOR SAMPLING DATE 12/22/2008 FOR THE FULTON AVENUE SITE	174	[REPORT]	[WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]	[SPEIS, DAVID N]	[NEW JERSEY ACCUTEST]
318943	03/02/2009	GROUND WATER SAMPLING RESULTS FOR SAMPLING DURING THE WEEK OF 12/15/2008 FOR OU1 FOR THE FULTON AVENUE SITE	71	[LETTER]	[WILLIS, KEVIN]	[US ENVIRONMENTAL PROTECTION AGENCY]	[WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]
318969	07/28/2009	CONSENT JUDGMENT UNITED STATES V. GENESCO INCORPORATED FOR THE FULTON AVENUE SITE	50	[AGREEMENT]	[]	[]	[MUGDAN, WALTER E]	[US ENVIRONMENTAL PROTECTION AGENCY]
319057	08/13/2009	ADMINISTRATIVE ORDER FOR A REMOVAL ACTION - ORDER NO. CERCLA-02-2009-2028 - RESPONDENT GENESCO INCORPORATED FOR THE FULTON AVENUE SITE	23	[ORDER]	[]	[]	[MUGDAN, WALTER E]	[US ENVIRONMENTAL PROTECTION AGENCY]
319083	10/09/2009	COMMENTS OF THE INCORPORATED VILLAGE OF GARDEN CITY ON PROPOSED CONSENT JUDGMENT NO. CV-09-3917 INCLUDING STATEMENT OF WORK FOR OU1 FOR THE FULTON AVENUE SITE	89	[REPORT]	[]	[]	[HUMANN, RICHARD W]	[HOLZMACHER, MCLENDON & MURRELL PC]
306795	10/17/2009	ENVIRONMENTAL RESOURCES MANAGEMENT - MONTHLY PROGRESS REPORT FOR OU1 FOR 10/2009 - ADMINISTRATIVE ORDER NO. CERCLA-02-2009-2028 FOR THE FULTON AVENUE SITE	4	[REPORT]	[WILLIS, KEVIN]	[US ENVIRONMENTAL PROTECTION AGENCY]	[WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]

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306796	10/17/2009	ENVIRONMENTAL RESOURCES MANAGEMENT - MONTHLY PROGRESS REPORT FOR OU1 FOR 10/2009 - CONSENT JUDGMENT NO. CV-09-3917 FOR THE FULTON AVENUE SITE	611	[REPORT]	[WILLIS, KEVIN]	[US ENVIRONMENTAL PROTECTION AGENCY]	[WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]
319055	10/26/2009	GROUNDWATER SAMPLING RESULTS FOR 09/2009 FOR OU1 - ADMINISTRATIVE ORDER NO. CERCLA-02-2009-2028 FOR THE FULTON AVENUE SITE	46	[REPORT]	[WILLIS, KEVIN]	[US ENVIRONMENTAL PROTECTION AGENCY]	[WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]
319056	10/09/2009	DATA VALIDATION REVIEW - SAMPLING EVENT 09/2009 FOR OU1 - PROJECT NO. 0097881 PHASE 2 - ACCUTEST LABRATORIES JOB NO'S. JA26870 AND JA27161 - ADMINISTRATIVE ORDER NO. CERCLA-02-2009-2028 FOR THE FULTON AVENUE SITE	57	[REPORT]	[]	[]	[COENEN, ANDREW J]	[ENVIRONMENTAL RESOURCES MANAGEMENT]
318994	10/26/2009	GROUNDWATER SAMPLING RESULTS FOR OU1 FOR 09/2009 - ADMINISTRATIVE ORDER NO. CERCLA-02-2009-2028 FOR THE FULTON AVENUE SITE	705	[REPORT]	[WILLIS, KEVIN]	[US ENVIRONMENTAL PROTECTION AGENCY]	[WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]
319028	12/10/2009	ENVIRONMENTAL RESOURCES MANAGEMENT - MONTHLY PROGRESS REPORT FOR OU1 FOR 11/2009 - ADMINISTRATIVE ORDER NO. CERCLA-02-2009-2028 FOR THE FULTON AVENUE SITE	2	[REPORT]	[WILLIS, KEVIN]	[US ENVIRONMENTAL PROTECTION AGENCY]	[WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]
319037	12/10/2009	ENVIRONMENTAL RESOURCES MANAGEMENT - MONTHLY PROGRESS REPORT FOR OU1 FOR 11/2009 - CONSENT JUDGMENT NO. CV-09-3917 FOR THE FULTON AVENUE SITE	4	[REPORT]	[WILLIS, KEVIN]	[US ENVIRONMENTAL PROTECTION AGENCY]	[WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]

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318978	01/07/2010	SAMPLING DATA JOB NO. JA37168 FOR PERIOD 01/05/2010 - 01/07/2010 FOR THE FULTON AVENUE SITE	431	[REPORT]	[WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]	[,]	[ACCUTEST LABORATORIES]
319029	01/10/2010	ENVIRONMENTAL RESOURCES MANAGEMENT - MONTHLY PROGRESS REPORT FOR OU1 FOR 12/2009 - ADMINISTRATIVE ORDER NO. CERCLA-02-2009-2028 FOR THE FULTON AVENUE SITE	2	[REPORT]	[WILLIS, KEVIN]	[US ENVIRONMENTAL PROTECTION AGENCY]	[WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]
319038	01/10/2010	ENVIRONMENTAL RESOURCES MANAGEMENT - MONTHLY PROGRESS REPORT FOR OU1 FOR 12/2009 - CONSENT JUDGMENT NO. CV-09-3917 FOR THE FULTON AVENUE SITE	4	[REPORT]	[WILLIS, KEVIN]	[US ENVIRONMENTAL PROTECTION AGENCY]	[WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]
306797	02/10/2010	ENVIRONMENTAL RESOURCES MANAGEMENT - MONTHLY PROGRESS REPORT FOR OU1 FOR 01/2010 - CONSENT JUDGMENT NO. CV-09-3917 FOR THE FULTON AVENUE SITE	4	[REPORT]	[WILLIS, KEVIN]	[US ENVIRONMENTAL PROTECTION AGENCY]	[WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]
306798	02/10/2010	ENVIRONMENTAL RESOURCES MANAGEMENT - MONTHLY PROGRESS REPORT FOR OU1 FOR 01/2010 - ADMINISTRATIVE ORDER NO. CERCLA-02-2009-2028 FOR THE FULTON AVENUE SITE	2	[REPORT]	[WILLIS, KEVIN]	[US ENVIRONMENTAL PROTECTION AGENCY]	[WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]
319031	03/10/2010	ENVIRONMENTAL RESOURCES MANAGEMENT - MONTHLY PROGRESS REPORT FOR OU1 FOR 02/2010 - ADMINISTRATIVE ORDER NO. CERCLA-02-2009-2028 FOR THE FULTON AVENUE SITE	2	[REPORT]	[WILLIS, KEVIN]	[US ENVIRONMENTAL PROTECTION AGENCY]	[WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]

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319040	03/10/2010	ENVIRONMENTAL RESOURCES MANAGEMENT - MONTHLY PROGRESS REPORT FOR OU1 FOR 02/2010 - CONSENT JUDGMENT NO. CV-09-3917 FOR THE FULTON AVENUE SITE	4	[REPORT]	[WILLIS, KEVIN]	[US ENVIRONMENTAL PROTECTION AGENCY]	[WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]
306799	04/12/2010	ENVIRONMENTAL RESOURCES MANAGEMENT - MONTHLY PROGRESS REPORT FOR OU1 FOR 03/2010 - CONSENT JUDGMENT NO. CV-09-3917 FOR THE FULTON AVENUE SITE	4	[REPORT]	[WILLIS, KEVIN]	[US ENVIRONMENTAL PROTECTION AGENCY]	[WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]
306800	04/12/2010	ENVIRONMENTAL RESOURCES MANAGEMENT - MONTHLY PROGRESS REPORT FOR OU1 FOR 03/2010 - ADMINISTRATIVE ORDER NO. CERCLA-02-2009-2028 FOR THE FULTON AVENUE SITE	2	[REPORT]	[WILLIS, KEVIN]	[US ENVIRONMENTAL PROTECTION AGENCY]	[WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]
306801	04/12/2010	GROUNDWATER SAMPLING RESULTS FOR OU1 FOR 01/2010 - ADMINISTRATIVE ORDER NO. CERCLA-02-2009-2028 FOR THE FULTON AVENUE SITE	529	[REPORT]	[WILLIS, KEVIN]	[US ENVIRONMENTAL PROTECTION AGENCY]	[WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]
318970	05/04/2010	EXPERT REPORT ON THE INTERPRETATION OF THE ISOTOPIC DATA FROM THE FULTON AVENUE SITE	119	[REPORT]	[]	[]	[PHILP, R. PAUL]	[UNIVERSITY OF OKLAHOMA]
306802	05/10/2010	ENVIRONMENTAL RESOURCES MANAGEMENT - MONTHLY PROGRESS REPORT FOR OU1 FOR 04/2010 - ADMINISTRATIVE ORDER NO. CERCLA-02-2009-2028 FOR THE FULTON AVENUE SITE	2	[REPORT]	[WILLIS, KEVIN]	[US ENVIRONMENTAL PROTECTION AGENCY]	[WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]

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306803	05/10/2010	ENVIRONMENTAL RESOURCES MANAGEMENT - MONTHLY PROGRESS REPORT FOR OU1 FOR 04/2010 - CONSENT JUDGMENT NO. CV-09-3917 FOR THE FULTON AVENUE SITE	4	[REPORT]	[WILLIS, KEVIN]	[US ENVIRONMENTAL PROTECTION AGENCY]	[WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]
318949	06/02/2010	TECHNICAL REPORT FOR SAMPLING DATE 05/10/2010 FOR THE FULTON AVENUE SITE	211	[REPORT]	[,]	[ENVIRONMENTAL RESOURCES MANAGEMENT]	[,]	[ACCUTEST LABORATORIES]
318950	06/04/2010	TECHNICAL REPORT FOR SAMPLING DATE 05/11/2010 FOR THE FULTON AVENUE SITE	233	[REPORT]	[,]	[ENVIRONMENTAL RESOURCES MANAGEMENT]	[,]	[ACCUTEST LABORATORIES]
318951	06/04/2010	TECHNICAL REPORT FOR SAMPLING DATE 05/12/2010 FOR THE FULTON AVENUE SITE	218	[REPORT]	[,]	[ENVIRONMENTAL RESOURCES MANAGEMENT]	[,]	[ACCUTEST LABORATORIES]
319030	06/10/2010	ENVIRONMENTAL RESOURCES MANAGEMENT - MONTHLY PROGRESS REPORT FOR OU1 FOR 05/2010 - ADMINISTRATIVE ORDER NO. CERCLA-02-2009-2028 FOR THE FULTON AVENUE SITE	2	[REPORT]	[WILLIS, KEVIN]	[US ENVIRONMENTAL PROTECTION AGENCY]	[WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]
319039	06/10/2010	ENVIRONMENTAL RESOURCES MANAGEMENT - MONTHLY PROGRESS REPORT FOR OU1 FOR 05/2010 - CONSENT JUDGMENT NO. CV-09-3917 FOR THE FULTON AVENUE SITE	4	[REPORT]	[WILLIS, KEVIN]	[US ENVIRONMENTAL PROTECTION AGENCY]	[WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]
318964	07/06/2010	WORK PLAN FOR WORK ASSIGNMENT NO. SERAS-098 FOR THE FULTON AVENUE SITE	6	[PLAN]	[,]	[US ENVIRONMENTAL PROTECTION AGENCY]	[,]	[LOCKHEED MARTIN / SERAS]
319032	07/12/2010	ENVIRONMENTAL RESOURCES MANAGEMENT - MONTHLY PROGRESS REPORT FOR OU1 FOR 06/2010 - ADMINISTRATIVE ORDER NO. CERCLA-02-2009-2028 FOR THE FULTON AVENUE SITE	2	[REPORT]	[WILLIS, KEVIN]	[US ENVIRONMENTAL PROTECTION AGENCY]	[WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]

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319041	07/12/2010	ENVIRONMENTAL RESOURCES MANAGEMENT - MONTHLY PROGRESS REPORT FOR OU1 FOR 06/2010 - CONSENT JUDGMENT NO. CV-09-3917 FOR THE FULTON AVENUE SITE	4	[REPORT]	[WILLIS, KEVIN]	[US ENVIRONMENTAL PROTECTION AGENCY]	[WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]
306804	07/21/2010	GROUNDWATER SAMPLING RESULTS FOR OU1 FOR 05/2010 - ADMINISTRATIVE ORDER NO. CERCLA-02-2009-2028 FOR THE FULTON AVENUE SITE	765	[REPORT]	[WILLIS, KEVIN]	[US ENVIRONMENTAL PROTECTION AGENCY]	[WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]
318971	08/01/2010	DATA ANALYSIS LAB RESULTS AUGUST 2010 FOR THE FULTON AVENUE SITE	1	[REPORT]	[]	[]	[]	[]
306805	08/10/2010	ENVIRONMENTAL RESOURCES MANAGEMENT - MONTHLY PROGRESS REPORT FOR OU1 FOR 07/2010 - ADMINISTRATIVE ORDER NO. CERCLA-02-2009-2028 FOR THE FULTON AVENUE SITE	2	[REPORT]	[WILLIS, KEVIN]	[US ENVIRONMENTAL PROTECTION AGENCY]	[WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]
306806	08/10/2010	ENVIRONMENTAL RESOURCES MANAGEMENT - MONTHLY PROGRESS REPORT FOR OU1 FOR 07/2010 - CONSENT JUDGMENT NO. CV-09-3917 FOR THE FULTON AVENUE SITE	4	[REPORT]	[WILLIS, KEVIN]	[US ENVIRONMENTAL PROTECTION AGENCY]	[WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]
318961	08/16/2010	QUALITY ASSURANCE PROJECT PLAN FOR THE FULTON AVENUE SITE	83	[REPORT]	[,]	[US ENVIRONMENTAL PROTECTION AGENCY]	[,]	[LOCKHEED MARTIN / SERAS]
306807	09/14/2010	ENVIRONMENTAL RESOURCES MANAGEMENT - MONTHLY PROGRESS REPORT FOR OU1 FOR 08/2010 - ADMINISTRATIVE ORDER NO. CERCLA-02-2009-2028 FOR THE FULTON AVENUE SITE	2	[REPORT]	[WILLIS, KEVIN]	[US ENVIRONMENTAL PROTECTION AGENCY]	[WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]

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306808	09/14/2010	ENVIRONMENTAL RESOURCES MANAGEMENT - MONTHLY PROGRESS REPORT FOR OU1 FOR 08/2010 - CONSENT JUDGMENT NO. CV-09-3917 FOR THE FULTON AVENUE SITE	4	[REPORT]	[WILLIS, KEVIN]	[US ENVIRONMENTAL PROTECTION AGENCY]	[WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]
318953	09/14/2010	TRANSMITTAL OF THE AUGUST 2010 MONTHLY PROGRESS REPORT FOR OU 1 FOR THE FULTON AVENUE SITE	4	[LETTER]	[WILLIS, KEVIN]	[US ENVIRONMENTAL PROTECTION AGENCY]	[WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]
318958	09/14/2010	PRELIMINARY RESULTS FOR WA# 0098 WITH CHAIN OF CUSTODY NO. 2-082710-083859-0004 FOR THE FULTON AVENUE SITE	8	[REPORT]	[SINGHVI , RAJESHMAL]	[US ENVIRONMENTAL PROTECTION AGENCY]	[KANSAL, VINOD]	[LOCKHEED MARTIN TECHNOLOGY SERVICES]
319033	10/14/2010	ENVIRONMENTAL RESOURCES MANAGEMENT - MONTHLY PROGRESS REPORT FOR OU1 FOR 09/2010 - ADMINISTRATIVE ORDER NO. CERCLA-02-2009-2028 FOR THE FULTON AVENUE SITE	2	[REPORT]	[WILLIS, KEVIN]	[US ENVIRONMENTAL PROTECTION AGENCY]	[WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]
319043	10/14/2010	ENVIRONMENTAL RESOURCES MANAGEMENT - MONTHLY PROGRESS REPORT FOR OU1 FOR 09/2010 - CONSENT JUDGMENT NO. CV-09-3917 FOR THE FULTON AVENUE SITE	4	[REPORT]	[WILLIS, KEVIN]	[US ENVIRONMENTAL PROTECTION AGENCY]	[WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]
318965	10/26/2010	DEPOSITION OF RICHARD HUMANN CASE NO. 2:07-CV-05244 FOR THE FULTON AVENUE SITE	60	[ORDER]	[]	[]	[HUMANN , RICH]	[H2M CONSULTING ENGINEERS]
306809	11/18/2010	ENVIRONMENTAL RESOURCES MANAGEMENT - MONTHLY PROGRESS REPORT FOR OU1 FOR 10/2010 - ADMINISTRATIVE ORDER NO. CERCLA-02-2009-2028 FOR THE FULTON AVENUE SITE	2	[REPORT]	[WILLIS, KEVIN]	[US ENVIRONMENTAL PROTECTION AGENCY]	[WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]

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306810	11/18/2010	ENVIRONMENTAL RESOURCES MANAGEMENT - MONTHLY PROGRESS REPORT FOR OU1 FOR 10/2010 - CONSENT JUDGMENT NO. CV-09-3917 FOR THE FULTON AVENUE SITE	8	[REPORT]	[WILLIS, KEVIN]	[US ENVIRONMENTAL PROTECTION AGENCY]	[WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]
318968	12/08/2010	TRIP REPORT FOR SOIL AND GROUNDWATER SAMPLING FOR THE FULTON AVENUE SITE	79	[REPORT]	[CATANZARITA, JEFF , LEUSER, RICK]	[LOCKHEED MARTIN INC, US ENVIRONMENTAL PROTECTION AGENCY]	[BOLDUC, JEAN]	[LOCKHEED MARTIN TECHNOLOGY SERVICES]
319034	12/15/2010	ENVIRONMENTAL RESOURCES MANAGEMENT - MONTHLY PROGRESS REPORT FOR OU1 FOR 11/2010 - ADMINISTRATIVE ORDER NO. CERCLA-02-2009-2028 FOR THE FULTON AVENUE SITE	2	[REPORT]	[WILLIS, KEVIN]	[US ENVIRONMENTAL PROTECTION AGENCY]	[WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]
319044	12/15/2010	ENVIRONMENTAL RESOURCES MANAGEMENT - MONTHLY PROGRESS REPORT FOR OU1 FOR 11/2010 - CONSENT JUDGMENT NO. CV-09-3917 FOR THE FULTON AVENUE SITE	4	[REPORT]	[WILLIS, KEVIN]	[US ENVIRONMENTAL PROTECTION AGENCY]	[WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]
306811	01/17/2011	ENVIRONMENTAL RESOURCES MANAGEMENT - MONTHLY PROGRESS REPORT FOR OU1 FOR 12/2010 - ADMINISTRATIVE ORDER NO. CERCLA-02-2009-2028 FOR THE FULTON AVENUE SITE	2	[REPORT]	[WILLIS, KEVIN]	[US ENVIRONMENTAL PROTECTION AGENCY]	[WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]
306812	01/17/2011	ENVIRONMENTAL RESOURCES MANAGEMENT - MONTHLY PROGRESS REPORT FOR OU1 FOR 12/2010 - CONSENT JUDGMENT NO. CV-09-3917 FOR THE FULTON AVENUE SITE	4	[REPORT]	[WILLIS, KEVIN]	[US ENVIRONMENTAL PROTECTION AGENCY]	[WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]
318960	01/22/2011	ANALYTICAL REPORT FOR THE FULTON AVENUE SITE	13	[REPORT]	[CATANZARITA, JEFF]	[US ENVIRONMENTAL PROTECTION AGENCY]	[,]	[LOCKHEED MARTIN / SERAS]

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319036	02/24/2011	ENVIRONMENTAL RESOURCES MANAGEMENT - MONTHLY PROGRESS REPORT FOR OU1 FOR 01/2011 - ADMINISTRATIVE ORDER NO. CERCLA-02-2009-2028 FOR THE FULTON AVENUE SITE	2	[REPORT]	[WILLIS, KEVIN]	[US ENVIRONMENTAL PROTECTION AGENCY]	[WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]
319047	02/24/2011	ENVIRONMENTAL RESOURCES MANAGEMENT - MONTHLY PROGRESS REPORT FOR OU1 FOR 01/2011 - CONSENT JUDGMENT NO. CV-09-3917 FOR THE FULTON AVENUE SITE	4	[REPORT]	[WILLIS, KEVIN]	[US ENVIRONMENTAL PROTECTION AGENCY]	[WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]
319035	03/16/2011	ENVIRONMENTAL RESOURCES MANAGEMENT - MONTHLY PROGRESS REPORT FOR OU1 FOR 02/2011 - ADMINISTRATIVE ORDER NO. CERCLA-02-2009-2028 FOR THE FULTON AVENUE SITE	2	[REPORT]	[WILLIS, KEVIN]	[US ENVIRONMENTAL PROTECTION AGENCY]	[WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]
319046	03/16/2011	ENVIRONMENTAL RESOURCES MANAGEMENT - MONTHLY PROGRESS REPORT FOR OU1 FOR 02/2011 - CONSENT JUDGMENT NO. CV-09-3917 FOR THE FULTON AVENUE SITE	4	[REPORT]	[WILLIS, KEVIN]	[US ENVIRONMENTAL PROTECTION AGENCY]	[WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]
318954	05/25/2011	TRANSMITTAL OF THE APRIL 2011 MONTHLY PROGRESS REPORT FOR OU 1 FOR THE FULTON AVENUE SITE	2	[LETTER]	[WILLIS, KEVIN]	[US ENVIRONMENTAL PROTECTION AGENCY]	[WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]
319042	06/14/2011	ENVIRONMENTAL RESOURCES MANAGEMENT - MONTHLY PROGRESS REPORT FOR OU1 FOR 05/2011 - CONSENT JUDGMENT NO. CV-09-3917 FOR THE FULTON AVENUE SITE	2	[REPORT]	[WILLIS, KEVIN]	[US ENVIRONMENTAL PROTECTION AGENCY]	[WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]

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306813	09/27/2011	ENVIRONMENTAL RESOURCES MANAGEMENT - MONTHLY PROGRESS REPORT FOR OU1 FOR 06/2011 - CONSENT JUDGMENT NO. CV-09-3917 FOR THE FULTON AVENUE SITE	2	[REPORT]	[WILLIS, KEVIN]	[US ENVIRONMENTAL PROTECTION AGENCY]	[WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]
306814	09/27/2011	ENVIRONMENTAL RESOURCES MANAGEMENT - MONTHLY PROGRESS REPORT FOR OU1 FOR 07/2011 AND 08/2011 - CONSENT JUDGMENT NO. CV-09-3917 FOR THE FULTON AVENUE SITE	6	[REPORT]	[WILLIS, KEVIN]	[US ENVIRONMENTAL PROTECTION AGENCY]	[WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]
318944	10/01/2011	REMEDIAL DESIGN WORK PLAN FOR OU1 FOR THE FULTON AVENUE SITE	635	[PLAN]	[]	[]	[,]	[ENVIRONMENTAL RESOURCES MANAGEMENT]
306815	11/28/2011	ENVIRONMENTAL RESOURCES MANAGEMENT - MONTHLY PROGRESS REPORT FOR OU1 FOR 10/2011 - CONSENT JUDGMENT NO. CV-09-3917 FOR THE FULTON AVENUE SITE	2	[REPORT]	[WILLIS, KEVIN]	[US ENVIRONMENTAL PROTECTION AGENCY]	[WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]
319048	01/24/2012	ENVIRONMENTAL RESOURCES MANAGEMENT - MONTHLY PROGRESS REPORT FOR OU1 FOR 12/2011 - CONSENT JUDGMENT NO. CV-09-3917 FOR THE FULTON AVENUE SITE	3	[REPORT]	[WILLIS, KEVIN]	[US ENVIRONMENTAL PROTECTION AGENCY]	[WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]
318959	01/27/2012	ANALYTICAL REPORT FOR THE FULTON AVENUE SITE	20	[REPORT]	[CATANZARITA, JEFF]	[US ENVIRONMENTAL PROTECTION AGENCY]	[,]	[LOCKHEED MARTIN / SERAS]
318987	01/30/2012	PUMPAGE WELL DATA WELL NO. 9 N-03881, WELL NO. 13 N-07058, WELL NO. 14 N-08339 FOR PERIOD 1968- 2012 FOR THE FULTON AVENUE SITE	9	[CHART / TABLE]	[WILLIS, KEVIN]	[US ENVIRONMENTAL PROTECTION AGENCY]	[]	[]

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318941	02/01/2012	PRELIMINARY 30% REMEDIAL DESIGN REPORT FOR OU1 FOR THE FULTON AVENUE SITEFOR THE FULTON AVENUE SITE	235	[REPORT]	[,]	[GENESCO INCORPORATED]	[,]	[ENVIRONMENTAL RESOURCES MANAGEMENT]
292460	02/18/2012	ENVIRONMENTAL RESOURCES MANAGEMENT - MONTHLY PROGRESS REPORT FOR OU1 FOR 01/2012 - CONSENT JUDGMENT NO. CV-09-3917 FOR THE FULTON AVENUE SITE	16	[REPORT]	[WILLIS, KEVIN]	[US ENVIRONMENTAL PROTECTION AGENCY]	[WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]
318940	02/22/2012	TRANSMITTAL OF THE PRELIMINARY 30% REMEDIAL DESIGN FOR OU1 FOR THE FULTON AVENUE SITE	4	[LETTER]	[WILLIS, KEVIN]	[US ENVIRONMENTAL PROTECTION AGENCY]	[WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]
318962	02/22/2012	TRIP REPORT FOR NOVEMBER 2011 SUB-SLAB SOIL GAS SAMPLING AND DECEMBER 2011 TAGA INDOOR AIR MONITORING AND SUB-SLAB SOIL GAS INDOOR AIR SAMPLING WORK ASSIGNMENT #SER00098 FOR THE FULTON AVENUE SITE	113	[REPORT]	[CATANZARITA, JEFF]	[US ENVIRONMENTAL PROTECTION AGENCY]	[CARTWRIGHT, MICHAEL]	[LOCKHEED MARTIN TECHNOLOGY SERVICES]
318991	03/11/2012	GENESCO HYDRAULIC EVALUATION PUMP TEST WATER LEVEL SUMMARY FOR 2/28/2012 - 3/11/2012 FOR THE FULTON AVENUE SITE	1	[CHART / TABLE]	[]	[]	[]	[]
318992	03/11/2012	GENESCO PUMP TEST ELEVATION DATA ANALYSIS TOOL FOR THE FULTON AVENUE SITE	458	[CHART / TABLE]	[]	[]	[]	[]
318993	03/13/2012	GENESCO PUMP TEST RAW DATA EVALUATION FOR THE FULTON AVENUE SITE	273	[CHART / TABLE]	[]	[]	[]	[]
319045	03/15/2012	ENVIRONMENTAL RESOURCES MANAGEMENT - MONTHLY PROGRESS REPORT FOR OU1 FOR 02/2012 - CONSENT JUDGMENT NO. CV-09-3917 FOR THE FULTON AVENUE SITE	2	[REPORT]	[WILLIS, KEVIN]	[US ENVIRONMENTAL PROTECTION AGENCY]	[WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]

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318952	03/29/2012	PRESENTATION: REMEDIAL DESIGN OU 1 FOR THE FULTON AVENUE SITE	35	[CHART / TABLE]	[WILLIS, KEVIN]	[US ENVIRONMENTAL PROTECTION AGENCY]	[HUMANN , RICH , Koch, Frank , PERAZZO, JAMES A, WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT, H2M CONSULTING ENGINEERS, Village of Garden City]
319087	04/05/2012	REQUEST FOR GENESCO AND THE VILLAGE OF GARDEN CITY TO SUBMIT AN ANALYSIS WHICH COMPARES THE REMEDIAL ACTION OF US EPA'S OU1 RECORD OF DECISON AGAINST A MODIFIED VERSION OF THE REMEDIAL ACTION - GARDEN CITY WELLS 9, 13 AND 14 FOR THE FULTON AVENUE SITE	2	[REPORT]	[ALEXIS, PAUL , PERICONI, JAMES J, YUDELSON, DAVID S]	[BRADLEY ARANT BOULT CUMMINGS LLP, PERICONI LLC, SIVE, PAGET & RIESEL, P.C.]	[KAMBIC, ROBERT B]	[US DEPARTMENT OF JUSTICE]
319085	05/03/2012	PROPOSED REMEDIAL DESIGN MODIFICATION ANALYSIS FOR OU1 - CONSENT JUDGMENT NO. CV-09-3917 FOR THE FULTON AVENUE SITE	13	[REPORT]	[WILLIS, KEVIN]	[US ENVIRONMENTAL PROTECTION AGENCY]	[WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]
318945	05/03/2012	TRANSMITTAL OF THEPROPOSED REMEDIAL DESIGN MODIFICATION ANALYSIS FOR OU1 - CONSENT JUDGMENT NO. CV-09-3917 FOR THE FULTON AVENUE SITE	2	[LETTER]	[KAMBIC, ROBERT B]	[US ATTORNEY'S OFFICE, EDNY]	[PERICONI, JAMES J]	[PERICONI LLC]
292461	05/20/2012	ENVIRONMENTAL RESOURCES MANAGEMENT - MONTHLY PROGRESS REPORT FOR OU1 FOR 04/2012 - CONSENT JUDGMENT NO. CV-09-3917 FOR THE FULTON AVENUE SITE	3	[REPORT]	[WILLIS, KEVIN]	[US ENVIRONMENTAL PROTECTION AGENCY]	[WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]
292466	05/20/2012	ENVIRONMENTAL RESOURCES MANAGEMENT - MONTHLY PROGRESS REPORT FOR OU1 FOR 03/2012 - CONSENT JUDGMENT NO. CV-09-3917 FOR THE FULTON AVENUE SITE	3	[REPORT]	[WILLIS, KEVIN]	[US ENVIRONMENTAL PROTECTION AGENCY]	[WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]

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318995	06/21/2012	VILLAGE OF GARDEN CITY - EXCERPT FROM THE BOARD OF TRUSTEES MEETING ON 06/21/2012 REGARDING THE RESOLUTION NO. 86-2012 - RECORD OF DECISION AMENDMENT FOR THE FULTON AVENUE SITE	3	[OTHER]	[]	[]	[]	[]
318966	07/24/2012	SUMMARY OF ADDITIONAL EVALUATIONS REGARDING THE PROPOSED REMEDIAL DESIGN MODIFICATION ANALYSIS, GROUNDWATER FLOW MODELING AND FORECASTING FOR THE FULTON AVENUE SITE	22	[LETTER]	[WILLIS, KEVIN]	[US ENVIRONMENTAL PROTECTION AGENCY]	[WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]
292465	07/30/2012	ENVIRONMENTAL RESOURCES MANAGEMENT - MONTHLY PROGRESS REPORT FOR OU1 FOR 06/2012 - CONSENT JUDGMENT NO. CV-09-3917 FOR THE FULTON AVENUE SITE	3	[REPORT]	[WILLIS, KEVIN]	[US ENVIRONMENTAL PROTECTION AGENCY]	[WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]
292467	07/30/2012	ENVIRONMENTAL RESOURCES MANAGEMENT - MONTHLY PROGRESS REPORT FOR OU1 FOR 05/2012 - CONSENT JUDGMENT NO. CV-09-3917 FOR THE FULTON AVENUE SITE	16	[REPORT]	[WILLIS, KEVIN]	[US ENVIRONMENTAL PROTECTION AGENCY]	[WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]
318957	02/12/2013	GENESCO INCORPORATED'S RESPONSE TO US EPA LETTER ON 11/06/2012 REGARDING THE IN-SITU CHEMCIAL OXIDATION COMPONENT FOR THE FULTON AVENUE SITE	10	[]	[WILLIS, KEVIN]	[US ENVIRONMENTAL PROTECTION AGENCY]	[PERAZZO, JAMES A, WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]

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292462	02/27/2013	ENVIRONMENTAL RESOURCES MANAGEMENT - MONTHLY PROGRESS REPORT FOR OU1 FOR 08/2012 - CONSENT JUDGMENT NO. CV-09-3917 FOR THE FULTON AVENUE SITE	3	[REPORT]	[WILLIS, KEVIN]	[US ENVIRONMENTAL PROTECTION AGENCY]	[WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]
292463	02/27/2013	ENVIRONMENTAL RESOURCES MANAGEMENT - MONTHLY PROGRESS REPORT FOR OU1 FOR 12/2012 - CONSENT JUDGMENT NO. CV-09-3917 FOR THE FULTON AVENUE SITE	2	[REPORT]	[WILLIS, KEVIN]	[US ENVIRONMENTAL PROTECTION AGENCY]	[WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]
292464	02/27/2013	ENVIRONMENTAL RESOURCES MANAGEMENT - MONTHLY PROGRESS REPORT FOR OU1 FOR 07/2012 - CONSENT JUDGMENT NO. CV-09-3917 FOR THE FULTON AVENUE SITE	3	[REPORT]	[WILLIS, KEVIN]	[US ENVIRONMENTAL PROTECTION AGENCY]	[WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]
292468	02/27/2013	ENVIRONMENTAL RESOURCES MANAGEMENT - MONTHLY PROGRESS REPORT FOR OU1 FOR 11/2012 - CONSENT JUDGMENT NO. CV-09-3917 FOR THE FULTON AVENUE SITE	2	[REPORT]	[WILLIS, KEVIN]	[US ENVIRONMENTAL PROTECTION AGENCY]	[WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]
292469	02/27/2013	ENVIRONMENTAL RESOURCES MANAGEMENT - MONTHLY PROGRESS REPORT FOR OU1 FOR 10/2012 - CONSENT JUDGMENT NO. CV-09-3917 FOR THE FULTON AVENUE SITE	2	[REPORT]	[WILLIS, KEVIN]	[US ENVIRONMENTAL PROTECTION AGENCY]	[WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]
292470	02/27/2013	ENVIRONMENTAL RESOURCES MANAGEMENT - MONTHLY PROGRESS REPORT FOR OU1 FOR 09/2012 - CONSENT JUDGMENT NO. CV-09-3917 FOR THE FULTON AVENUE SITE	3	[REPORT]	[WILLIS, KEVIN]	[US ENVIRONMENTAL PROTECTION AGENCY]	[WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]

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319071	03/22/2013	US EPA COMMENTS REGARDING THE IN-SITU CHEMICAL OXIDATION COMPONENT OU1 REMEDIAL DESIGN FOR THE FULTON AVENUE SITE	2	[LETTER]	[PERAZZO, JAMES A]	[ENVIRONMENTAL RESOURCES MANAGEMENT]	[WILLIS, KEVIN]	[US ENVIRONMENTAL PROTECTION AGENCY]
292473	04/08/2013	ENVIRONMENTAL RESOURCES MANAGEMENT - MONTHLY PROGRESS REPORT FOR OU1 FOR 02/2013 - CONSENT JUDGMENT NO. CV-09-3917 FOR THE FULTON AVENUE SITE	2	[REPORT]	[WILLIS, KEVIN]	[US ENVIRONMENTAL PROTECTION AGENCY]	[WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]
292474	04/08/2013	ENVIRONMENTAL RESOURCES MANAGEMENT - MONTHLY PROGRESS REPORT FOR OU1 FOR 01/2013 - CONSENT JUDGMENT NO. CV-09-3917 FOR THE FULTON AVENUE SITE	248	[REPORT]	[WILLIS, KEVIN]	[US ENVIRONMENTAL PROTECTION AGENCY]	[WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]
292477	04/09/2013	ENVIRONMENTAL RESOURCES MANAGEMENT - MONTHLY PROGRESS REPORT FOR OU1 FOR 03/2013 - CONSENT JUDGMENT NO. CV-09-3917 FOR THE FULTON AVENUE SITE	2	[REPORT]	[WILLIS, KEVIN]	[US ENVIRONMENTAL PROTECTION AGENCY]	[WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]
292471	05/07/2013	ENVIRONMENTAL RESOURCES MANAGEMENT - MONTHLY PROGRESS REPORT FOR OU1 FOR 04/2013 - CONSENT JUDGMENT NO. CV-09-3917 FOR THE FULTON AVENUE SITE	7	[REPORT]	[WILLIS, KEVIN]	[US ENVIRONMENTAL PROTECTION AGENCY]	[WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]
318974	05/14/2013	BOH MEETING 05/14/2013 MONTHLY REPORT FOR THE FULTON AVENUE SITE	1	[REPORT]	[]	[]	[]	[]
318947	05/29/2013	FIGURE 4 - GROUNDWATER FLOW MODEL OUTPUT VGC SUPPLY WELL NOS. 13 & 14 FOR THE FULTON AVENUE SITE	1	[FIGURE]	[,]	[GENESCO INCORPORATED]	[,]	[ENVIRONMENTAL RESOURCES MANAGEMENT]

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318973	05/29/2013	CORRESPONDENCE TO SUMMARIZE THE RESULTS OF GROUNDWATER FLOW MODELING AND EVALUATIONS TO FURTHER INFORM EPA'S DECISION ON WHETHER TO MODIFY THE SELECTED REMEDY FOR THE FULTON AVENUE SITE	9	[LETTER]	[WILLIS, KEVIN]	[US ENVIRONMENTAL PROTECTION AGENCY]	[WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]
319051	06/07/2013	SAMPLING RESULTS FOR MW-21C - SDG NO. 1305061 FOR OU2 FOR THE FULTON AVENUE SITE	3	[CHART / TABLE]	[]	[]	[,]	[HDR INCORPORATED]
292481	06/10/2013	ENVIRONMENTAL RESOURCES MANAGEMENT - MONTHLY PROGRESS REPORT FOR OU1 FOR 05/2013 - CONSENT JUDGMENT NO. CV-09-3917 FOR THE FULTON AVENUE SITE	3	[REPORT]	[WILLIS, KEVIN]	[US ENVIRONMENTAL PROTECTION AGENCY]	[WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]
292480	07/08/2013	ENVIRONMENTAL RESOURCES MANAGEMENT - MONTHLY PROGRESS REPORT FOR OU1 FOR 06/2013 - CONSENT JUDGMENT NO. CV-09-3917 FOR THE FULTON AVENUE SITE	2	[REPORT]	[WILLIS, KEVIN]	[US ENVIRONMENTAL PROTECTION AGENCY]	[WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]
318956	07/12/2013	GENESCO INCORPORATED'S RESPONSE TO US EPA LETTER ON 03/22/2013 REGARDING THE IN-SITU CHEMICAL OXIDATION COMPONENT FOR THE FULTON AVENUE SITE	2	[LETTER]	[WILLIS, KEVIN]	[US ENVIRONMENTAL PROTECTION AGENCY]	[PERAZZO, JAMES A, WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]
292475	08/12/2013	ENVIRONMENTAL RESOURCES MANAGEMENT - MONTHLY PROGRESS REPORT FOR OU1 FOR 07/2013 - CONSENT JUDGMENT NO. CV-09-3917 FOR THE FULTON AVENUE SITE	3	[REPORT]	[WILLIS, KEVIN]	[US ENVIRONMENTAL PROTECTION AGENCY]	[WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]

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319070	09/05/2013	US EPA RESPONSE TO ENVIRONMENTAL RESOURCE MANAGEMENT'S CORRESPONDENCE DATED 07/12/2013 REGARDING THE INTALLATION OF DEEP BORINGS FOR THE FULTON AVENUE SITE	2	[LETTER]	[ALEXIS, PAUL]	[BRADLEY ARANT BOULT CUMMINGS LLP]	[FISCHER, DOUGLAS]	[US ENVIRONMENTAL PROTECTION AGENCY]
292472	09/10/2013	ENVIRONMENTAL RESOURCES MANAGEMENT - MONTHLY PROGRESS REPORT FOR OU1 FOR 08/2013 - CONSENT JUDGMENT NO. CV-09-3917 FOR THE FULTON AVENUE SITE	3	[REPORT]	[WILLIS, KEVIN]	[US ENVIRONMENTAL PROTECTION AGENCY]	[WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]
319069	09/28/2013	REMEDIAL DESIGN WORK PLAN ADDENDUM FOR OU1 FOR CONTINUED GROUNDWATER INVESTIGATION FOR THE FULTON AVENUE SITE	15	[PLAN]	[]	[]	[,]	[ENVIRONMENTAL RESOURCES MANAGEMENT]
292479	10/09/2013	ENVIRONMENTAL RESOURCES MANAGEMENT - MONTHLY PROGRESS REPORT FOR OU1 FOR 09/2013 - CONSENT JUDGMENT NO. CV-09-3917 FOR THE FULTON AVENUE SITE	2	[REPORT]	[WILLIS, KEVIN]	[US ENVIRONMENTAL PROTECTION AGENCY]	[WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]
318988	10/23/2013	GC SUPPLY WELL NO. 9 PUMPAGE DATA AND RAW WATER SAMPLE RESULTS THROUGH 10/2013 FOR THE FULTON AVENUE SITE	8	[CHART / TABLE]	[WILLIS, KEVIN]	[US ENVIRONMENTAL PROTECTION AGENCY]	[]	[]
318955	10/30/2013	CORRESPONDENCE REGARDING THE RESOLUTION ADOPTED AT THE BOARD OF TRUSTEE MEETING ON 06/21/2012 FOR THE FULTON AVENUE SITE	1	[LETTER]	[WILLIS, KEVIN]	[US ENVIRONMENTAL PROTECTION AGENCY]	[BROWN , CYNTHIA]	[NONE]

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319058	11/07/2013	MEETING MINUTES OF THE BOARD OF TRUSTEES OF THE VILLAGE OF GARDEN CITY MEETING HELD ON 11/07/2013 FOR THE FULTON AVENUE SITE	12	[MEETING MINUTES]	[]	[]	[]	[]
319068	11/07/2013	US EPA COMMENTS AND APPROVAL OF THE 09/2013 OU1 REMEDIAL DESIGN WORK PLAN ADDENDUM RECEIVED FROM ENVIRONMENTAL RESOURCES MANAGEMENT ON BEHALF OF GENESCO INCORPORATED FOR THE FULTON AVENUE SITE	3	[LETTER]	[WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]	[WILLIS, KEVIN]	[US ENVIRONMENTAL PROTECTION AGENCY]
319012	11/12/2013	ENVIRONMENTAL RESOURCES MANAGEMENT - MONTHLY PROGRESS REPORT FOR OU1 FOR 10/2013 - CONSENT JUDGMENT NO. CV-09-3917 FOR THE FULTON AVENUE SITE	2	[REPORT]	[WILLIS, KEVIN]	[US ENVIRONMENTAL PROTECTION AGENCY]	[WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]
319072	11/15/2013	REVISED FINAL REMEDIAL DESIGN WORK PLAN ADDENDUM FOR OU1 - CONSENT JUDGMENT NO. CV-09-3917 FOR THE FULTON AVENUE SITE	16	[PLAN]	[WILLIS, KEVIN]	[US ENVIRONMENTAL PROTECTION AGENCY]	[WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]
292482	12/10/2013	ENVIRONMENTAL RESOURCES MANAGEMENT - MONTHLY PROGRESS REPORT FOR OU1 FOR 11/2013 - CONSENT JUDGMENT NO. CV-09-3917 FOR THE FULTON AVENUE SITE	3	[REPORT]	[WILLIS, KEVIN]	[US ENVIRONMENTAL PROTECTION AGENCY]	[WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]
319060	12/17/2013	H2M CORRESPONDENCE REGARDING VILLAGE OF GARDEN CITY AND THE OVERALL STRATEGY FOR DEALING WITH THE FULTON AVENUE SITE	3	[LETTER]	[,]	[INCORPORATED VILLAGE OF GARDEN CITY]	[HUMANN, RICHARD W]	[H2M ARCHITECTS + ENGINEERS]

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319061	12/20/2013	TRANSMITTAL OF H2M CORRESPONDENCE REGARDING VILLAGE OF GARDEN CITY AND THE OVERALL STRATEGY FOR DEALING WITH THE FULTON AVENUE SITE	1	[LETTER]	[BROWN , CYNTHIA]	[NONE]	[SCHOELLE, ROBERT L]	[INCORPORATED VILLAGE OF GARDEN CITY]
319062	12/27/2013	REDACTED CORRESPONDENCE FROM CYNTHIA BROWN REGARDING H2M'S RESPONSE TO HER PREVIOUS LETTER REGARDING THE VILLAGE OF GARDEN CITY AND THE OVERALL STRATEGY FOR THE FULTON AVENUE SITE	1	[LETTER]	[WILLIS, KEVIN]	[US ENVIRONMENTAL PROTECTION AGENCY]	[BROWN , CYNTHIA]	[NONE]
318979	01/07/2014	LABORATORY RESULTS AIR STRIPPERS FOR WELL 1 AND 2 FOR LAB NO. 1401216-001 - 1401216-003 FOR THE FULTON AVENUE SITE	7	[CHART / TABLE]	[]	[]	[,]	[PACE ANALYTICAL]
319006	01/10/2014	ENVIRONMENTAL RESOURCES MANAGEMENT - MONTHLY PROGRESS REPORT FOR OU1 FOR 12/2013 - CONSENT JUDGMENT NO. CV-09-3917 FOR THE FULTON AVENUE SITE	3	[REPORT]	[WILLIS, KEVIN]	[US ENVIRONMENTAL PROTECTION AGENCY]	[WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]
318980	02/04/2014	LABORATORY RESULTS AIR STRIPPERS FOR WELL 1 AND 2 FOR LAB NO. 1402121-001 - 1402121-003 FOR THE FULTON AVENUE SITE	8	[CHART / TABLE]	[]	[]	[,]	[PACE ANALYTICAL]
319008	02/10/2014	ENVIRONMENTAL RESOURCES MANAGEMENT - MONTHLY PROGRESS REPORT FOR OU1 FOR 01/2014 - CONSENT JUDGMENT NO. CV-09-3917 FOR THE FULTON AVENUE SITE	3	[REPORT]	[WILLIS, KEVIN]	[US ENVIRONMENTAL PROTECTION AGENCY]	[WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]
318981	03/04/2014	LABORATORY RESULTS AIR STRIPPERS FOR WELL 1 AND 2 FOR LAB NO. 1403168-001 - 1403168-003 FOR THE FULTON AVENUE SITE	8	[CHART / TABLE]	[]	[]	[,]	[PACE ANALYTICAL]

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292486	03/11/2014	ENVIRONMENTAL RESOURCES MANAGEMENT - MONTHLY PROGRESS REPORT FOR OU1 FOR 10/2014 - CONSENT JUDGMENT NO. CV-09-3917 FOR THE FULTON AVENUE SITE	7	[REPORT]	[WILLIS, KEVIN]	[US ENVIRONMENTAL PROTECTION AGENCY]	[WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]
318302	03/18/2014	PRESENTATION ON BEHALF OF THE INCORPORATED VILLAGE OF GARDEN CITY AND GENESCO INCORPORATED FOR THE FULTON AVENUE SITE	21	[OTHER]	[]	[]	[,]	[H2M CONSULTING ENGINEERS]
318982	04/01/2014	LABORATORY RESULTS AIR STRIPPERS FOR WELL 1 AND 2 FOR LAB NO. 1404075-001 - 1404075-003 FOR THE FULTON AVENUE SITE	7	[CHART / TABLE]	[]	[]	[,]	[PACE ANALYTICAL]
319010	04/14/2014	ENVIRONMENTAL RESOURCES MANAGEMENT - MONTHLY PROGRESS REPORT FOR OU1 FOR 03/2014 - CONSENT JUDGMENT NO. CV-09-3917 FOR THE FULTON AVENUE SITE	2	[REPORT]	[WILLIS, KEVIN]	[US ENVIRONMENTAL PROTECTION AGENCY]	[WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]
318983	05/06/2014	LABORATORY RESULTS AIR STRIPPERS FOR WELL 1 AND 2 FOR LAB NO. 1405384-001 - 1405384-003 FOR THE FULTON AVENUE SITE	8	[CHART / TABLE]	[]	[]	[,]	[PACE ANALYTICAL]
319004	05/16/2014	ENVIRONMENTAL RESOURCES MANAGEMENT - MONTHLY PROGRESS REPORT FOR OU1 FOR 04/2014 - CONSENT JUDGMENT NO. CV-09-3917 FOR THE FULTON AVENUE SITE	2	[REPORT]	[WILLIS, KEVIN]	[US ENVIRONMENTAL PROTECTION AGENCY]	[WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]
318997	06/01/2014	NASSAU COUNTY PUBLIC HEALTH ORDINANCE DATED 06/2014	213	[OTHER]	[]	[]	[EISENSTEIN, LAWRENCE]	[NASSAU COUNTY]

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318984	06/03/2014	LABORATORY RESULTS AIR STRIPPERS FOR WELL 1 AND 2 FOR LAB NO. 1406212-001 -1406212-003 FOR THE FULTON AVENUE SITE	8	[CHART / TABLE]	[]	[]	[,]	[PACE ANALYTICAL]
292487	06/23/2014	ENVIRONMENTAL RESOURCES MANAGEMENT - MONTHLY PROGRESS REPORT FOR OU1 FOR 05/2014 - CONSENT JUDGMENT NO. CV-09-3917 FOR THE FULTON AVENUE SITE	6	[REPORT]	[WILLIS, KEVIN]	[US ENVIRONMENTAL PROTECTION AGENCY]	[WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]
318985	07/01/2014	LABORATORY RESULTS AIR STRIPPERS FOR WELL 1 AND 2 FOR LAB NO. 1407087-001 - 1407087-003 FOR THE FULTON AVENUE SITE	7	[CHART / TABLE]	[]	[]	[,]	[PACE ANALYTICAL]
318948	07/01/2014	REMEDIAL DESIGN SUPPLEMENTAL TECHNICAL MEMORANDUM FOR OU1 FOR THE FULTON AVENUE SITE	3321	[REPORT]	[]	[]	[,]	[ENVIRONMENTAL RESOURCES MANAGEMENT]
292484	07/30/2014	ENVIRONMENTAL RESOURCES MANAGEMENT - MONTHLY PROGRESS REPORT FOR OU1 FOR 06/2014 - CONSENT JUDGMENT NO. CV-09-3917 FOR THE FULTON AVENUE SITE	2	[REPORT]	[WILLIS, KEVIN]	[US ENVIRONMENTAL PROTECTION AGENCY]	[WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]
318986	08/05/2014	LABORATORY RESULTS AIR STRIPPERS FOR WELL 1 AND 2 FOR LAB NO. 1408282-001 - 1408282-003 FOR THE FULTON AVENUE SITE	15	[CHART / TABLE]	[]	[]	[,]	[PACE ANALYTICAL]
292483	08/20/2014	ENVIRONMENTAL RESOURCES MANAGEMENT - MONTHLY PROGRESS REPORT FOR OU1 FOR 07/2014 - CONSENT JUDGMENT NO. CV-09-3917 FOR THE FULTON AVENUE SITE	2	[REPORT]	[WILLIS, KEVIN]	[US ENVIRONMENTAL PROTECTION AGENCY]	[WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]

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319078	09/02/2014	LABORATORY RESULTS AIR STRIPPERS FOR WELLS 1 AND 2 FOR LAB NO. 1409061-001 - 1409061-003 FOR THE FULTON AVENUE SITE	9	[CHART / TABLE]	[]	[]	[,]	[PACE ANALYTICAL]
319005	09/25/2014	ENVIRONMENTAL RESOURCES MANAGEMENT - MONTHLY PROGRESS REPORT FOR OU1 FOR 08/2014 - CONSENT JUDGMENT NO. CV-09-3917 FOR THE FULTON AVENUE SITE	2	[REPORT]	[WILLIS, KEVIN]	[US ENVIRONMENTAL PROTECTION AGENCY]	[WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]
319079	10/07/2014	LABORATORY RESULTS AIR STRIPPERS FOR WELLS 1 AND 2 FOR LAB NO. 1410513-001 - 1410513-003 FOR THE FULTON AVENUE SITE	8	[CHART / TABLE]	[]	[]	[,]	[PACE ANALYTICAL]
319013	10/31/2014	ENVIRONMENTAL RESOURCES MANAGEMENT - MONTHLY PROGRESS REPORT FOR OU1 FOR 09/2014 - CONSENT JUDGMENT NO. CV-09-3917 FOR THE FULTON AVENUE SITE	2	[REPORT]	[WILLIS, KEVIN]	[US ENVIRONMENTAL PROTECTION AGENCY]	[WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]
292485	11/01/2014	ENVIRONMENTAL RESOURCES MANAGEMENT - MONTHLY PROGRESS REPORT FOR OU1 FOR 10/2014 - CONSENT JUDGMENT NO. CV-09-3917 FOR THE FULTON AVENUE SITE	2	[REPORT]	[WILLIS, KEVIN]	[US ENVIRONMENTAL PROTECTION AGENCY]	[WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]
319080	11/05/2014	LABORATORY RESULTS AIR STRIPPERS FOR WELLS 1 AND 2 FOR LAB NO. 1411275-001 - 1411275-003 FOR THE FULTON AVENUE SITE	8	[CHART / TABLE]	[]	[]	[,]	[PACE ANALYTICAL]

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319015	11/18/2014	ERM REVISED REMEDIAL ALTERNATIVE COST ESTIMATES - LIMITED ACTION AND GROUNDWATER EXTRACTION, TREATMENT AND SURFACE RECHARGE FOR OU1 FOR THE FULTON AVENUE SITE	4	[LETTER]	[WILLIS, KEVIN]	[US ENVIRONMENTAL PROTECTION AGENCY]	[WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]
319081	12/02/2014	LABORATORY RESULTS AIR STRIPPERS FOR WELLS 1 AND 2 FOR LAB NO. 1412138-001 - 1412138-003 FOR THE FULTON AVENUE SITE	9	[CHART / TABLE]	[]	[]	[,]	[PACE ANALYTICAL]
319054	12/04/2014	CORRESPONDENCE REGARDING EVALUATION OF AIR STRIPPING TOWER EMISSIONS H2M PROJECT NO. GARV 14-01 FOR THE FULTON AVENUE SITE	12	[LETTER]	[ALARCON, MICHAEL]	[NASSAU COUNTY HEALTH DEPT]	[TODARO, JOSEPH]	[H2M ARCHITECTS + ENGINEERS]
319011	12/15/2014	ENVIRONMENTAL RESOURCES MANAGEMENT - MONTHLY PROGRESS REPORT FOR OU1 FOR 11/2014 - CONSENT JUDGMENT NO. CV-09-3917 FOR THE FULTON AVENUE SITE	2	[REPORT]	[WILLIS, KEVIN]	[US ENVIRONMENTAL PROTECTION AGENCY]	[WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]
319082	01/01/2015	NYDEC PUMPAGE REPORT FOR 2014 IN THOUSANDS OF GALLONS FOR WELL NOS. N3603, N3604, N3605, N7117, AND N8818 FOR THE FULTON AVENUE SITE	1	[CHART / TABLE]	[]	[]	[,]	[NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION]
319075	01/06/2015	LABORATORY RESULTS AIR STRIPPERS FOR WELLS 1 AND 2 FOR LAB NO. 1501196-001 - 1501196-003 FOR THE FULTON AVENUE SITE	8	[CHART / TABLE]	[]	[]	[,]	[PACE ANALYTICAL]
319014	01/14/2015	H2M COST ESTIMATES FOR OU1 FOR THE FULTON AVENUE SITE	4	[LETTER]	[WILLIS, KEVIN]	[US ENVIRONMENTAL PROTECTION AGENCY]	[HUMANN, RICHARD W]	[H2M ARCHITECTS + ENGINEERS]

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319059	01/30/2015	ENVIRONMENTAL RESOURCES MANAGEMENT - MONTHLY PROGRESS REPORT FOR OU1 FOR 12/2014 - CONSENT JUDGMENT NO. CV-09-3917 FOR THE FULTON AVENUE SITE	2	[REPORT]	[WILLIS, KEVIN]	[US ENVIRONMENTAL PROTECTION AGENCY]	[WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]
319076	02/03/2015	LABORATORY RESULTS AIR STRIPPERS FOR WELLS 1 AND 2 FOR LAB NO. 1502144-001 - 1502144-003 FOR THE FULTON AVENUE SITE	9	[CHART / TABLE]	[]	[]	[,]	[PACE ANALYTICAL]
319009	02/16/2015	ENVIRONMENTAL RESOURCES MANAGEMENT - MONTHLY PROGRESS REPORT FOR OU1 FOR 01/2015 - CONSENT JUDGMENT NO. CV-09-3917 FOR THE FULTON AVENUE SITE	6	[REPORT]	[WILLIS, KEVIN]	[US ENVIRONMENTAL PROTECTION AGENCY]	[WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]
319088	02/16/2015	SAMPLING DATA FOR WELLS 9, 13, AND 14 FOR THE TIME PERIOD OF 01/16/2009 - 02/16/2015 FOR THE FULTON AVENUE SITE	3562	[OTHER]	[]	[]	[]	[]
319077	03/03/2015	LABORATORY RESULTS AIR STRIPPERS FOR WELLS 1 AND 2 FOR LAB NO. 1503165-001 - 1502165-003 FOR THE FULTON AVENUE SITE	9	[CHART / TABLE]	[]	[]	[,]	[PACE ANALYTICAL]
319007	03/24/2015	ENVIRONMENTAL RESOURCES MANAGEMENT - MONTHLY PROGRESS REPORT FOR OU1 FOR 02/2015 - CONSENT JUDGMENT NO. CV-09-3917 FOR THE FULTON AVENUE SITE	2	[REPORT]	[WILLIS, KEVIN]	[US ENVIRONMENTAL PROTECTION AGENCY]	[WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]
319065	03/27/2015	CORRESPONDENCE AND CHARTS REGARDING THE PUMPAGE CHANGES IN WELL NOS. 9, 13, AND 14 FOR 2008 - 2014 FOR THE FULTON AVENUE SITE	6	[E MAIL MESSAGE]	[WILLIS, KEVIN]	[US ENVIRONMENTAL PROTECTION AGENCY]	[WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]

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319067	03/30/2015	UNVALIDATED DATA FOR 03/2015 GROUNDWATER SAMPLES COLLECTED FROM SELECT WELLS REQUESTED BY US EPA FOR THE FULTON AVENUE SITE	31	[E MAIL MESSAGE]	[WILLIS, KEVIN]	[US ENVIRONMENTAL PROTECTION AGENCY]	[WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]
319053	03/31/2015	NEW YORK STATE CONCURRENCE WITH THE PROPOSED PLAN FOR THE ROD AMENDMENT FOR OU1 FOR THE FULTON AVENUE SITE	2	[LETTER]	[MUGDAN, WALTER E]	[US ENVIRONMENTAL PROTECTION AGENCY]	[SCHICK, ROBERT]	[NY STATE DEPT OF ENVIRONMENTAL CONSERVATION (NYSDEC)]
319074	04/13/2015	GROUNDWATER SAMPLING RESULTS FOR OU1 FOR 03/2015 - ADMINISTRATIVE ORDER NO. CERCLA-02-2009-2028 FOR THE FULTON AVENUE SITE	1207	[REPORT]	[WILLIS, KEVIN]	[US ENVIRONMENTAL PROTECTION AGENCY]	[WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]
319086	04/14/2015	SAMPLING RESULTS FOR WELL 13 AND WELL 14 FOR THE FULTON AVENUE SITE	10	[REPORT]	[]	[]	[MURRELL, STU]	[PACE ANALYTICAL]
319064	04/22/2015	COST ESTIMATES FOR REMEDIAL ALTERNATIVES GW-1 AND GW-2 FOR THE PROPOSED PLAN FOR AMENDING 2007 FIRST OPERABLE UNIT RECORD OF DECISION FOR THE FULTON AVENUE SITE	3	[MEMORANDUM]	[]	[]	[BADALAMENTI, SALVATORE]	[US ENVIRONMENTAL PROTECTION AGENCY]
319073	04/22/2015	ENVIRONMENTAL RESOURCES MANAGEMENT - MONTHLY PROGRESS REPORT FOR OU1 FOR 03/2015 - CONSENT JUDGMENT NO. CV-09-3917 FOR THE FULTON AVENUE SITE	2	[REPORT]	[WILLIS, KEVIN]	[US ENVIRONMENTAL PROTECTION AGENCY]	[WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]
319084	04/23/2015	PROPOSED PLAN FOR OU1 RECORD OF DECISION AMENDMENT FOR THE FULTON AVENUE SITE	11	[PLAN]	[]	[]	[,]	[US ENVIRONMENTAL PROTECTION AGENCY]

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319087	04/05/2012	REQUEST FOR GENESCO AND THE VILLAGE OF GARDEN CITY TO SUBMIT AN ANALYSIS WHICH COMPARES THE REMEDIAL ACTION OF US EPA'S OU1 RECORD OF DECISON AGAINST A MODIFIED VERSION OF THE REMEDIAL ACTION - GARDEN CITY WELLS 9, 13 AND 14 FOR THE FULTON AVENUE SITE	2	[REPORT]	[ALEXIS, PAUL , PERICONI, JAMES J, YUDELSON, DAVID S]	[BRADLEY ARANT BOULT CUMMINGS LLP, PERICONI LLC, SIVE, PAGET & RIESEL, P.C.]	[KAMBIC, ROBERT B]	[US DEPARTMENT OF JUSTICE]
350506	05/26/2015	ENVIRONMENTAL RESOURCES MANAGEMENT - MONTHLY PROGRESS REPORT FOR OU1 FOR 04/2015 - CONSENT JUDGMENT NO. CV-09-3917 FOR THE FULTON AVENUE SITE	2	[REPORT]	[WILLIS, KEVIN]	[US ENVIRONMENTAL PROTECTION AGENCY]	[WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]
319543	06/19/2015	ENVIRONMENTAL RESOURCES MANAGEMENT - 05/2015 GROUNDWATER SAMPLING RESULTS FOR FULTON AVENUE SITE	56	[REPORT]	[WILLIS, KEVIN]	[US ENVIRONMENTAL PROTECTION AGENCY]	[WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]
350507	06/23/2015	ENVIRONMENTAL RESOURCES MANAGEMENT - MONTHLY PROGRESS REPORT FOR OU1 FOR 05/2015 - CONSENT JUDGMENT NO. CV-09-3917 FOR THE FULTON AVENUE SITE	2	[REPORT]	[WILLIS, KEVIN]	[US ENVIRONMENTAL PROTECTION AGENCY]	[WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]
350508	07/27/2015	ENVIRONMENTAL RESOURCES MANAGEMENT - MONTHLY PROGRESS REPORT FOR OU1 FOR 06/2015 - CONSENT JUDGMENT NO. CV-09-3917 FOR THE FULTON AVENUE SITE	2	[REPORT]	[WILLIS, KEVIN]	[US ENVIRONMENTAL PROTECTION AGENCY]	[WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]

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350509	08/25/2015	ENVIRONMENTAL RESOURCES MANAGEMENT - MONTHLY PROGRESS REPORT FOR OU1 FOR 07/2015 - CONSENT JUDGMENT NO. CV-09-3917 FOR THE FULTON AVENUE SITE	4	[REPORT]	[WILLIS, KEVIN]	[US ENVIRONMENTAL PROTECTION AGENCY]	[WENCZEL, CHRIS W]	[ENVIRONMENTAL RESOURCES MANAGEMENT]
319540	08/27/2015	SUPPLEMENTAL RISK EVALUATION FOR OU1 FOR THE FULTON AVENUE SITE	7	[MEMORANDUM]	[WILLIS, KEVIN]	[US ENVIRONMENTAL PROTECTION AGENCY]	[FILIPOWICZ, URSZULA]	[US ENVIRONMENTAL PROTECTION AGENCY]

APPENDIX IV

STATE CONCURRENCE LETTER

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Division of Environmental Remediation, Office of the Director
625 Broadway, 12th Floor, Albany, New York 12233-7011
P: (518) 402-9706 | F: (518) 402-9020
www.dec.ny.gov

Sent Via Email Only August 18, 2015

Walter Mudgan, Director
Emergency and Remedial Response Division
United States Environmental Protection Agency
Region II Office
290 Broadway
New York, NY 10007-1866

Re: Record of Decision Amendment
Site Name: Fulton Avenue (Garden City Park Indust.) NPL
Site Operable Unit 1 (OU1), Nassau (C)
DEC Site No. 130073

Dear Mr. Mudgan:

The New York State Department of Environmental Conservation (DEC) and the New York State Department of Health (DOH) have reviewed the above referenced 2015 OU1 final ROD Amendment for the Fulton Avenue National Priorities List (NPL) site.

Through this Record of Decision (ROD) amendment, the United States Environmental Protection Agency (EPA) is modifying the scope and role of the response action identified in the 2007 ROD, which included a groundwater extraction and treatment system that would restore the groundwater to its beneficial use. The ROD selected groundwater extraction system was expected to "more expeditiously meet chemical-specific applicable or relevant and appropriate requirements, or "ARARs" for the groundwater." The remedy provided for the groundwater extraction wells be operated at a pumping rate adequate to hydraulically contain the contaminated groundwater and prevent it from migrating into the area of influence of Garden City Water District wells 13 and 14.

Given the extensive dispersal of PCE within the OU1 plume, the EPA determined that the extraction system contemplated in the 2007 ROD would not be effective in pulling the PCE contamination back from wells 13 and 14. Moreover, data collected since 2007 show that PCE levels are declining in the OU1 portion of the groundwater plume, and the treatment systems currently installed on wells 13 and 14 are effectively removing PCE and other VOCs from groundwater entering the wells.

Therefore, the groundwater extraction system is no longer needed to protect the potable water supply obtained from Village wells 13 and 14 and thus, this amendment proposes to eliminate the OU1 extraction and treatment system.

The EPA will instead address restoration of the groundwater in conjunction with its evaluation of a final remedial approach for the Site that includes running the Village of Garden City wells at their current rate of extraction.

The 2007 ROD also called for the application of an in-situ chemical oxidation (ISCO) technology. Investigations performed during the OU1 remedial design did not identify PCE source material in the shallow aquifer amenable to ISCO treatment in the immediate vicinity of the Fulton Property. Therefore, ISCO will not be applied to the shallow aquifer at that location.

The EPA Fulton Avenue ROD Amendment also calls for a vapor intrusion evaluation of structures that are in the vicinity of the Fulton Property and that could potentially be affected by the OU1 portion of the groundwater contamination plume. An appropriate response action (such as sub-slab ventilation systems) may be implemented based on the results of the investigation. The operation and maintenance (O&M) of the existing sub-slab ventilation system at the Fulton Property will continue.

The EPA will also continue to investigate additional areas where possible source material may exist under Operable Unit 2 (OU2) that may need to be addressed. This investigation will include source(s) of elevated PCE observed in nearby monitoring well GCP-01, located southwest and downgradient of the Fulton Property.

Therefore, the State concurs with the changes to the selected remedy as stated in the 2015 OU1 ROD Amendment. If you have any questions, please contact Mr. Jim Harrington, of my staff, at (518) 402-9625.

Sincerely,

Robert W. Schick, P.E.
Director
Division of Environmental Remediation

ec: Sal Badalamenti, EPA
Angela Carpenter, EPA
Krista Anders, DOH
Charlotte Bethoney, DOH
Renata Ockerby, DOH
J. DeFranco, NCDH
Jim Harrington, DEC
John Swartwout, DEC
Steve Scharf, DEC
Walter Parish, DEC

APPENDIX V

RESPONSIVENESS SUMMARY

RESPONSIVENESS SUMMARY

FOR THE

RECORD OF DECISION AMENDMENT

FULTON AVENUE SUPERFUND SITE, FIRST OPERABLE UNIT

TOWNS OF NORTH HEMPSTEAD AND HEMPSTEAD,

NASSAU COUNTY, NEW YORK

INTRODUCTION

This Responsiveness Summary provides a summary of citizens' significant comments submitted during the public comment period for the U.S. Environmental Protection Agency's (EPA's) April 2015 Proposed Plan for amending the EPA's September 28, 2007, interim Record of Decision (ROD) for the First Operable Unit (OU1) of the Fulton Avenue site (Site) and provides the EPA's responses to those comments. The EPA considered all significant comments summarized in this document prior to selecting the remedy modifications documented in the ROD Amendment.

SUMMARY OF COMMUNITY RELATIONS ACTIVITIES

On April 24, 2015, the EPA issued, for public comment, a Proposed Plan in which the EPA identified its preferred modifications to the 2007 interim OU1 ROD for the Site. The public comment period on the Proposed Plan ran from April 24 through May 26, 2015, and included a May 12, 2015, public meeting at the Garden City Village Hall at 351 Stewart Avenue in Garden City, New York. The purpose of the public meeting was to inform interested citizens and local officials about the Superfund process, discuss and receive comments on the Proposed Plan, and respond to questions from the public and other interested parties. Notice of the Proposed Plan and comment period was published in the Garden City News on April 24, 2015. The public notice informed the public of the duration of the public comment period, the date and location of the public meeting, and the availability of the Proposed Plan and Administrative Record file supporting the proposed modification. The Proposed Plan and supporting documentation were available to the public at the EPA Region 2 Superfund Records Center in New York, New York, the Garden City Public Library in Garden City,

New York, and at the Shelter Rock Public Library in Albertson, New York. The Proposed Plan also was available to the public at http://www.epa.gov/region02/superfund/npl/fulton. Responses to the comments and questions received at the public meeting, along with other written comment received during the public comment period, are included in this Responsiveness Summary.

Attached to this Responsiveness Summary are the following Attachments:

Attachment 1 - Proposed Plan
Attachment 2 - Public Notice – Commencement of Public Comment Period
Attachment 3 - August 5, 2014 Public Meeting Sign-In Sheets
Attachment 4 - August 5, 2014 Public Meeting Transcript
Attachment 5 - Written Comment Submitted During the Public Comment Period

COMMENTS AND RESPONSES

Comment #1: Was contamination that could be treated with in-situ chemical oxidation (ISCO) found near the original source area at 150 Fulton Avenue?

Response: The area in the vicinity of 150 Fulton Avenue was extensively investigated and no source areas amenable to treatment with ISCO were identified. The investigation included the collection of groundwater and soil samples to depths of up to 60 feet below ground surface.

The purpose of the ISCO injections was to convert high levels of organic contamination into nonhazardous compounds, thereby accelerating restoration of the groundwater to federal or state maximum contaminant levels (MCLs). Investigations performed during the OU1 remedial design did not identify the location of any high level PCE source material in the shallow aquifer in the immediate vicinity of 150 Fulton Avenue. Therefore, this component of the interim OU1 remedy will not be implemented. As noted in the ROD Amendment, the EPA will continue to investigate additional areas for possible source material that may need to be addressed (by ISCO or another remedial approach), including source(s) of elevated PCE that has been observed in monitoring well GCP-01 located southwest and downgradient of 150 Fulton Avenue.

Comment #2: Are extraction and safety devices still being used to protect the people who work at 150 Fulton Avenue?

Response: Yes, the sub-slab ventilation system beneath 150 Fulton Avenue continues to operate in order to protect building occupants from exposure to volatile organic compound (VOC) vapors that may enter the building from beneath it.

Comment #3: Is Genesco paying for this remedy?

Response: The ROD Amendment is not an enforcement document and does not identify the party(ies) that will be responsible for implementing or paying for the remedy.

According to status reports filed with the U.S District Court for the Eastern District of New York, the Village of Garden City and Genesco have reached a settlement in principle to resolve a separate lawsuit in *Village of Garden City v. Genesco Inc. and Gordon Atlantic Corporation,* 07-CV-5244 (EDNY). It is the EPA's expectation that this settlement would provide for Genesco's payment for the operation, maintenance and monitoring ("O&M") of the treatment systems on Village water supply wells 13 and 14 for a period of 30 years. It should be noted that the EPA's modified remedy calls for the continued O&M of those wells until those wells no longer are impacted by contaminants above the MCLs for PCE and trichloroethylene (TCE), which may take longer than 30 years. The EPA anticipates that the government and Genesco will modify the existing consent judgment to secure Genesco's implementation of the modified remedy.

Comment #4: What are ARARs?

Response: "ARARs" is an acronym for "Applicable or Relevant and Appropriate Requirements," which are standards, requirements, criteria, or limitations of other federal and state environmental laws that are legally applicable or relevant and appropriate to a Superfund response action. A Superfund remedial action must comply with ARARs, unless a waiver is justified. ARARs for the Site include, for example, the MCLs for PCE and TCE established by the federal Safe Drinking Water Act's National Primary Drinking Water Regulations at 40 C.F.R. § 141.61, which are applicable to public water supplies including Village of Garden City wells 13 and 14.

Comment #5: Is the drinking water from Garden City's wells 13 and 14 safe?

Response: Yes. The treatment system on wells 13 and 14 effectively removes PCE, TCE and other VOCs from groundwater before it is distributed to the public. The drinking water from wells 13 and 14 is monitored by the Village of Garden City to ensure that it complies with applicable federal and New York State laws and regulations relating to water districts.

Comment #6: Minutes of a 2013 board meeting of the Nassau County Department of Health (NCDOH) state that EPA, the New York State Department of Environmental Conservation (NYSDEC), New York State Department of Health (NYSDOH) and NCDOH believe there is a definite danger of sending contamination into the Garden City water distribution system under the revised project. Please address that concern. The commenter also separately noted that, "In 2013, a revised proposal was made to flood the contaminated site while simultaneously using [Village water supply wells 13 and 14] to supply water."

Response: The referenced minutes provide the Nassau County Department of Health's summary of a discussion among the EPA, NYSDEC, NYSDOH, and NCDOH regarding a 2012 proposal by the Village of Garden City and Genesco Inc. to use wells 13 and 14 to remove PCE from the OU1 part of the aquifer for the purposes of restoring the groundwater and providing potable water. Use of the public supply wells to remove PCE from the aquifer was part of the Village of Garden City's and Genesco's original proposal to modify the 2007 ROD, as stated in March 29, 2012, slides that the Village and Genesco presented to the EPA. Those slides are publicly available in the Administrative Record. After discussing this proposal with NYSDEC, NYSDOH and NCDOH, however, EPA rejected the proposal to use wells 13 and 14 for aquifer restoration and instead determined that the interim OU1 remedy modification would focus on ensuring the continued provision of safe drinking water from wells 13 and 14. The well 13 and 14 removal and treatment of some of the contaminants from the aquifer is an incidental effect of the ROD Amendment.

The meeting minutes identify NCDOH's concern about the original Village/Genesco proposal. The minutes do not, however, mention the views of the EPA, NYSDEC or NYSDOH regarding that proposal.

The commenter's statement regarding a 2013 revised proposal to "flood the contaminated site" appears to reference the 2012 Village/Genesco proposal that was discussed in the 2013 NCDOH minutes. The proposal did not call for any flooding of the Site, however.

Comment #7: Why is EPA taking away the groundwater extraction and treatment system that was part of the remedy selected in the 2007 ROD?

Response: The groundwater treatment system was part of an interim remedy to address the PCE-dominant portion of the groundwater contamination plume. EPA has chosen to eliminate the groundwater extraction and treatment system from the interim OU1 remedy because PCE levels in groundwater reaching the intakes of wells 13 and 14 have been steadily declining since the summer of 2007, whereas those levels had been increasing prior to the 2007 ROD. The lower PCE levels in groundwater suggest that the extraction well system in the 2007 ROD is not needed on an interim basis to help prevent more highly elevated levels of contamination from reaching wells 13 and 14, because high levels of OU1 contamination are unlikely to be present in the future. The attenuating nature of the PCE-dominant portion of the groundwater plume also suggests that the source of the PCE in the OU1 portion of the groundwater plume is depleting, and that the highest levels of contamination may already have passed through the well head treatment systems at supply wells 13 and 14. The existing treatment systems at those wells have been and are expected to continue to effectively provide a safe drinking water supply.

The EPA currently is investigating TCE contamination as well as possible sources of PCE and TCE as part of the second operable unit (OU2) for the Site, and expects to issue a ROD for OU2 that will constitute the final groundwater remedy for the Site and that will serve as a final decision for OU1. Currently, groundwater restoration is one of the EPA's goals for the final Site remedy. The OU1 interim remedy will neither be inconsistent with, nor preclude, implementation of a final remedy for the Site.

Comment #8: If PCE levels in the aquifer have dropped, where did that contamination go?

Response: It appears that the source(s) of the OU1/PCE-dominant portion of the contaminant plume is attenuating, with the residual (or remaining) contamination moving downgradient (generally south-southwest) in the groundwater. Active source(s) of PCE mass have not been identified. Analytical results show an overall downward trend in contamination levels in the OU1 portion of the plume. Attenuation also is supported by Genesco's 2014 investigation of potential source areas in the vicinity of the former drywell at 150 Fulton Avenue, which did not identify any source areas in the shallow aquifer in the vicinity of the drywell (though EPA will continue to investigate additional areas for possible source material that may need to be addressed, such as potential source(s) of elevated PCE that has been observed in monitoring well GCP-01 located southwest and downgradient of 150 Fulton Avenue). A portion of the OU1 contamination is incidentally removed and treated by the well 13 and 14 treatment systems. See also the response to Comment #1, above.

Comment #9: What alternatives will EPA evaluate for restoring the aquifer in OU2?

Response: The EPA currently is performing a Remedial Investigation (RI) for OU2, which is the TCE-dominant portion of the contamination plume. The OU2 RI will identify the nature and extent of OU2 contamination, including potential sources of TCE and PCE contamination. The EPA will then prepare a Feasibility Study (FS) that will identify alternatives for restoring the aquifer (both the PCE- and TCE-dominant parts) and addressing sources of contamination that have been identified.

Comment #10: The 2007 Record of Decision states that certain wells would be evaluated to determine if the Village of Garden City's 2007 upgrade of the well 13 and 14 treatment system was "fully protective," whereas EPA states in its May 12, 2015, presentation slides that "Based on the evaluation to date, the [well 13 and 14] treatment system is effectively protecting the water supply." Is there a functional difference between the words "fully protective" and "effectively protecting"?

Response: No. Both statements refer to the treatment systems' ability to continue to provide water that is safe to drink.

Comment #11: Slide 21 from EPA's presentation at the May 12, 2015, public meeting depicts VOC concentrations in MW 21C. For 2006 and 2007, the slide shows a steep decline in VOC levels, followed by a sharp increase. The slide also shows a steep decrease in PCE levels beginning in late 2011. How can EPA be sure that there also wasn't a significant VOC increase in 2012 and/or 2013 if no data were collected during those years?

Response: The graph on slide 21 shows a steep decline in PCE levels from the November 9, 2011, sample (850 parts per billion, or "ppb") to the March 5, 2015, sample (1.3 ppb). Concentrations of TCE and cis-1,2-DCE show a similarly steep decline during that period. The commenter is correct in that no samples were collected from MW 21C between November 9, 2011, and March 5, 2015, and the contamination levels in MW 21C during that time therefore are unknown. It should be noted that additional sampling conducted on May 1, 2015, showed PCE at a concentration of 318 ppb in a sample from MW 21C.[1] The EPA is continuing to monitor VOC contamination levels in the OU1 portion of the contamination plume.

The sharp decreases and subsequent increases in PCE, TCE and cis-1,2-DCE levels in MW 21C in 2006-2007 generally coincided with the Village of Garden City's upgrades to wells 13 and 14, during which time the wells went from operational, to shut down, to operational. When wells 13 and 14 were re-started in 2007 following the upgrade, the contamination levels in MW 21C generally resumed the patterns observed in MW 21C prior to the shutdown. This suggests that the 2006-2007 concentrations seen in MW 21C were influenced by the shutdown and startup of wells 13 and 14.

Comment #12: If the EPA selects Alternative GW-2, which is less expensive than Alternative GW-1, can the EPA apply the

[1] The May 1, 2015, result was not included in EPA's May 12, 2015, slide presentation because EPA did not receive the validated data for that sample until June, 2015.

difference in cost to OU2 in order to speed up the OU2 investigation?

Response: Alternative GW-1 is the lower cost alternative that the EPA evaluated in the Proposed Plan. The lower projected cost of the amended OU1 remedy will not, however, result in additional funds becoming available for OU2. The EPA expects the OU1 remedy to be funded by one or more potentially responsible parties for the Site, whereas the EPA currently is using Superfund money (from general tax revenues) for the OU2 investigation. The EPA has sufficient funding to complete the OU2 RI and, because an RI is iterative in nature, the availability of additional funding would not necessarily accelerate that work. Additional groundwater sampling is expected later this year. At that time, the EPA will determine if sufficient information has been collected to make a final remedial decision for groundwater at the Site.

Comment #13: It looks like the EPA did not evaluate the costs of the remedial alternatives beyond 30 years. Isn't the remedy supposed to provide a long-term, permanent solution?

Response: The EPA estimated the costs of the remedy using a 30-year duration as a simplifying calculation for this interim remedy. The EPA also used a 30-year time frame to compare the costs of the two alternatives evaluated in the Proposed Plan. The EPA expects, however, that PCE and TCE levels in the aquifer may exceed their respective MCLs for greater than 30 years and, as a result, the treatment systems on Village supply wells 13 and 14 may need to be operated for greater than 30 years. It was not necessary for the EPA to estimate the projected costs of this interim remedy for greater than 30 years because the EPA plans to issue an OU2 ROD that will constitute the final groundwater remedy for the Site and serve as a final remedial decision for OU1. The EPA may use a duration of greater than 30 years in the OU2 ROD if PCE and TCE levels in the aquifer are expected to exceed their respective MCLs for greater than 30 years.

Comment #14: Why would the EPA select Alternative GW-1 when Alternative GW-2 will extract more contamination from the aquifer?

Response: The modified remedy continues to be an interim remedy until a final decision is made regarding groundwater restoration at the Site. The remedial action objectives of the selected remedy are to (i) minimize and/or eliminate the potential for future human exposure to Site contaminants via contact with contaminated drinking water, and (ii) help reduce migration of contaminated groundwater. The existing well head treatment systems at Village water supply wells 13 and 14 have been effectively removing contamination from the groundwater without the need for an additional groundwater extraction and treatment system. The ROD Amendment assumes the continued operation of Village wells 13 and 14 until those wells no longer are impacted by contaminants above the MCLs for PCE and TCE.

Restoration of the aquifer is not a remedial action objective for OU1 because the nature and extent of the contamination present in the OU1 and OU2 portions of the plume – including sources of TCE - have not yet been identified. The EPA therefore does not have sufficient information at this time to determine whether the aquifer at the Site can be fully restored, and will conduct additional investigations as part of OU2. Currently, groundwater restoration is one of the EPA's goals for the final Site remedy. The modified interim remedy is neither inconsistent with nor will it preclude a final groundwater restoration remedy for the Site.

Comment #15: Is there a risk now or in the foreseeable future that the OU1 groundwater contamination will reach other communities south of Village water supply wells 13 and 14?

Response: Some OU1 groundwater contamination has been detected in monitoring wells located downgradient of Village water supply wells 13 and 14. Specifically, since 2004 PCE-dominant contamination has been sporadically detected in samples collected from various groundwater elevations at MW 26, located approximately between Village water supply wells 13 and 14 and Franklin Square Water District wells 1 and 2. As shown in Table 2 of the ROD Amendment, TCE concentrations in MW 26 historically have been TCE-dominant. Samples collected from MW 26 in March and May 2015, however, show PCE concentrations that are higher than TCE concentrations in several of the MW 26 screening levels (MW 26B at 271 feet, MW26C at 325 feet, MW 26D at 350.5 feet,

26E at 377 feet and 26F at 410.5 feet).[2] PCE-dominant contamination has not been detected in MW 27, located south of MW 26 and between the Village's supply wells 13 and 14 and the Franklin Square supply wells, nor has PCE been detected in Franklin Square supply wells 1 and 2. These data suggest that Village supply wells 13 and 14 are helping to reduce the migration of the OU1 portion of the groundwater plume. EPA will continue to monitor contaminant levels in groundwater downgradient of Village supply wells 13 and 14.

Comment #16: Does the term "drinking water" include the water that we use for washing?

Response: Yes. For purposes of the ROD Amendment, "drinking water" includes all water from wells 13 and 14, including water used for drinking and washing.

Comment #17: Is the water from Village supply wells 13 and 14 used only by people who live near those wells, or does it go into a centrally-shared system?

Response: Village supply wells 13 and 14 are connected to an interconnected water distribution system for the Village of Garden City water district. Questions regarding which specific homes receive water from Village water supply wells 13 and 14 should be directed to the Village of Garden City Department of Public Works.

Comment #18: Please confirm the levels of TCE and PCE entering Village water supply wells 13 and 14 as shown on EPA's May 12, 2015 public meeting presentation slides. What are the MCLs for PCE and TCE?

Response: Figure 1 from EPA's presentation slides showed 320 ppb PCE and 50 ppb TCE in water entering Village well 13 before treatment in January 2014. Figure 2 showed water containing 190 ppb PCE and 33 ppb TCE entering well 14 before treatment in January 2014. The federal MCL for both chemicals is 5 ppb.

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[2] Screening levels MW 26B and MW26C were not sampled in March, 2015.

In July, 2015, 436 ppb PCE and 66.5 ppb TCE were detected in water entering well 13 before treatment, and 378 ppb PCE and 55.4 ppb TCE were detected in water entering well 14 before treatment.

Comment #19: Does EPA know what the litigation between the Village of Garden City and Genesco is about?

Response: In December 2007, the Village filed a lawsuit against Genesco Inc. and Gordon Atlantic Corporation seeking costs, damages, and injunctive relief associated with the contamination of Village of Garden City wells 13 and 14. That case is still pending in the federal district court for the Eastern District of New York. In a June 26, 2015, status report to the court, the Village of Garden City informed the court that it had reached a settlement in principle with Genesco, while some details remained to be finalized concerning the Village's claims against Gordon Atlantic Corporation.

Comment #20: Where is the OU2 investigation being conducted?

Response: The OU2 Remedial Investigation is mainly being conducted north and west of 150 Fulton Avenue, generally in the area north of Hempstead Turnpike, south of Hillside Avenue, east of Covert Avenue, and west of Roslyn Road.

Comment #21: EPA stated that deep monitoring wells are going to be installed during the OU2 investigation. Where will they be constructed?

Response: EPA expects that the deep monitoring wells planned for the next phase of the OU2 investigation will be installed north and west of the OU1 study area. The specific locations have not yet been determined.

Comment #22: Did Genesco Inc., or its agents review or provide any input into this Fulton Ave OU1 Proposed Plan prior to the May 12, 2015, public meeting?

Response: In March of 2012, Genesco and the Village of Garden City jointly proposed modifications to the EPA's 2007 Record of Decision that would eliminate the separate groundwater

extraction and treatment system while ensuring the continued operation of the wellhead treatment systems on Village water supply wells 13 and 14. The Village and Genesco also proposed the elimination of the in-situ chemical oxidation, or ISCO, component of the 2007 ROD. The Village's and Genesco's March 2012 proposal was the basis of the remedy modifications that EPA issued for public comment in its April 2015 Proposed Plan for the Site. The EPA, in consultation with the NYSDEC, NYSDOH and NCDOH, independently determined that the proposed modifications are appropriate, for the reasons explained in the ROD Amendment. The slides from the Village's and Genesco's March 29, 2012, presentation to the EPA are in the Administrative Record.

The EPA discussed major elements of the remedy modifications with Genesco and the Village of Garden City prior to the EPA's issuance of the Proposed Plan. The EPA did not, however, share the April 2015 Proposed Plan with either Genesco or the Village prior to the Proposed Plan being issued to the public for comment on April 24, 2015.

Comment #23: N.Y. State Senator Kemp Hannon supported a bill to contain the Grumman/Navy plume in Bethpage. Why not here in Garden City? Is it not better to have uncontaminated sources of drinking water than to try and decontaminate the source of drinking water before sending it to the community?

Response: The reasons for the EPA's decision to eliminate the groundwater extraction system from the interim remedy are explained in the ROD Amendment (see "Site History and Enforcement Activities" and "Summary of the Rationale for the Selected Remedy").

The pumping of Village water supply wells 13 and 14 provides an incidental benefit of helping to reduce the mobility of contaminants in the OU1 portion of the plume. Restoration of the aquifer is not a remedial action objective for OU1 because the nature and extent of the contamination present in the OU1 and OU2 portions of the plume – including sources of TCE - have not yet been fully identified. The EPA therefore does not have sufficient information at this time to determine whether the aquifer at the Site can be fully restored, and will conduct additional investigations as part of OU2. Nevertheless, groundwater restoration is one of the EPA's goals for the final Site remedy. It should be noted that analytical results show an overall downward trend in contamination levels in the OU1

portion of the plume, and the interim OU1 remedial action will assure the provision of a safe drinking water supply from Village water supply wells 13 and 14 while the Site-wide groundwater investigation continues.

ATTACHMENTS

Attachment 1 - Proposed Plan

Attachment 2 - Public Notice – Commencement of Public Comment Period

Attachment 3 – May 12, 2015, Public Meeting Sign-In Sheets

Attachment 4 - May 12, 2015, Public Meeting Transcript

Attachment 5 - Written Comments Submitted During Public Comment Period

Attachment 1

Proposed Plan

Fulton Avenue Superfund Site (OU1)

Garden City Park, Nassau County, New York

April 2015

EPA ANNOUNCES PROPOSED PLAN

This Proposed Plan describes the remedial alternatives considered for amending the interim remedial action selected in the U.S. Environmental Protection Agency's (EPA's) September 28, 2007, Record of Decision (ROD) for the first operable unit (OU1) of the Fulton Avenue Superfund Site. The Proposed Plan identifies the EPA's preferred amendment to the interim OU1 remedy for the Site and provides the rationale for this preference. The Proposed Plan was developed by the EPA in consultation with the New York State Department of Environmental Conservation (NYSDEC). The preferred interim remedial action described in this Plan addresses human and environmental risks associated with contaminants identified in the portions of the groundwater at the Site that are primarily contaminated with tetrachloroethylene (PCE).

In accordance with Section 117(a) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended, 42 U.S.C. § 9617(a), and Section 300.435(c)(2)(ii) of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 C.F.R. § 300.435(c)(2)(ii), if the EPA decides to fundamentally alter a remedy selected in a ROD, the EPA's proposed changes must first be made available for public comment in a proposed plan before the EPA amends the ROD. The EPA is issuing this Proposed Plan as part of its public participation responsibilities under CERCLA Section 117(a) and Sections 300.430(f) and 300.435(c) of the NCP, 40 C.F.R. §§ 300.430(f) and 300.435(c).

The nature and extent of the contamination at the Site and the elements of the remedial alternatives summarized in this Proposed Plan are more fully described in the following documents:1) Remedial Investigation Report (RI) dated August 14, 2005, 2) the Feasibility Study Report (FS) report dated July 13, 2006, 3) FS Addendum dated February 15, 2007, 4) the OU1 ROD, 5) March 18, 2014, presentation slides prepared on behalf of the Village of Garden City, N.Y. (Village) and Genesco Inc. (Genesco), a potentially responsible party for the Site that identify proposed modifications to the OU1 ROD, 6) November 18, 2014, updated remedial alternative cost estimate prepared by Genesco, 7) January 14, 2015, cost estimate prepared by the Village, and 8) other documents contained in the OU1 Administrative Record and the OU1 Administrative Record Update for the Site. The EPA encourages the public to review these documents to gain a more comprehensive understanding of the Site and the Superfund activities that have been conducted.

In this Proposed Plan, the EPA proposes to eliminate the separate groundwater extraction and treatment system component of the 2007 remedy as well as the use of *in-situ* chemical oxidation (ISCO) in the shallow aquifer in the immediate vicinity of a facility located at 150 Fulton Avenue in Garden City Park, New York (the "Fulton Property"). The proposed remedy modification would

Mark Your Calendar

Public comment period:
April 24, 2015 – May 26, 2015
EPA will accept comments on the Proposed Plan during this public comment period.

Public Meeting:
May 12, 2015 at 7:00 p.m.
EPA will hold a public meeting to explain the Proposed Plan. The meeting will be held at Garden City Village Hall, 351 Stewart Avenue, Garden City, New York.

For more information, see the Administrative Record file, which is available at the following locations:

Shelter Rock Public Library
165 Searingtown Road
Albertson, New York 12548
Tel. (516) 883-7331
Hours: Monday - Friday 9:00am - 3:30pm

Garden City Public Library
60 Seventh Street
Garden City, New York 11530
Tel. (516) 742-8405
Hours: Monday and Friday 1:00pm - 6:00pm, Tuesday 1:00pm - 8:00pm, Wednesday and Thursday 10:00am - 8:00pm, Saturday 10:00am - 3:00pm

USEPA-Region 2
Superfund Records Center
290 Broadway, 18th Floor
New York, NY 10007-1866
(212) 637-4308
Hours: Monday-Friday, 9:00 a.m. - 5:00 p.m.

Written comments on this Proposed Plan should be addressed to:

Kevin Willis, Project Manager
United States Environmental Protection Agency
290 Broadway, 20th Floor
New York, NY 10007-1866
Telephone: (212) 637-4252
Fax: (212) 637-3966
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continue the operation and maintenance of the existing wellhead treatment systems for the Village potable water supply wells 13 and 14. The existing wellhead treatment systems consist of air strippers, which reduce concentrations of volatile organic compounds (VOCs) such as PCE in the treated drinking water to below the federal maximum contaminant levels (MCLs), followed by an activated carbon polishing step which further reduces VOC levels to below the detection limits of the required analytical method. Under this Proposed Plan, the air stripping systems will continue to be operated and maintained in order to protect the public from exposure to Site-related VOCs, including PCE, in groundwater entering those water supply wells, thereby providing a safe drinking water supply for the public. Vapor phase carbon treatment of the exhaust from the existing treatment systems will be added, if needed. The proposed remedy modification does not include maintenance of the activated carbon polishing step, which is separately implemented by the Village and which is not needed to maintain VOC levels below the MCLs. The proposed remedy modification also includes monitoring of groundwater entering wells 13 and 14 as well as monitoring groundwater upgradient, sidegradient and downgradient of wells 13 & 14.

The interim remedy described in this Proposed Plan is the *preferred* remedy for the Site. Changes to the preferred remedy or a change from the preferred remedy to another remedy may be made if public comments or additional data indicate that such a change will result in a more appropriate remedial action. The final decision regarding the selected interim remedy will be made after the EPA has taken into consideration all public comments on this Proposed Plan.

COMMUNITY ROLE IN SELECTION PROCESS

The EPA relies on public input to ensure that the concerns of the community are considered in selecting an effective remedy for each Superfund site. To this end, this Proposed Plan and the documents supporting this Proposed Plan are being made available to the public for a public comment period which begins on April 24, 2015 and concludes on May 26, 2015. See above for document repositories.

A public meeting will be held during the public comment period at the Garden City Village Hall, Garden City, New York on May 12, 2015, at 7:00 P.M. to further discuss with the public the reasons for this Proposed Plan, and to receive public comments.

Comments received at the public meeting, as well as written comments, will be documented in the responsiveness summary section of an amendment to the OU1 ROD, which will be the document that formalizes the EPA's selection of the modified interim remedy for OU1.

SCOPE AND ROLE OF ACTION

Site remediation activities are sometimes segregated into different phases, or operable units, so that remediation of different aspects of a site can proceed separately, resulting in a more expeditious cleanup of the entire site. The EPA also uses interim actions to address areas or contaminated media, such as groundwater, that ultimately may be included in the final Record of Decision for a site. Interim actions are used, for example, to institute temporary measures to stabilize a site or operable unit and/or prevent further migration of contaminants or further environmental degradation.

The Site is being addressed by the EPA in two operable units. This Proposed Plan describes the EPA's preferred interim action to address the portions of the groundwater at the Site that are primarily contaminated with PCE. The EPA has designated this action as OU1 of the Site remediation. The Fulton Avenue Site also includes trichloroethylene (TCE) contamination in groundwater surrounding the PCE-dominant portion of the groundwater contamination which is being addressed in OU1. The EPA currently is investigating the TCE contamination as well as possible sources of PCE and TCE as part of a second operable unit (OU2) for the Site. The EPA currently is performing an RI/FS for OU2, and expects to issue a ROD for OU2 that will constitute the final groundwater remedy for the Site and that will serve as a final decision for OU1. This OU1 interim remedial action will assure the provision of a safe drinking water supply from Village potable supply wells 13 and 14 while the Site-wide groundwater investigation continues.

With this Proposed Plan, the EPA is modifying the scope and role of the response action identified in the 2007 ROD, which included a groundwater extraction and treatment system that was intended to work towards restoring the groundwater to its beneficial use. (See 2007 ROD at p.4.) The ROD (p.23) indicated that the groundwater extraction system was expected to "more expeditiously meet chemical-specific ARARs [applicable or relevant and appropriate requirements] (e.g., MCLs) for the groundwater." Data collected since 2007, however, show that PCE levels are declining in the OU1 portion of the groundwater plume, and the treatment systems currently installed on wells 13 and 14 are effectively removing PCE and other VOCs from groundwater entering the wells. Further, modeling analyses conducted in 2012 by Genesco raised uncertainties as to whether the groundwater extraction system would significantly shorten the time to achieve the MCL for PCE in groundwater. Because of such uncertainty, and the fact that the groundwater extraction system is not needed to protect the potable water supply obtained from Village wells 13 and 14, the EPA is proposing to eliminate the extraction and treatment system from the OU1 interim remedy. Rather than implement the groundwater extraction system as part of this interim remedy, EPA proposes instead to address restoration of the groundwater in conjunction with its evaluation of a final remedial approach for the Site.

The 2007 ROD also called for the application of ISCO technology, in which an oxidant such as potassium permanganate would be injected underground near the former drywell at the Fulton Property, which is a major source of the OU1 PCE groundwater contamination. The purpose of the ISCO injections was to convert organic contamination into nonhazardous compounds, thereby accelerating restoration of the groundwater to the MCLs. Investigations performed during the OU1 remedial

design, however, did not identify PCE source material in the shallow aquifer in the immediate vicinity of the Fulton Property. Therefore, ISCO will not be applied to the shallow aquifer at that location. The EPA will continue to investigate additional areas for possible source material that may need to be addressed (by ISCO or another remedial approach), including source(s) of elevated PCE observed in nearby monitoring well GCP-01 located southwest and downgradient of the Fulton Property.

In the 2007 ROD, the EPA indicated that the OU1 portion of the contamination plume would be restored to its beneficial use when the TCE-dominant contamination is addressed in OU2. Because all sources of contamination present in the OU1 and OU2 portions of the plume – including sources of TCE - have not yet been identified, the EPA does not have sufficient information at this time to determine whether groundwater at the Site can be fully restored, and will conduct additional investigations as part of OU2. Currently, groundwater restoration is one of EPA's goals for the final Site remedy. The OU1 interim remedy will neither be inconsistent with, nor preclude, implementation of a final remedy for the Site.

SITE BACKGROUND

Site Description

The Site includes the 0.8-acre Fulton Property, all contamination emanating from the Fulton Property, and other contamination impacting the groundwater in the vicinity and downgradient of the Fulton Property including an overlapping TCE-dominant portion of the plume in the Upper Glacial and Magothy aquifers, and sources of TCE contamination impacting public supply wells in the Village and Franklin Square. EPA's OU2 RI/FS includes an investigation of TCE and other PCE sources.

The Fulton Property is owned by Gordon Atlantic Corporation, a potentially responsible party for the Site. It is located within the Garden City Park Industrial Area (GCPIA) in the Hamlet of Garden City Park, Town of North Hempstead, Nassau County, New York. A fabric-cutting mill operated at the Fulton Property from approximately January 1, 1965, through December 31, 1974, which involved dry-cleaning of fabrics with PCE. Currently, the Fulton Property is occupied by a digital imaging/business support company. EPA believes that a significant portion of the PCE groundwater contamination at the Site was caused by the disposal of PCE into a drywell on the Fulton Property.

There are about 20,000 people living within a mile of the Fulton Property. Residents within the area obtain their drinking water from public supply wells. The GCPIA is immediately adjacent to residential areas.

Site Geology/Hydrogeology

The Site is situated in the outwash plain on Long Island, New York. Approximately 500 feet of interbedded sands and limited clay lenses overlay Precambrian bedrock. There are three aquifers that exist beneath the Site, two of which are affected. The Upper Glacial aquifer is the surficial unit which overlies the Magothy aquifer. The Magothy is the primary source for public water in the area. No substantive clays have been observed between the Upper Glacial and Magothy aquifers within the areas studied to date.

Site History

Beginning in 1986, numerous investigations were conducted by the Nassau County Departments of Health and Public Works to identify the source(s) of VOCs impacting numerous public supply wells in Nassau County located downgradient of the GCPIA. Based on the results of these investigations, NYSDEC placed the Fulton Property on the Registry of Inactive Hazardous Waste Disposal Sites.

On March 6, 1998, the EPA placed the Site on the National Priorities List (NPL) of sites under CERCLA. At that time, NYSDEC was the lead regulatory agency overseeing the implementation of an RI/FS and an Interim Remedial Measure (IRM) described below.

Genesco conducted the IRM from August 1998 to December 2001 to remove contaminants from a drywell on the Fulton Property in order to prevent further contaminant migration into the groundwater and into the indoor air at the facility. During the IRM, contaminated soils were excavated, after which a soil vapor extraction (SVE) system was installed to address residual soil contamination from the bottom of the drywell. The system was operated until NYSDEC Technical and Administrative Guidance Memorandum soil cleanup levels were achieved. Over 10,000 pounds of PCE were estimated to have been removed from the source area during the operation of the SVE system. This action was approved by NYSDEC and the dismantling of the SVE system was authorized on January 2, 2002.

Following this action, Genesco installed a sub-slab ventilation system under the Fulton Property to protect occupants from exposure to VOC vapors that may enter the Fulton Property from beneath the building. This system remains in operation to protect the indoor air quality.

In 1999, under an Administrative Order with NYSDEC, Genesco contracted with an environmental consulting firm, Environmental Resources Management (ERM), to conduct an RI/FS. Between March 2000 and May 2003, 20 monitoring wells were installed and sampled in the RI/FS study area. The RI Report was approved by NYSDEC in November 2005. An FS Report was approved by NYSDEC on February 15, 2007. The EPA prepared an addendum to the FS Report in February 2007, and became the lead agency for the Site at the conclusion of the OU1 RI/FS process.

The Proposed Plan for OU1 at the Site was released by the EPA for public comment on February 23, 2007, and the public comment period ran from that date through March 31, 2007. The EPA selected the OU1 interim remedy in the 2007 ROD. The selected remedy included the following elements:

- ISCO treatment of source contamination at and near 150 Fulton Avenue;
- Construction and operation of a groundwater extraction and treatment system midway along the spine of the PCE-dominant portion of the contaminant plume;
- Evaluation of Village of Garden City's 2007 upgrade to treatment systems on wells 13 and 14 to determine whether the upgrade is fully protective;
- Investigation and remediation, if necessary, of vapor intrusion into structures within the vicinity of the Fulton Property; and
- Institutional controls to restrict future use of groundwater at the Site.

On September 10, 2009, the United States filed for public comment, in the United States District Court for the Eastern District of New York, a consent judgment in which Genesco agreed to implement the remedy selected in the 2007 ROD. Genesco began the remedial design of that remedy after the consent judgment was filed. The Village, which had filed its own lawsuit against Genesco and Gordon Atlantic Corporation, criticized the settlement in comments filed with the court and the consent judgment remains filed with the court but not entered. Discussions between and among EPA, Genesco, and the Village ensued.

In March of 2012, while the remedial design was underway, the Village and Genesco proposed modifications to the 2007 ROD that would, among other things, eliminate the separate groundwater extraction and treatment system while ensuring the continued operation of the wellhead treatment systems on Village water supply wells 13 and 14.

The EPA concluded that eliminating the separate groundwater extraction and treatment system from the OU1 remedy would be appropriate because PCE levels in groundwater reaching the intakes of wells 13 and 14, which had been increasing at the time of the ROD, instead have been declining since the summer of 2007. The lower PCE levels in groundwater suggest that the extraction well system contemplated in the 2007 ROD is not needed to help prevent more highly elevated levels of contamination from reaching wells 13 and 14, because such high levels of contamination are unlikely to be present in the future. The existing treatment systems at water supply wells 13 and 14 have been and are expected to continue to effectively provide a safe drinking water supply. The attenuating nature of the PCE-dominant portion of the groundwater plume indicates that the source of the PCE in the PCE-dominant portion of the plume may be depleting and that the highest levels of contamination may have already passed through the well head treatment systems at supply wells 13 and 14.

In addition, remedial design sampling conducted by Genesco's contractor in the area around 150 Fulton Avenue did not identify PCE source material in the shallow aquifer in the immediate vicinity of the former drywell into which the EPA believes PCE was historically disposed. The EPA has, however, identified fluctuating high levels of PCE (as high as approximately 50,000 parts per billion, or "ppb," in 1986) in groundwater in monitoring well GCP-01; this monitoring well is located on Atlantic Avenue approximately 400 feet southwest of the Fulton Property and monitors the shallow aquifer. While concentrations have fluctuated significantly over the sampling period, concentrations are generally declining. A sample collected in March 2015 contained 210 ppb PCE. High PCE levels detected in GCP-01

WHAT IS RISK AND HOW IS IT CALCULATED?

A Superfund baseline human health risk assessment is an analysis of the potential adverse health effects caused by hazardous substance releases from a site in the absence of any actions to control or mitigate these under current- and future-land uses. A four-step process is utilized for assessing site-related human health risks for reasonable maximum exposure scenarios.

Hazard Identification: In this step, the contaminants of concern (COC) at a site in various media (*i.e.*, soil, groundwater, surface water, and air) are identified based on such factors as toxicity, frequency of occurrence, and fate and transport of the contaminants in the environment, concentrations of the contaminants in specific media, mobility, persistence, and bioaccumulation.

Exposure Assessment: In this step, the different exposure pathways through which people might be exposed to the contaminants identified in the previous step are evaluated. Examples of exposure pathways include incidental ingestion of and dermal contact with contaminated soil. Factors relating to the exposure assessment include, but are not limited to, the concentrations that people might be exposed to and the potential frequency and duration of exposure. Using these factors, a reasonable maximum exposure scenario, which portrays the highest level of human exposure that could reasonably be expected to occur, is calculated.

Toxicity Assessment: In this step, the types of adverse health effects associated with chemical exposures and the relationship between magnitude of exposure and severity of adverse effects are determined. Potential health effects are chemical-specific and may include the risk of developing cancer over a lifetime or other non-cancer health effects, such as changes in the normal functions of organs within the body (*e.g.*, changes in the effectiveness of the immune system). Some chemicals are capable of causing both cancer and non-cancer health effects.

Risk Characterization: This step summarizes and combines outputs of the exposure and toxicity assessments to provide a quantitative assessment of site risks. Exposures are evaluated based on the potential risk of developing cancer and the potential for non-cancer health hazards. The likelihood of an individual developing cancer is expressed as a probability. For example, a 10^{-4} cancer risk means a one-in-ten-thousand excess cancer risk; or one additional cancer may be seen in a population of 10,000 people as a result of exposure to site contaminants under the conditions explained in the Exposure Assessment. Current Superfund guidelines for acceptable exposures are an individual lifetime excess cancer risk in the range of 10^{-4} to 10^{-6} (corresponding to a one-in-ten-thousand to a one-in-a-million excess cancer risk) with 10^{-6} being the point of departure. For non-cancer health effects, a hazard index (HI) is calculated. An HI represents the sum of the individual exposure levels compared to their corresponding reference doses. The key concept for a non-cancer HI is that a threshold level (measured as an HI of less than 1) exists below which non-cancer health effects are not expected to occur.

suggest the existence of PCE source material in that vicinity. The EPA expects to continue the investigation of potential source material.

SUMMARY OF SOIL AND GROUNDWATER SAMPLING

Soil

A focused RI, conducted in the 1990s by NYSDEC, identified a drywell immediately adjacent to the Fulton Property building as the primary source of the PCE-dominant contamination plume migrating from the Fulton Property. This drywell was connected to a pipe which received dry-cleaning waste from inside the building. The primary contaminant identified in drywell sediments, adjacent soil, and shallow groundwater beneath the drywell was PCE. TCE was also detected in soil at the Fulton Property at lower concentrations.

A sampling effort was performed in 2010 by Genesco's consultant, ERM, to identify PCE source materials in the vicinity of the Fulton Property that would be amenable to treatment with ISCO. However, source material was not found in the shallow (Upper Glacial) aquifer in that area. The EPA intends to investigate the potential existence of possible source material in the deeper Magothy aquifer below the Garden City Park Industrial Area as part of future investigations at the Site. The investigation of whether a deeper source of Site-related PCE contamination is present in the Magothy aquifer is beyond the scope of this Proposed Plan.

Genesco conducted additional investigatory work in order to identify a source or sources responsible for the high PCE concentrations seen in monitoring well GCP-01. The investigation, however, did not identify sources of that contamination. The EPA is continuing to investigate additional areas for possible sources that may need to be addressed.

Groundwater

The OU1 groundwater sampling program prior to the 2007 ROD included sampling of 20 groundwater monitoring wells located at the Site and analysis of samples for organic and inorganic compounds. The highest PCE concentration observed in monitoring well (MW) 21 prior to the ROD was 3,330 ppb detected in MW 21C in 2006. MW 21 is located approximately 1200 feet upgradient of Village wells 13 and 14.

Since the 2007 ROD, sampling of the monitoring wells along the OU1 portion of the plume, as well as data gathered by the Village during its operation of Village supply wells 13 and 14, show that concentrations of PCE have steadily diminished in the OU1 portion of the contaminant plume. For example, PCE concentrations in MW 21C have trended downward from the pre-ROD peak of 3,330 ppb in 2006 to 6.1 ppb PCE detected by EPA in June of 2013. More recently, sampling conducted by Genesco in March 2015 identified 1.5 ppb PCE in MW 21B and 1.3 ppb PCE in MW 21C, which are the lowest PCE levels detected in those well intervals since MW 21 was constructed in 2001. TCE concentrations in MW 21B and MW 21C have similarly experienced a decline, from 80.7 ppb in 2011 to 1.1 ppb in 2015 in MW 21B, and from 48.4 ppb in 2011 to 0.0 ppb (non-detect) in 2015 in MW 21C.

A downward trend has also been observed in Village wells 13 and 14 where the concentration of PCE decreased from a high of 1,020 ppb in June 2007 in well 13 to a low concentration of 170 ppb in May and November 2014 in well 14. Samples collected in April 2015 detected 436 ppb PCE in groundwater entering well 13, and 250 ppb PCE in groundwater entering well 14. It should be noted that there are fluctuations in the PCE levels entering wells 13 and 14, though a downward trend is clearly evident over the broader sampling period since 2007.

In MW 15A, located approximately midway between MW 21 and the Fulton Property, PCE levels declined from 1,120 ppb PCE in November 2011 to 243 ppb in March 2015. These and any future data will be utilized in the evaluation of a final groundwater remedy for the Site.

With respect to the current extent of the PCE-dominant groundwater contamination being addressed in OU1, sampling conducted since 2004 at MW 26, located generally between Village supply wells 13 and 14 and Franklin Square Water District wells 1 and 2, has sporadically shown low levels of PCE-dominant contamination (in 9 of 101 samples). The majority of the contamination in MW 26 generally has been TCE. When compared to 2011 analytical results, the March 2015 samples collected from MW 26 show higher PCE concentrations relative to TCE concentrations in several of the MW 26 screening levels (MW 26D at 350.5 feet, 26E at 377 feet and 26F at 410.5 feet), with a maximum 2015 PCE concentration of 42 ppb detected in MW 26F. PCE-dominant contamination has not been detected in MW 27, located south of MW 26 and between Village supply wells 13 and 14 and the Franklin Square supply wells, nor has PCE been detected in Franklin Square supply wells 1 and 2. These data suggest that Village wells 13 and 14 are helping to reduce the migration of the OU1 portion of the groundwater plume.

SUMMARY OF SITE RISKS

Human Health Risk Assessment

The purpose of the risk assessment is to identify potential cancer risks and noncancer health hazards at the Site assuming that no further remedial action is taken. A baseline human health risk assessment was performed during the OU1 RI to evaluate current and future cancer risks and noncancer health hazards and is summarized below. Data collected since the 2007 ROD do not change the conclusions of the OU1 risk assessment.

A four-step risk assessment process was used for assessing Site-related cancer risks and non-cancer health hazards. The process included: Hazard Identification of Chemicals of Potential Concern (COPCs), Exposure Assessment, Toxicity Assessment, and Risk Characterization.

A baseline risk assessment is an analysis of the potential adverse human health effects caused by hazardous-substance exposure in the absence of any actions to control or mitigate such exposure under current and future land uses.

The human-health risk estimates summarized below are based on reasonable maximum exposure scenarios and were developed by taking into account various conservative estimates about the frequency and duration of an individual's exposure to the COPCs for adults and children, as well as the toxicity of these contaminants. PCE and TCE are the COPCs for OU1.

The baseline risk assessment began with selecting COPCs in media that would be representative of Site risks. Since the area is served by municipal water, it is not likely that the groundwater underlying the Site will be used for potable purposes in the foreseeable future without proper treatment. However, since the aquifer system is designated as a sole-source aquifer, and the Site groundwater is being used as a source of drinking water, exposure to untreated groundwater through ingestion, inhalation and dermal contract was evaluated.

Based on this analysis, carcinogenic risk and/or noncarcinogenic hazards were above the acceptable carcinogenic risk (CR) range of 10^{-6} to 10^{-4} and the noncarcinogenic hazard index (HI) of 1 for the following chemicals and exposure pathways.

Population	Pathway	CR	HI
Adult resident – TCE and PCE	Ingestion/dermal absorption	3×10^{-3}	8
	Inhalation from shower	6×10^{-4}	NA
	Total	**4×10^{-3}**	**8**
Child resident – TCE and PCE	Ingestion/dermal absorption	2×10^{-3}	22
	Inhalation from shower	2×10^{-4}	NA
	Total	**2×10^{-3}**	**22**
Commercial Worker – TCE and PCE	Ingestion	7×10^{-4}	2.4

NA – Noncarcinogenic hazards were not estimated due to the lack of inhalation toxicity values for the COPCs.

These calculated risks to human health indicate that remedial action is warranted to reduce the risks associated with the observed contamination. The potential for vapor intrusion as an exposure pathway will be further evaluated.

The toxicity data and exposure assumptions that were used to estimate the potential risks and hazards to human health followed the Risk Assessment Guidance for Superfund used by the EPA. Although specific toxicity values and exposure assumptions may have changed since the time the risk assessment was completed, the risk assessment process that was used is consistent with current methodology and the need to take action is still warranted.

Ecological Risk Assessment

The potential risk to ecological receptors also was evaluated. For there to be an exposure, there must be a pathway through which a receptor (e.g., person, animal) comes into contact with one or more of the COPCs. Without a complete pathway or receptor, there is no exposure and, hence, no risk.

Based on a review of existing data, there are no potential exposure pathways for ecological receptors at the Site. As noted above, the Fulton Property itself is less than one acre in size and is located in the GCPIA within a highly developed area. The entire Fulton Property is paved or covered with buildings. The depth to groundwater (the medium of concern) is approximately 50 feet and is unlikely to affect any surface water bodies.

REMEDIAL ACTION OBJECTIVES

Remedial action objectives (RAOs) are specific goals to protect human health and the environment. These objectives are based on available information and standards such as ARARs for drinking water and groundwater, Site-specific risk-based levels, and the reasonably anticipated future land use for the Site (e.g., commercial/industrial or residential).

The following RAOs were established for OU1 in the 2007 ROD:

- Reduce contaminant levels in the drinking water aquifer to ARARs.

- Prevent further migration of contaminated groundwater.

The proposed change to the 2007 ROD is not inconsistent with the RAOs identified in the 2007 ROD, because the continued pumping and treatment of Village wells 13 and 14 will ensure a potable water supply, and this pumping and treatment provides the incidental benefit of helping to reduce migration of contaminated groundwater. While the proposed modification also will have the incidental benefit of reducing contaminant levels in drinking water, the primary purposes of this proposed modification are to prevent exposure to contaminated groundwater and to help reduce migration of contaminated groundwater.

The RAOs for this proposed change to the interim remedy are as follows:

- Minimize and/or eliminate the potential for future human exposure to Site contaminants via contact with contaminated drinking water.

- Help reduce migration of contaminated groundwater.

SUMMARY OF ALTERNATIVES

Common Elements for All Alternatives

Under the two alternatives presented in this Proposed Plan, the existing treatment systems on Village wells 13 and 14 would continue to operate and protect the public from contamination in the OU1 portion of the groundwater plume. Each alternative requires and includes the operation, monitoring and maintenance (O&M) of the existing treatment systems until wells 13 and 14 no longer are impacted by contaminants above the MCLs. Neither alternative requires any modification to the current pumping rates or volumes of water pumped by Village wells 13 and 14.

In addition, both alternatives include institutional controls that restrict future use of groundwater at the Site. Specifically, the Nassau County Sanitary Code regulates installation of private potable water supply wells in Nassau County.

The Fulton Property is zoned for industrial use, and the EPA does not anticipate any changes to the land use in the foreseeable future. If a change in land use is proposed, additional investigation of soils at the Fulton Property may be necessary to determine whether the change in land use could affect exposure risks at the property.

For each alternative, a Site management plan (SMP) would provide for the proper management of all OU1 remedy components, including institutional controls. The SMP would include: (a) O&M of Village wells 13 and 14 as well as monitoring of Site groundwater upgradient, sidegradient and downgradient of wells 13 and 14; (b) conducting an evaluation of the potential for vapor intrusion, and appropriate response action, if necessary, in the event of future construction at the Fulton Property; and (c) periodic certifications by the party(ies) implementing the remedy that any institutional and engineering controls are in place.

Each alternative also includes a vapor intrusion evaluation of structures that are in the vicinity of the Fulton Property and that could potentially be affected by the OU1 portion of the groundwater contamination plume. An appropriate response action (such as sub-slab ventilation systems) may be implemented based on the results of the investigation. The operation, maintenance and monitoring of the existing sub-slab ventilation system at 150 Fulton Avenue would continue under both alternatives.

Below is a brief description of the two alternatives considered in this Proposed Plan.

GW-1: Continued Operation of Existing Treatment Systems on Village Wells 13 and 14.

Capital Cost	$1,118,578[1]
O & M Cost	$2,920,610
Present Worth Cost	$4,039,188
Construction Time	N/A
Duration	30 years

This alternative relies upon the continued operation and maintenance of the existing air stripper treatment units on Village wells 13 and 14 in order to protect the public from exposure to hazardous substances in groundwater, and to provide a safe drinking water supply. The costs associated with this alternative include the costs of replacing existing air strippers as the equipment wears out. This alternative includes the addition of a vapor phase carbon unit if needed to capture VOCs being discharged from the air stripper treatment units. This alternative also includes monitoring of contamination in groundwater entering wells 13 and 14.

For cost estimating purposes, a 30-year time frame was assumed as the duration of this alternative. The EPA expects, however, that PCE and TCE levels in the groundwater will exceed their respective MCLs for greater than 30 years and, as a result, the treatment systems on Village wells 13 and 14 will need to be operated for greater than 30 years.

Because this alternative would result in contaminants remaining on Site above levels that would allow for unlimited use and unrestricted exposure, CERCLA requires that the Site be reviewed at least once every five years.

GW-2: Continued Operation of Existing Treatment Systems on Village wells 13 and 14, and Groundwater Extraction and Treatment

Capital Cost	$6,296,578
O & M Cost	$7,415,610
Present Worth Cost	$13,712,188
Construction Time	10 months
Duration	30 years

Alternative GW-2 was the remedy chosen in the 2007 ROD. This alternative includes a separate groundwater extraction and treatment system that would be constructed in the OU1 portion of the groundwater plume, upgradient of Village wells 13 and 14. In the ROD, the EPA anticipated that the system would be constructed in the "Estate" area of the Village, and would pump and treat groundwater for discharge into the existing infiltration

[1] The cost estimates in the 2007 ROD were refined during the design of the 2007 remedy.

basin at the Garden City Bird Sanctuary for recharge to groundwater.

The 2007 ROD included the application of ISCO technology to address potential PCE source material in the shallow aquifer in the vicinity of the Fulton Property. As explained above, however, during the remedial design, source material amenable to treatment with ISCO was not identified in the immediate vicinity of the Fulton Property. The cost estimate for GW-2, therefore, does not include the cost of the ISCO injections that were included in the ROD remedy.

For cost estimating purposes, a 30-year time frame was assumed as the duration of this alternative. The EPA expects, however, that PCE and TCE levels in the groundwater will exceed their respective MCLs for greater than 30 years and, as a result, the treatment systems on Village wells 13 and 14 and the separate groundwater extraction and treatment system will need to be operated for greater than 30 years.

Because this alternative would result in contaminants remaining on Site above levels that would allow for unlimited use and unrestricted exposure, CERCLA requires that the Site be reviewed at least once every five years.

EVALUATION OF ALTERNATIVES

In selecting a remedy for a site, the EPA considers the factors set forth in CERCLA i 121, 42 U.S.C. i 9621, by conducting a detailed analysis of the viable remedial alternatives pursuant to the NCP, 40 CFR i 300.430(e)(9) the EPA's *Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA* (OSWER Directive 9355.3-01), and the EPA's *Guide to Preparing Superfund Proposed Plans, Records of Decision, and Other Remedy Selection Decision Documents* (OSWER Directive 9200.1-23P) (July 1999). The detailed analysis consists of an assessment of the individual alternatives against each of nine evaluation criteria and a comparative analysis focusing upon the relative performance of each alternative against those criteria, as follows:

X Overall protection of human health and the environment addresses whether or not a remedy provides adequate protection and describes how risks posed through each exposure pathway (based on a reasonable maximum exposure scenario) are eliminated, reduced, or controlled through treatment, engineering controls, or institutional controls.

X Compliance with applicable or relevant and appropriate requirements (ARARs) addresses whether or not a remedy would meet all of the applicable or relevant and appropriate requirements of other federal and state environmental statutes and regulations or provide grounds for invoking a waiver.

X Long-Term effectiveness and permanence refers to the ability of a remedy to maintain reliable protection of human health and the environment over time, once cleanup goals have been met. It also addresses the magnitude and effectiveness of the measures that may be required to manage the risk posed by treatment residuals and/or untreated wastes.

X Reduction of toxicity, mobility, or volume through treatment evaluates an alternative's use of treatment to reduce the harmful effects of principal contaminants, their ability to move in the environment, and the amount of contamination present.

X Short-Term effectiveness addresses the period of time needed to achieve protection and any adverse impacts on human health and the environment that may be posed during the construction and implementation period until cleanup goals are achieved.

X Implementability considers the technical and administrative feasibility of implementing the alternative, including factors such as the relative availability of goods and services.

X Cost includes estimated capital and operation and maintenance costs, and net present-worth costs. Present worth cost is the total cost of an alternative over time in terms of today's dollar value. Cost estimates are expected to be accurate within a range of +50 to -30 percent.

X State acceptance. Considers whether the State agrees with the EPA's analyses and recommendations, as described in the RI/FS and Proposed Plan.

X Community acceptance will be assessed in the ROD, and considers whether the local community agrees with the EPA's analyses and preferred alternative. Comments received on the Proposed Plan are an important indicator of community acceptance.

The first two criteria above (overall protection of human health and the environment and compliance with ARARs) are known as "threshold criteria" because they are the minimum requirements that each response measure must meet in order to be eligible for selection as a remedy. The next five Superfund criteria (long-term protectiveness and permanence, reduction of toxicity, mobility, or volume through treatment, short-term effectiveness, implementability and cost) are known as "primary balancing criteria" and are factors with which tradeoffs between response measures are assessed so that the best option will be chosen, given site-specific data and conditions. The final two evaluation criteria (state acceptance and community acceptance) are called "modifying criteria" because new information or comments from the state or the community on the Proposed Plan may cause the EPA to modify the

preferred response measure or cause another response measure to be considered.

In accordance with EPA guidance, this modification of the OU1 remedial action is an interim remedy that will be protective of human health and the environment in the short term and is intended to provide adequate protection until a final remedy for the Site is implemented.

This section of the Proposed Plan evaluates the relative performance of each of the two remedial alternatives discussed above against the nine criteria.

Overall Protection of Human Health and the Environment

Both alternatives include the continued operation and maintenance of the existing treatment systems installed on Village wells 13 and 14 as an interim remedy, and as such overall protection would not be achieved until the final remedy for the Site is selected. Nevertheless, the treatment systems will continue to protect the public from exposure to PCE and other VOCs in the OU1 portion of the groundwater contamination plume by providing a safe drinking water supply for the Village. The institutional controls will further restrict exposure to contaminants in groundwater.

The groundwater extraction and treatment system in GW-2 is also an interim remedy and would remove some VOC contamination from groundwater upgradient of Village wells 13 and 14. Analyses performed during the remedial design, however, raised uncertainties as to whether the extraction system selected in the 2007 ROD would significantly shorten the time needed to reach the MCL for PCE in the OU1 portion of the groundwater plume. The EPA will further study the effectiveness of an extraction and treatment system as part of its evaluation of a final remedial approach for the Site.

Although GW-1 is not intended to restore the groundwater aquifer, the pumping of Village wells 13 and 14 followed by treatment of the pumped water will continue to have the incidental benefit of removing contaminants from groundwater. Similarly, the pumping of Village wells 13 and 14 will continue to help prevent the OU1 portion of the groundwater plume from reaching the Franklin Square Water District wells.

Compliance with ARARs

ARARs related to the Village wells 13 and 14 include the Safe Drinking Water Act, 42 U.S.C. §§ 42 U.S.C. §§ 300f - 300j-26 (SDWA) and New York State Sanitary Code at 10 NYCRR Subpart 5-1, which relates to public water supply systems. Under both alternatives, the wellhead treatment systems for Village wells 13 and 14 would continue to achieve ARARs which are the MCLs for PCE, TCE and other VOCs in treated water as required under the SDWA 10 NYCRR Subpart 5-1.

The effluent from the pump and treat system called for in GW-2 would also achieve the MCLs for PCE and TCE. Restoration of the groundwater to MCLs will be addressed as part of the final Site remedy in OU2, and is not within the scope of this interim response action. This Proposed Plan, therefore, does not identify remediation goals for PCE and TCE in the groundwater for OU1.

Long-Term Effectiveness and Permanence

As indicated above, interim remedies are intended to be protective of human health and the environment in the short term, and to provide adequate protection until a final ROD is issued. This interim remedy, therefore, is not intended to provide a permanent remedy for OU1.

For both alternatives, the O&M of the treatment systems on Village wells 13 and 14 will continue to protect the public from exposure to contaminants in groundwater entering those wells. The OU1 remedy will be consistent with, and not preclude, a final remedy for the Site.

Reduction of Toxicity, Mobility, or Volume through Treatment

Because this action does not constitute the final remedy for the Site, the statutory preference for remedies that employ treatment that reduce toxicity, mobility or volume as a principal element will be fully addressed by the final response action.

The pumping of wells 13 and 14 provides an incidental benefit of helping to reduce the mobility of contaminants in the OU1 portion of the plume. The groundwater extraction and treatment system in Alternative GW-2 would provide additional reduction in the toxicity, mobility, and volume of volatile organic contaminants in groundwater through removal and treatment of VOCs from the OU1 portion of the plume.

Short -Term Effectiveness

Alternative GW-1 would not result in short-term impacts to human health and the environment because no construction is involved with respect to the treatment systems on Village wells 13 and 14. The GW-1 groundwater treatment systems already are in place and are protecting the public from impacts to human health. Alternative GW-2 would potentially result in greater short-term exposure to workers who may come into contact with contamination during construction of the groundwater extraction and treatment system.

Installation of the extraction wells and associated piping for Alternative GW-2 would be completed in approximately 8-12 months. While efforts would be made to minimize the impacts, some disturbances would result from disruption of traffic, excavation activities on public and private land, noise, and fugitive dust emissions. Proper health and safety precautions and fugitive dust mitigation measures would help control these impacts.

Implementability

The technologies presented in Alternatives GW-1 and GW-2 have been used at other Superfund sites and are considered technically feasible.

The goods and services needed to implement GW-1 and GW-2 are readily available. Both alternatives are administratively implementable as well. No permits would be required for on-Site work pursuant to the permit exemption at Section 121(e)(1) of CERCLA, 42 U.S.C. § 9621(e)(1), although substantive requirements of otherwise-needed permits would be met.

Cost

The estimated capital, annual O&M (including monitoring), and present-worth costs for each of the alternatives are presented below:

Alternative	Capital Cost	Annual O&M	Present Worth
GW-1	$1,118,578	$2,920,610	$4,039,188
GW-2	$6,296,578	$7,415,610	$13,712,188

GW-1 has lower capital and O&M present worth costs than GW-2. The cost estimate for GW-1 is based on the "No Further Action – Limited Action" alternative described in the 2007 ROD, as updated by Genesco on November 18, 2014 and by the Village on January 14, 2015. The cost estimate for GW-2 is based on the cost estimate for the corresponding groundwater extraction and treatment system presented in the 2007 ROD, as adjusted based on updated cost information provided by Genesco during the remedial design of the 2007 remedy.

The cost estimates are order-of-magnitude engineering cost estimates that are expected to be within +50 to -30 percent of the actual cost of the project.

For cost estimating purposes, a 30-year time frame was assumed as the duration of each alternative. The EPA expects, however, that PCE and TCE levels in the aquifer will exceed their respective MCLs for greater than 30 years and, as a result, the treatment systems on Village wells 13 and 14 will need to be operated for greater than 30 years.

The GW-1 and GW-2 cost estimates do not include a separate cost item for the vapor intrusion response actions. Because the scope of the vapor intrusion-related work would be the same under both alternatives, the vapor intrusion response actions do not change the relative cost effectiveness of each of those alternatives. In addition, the costs of vapor intrusion response actions are relatively low, and the EPA does not expect the vapor intrusion response actions costs to affect whether the actual remedy costs are within +50% to -30% of the cost estimates.

State Acceptance

The State of New York supports the preferred remedy.

Community Acceptance

Community acceptance of the preferred remedy will be assessed in the ROD following review of the public comments received on this Proposed Plan.

PREFERRED ALTERNATIVE

The EPA's preferred alternative for amending the 2007 interim ROD is Alternative GW-1 (Continued Operation of Existing Treatment Systems on Village Wells 13 and 14). This alternative consists of the following:

- Continued O&M (including monitoring) of the treatment systems currently installed on Village wells 13 and 14 in order to protect the public from exposure to Site-related volatile organic compounds, including PCE, in groundwater entering those wells. The treatment systems will be maintained and replaced or upgraded as needed in order to ensure that water distributed to the public from wells 13 and 14 complies with ARARs (including SDWA and 10 NYCRR Subpart 5-1). Vapor phase carbon treatment of the exhaust from the existing treatment systems will be added, if needed. The proposed remedy modification does not include maintenance of the activated carbon polishing step, which is separately implemented by the Village and which is not needed to maintain VOC levels below the MCLs;

- A monitoring plan that will include groundwater sampling to monitor contaminant levels in groundwater at the Site, including monitoring of contamination that is entering wells 13 and 14, monitoring of groundwater upgradient, sidegradient and downgradient of wells 13 and 14, and graphic depictions of the results;

- Institutional controls that restrict future use of groundwater at the Site. Specifically, the Nassau County Sanitary Code regulates installation of private potable water supply wells in Nassau County. The Fulton Property is zoned for industrial use, and the EPA does not anticipate any changes to the land use in the foreseeable future. If a change in land use is proposed, additional investigation of soils at the Fulton Property may be necessary to determine whether the change in land use could affect exposure risks at the property;

- A vapor intrusion evaluation of structures that are in the vicinity of the Fulton Property and that could potentially be affected by the OU1 portion of the groundwater contamination plume. An appropriate response action (such as sub-slab ventilation systems) may be implemented based on the results of the investigation. The operation, maintenance and monitoring of the existing sub-slab ventilation system at 150 Fulton Avenue would continue; and

- A site management plan (SMP) that would provide for the proper management of all OU1 remedy components, including institutional controls. The SMP would include: (a) O&M of Village wells 13 and 14 as well as monitoring of Site groundwater upgradient, sidegradient and downgradient of wells 13 and 14; (b) conducting an evaluation of the potential for vapor intrusion, and an appropriate response action, if necessary, in the event of future construction at the Fulton Property; and (c) periodic certifications by the party(ies) implementing the remedy that any institutional and engineering controls are in place.

The preferred alternative may change in response to public comments or new information.

RATIONALE FOR PREFERRED ALTERNATIVE

Because this is an interim remedy, the GW-1 alternative would ensure the protection of the public water supply until a final remedy that addresses the groundwater is selected for the Site. Contamination levels in groundwater entering Village wells 13 and 14 will be monitored, and the treatment systems will be maintained and replaced or upgraded as needed in order to ensure that water distributed to the public from Village wells 13 and 14 complies with ARARs.

Alternative GW-1 provides the best balance of trade-offs between the two alternatives with respect to the balancing criteria discussed above. The EPA believes that the preferred alternative will be protective of human health and the environment until a final remedy is selected for the Site, will comply with the ARARs identified for this interim action, and is cost-effective. Although this interim action is not intended to address fully the statutory mandate for compliance with ARARs, overall protection, permanence, and treatment to the maximum extent practicable, this interim action does utilize treatment at the Village wells, and thus supports part of the statutory mandate.

The preferred alternative GW-1 is more cost-effective than GW-2. The GW-2 extraction and treatment system has a present-worth cost of approximately $13.7 million, without fully restoring the aquifer. GW-1 also would have fewer short-term impacts to workers and the community, and is more readily implementable because it does not involve the construction of an extraction and treatment system. The well head treatment systems of Alternative GW-1 are in place and, therefore, are already protecting the public from drinking water impacts to human health. The EPA expects that before the ROD is issued the Village and Genesco will reach an agreement that will ensure the long-term O&M of the Village well 13 and 14 treatment systems.

The EPA expects that PCE and TCE levels in the aquifer will exceed their respective MCLs for greater than 30 years and, as a result, the treatment systems on Village wells 13 and 14 will need to be operated for greater than 30 years.

The continued operation of Village wells 13 and 14 will continue to help reduce migration of the OU1 portion of the groundwater plume toward the Franklin Square Water District wells. The Village wells 13 and 14 treatment systems also will have the incidental benefit of removing and treating contaminants in groundwater that enters those wells, and thereby reducing the mass and mobility of VOCs in the OU1 part of the groundwater plume.

The environmental benefits of the preferred remedial alternative may be enhanced by employing design technologies and practices that are sustainable in accordance with the EPA Region 2's Clean and Green Energy Policy, available at: http://epa.gov/region2/superfund/green_remediation.

EPA expects the preferred alternative to satisfy the statutory requirements of CERCLA § 121(b), as follows: Based on information currently available, the preferred alternative, GW-1, is protective of human health and the environment in the short term and is intended to provide adequate protection until a final remedy is implemented for the Site, complies with those federal and state requirements that are applicable or relevant and appropriate for this limited-scope action, and is cost-effective. The preferred alternative, therefore, meets the threshold criteria, and provides a better balance of tradeoffs than alternative GW-2. Because this action does not constitute the final remedy for the Site, the statutory preference for remedies that employ treatment that reduce toxicity, mobility or volume as a principal element will be fully addressed by the final response action. Subsequent actions will be evaluated to address fully the threats posed by conditions at the Site. Because this remedy will result in hazardous substances remaining on-Site above health-based levels, a review will be conducted to ensure that the remedy continues to provide adequate protection of human health and the environment within five years after commencement of the remedial action. Because this is an interim action, review of this remedy and the Site will be ongoing as the EPA develops the final Site remedy.

Attachment 2

Public Notice – Commencement of Public Comment Period

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY INVITES PUBLIC COMMENT ON A PROPOSED PLAN FOR THE FULTON AVE. SUPERFUND SITE GARDEN CITY PARK, NASSAU COUNTY, NEW YORK

The U.S. Environmental Protection Agency (EPA) announces the opening of a **30-day comment period** on a Proposed Plan and preferred interim cleanup alternative for the first operable unit (OU1) of the Fulton Ave Superfund site (Site), located in and near Garden City Park, Nassau County, New York. In the Proposed Plan, EPA proposes to amend EPA's 2007 Record of Decision (ROD), in which EPA selected an interim OU1 cleanup for the Site. The comment period **begins on April 17, 2015 and ends on May 22, 2015.** As part of the public comment period, EPA will hold a **Public Meeting on Thursday, May 12, 2015 at 7:00 PM** at the **Garden City Village Hall, Garden City, NY 11531**. To learn more about the meeting you can contact Ms. Cecilia Echols, EPA's Community Involvement Coordinator, at 212-637-3678 or 1-800-346-5009 or visit our website at www.epa.gov/region2/superfund/npl/fultonave.

The Fulton Ave. Superfund site is listed on the Superfund National Priorities List. The Proposed Plan provides EPA's rationale for the proposed modification to the 2007 ROD, including a description of information obtained by EPA since the 2007 ROD was issued and that supports the proposed modification.

The preferred cleanup alternative includes:

- Ensuring the continued provision of well-head treatment on Garden City Water District Wells 13 and 14;
- Monitoring of contaminant levels in groundwater;
- Evaluation and appropriate response actions of potential vapor intrusion into buildings in the vicinity of 150 Fulton Avenue in Garden City Park, New York; and
- Elimination of the groundwater extraction and treatment system and the in-place treatment of groundwater contamination in the shallow aquifer near 150 Fulton Avenue, as called for in the 2007 ROD.

During the **April 16, 2015 Public Meeting,** EPA representatives will be available to further elaborate on the reasons for recommending the preferred interim cleanup alternative for OU 1. Public comments will be accepted at the meeting.

Site-related documents including the Proposed Plan, 2007 ROD, Remedial Investigation Report, Feasibility Study Report, 30% Remedial Design, and other Site-related documents are available for public review at the information repositories established for the Site at the following locations:

Village of Garden City Public Library, 60 Seventh St., Garden City, NY 11530
(845) 221-9943 Hours: Mon. - Thurs., 10am - 8pm; Fri., 10am - 6pm; Sat., 10am - 5pm

USEPA Region 2: Superfund Records Center, 290 Broadway, 18th Floor, New York, NY 10007-1866,
(212) 637-4308 Hours: Mon. - Fri., 9am - 5pm

EPA relies on public input to ensure that the selected remedy for each Superfund site meets the needs and concerns of the local community. It is important to note that although EPA has identified a preferred cleanup alternative for the Site, no final decision will be made until EPA has considered all public comments received during the public comment period. EPA will summarize these comments along with EPA's responses in a Responsiveness Summary, which will be included in the Administrative Record file as part of an amended Record of Decision for OU1. **Written comments and questions regarding OU1 of the Fulton Ave. Superfund site, postmarked no later than May 12, 2015 may be sent to:**

Mr. Kevin Willis, Remedial Project Manager
U.S. Environmental Protection Agency
290 Broadway, 20th Floor
New York, New York 10007-1866
Telefax: (212) 637-3966
Email: willis.kevin@epa.gov

The Garden City News Friday, A

INVITES PUBLIC COMMENT ON A PROPOSED PLAN FOR THE FULTON AVENUE SUPERFUND SITE GARDEN CITY PARK, NASSAU COUNTY, NEW YORK

The U.S. Environmental Protection Agency (EPA) announces the opening of a **30-day comment period** on a Proposed Plan and preferred interim cleanup alternative for the first operable unit (OU1) of the Fulton Avenue Superfund site (Site), located in and near Garden City Park, Nassau County, New York. In the Proposed Plan, EPA proposes to amend EPA's 2007 Record of Decision (ROD), in which EPA selected an interim OU1 cleanup for the Site. The comment period **begins on April 24, 2015 and ends on May 26, 2015.** As part of the public comment period, EPA will hold a **Public Meeting on Thursday, May 12, 2015 at 7:00 PM** at the **Garden City Village Hall, Garden City, NY 11531.** To learn more about the meeting you can contact Ms. Cecilia Echols, EPA's Community Involvement Coordinator, at 212-637-3678 or 1-800-346-5009 or visit our website at www.epa.gov/region2/superfund/npl/fulton/.

The Fulton Avenue Superfund site is listed on the Superfund National Priorities List. The Proposed Plan provides EPA's rationale for the proposed modification to the 2007 ROD, including a description of information obtained by EPA since the 2007 ROD was issued and that supports the proposed modification.

The preferred cleanup alternative includes:

- Ensuring the continued provision of well-head treatment on Garden City Water District Wells 13 and 14;
- Monitoring of contaminant levels in groundwater;
- Evaluation and appropriate response actions of potential vapor intrusion into buildings in the vicinity of 150 Fulton Avenue in Garden City Park, New York; and
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During the May 12, 2015 Public Meeting, EPA representatives will be available to further elaborate on the reasons for recommending the preferred interim cleanup alternative for OU1. Public comments will be accepted at the meeting.

Site-related documents including the Proposed Plan, 2007 ROD, Remedial Investigation Report, Feasibility Study Report, 30% Remedial Design, and other Site-related documents are available for public review at the information repositories established for the Site at the following locations:

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Mr. Kevin Willis, Remedial Project Manager
U.S. Environmental Protection Agency
290 Broadway, 20th Floor
New York, New York 10007-1866
Telefax: (212) 637-3966

Attachment 3

May 12, 2015, Public Meeting Sign-in Sheets

(Private home and email addresses redacted)

EPA

Fulton Avenue Superfund Site
Public Meeting – Tuesday, May 12, 2015 @ 7:00pm
Garden City Village Hall
351 Stewart Avenue, Garden City, New York

PLEASE PRINT CLEARLY

NAME	ADDRESS (with Zip Code)	E-mail	Representing
John Swartwout	625 Broadway Albany, NY 12233-7015	john.swartwout @dec.ny.gov	NYSDEC
CYNTHIA BROWN	(b) (6)		self
Leo Stimmler			self
Janet Blohm			self
Stephen McKinney			c.c.
Kathleen Auro			

Fulton Avenue Superfund Site
Public Meeting – Tuesday, May 12, 2015 @ 7:00pm
Garden City Village Hall
351 Stewart Avenue, Garden City, New York

PLEASE PRINT CLEARLY

NAME	ADDRESS (with Zip Code)	E-mail	Representing
Lisa K. Voyce	HDR One International Blvd. Mahwah, NJ	lisa.voyce@hdrinc.com	HDR
Regina Ockerby	NYSDOH Corning Tower	regina.ockerby@health.ny.gov	NYSDOH
James Baker	(b) (6)		GC EAB
Laurence Quinn			GC EAB
Nick Eriscopia			Mayor's Office

Attachment 4

May 12, 2015, Public Meeting Transcript

1

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 2
----------x

FULTON AVENUE SUPERFUND SITE

AMENDMENT TO FIRST OPERABLE UNIT

PUBLIC MEETING
----------x

351 Stewart Avenue
Garden City, New York

May 12, 2015
7:25 p.m.

PRESENTERS:

CECILIA ECHOLS,
Community Involvement Coordinator

SAL BADALAMENTI,
Chief, Eastern NY Remedial Section

KEVIN WILLIS,
Remedial Project Manager

DOUGLAS L. FISCHER,
Assistant Regional Counsel

MS. ECHOLS: Hello. My name is Cecilia Echols. We are here, EPA is here about the Fulton Avenue Superfund site. I am the community involvement coordinator for the site. Sal Badalamenti, is the Chief of the Eastern New York Remedial Section. Kevin Willis, he is the Remedial Project Manager, and we have Doug Fischer, he is our Assistant Regional Counsel.

Tonight's meeting is about the proposed modifications to EPA's 2007 cleanup decision. In April of 2015 a proposed plan was prepared which proposes an amendment to EPA's 2007 Record of Decision, which we call ROD, in which EPA selected an interim cleanup approach for the first operable unit of the site. A public notice was issued on April 24, 2015, and we will accept public comment until May 26.

EPA will select a ROD amendment after all public comments

are considered and EPA will respond to the comments in a respnsiveness summary to be included with the ROD amendment.

The Fulton Avenue site has two operable units. The Fulton Avenue site cleanup is being addressed as two separate operable units. Tonight's meeting is about the First Operable Unit which is groundwater, primarily contaminated with the dry cleaning solvent tetrachloroethene, which is called PCE.

The Second Operable Unit, EPA is separately conducting the second Operable Unit which is an investigation of groundwater primarily contaminated with the solvent, trichloroethylene, TCE, which surrounds and overlaps Operable Unit 1.

This proposed plan addressed the interim remedy for OU1.

Now we will have Sal

Badalamenti, who will give an overview.

MR. BADALAMENTI: This project is being undertaken under the Comprehensive Environmental Response, Compensation, and Liability Act, CERCLA, otherwise known as the Superfund law, which was prompted by, if you recall, what happened with the Love Canal. That prompted its passage by Congress in 1980. It provides for federal funds for cleanup at hazardous sites and for both long-term remedial action and short-term removal and emergency cleanups. It also empowers the EPA to compel potentially responsible parties to pay for or conduct Superfund response actions.

The process is very well defined. It starts with a site being discovered and ranked according to several hazardous site factors and placed on the National Priorities List. A remedial

investigation and feasibility study is conducted to determine the extent of the contamination and what the alternatives are to address it.

The proposed plan is then prepared for whatever is the appropriate remedy for the site. At the point we are at on this site right now we have issued a proposed plan and the next step before consideration will be public comments tonight which will be included in the preparation of a Record of Decision, which documents the agency's decision on what the appropriate remedy for the site will be. That is decided in coordination with the State of New York, the State Health Department, the Department of Environmental Conservation, as well as the next step for a remedial design project, the remedial reaction implementation procedure after any construction is completed.

Then there is an operation and maintenance phase and when eventually the site achieves all the remedial action objectives, and then the site is delisted from the National Priorities List.

That's the entire process. It takes some amount of time to get through it and that's where we are tonight. With that, we can continue with tonight's specifics.

MR. WILLIS: If anybody has any questions, we will answer them later, but this is the study area. We are talking about the site background.

A fabric-cutting mill operated at 150 Fulton Avenue in Garden City Park from January 1965 until December of 1974. During operations, PCE was disposed of in a drywell located beneath the parking lot of the facility. In September of 1997, Genesco Inc., a former owner/operator of 150 Fulton Avenue

and a PRP for the site, entered into a consent order with the New York State Department of Environmental Conservation to perform a remedial investigation and a feasibility study and an Interim Remedial Measure.

March 6, 1998, EPA placed the site on the National Priorities List under CERCLA. In December of 2001, Genesco completed the IRM, which was to clean up the soil around the drywell where the PCE were originally deposited.

After the IRM, Genesco installed the sub-slab depressurization system basically slotted pipes underneath the building to make sure that the people in the building were safe from anything that was left over. The system still remains in operation.

The remedial investigation went on from 1998 until 2005 and

included the sampling of approximately 70 monitoring wells that were partially installed before and then, during the investigation, when things got a little more defined, the RI identified unacceptable human health risks but no ecological risks from the exposure to untreated groundwater.

The existing treatment systems on the Village of Garden City supply wells 13 and 14 continue to protect the public from exposure to the most contaminated groundwater that does migrate down to those wells.

This was drilling, monitoring the well; this is sampling the monitored well.

In 2007 we came into this room and proposed a remedy. We became the lead agency for the site in February of 2007. We ultimately issued a Record of Decision on September 28, 2007. The Record of

Decision included a number of treatment remedial options:

in-situ chemical oxidation for source contamination that was still in the vicinity of 150 Fulton Avenue; partial ground water extraction and treatment system midway between 150 Fulton Avenue and Village of Garden City wells 13 and 14; evaluation of the Village of Garden City's 2007 upgrade to the treatment systems on wells 13 and 14 to determine whether the upgrades were fully protective.

Based on evaluation, to date, the treatment system is effectively protecting the water supply, and investigation and remediation, if necessary, of vapor intrusion into structures within the vicinity of the 150 Fulton Avenue property and in place institutional controls to restrict future use of groundwater at the site.

September 10, 2009, the

United States files in the United States District Court for a proposed consent judgment in which Genesco agreed to implement the 2007 ROD.

The Village of Garden city filed public comments expressing concerns about the proposed settlement.

In 2012, the Village of Garden City and Genesco came to EPA and proposed a remedy modification. Since 2012, the proposed remedy modification has been discussed among U.S. EPA, Genesco and the Village. It's been a long conversation and a settlement is not yet approved by the Court.

MR. FISCHER: Can I expand a bit, Kevin? The Village filed comments expressing its concern about the proposed settlement agreement. Most of the Village's concern was focused on their concern that high levels of contaminants in the groundwater would overwhelm the

treatment capacity of the treatment system on Village wells 13 and 14, but about the time that EPA issued the Record of Decision, we found that the contamination levels in the groundwater started to decline, so we started having discussions with the Village and Genesco about the implication of these low and declining groundwater contaminant levels that, in turn, led to the Village again proposing the remedy modification we are going to be discussing later on this evening.

Can we talk a little about the decline in the contaminant levels that we are seeing?

MR. WILLIS: The groundwater sample data since the ROD has shown, like Doug says, a continued lowering of the contamination. In 2006, at monitoring well 21C, which is just across Stuart Avenue from the public supply wells. Contamination in 2006 was 3.3 parts per million or

approximately 3,303 parts per billion. In the last round of groundwater sampling it was down to 1.3. That was a dramatic drop in this last ground sampling.

A month ago we asked Genesco to go out and resample and the results are just starting to come in again and it looks like it's stabilizing back to what we had expected before; there is contamination that is slightly higher in monitoring well 21C; not all the way down to that 1.3 parts per billion, which is more like what we will expect.

MR. DE FRANCO: Joe De Franco from Nassau County Department of Health. I want to know how deep that well was.

MR. WILLIS: Rather quickly, that's about 400 feet deep.

The Village of Garden City wells 13 and 14, the concentration of PCE in the wells are declining,

although still above the federal MCL drinking water standard of 5 ppb.

Monitoring well GCP-01 up near the site is a well that has PCE concentrations that are variable, but still above MCL. We haven't quite figured out what is going on with that. We are going to have our emergency people go and do sampling around this area and we actually have gotten funds, so sometime in the near future we will be looking at what is going on in that area.

I will cover a bit of a discussion about this area a little later.

MR. STIMMLER: In the first sentence there it says the wells are declining, but there are still people drinking water that is above the maximum.

MR. WILLIS: No, the drinking water is considered safe by EPA and the water district.

Additional monitoring, well

sampling is being performed to monitor the downward trend in contamination levels.

This is monitoring well 21C. This shows you how the last couple of years, the last few years, this is 2009, '10 and '11 and the levels are trailing off basically since the ROD. It's showing that the levels are turning downward.

This is a compilation graph of all the data that we have. This one is well 13, Village of Garden City 13. It shows that this is the level that it can treat to remove these PCE levels and there is essentially room, it's being treated. The green line is being treated.

MS. BROWN: Can I ask --

MS. ECHOLS: Keep the comments until the end.

MR. WILLIS: This would be TCE that we are talking about as well. There's less contamination

for this Operable Unit, this the higher PCE downward contamination. This is the same graph for well 14. PCE levels pumping -- I think where you are talking about, that line right there, that's how much is being pumped in. That is the maximum that we can pump.

Going back to what we were planning on doing for the 2007 ISCO source investigation. In the 2007 ROD called for ISCO treatment for remaining source material in the shallow aquifer around 150 Fulton Avenue.

Post-ROD investigation: During the remedial design, work did not identify source material at that location that we can apply this treatment to. We have had them go out on two separate occasions to look all through the area on a rather tight grid and we couldn't find anything that we could apply this treatment to. Without having

source material there, you would be putting this very strong purple chemical into the ground and if it did not have something to work against, it would end up in the water supply.

MS. BROWN: Cynthia Brown. I thought you identified one of the problems at the 150 Fulton as causing part of the plume.

MR. WILLIS: When we got in there to look for materials that we could treat, it wasn't there.

MS. BROWN: But you are still using extraction and safety devices for the people who work there. It's still in operation.

MR. WILLIS: As a precautionary matter.

MR. SHARF: Steve Sharf. ISCO is a strong laboratory chemical that you put into the ground; so that reacts with certain kinds of contamination and without that kind of source material it does not go

away and it ends up migrating into your water supply.

MR. WILLIS: This is the grid that I was talking about. 150 Fulton Avenue is this building here and they did some rather extensive sampling all around that area trying to find something to apply chemical to, and nothing was found to do.

MS. BROWN: Is that going out? Are the circles going out? I can't read the map, I don't understand it.

MR. WILLIS: If you are going up Nassau Boulevard, that is the 7-Eleven right across the railroad station. This is the street. It's immediately after the railroad trestle there. By the tracks, the railroad trestle.

MS. BROWN: That is north?

MR. WILLIS: That's north of the railroad tracks.

March of 2012, the Village of Garden City proposed modification to

the 2007 ROD to eliminate the separate groundwater extraction and treatment system while ensuring the continued operation of the Village of Garden City's wells 13 and 14 treatment systems, and eliminate the ISCO component of the remedy. This was at approximately 30 percent, this was at approximately 30 percent design level.

They have done a lot of work up to this point. Why is EPA proposing to amend the ROD? Well no source area is identified for the ISCO treatment. The post-2007 data shows that there is a downward trend in the PCE; there's indication that the contaminants in the plume may be depleting.

Existing treatment systems on the Village of Garden City wells 13 and 14 effectively removed the PCE's and other VOC's. The extraction system is not needed to protect the Village water supply from these

contaminants to provide safe water.

EPA consulted with the New York State Department of Environmental Conservation, New York State Department of Health, Nassau County Department of Health and within the EPA headquarters, the research EPA does independently, it agrees with the proposed amendment that was brought to the site.

There is some uncertainty as to whether the groundwater extraction system would significantly shorten the time to achieve the MCL for PCE in groundwater, and a final decision on groundwater restoration will await a final remedial decision for restoring the groundwater site-wide.

That is after OU2 is complete, after we continue to finish this entire investigation, we will figure out what can be done to help the entire aquifer.

The remedial action

objectives, our specific goals are designed to protect human health and the environment. The RAO's for the proposed ROD amendment are:

To minimize and/or eliminate the potential for future human exposure to site contaminants via contact with the contaminated drinking water, and help reduce migration of contaminated groundwater.

The alternatives evaluated in the proposed plan: When the language was sent out in April, GW-1, the first alternative, was continued operation of the existing treatment systems on Village of Garden City wells 13 and 14, and the second alternative to evaluate was the continued operation of existing treatment systems on Village of Garden City wells 13 and 14 and the groundwater extraction and treatment system that is proposed.

The continued operation of

existing treatment systems on VGC wells 13 and 14: Operation and maintenance of treatment systems on Village of Garden City wells 13 and 14; the replacement of existing air strippers as equipment wears out. This includes a vapor-phase carbon treatment of air emissions from air stripper treatment units, if needed. There is a state program that has to be followed to determine whether or not their omissions are safe or not.

Monitoring of contamination in groundwater at the site, including groundwater entering the VGC wells 13 and 14; protectiveness of the remedy to be established; what we are doing to make sure everything is continued okay. Protectiveness of the remedy to be reviewed every five years. That's standard EPA policy.

The estimated present-worth cost of this system of maintaining the treatment on wells 13 and 14 is

$4,039,188.

GW-2 operation of treatment systems on Village of Garden City wells 13 and 14 and the groundwater extraction system has all the same elements as I just described: Separate groundwater extraction and treatment system, and water entering the system in the OU1 portion of the groundwater plume, upgradient of Village of Garden City wells 13 and 14.

The estimated present-worth of the entire system is $13,712,188. So approximately $10 million for the treatment system.

MS. BROWN: Which would be paid by Genesco?

MR. WILLIS: Yes.

MS. BROWN: We hope it will still be paid by Genesco if this original plan goes through.

MR. FISCHER: This proposed plan is not an enforcement document. It does not identify who will be

responsible for the various costs. We would look to the responsible parties to perform the remedy.

MS. BROWN: I thought that you said that was agreed upon.

MR. FISCHER: We filed a settlement agreement. It was filed with the court in 2009 in which Genesco did agree to implement the remedy that we selected in 2007.

MS. BROWN: Which is the 13 million?

MR. FISCHER: It's pretty close, yes.

MR. WILLIS: Common elements of alternatives: Institutional controls that restrict the future use of groundwater at the site. The site management plan is an overall plan on how to do everything we say we are going to do. Investigation of soils at 150 Fulton Avenue; if a change in land-use zoning is proposed that could affect exposure risks; and vapor intrusion

evaluation of structures in the vicinity of 150 Fulton Avenue and response action, if necessary.

When we evaluate criteria, we use a standard nine criteria analysis of alternatives:

Overall protection of human health and the environment.

Compliance with applicable or relevant and appropriate requirements. Those are the standards. Basically, long-term effectiveness and permanence. The reduction of toxicity, mobility or volume through treatment. The short-term effectiveness of implementing the remedy. Implementability; how easy is it to build this. Cost, state acceptance and community acceptance.

Why we are here today -- comparative analysis of alternatives: Overall protection of human health and the environment: Both alternatives are protective.

Groundwater extraction and treatment system is not needed to protect the Village of Garden City water supply.

Compliance with ARARs: Both alternatives will comply with the ARARs. Long-term effectiveness and permanence. Both alternatives will protect Village of Garden City's wells 13 and 14 water supply until a permanent remedy decision is made for the site. After all the site is evaluated.

MS. BROWN: What is ARARs?

MR. FISCHER: ARARs is an acronym for "Applicable or Relevant and Appropriate Requirements" which are the federal and state environmental laws that apply to the clean up.

MR. WILLIS: Reduction of toxicity, mobility or volume through treatment: The Village of Garden City wells 13 and 14 treatment systems provide incidental benefit of treating contamination in the

aquifer. Groundwater extraction and treatment system would treat some additional contamination.

Short-term effectiveness: Construction of groundwater extraction and treatment system would cause short-term impacts to community and workers.

Installing the systems -- implementability, both alternatives are implementable.

The cost is $4,039,188 verses $13,712,188 for the pump and treatment system.

State acceptance: New York State supports EPA's preferred remedy modification. Here, tonight, community acceptance will be assessed following the public comment period.

The reasons for the preferred alternative: It protects the Village of Garden City's wells 13 and 14 public water supply until a final remedy that addresses the

groundwater and the entire area is selected for the site. There are no short-term impacts.

Preferred remedy is more implementable because it does not require the construction of a separate extraction and treatment system.

The preferred remedy is more cost effective than groundwater remedy number 2, which has a present-worth cost of $13.7 million versus the $4 million, and the groundwater restoration is not a purpose of this interim remedy. That's the overall site decision.

The continued operation of Village of Garden City wells 13 and 14 will incidentally continue to help reduce the migration of the OU1 contamination towards the Franklin Square Water District or wells beyond. Village of Garden City wells 13 and 14 treatment systems have an incidental benefit of

removing and treating contaminants in the groundwater.

Next steps: EPA is continuing the OU2 remedial investigation. The remedial investigation is going on right now and has been going on for the last couple of years to, among other things, to define the extent of the OU2 contamination and identify contamination sources for both OU1 and OU2.

OU2 got identified during and after the remedial investigation when we found very high levels of TCE contamination deep in the aquifer, but it wasn't related to a problem we could address. With OU2, like OU1, what we did, we are out there investigating. The contractor has been working on that with me, and we are making headway on what we know about the aquifer system out here.

OU2 focuses on portions of

the groundwater contamination at the site that's primarily contaminated with TCE, and that surrounds and overlaps the OU1 contamination.

Just in this area, with wells 13 and 14, you are primarily getting a piece of contamination, but if you go across the street, the street over well 9, which is behind the firehouse, and that's behind the firehouse on Stuart avenue, the investigation includes the installation of deep monitoring wells in the spring and summer of 2015. We are about to go out and drill some deeper monitoring wells now that they have a better idea on where to put them. They are very expensive.

Any comments or questions?

MR. WILLIS: This PowerPoint presentation is on the website. It's currently on there now. If you want to Google it, you can pull it up.

This (indicating) would be the main line. The railroad tracks in Mineola would be about there.

150 Fulton Avenue, that 7-Eleven right across Nassau Boulevard in Garden City Park would be about there. The OU1 contamination follows a path.

MS. BROWN: It goes under --

MR. WILLIS: It drops to 3 and 400 feet down. While we were doing the investigation up this way we found a couple of parts per million of the trichloroethylene and we can't ignore that. So that's why OU2 began and we're trying to find out, it's a very difficult type of investigation.

When this was done, by the time we got involved we already knew where the source was, where it was migrating to. Here we have it 3 and 400 feet deep over this way and now we are trying to find out where it's coming from to the surface so we can

treat that.

MS. BROWN: Right. Now wells 13 and 14, you are treating the water; what are you treating it with that protects it? The reason I am asking is in 2013, DEC, you guys, the State Health Department, Nassau County Department of Health said in their official Board of Health meeting in 2013 that there's a definite danger of sending contamination to our distribution system with this revised project. Can you address that, please?

MR. WILLIS: I am unfamiliar with that, where was that coming from?

MS. BROWN: This is official memos from the Board of Health, based on a telephone conference call. In other words, you are declining, but you are not eliminating the problem.

MR. FISCHER: If I am thinking about the same minutes that

you are referring to, at that time, what was discussed on the state agency's involvement in those minutes was an investigation, we were looking into whether the pumping of wells 13 and 14 would reduce contamination in the aquifer.

That is not the analysis we are going forward with. The proposal that we are going forward with, the proposal is to ensure that the Village receives cleanup of these wells that, again, if I remember correctly, at the time the issue being discussed was that the Village wells were themselves remediation wells.

MS. BROWN: That was not my understanding, so I don't know.

MR. BADALAMENTI: That is an existing situation that has been there for a long time. That's why the treatment systems are in place. Most treatment systems are very effective in providing a safe

drinking water supply to the Village of Garden City.

MS. BROWN: It's safe but then the 2007, because it's been a while, the 2007 pump and treatment systems had the same contamination, and it was approved, I thought, by the Village as well as by the EPA.

MR. BADALAMENTI: At that point in time it was believed that the contamination levels were increasing and there was a possibility that the treatment systems that the Village had in place were going to be overwhelmed by the contamination.

MS. BROWN: We had to increase the pumping. Did we need to do that according to that green line?

MR. BADALAMENTI: The rate of pumping has to do with the water demand in the community, how much water was required.

MS. BROWN: Why was there a

delay? I mean, if there is a problem with our drinking water, hello, I would like to see it done as best as possible. We are not -- why can't we go to the more expensive plan? I mean, because it's very responsible. I assume from your presentation, what you said here is that it would be getting more of the bad stuff out of the water.

MR. BADALAMENTI: At the time it was required; we thought it would be necessary at that point in time, but the levels have dropped.

MS. BROWN: Where did the contamination go? It doesn't disappear.

MR. BADALAMENTI: If the source gets depleted, then eventually it does.

MS. BROWN: If it's depleted in the source, that means it's moved down into our neck of the woods.

MR. BADALAMENTI: Right now

the object of the interim remedy is to protect the water supply. The existing system does that. As far as OU2, we will try to evaluate alternatives on how to restore the aquifer.

MS. BROWN: How?

MR. BADALAMENTI: There are air strippers in place that remove the bulk of volatile chemicals, in this case, PCE, through an aeration process and it's followed by a polishing step of an activated carbon unit, which in most cases knocks it down to non-detectable levels. It's like an additional step.

MS. BROWN: That's not good enough.

MR. QUINN: Larry Quinn. On the 2007 Record of Decision you said certain wells would be evaluated to determine if the upgrade was "fully protective," then you say the treatment system is "effectively

protective." There is a fundamental difference between "fully protective" and "effectively protective."

In terms of why the different wordage? On your site, on page 6 of the 2007 Record of Decision, it says: "Will be evaluated to determine whether this upgrade is fully protective." Based on the evaluation to date the operating system is "effectively" protecting the water supply. Is there a functional difference between the words "fully protective" and just "effectively protective"?

MR. FISCHER: No.

MS. BROWN: You did say it was declining, you did not say eliminated.

MR. QUINN: The question I had with the slide, with the bottom slide on page 7, you show it fairly right behind the graph that says "below ground surface," the bigger

graph. You have pointed out that green line, that one there. You are remarking that the numbers are declining, but it looks to me that prior to 2012, as you were diagnosing yearly numbers, you have no data for 2012, 2013 and you are saying that in 2015 there was a decline.

I am looking at what happened between 2006 and 2007 where you had a precipitous decline and a huge jump up in the numbers there, back there. Just reflecting back, if we are looking back, 1.5 billion parts and the 3000 billion parts, that's a huge jump; how do we know there wasn't a similar jump, that you did not have a similar jump like we have had in the past, because it looks like we had numbers all around the thousands levels for which you have no data.

MR. WILLIS: It's basically a scale. When you put them all on the

same line here, that's basically what was happening at monitoring well 20 or 21C. Basically, it was minimizing. At the Garden City supply wells 13 and 14 we have the data and it shows a much more even decline, and that's what we were actually -- when you look at it like this, it does look rather sporadic.

MR. QUINN: The present data you are suggesting says there is a decline. That looks just like what happened in 2006, 2007. I have no assurance that there wasn't something similar happening in 2012 and '13. The data points aren't there.

MR. WILLIS: We will address this in the responsiveness summary.

MR. QUINN: The final issue I have on the slide is why EPA proposed to amend the ROD. Continuing the slide you said there was uncertainty as to whether the groundwater extraction will

significantly shorten the time to achieve minimum contamination levels of PCE. It looks like you only did a 30-year analysis for whatever cost purposes and we say we are looking for long-term effectiveness to be permanent in your final solution. Groundwater restoration is not the purpose of this interim remedy.

You have no prediction for beyond 30 years. Why try to program like this when you know that you will have a greater extraction with the more expensive extraction system.

MR. BADALAMENTI: That would be part of the objective of the OU2 investigation, to approach OU2.

MS. BROWN: I thought the OU2 is TCE.

MR. BADALAMENTI: It is TCE and the aquifer.

MR. WILLIS: It's OU1 and OU2 at that point.

MS. BROWN: It could take

longer, not just 30 years; nobody knows.

MR. BADALAMENTI: We are out there investigating right now and looking for solutions.

MR. WILLIS: I hope to have a decision on the OU2 in the near future.

MR. FISCHER: Just to expand: Sal was referring to part of the OU2 investigation to identify other sources of contamination to the aquifer in the OU2 part of the plume. It includes sources of PCE and TCE that are contributing to the contamination, so we need to identify the source as part of the program to investigate what can be done in terms of restoring the aquifer.

MS. BROWN: We certainly know and understand that you want to protect the aquifer. Right now we are talking about Garden City drinking water.

MR. FISCHER: That's the issue, drinking water, to ensure that the drinking water is safe.

MR. BAUER: Jim Bauer, with the Garden City EAB, I have a two-part question:

If you go back to the map, if you could, one of the things that you said or that's in the presentation is that the existing pumping wells 13 and 14 would slow down the migration of the plume to other communities, including Franklin Square. Is there any risk at this point or in the foreseeable future to other wells in other communities? From the map it must be further south.

MR. WILLIS: Most of the PCE contamination we are concerned about migrates down towards Franklin Square. Their wells, as you can see from the water tower, from the golf course, basically they're east, most of the OU1 contamination is being

removed by 13 and 14 so that is what we are saying. It's by that contamination coming out, it's not migrating someplace else. That's all we are saying.

MS. BROWN: It's not completely clean, right? It's still migrating.

MR. WILLIS: There is still a little bit going past it.

MS. BROWN: Including into our drinking water.

MR. WILLIS: What is in the drinking water goes into the treatment system, that contamination is taken out. What we are seeing in monitoring wells down here is that there is still some level of contamination that is getting passed on.

MR. BAUER: The second part of the question: If GW-2 is selected, is there anyway to take the incremental funds, in other words $9 million, and apply that to

OU2 and speed that process up.

MS. BROWN: That would be --

MR. FISCHER: We are performing OU2. We have identified Genesco as one potentially responsible party for OU1. We are prepared to negotiate with them when we talk about implementing the remedy that we ultimately select as part of the amended plan for OU1. We have EPA performing that investigation.

At this point we are looking for sources, looking for responsible parties for that contamination, but at this point EPA is funding that work. It's not that we were selecting the cheaper response for OU1 and requiring Genesco or anybody else to take the difference and apply it towards OU2. We have not identified any potentially responsible parties for OU2 yet.

MR. WILLIS: OU2 is being completed by the EPA.

MR. ELOSTANDO: Don Elostando, E L O S T A N D O. One question, and she is my wife, so I only have one and she has one: Where wells 13 and 14 are, are they in the country club on this map in Garden City?

MR. WILLIS: There is the Garden City Country Club. They are in the Garden City Country Club.

MR. ELOSTANDO: Drinking water from chemicals, does drinking water include water that we wash with?

MR. WILLIS: Yes.

MR. ELOSTANDO: The last one was to Larry's point, the drop- off in the data, did you say there is no explanation for that? You are not really sure whether there's a big drop-off in the middle?

MR. WILLIS: A big drop-off, but that last round of sampling is not completely validated. Before we can use the data, it has to go

through a validation process. They just finished sampling last week.

MR. ELOSTANDO: That was back a couple of years. Larry was saying it was added -- in other words, going across them, there's a big drop, then when Genesco kind of talked to the last drop, was there an explanation for that middle drop off.

MR. WILLIS: No, I don't know.

MS. ELOSTANDO: Pat Elostando. I am a neophyte as far as drinking water systems, so the water that is treated at wells 13 and 14, I assume that water then becomes part of the general pool of water that we drink and that 13 and 14 is not specifically drunk by people that live in the area near 13 and 14; is that true?

MR. WILLIS: It's probably more likely that if you live in the vicinity, you would get more of that

water. It does go into a big pool.

MR. MAKRINO: Steve Makrino, M A K R I N O. Please turn the slide to the ROD water sampling data. The first point there, it says that it's still higher than the federal MCL standard. What is the actual number?

MR. WILLIS: 5 parts per billion is the MCL.

MR. MAKRINO: What is that actually showing?

MR. WILLIS: I don't know offhand.

MR. DE FRANCO: Joe De Franco. As of 2015, recent data for April of this year showed tetrachloroethene concentration at 250 parts per billion, trichloroethylene 48.5.

MS. ELOSTANDO: That's raw water.

MR. DE FRANCO: That's well 13 for the same reporting period, April of 2015. We have 436 parts

per billion PCE and 66.5 parts per billion of TCE. That's water samples; that is prior to treatment which I think is what the question was.

MR. WILLIS: That data is available from the Village.

MR. BADALAMENTI: Your wells are sampled on a monthly basis, those two wells, and that's available either at the Town Village Hall or at libraries.

Are there anymore questions?

MS. BROWN: Does EPA have any idea if the Village is spending $1.5 million more on attorney fees?

MR. FISCHER: We can't respond to the question.

MS. BROWN: Do you have any idea what the litigation is about?

MR. FISCHER: We know what the litigation is about. As to why the Village is spending certain sums of money on the attorneys, that you need to ask the Village.

MR. YUDELSON: David Yudelson from the law firm of Sive, Paget & Riesel, and I am environmental counsel to the Village.

I want to make a statement that would clarify, I think, a little bit of confusion. The cost of treating wells 13 and 14 would be borne by Genesco, not by the Village.

MS. BROWN: Why has 1.5 million been spent on attorneys? They are not health people.

MR. YUDELSON: Somebody has to pursue recovery of these costs. Let's stick to the point of we are in the final throes of the settlement negotiations with Genesco, under which Genesco would be providing the Village with enough funds to operate wells 13 and 14 in the treatment.

MS. BROWN: With the revised plan, not with the original pump and treatment, right? With the $4

million, not with the $13 million.

MR. YUDELSON: Forget those numbers. That's sort of for academic comparison purposes. They don't really have a bearing on what the settlement would be based on.

MS. BROWN: I don't understand. We all want healthy, clean water.

MR. YUDELSON: We are ensuring that there is healthy clean water for all of the people who live in that plume. That's our goal.

MS. BROWN: In other words, it's money, money, money.

It's actually money. What the problem is, Genesco does not want to spend the money.

MR. YUDELSON: I said we are in the final throes of the negotiations in a settlement where they will be paying a sum of money to make sure there is clean water in the Village for a very long time.

MS. BROWN: Excuse me, by

law, the EPA has to get it from Genesco, so why do we have any lawyers involved? By law it already states, does it not, that the responsible party has to pay for the cleanup or whatever, however it's done.

MR. YUDELSON: The Village does not ensure the cost for providing clean water to the public and we are seeking reimbursement of that money. That's part of the settlement as well. If you have a problem with EPA proceeding, it's not to --

MS. BROWN: I don't have a problem with EPA at all. I think they are the good guys. I am just asking why, then, do we have to increase the expense of cleaning our water? Why do we have to pay attorneys now? You just said we have to recover these additional monies, did you not? Why are we incurring costs to recover the money

spent by the Village already? Why don't we go ahead with the 2007 pump and treatment system?

MR. YUDELSON: You would have to ask EPA. The exclusion of the pump and treatment plan would not reduce the Village's expenses, that's the long and short of it.

MS. BROWN: I thought the increased expense was due to the plume, the increased toxicity to the water?

MR. YUDELSON: No. What we are talking about is the Village had to treat its wells so they could supply safe water to the public anywhere. The treatment system proposed in 2007, independent of the Village systems, would not have changed the Village's expenses and that's why we wanted Genesco to reimburse the Village for the past and future cost of treatment, and that is the purpose of this amended plan.

MS. BROWN: We have been treating these wells for how long? 1988 is when your investigation goes back to at 150 Fulton. You did most of OU1, not OU2, but it goes back, therefore, any increased cost to us to ensure that our water is clean and safe for us to drink, would this not also be Genesco's responsibility as the responsible party?

MR. YUDELSON: Genesco did not offer the money prior to the time we initiated the litigation.

MS. BROWN: Why would they offer anything? Didn't it go through the EPA?

MR. YUDELSON: The Village thought they did not agree to pay the cost of the litigation. We came up with a resolution that will make the Village whole and will cover future expenses. That's what I think is a near perfect resolution.

MS. BROWN: This is separate, this $1.5 million is completely

separate.

MR. YUDELSON: Where did that number come from?

MS. BROWN: Garden City News.

MR. YUDELSON: It will be all publicly laid out.

MS. BROWN: This is separate?

MR. YUDELSON: That's correct.

MS. BROWN: At least that's clarified.

MS. AURO: Kathleen Auro, A U R O. On page 13, which is the last slide, the last item on that, it says: "The investigation includes the installation of deep monitoring wells in spring and summer of 2015." Could you tell me where those wells would be located?

MR. WILLIS: Where the new wells are going, at this point we haven't really pinpointed them, but probably north of the site.

MS. AURO: You mean north of 150 Fulton?

MR. WILLIS: Right, northwest of 150 Fulton.

MS. BROWN: In Garden City Park?

MR. WILLIS: That's what we are trying to really figure out, what is going on in the whole area.

MS. AURO: Why would it be north when the plume is coming southeast -- southwest?

MR. WILLIS: I am going to go back to my map here.

MS. AURO: It's coming from another source.

MR. WILLIS: It's very likely coming from another source. All OU2 started with was the TCE contamination very deep in that area. We know that this is traveling along here (indicating). We are trying to figure out what is happening in basically a six square mile area. We went out, we ran tests going up this way of shallow wells. We are trying to do what is

called the "Triad Approach," where we try to do things as cheaply as possible as we are doing the investigation, and this was okay.

We wanted to put in the deep wells here, they are very expensive; but with the shallow wells, we figure, you go out, okay, groundwater is traveling in this direction. We were going to do upgradient, we put in the shallow wells here and saw that there is nothing there. So we go over this way now, on Mineola Boulevard, and there is nothing. We go up Roslyn Road and there is nothing there.

MS. BROWN: Where is it?

MR. WILLIS: We went and put -- we did what we could to find all of the wells that we could find in this whole area. We put in a monitoring device, monitoring the wells all through this area for a month to see if they could start pointing to the way the groundwater

is flowing.

When I got my degree in hydrology many years ago at Adelphi, we had a different idea about how groundwater was flowing through the area. I think we are rethinking how groundwater is flowing now.

So we will put these monitoring devices all through this area. We are learning.

MS. BROWN: You are putting the deep wells south?

MR. WILLIS: We are putting probably the deep wells in this area, up in this area, someplace we haven't, because I am doing all of this and I haven't sat down and really defined where we are going to put these next series of wells. Then, whatever information we get from these wells, we probably will have to put in some more wells. It's a never-ending process. We are learning things and we are not following the plan here that we

thought we had.

I could probably add that at some point in the relatively near future I will come and give an availability session to describe what we come up with. With this, we are trying. We are trying and it's coming through.

When we are putting in wells and sending water to the lab, the lab comes to us and says just, "You're like magic, nobody else can find clean water over here."

MS. BROWN: When do we know the results of the meeting, whether it goes pump and treatment systems, whether it's one and the same?

MR. WILLIS: What goes through here, we have this decline, that's what we did back in 2007.

MR. BADALAMENTI: By September 30th.

MS. BROWN: Do you think by September 25th we would know if it's the 2007 investigation or the 2013

version?

MR. FISCHER: The 30th of September. That is our general turn around.

MR. ELOSTANDO: Or has Genesco or their agents had any inputs or reviewed this before this presentation?

MR. FISCHER: The proposed plan?

MR. BAUER: Yes.

MR. FISCHER: No.

Now I think we mentioned on one of the slides that in 2012 Genesco and the Village made a joint presentation to EPA. In 2012 Genesco and the Village made a presentation to EPA regarding their recommended changes to the 2007 remedy decision. That ultimately formed the basis of what we are proposing today. They have this -- they made the presentation and we needed to evaluate it.

There was a lot of follow-up,

additional information to study. We needed to consult closely with the State of New York, the Department of Health, the County Department of Health. There's a long process; we went through the 2012 presentation to make sure we were comfortable with what we are going public with.

MS. BROWN: And the answer is, in other words, it's basically Genesco?

MR. ELOSTANDO: And that's part of tonight's discussion?

MR. FISCHER: It's based on that.

MR. BAUER: What I just said, EPA verified what was in that plan without any influence or undue influence?

MR. FISCHER: We needed to be comfortable with our plan. We need to be completely comfortable with what we are proposing today.

MR. YUDELSON: Genesco and the Village worked cooperatively,

starting in 2011, because the original proposed plan would have been ineffective in the Village's view. Also, it would be extremely disruptive to the community. It would have placed a treatment facility on a residential lot, which isn't satisfactory. It's running the treatment water up to the bird sanctuary and it would require the routing of pipes and wells under a number of miles of streets in the neighborhood over a period of time. It also would not eliminate the cost of the Village for treatment at wells 13 and 14 and would shorten the time that those wells would be needed to be under treatment.

So we put the best engineers we could find to come up with a plan that would, one, be funded by Genesco; and, two, continue to provide clean water to the Village without any disrepresentation.

MS. BROWN: Don't say it was

ineffective.

MR. YUDELSON: But not in the --

MS. BROWN: Excuse me, a pump and treatment system that is going into Bethpage, that is going all over, don't say that it is ineffective.

MR. YUDELSON: It would be ineffective in shortening the time that 13 and 14 need to be treated or in lowering the cost of treating wells 13 and 14.

MS. BROWN: The bird sanctuary, although you said it was fine to put the systems there.

MR. YUDELSON: People disagree with that, so --

MS. BROWN: From what I understand, that shouldn't be a problem. We are going back to expenses when you talk about miles of piping. I think that's a little exaggeration. Don't say it's ineffective.

MR. YUDELSON: Review the plans.

MS. BROWN: We have been reviewing the pump and treatment systems for a long time.

MR. YUDELSON: It wasn't going to happen.

MS. BROWN: I don't see how you can say that. I really don't see how you are --

MR. YUDELSON: Because I have studied all the engineering reports.

MS. BROWN: I am very happy that you have. I would rather have health professionals.

MR. YUDELSON: The reports were prepared by health professionals.

MS. BROWN: I would rather do what that they say. There is a danger with not going with that.

MS. ECHOLS: Are there any other questions?

MR. STIMMLER: In terms of full disclosure, shouldn't you have

told us about the role of Genesco in all of this tonight? You have said you would talk about the total history package.

MR. FISCHER: I think we did, it's on one of the slides. Genesco made a presentation to EPA, Genesco and the Village made that presentation. The presentation materials are in the administrative record. You can actually see the slide presentation, slide 18.

MS. ECHOLS: You can see the records at two libraries, the Shelter Rock Public Library and the Garden City Public Library. If you want to see any documents related to the site, you can go to one of the libraries or you can come into the EPA office in Manhattan. We have information in the repository there too.

MR. STIMMLER: It says since 2012, they proposed a remedy modification, discussed among the

Village, Genesco and EPA, but that's not what you are saying now. Genesco proposed it. Genesco proposed the remedy.

MR. FISCHER: And the Village.

MR. STIMMLER: Genesco and the Village of Garden City proposed it?

MR. FISCHER: Yes.

MR. STIMMLER: Who, the Village board, as Bob Mangan?

MS. ECHOLS: Anymore questions?

We are going to close the meeting, and Kevin is going to put up a slide that has our contact information. If you have any comments, you can send your comments or questions to Kevin and they will be part of the responsiveness summary.

Do not forget that at the bottom of this slide is the web page for the site. You can Google it and

all of the site-related documents that are attached to this website as well.

Thank you so much for your time.

(Time Noted: 8:30 p.m.)

C E R T I F I C A T E

STATE OF NEW YORK)
) ss.
COUNTY OF NEW YORK)

I, MONIQUE CABRERA, a Shorthand (Stenotype) Reporter and Notary Public of the State of New York, do hereby certify that the foregoing Proceedings taken at the time and place aforesaid, are a true and correct transcription of my shorthand notes.

I further certify that I am neither counsel for nor related to any party to said action, nor in any wise interested in the result or outcome thereof.

IN WITNESS WHEREOF, I have hereunto set my hand this 17th day of May, 2015.

_____

Monique Cabrera,
Shorthand Reporter

Attachment 5

Written Comments Submitted During Public Meeting

Questions to be asked at the EPA / Garden City meeting re the Fulton Ave. Garden City Park Superfund Site.

On the May 12th meeting at Village Hall the Environmental Protection Agency (EPA) will address the drinking water contamination currently affecting the Village of Garden City from the Fulton Ave., Garden City Park, Superfund Site. This site includes a. toxic PCE plume currently flowing under Stratford School and Western sections of the Village.

Why has the EPA changed their original recommendations?

Originally, the 2007 agreement was to have Genesco, the responsible party, required by law to pay for the clean-up, remove the contamination and then introduce clean water into the ground Yet, the EPA now states in the May 1st GC News story that this was no longer needed "at this time, in part because contamination levels in this area of groundwater have been declining…" **Declining – but not eliminated.**

In 2013, a revised proposal was made to flood the contaminated site while simultaneously using these same wells to supply water. Yet, the NYSDEC, the USEPA, the New York State Department of Health and the Nassau County Department of Health **unanimously stated in 2013 that there is a definite danger of sending contamination to our distribution system with this revised proposal.**

As Village Trustee Theresa Trouve, chair of Garden City's Environmental Advisory Board, stated in the GC News article "we should be going forward with those wells to keep them as pure as we possibly can."

State Senator

~~As Village Trustee Theresa Trouve, chair of Garden City's Environmental Advisory Board, stated in the GC News article "we should be going forward with those wells to keep them as pure as we possibly can."~~

Kemp Hannon supported a bill **to contain** the Grumman/Navy plume in Bethpage. Why not here in Garden City? Is it not better to have uncontaminated sources of drinking water than to try and decontaminate the source of drinking water before sending it to the community?

Why has Garden City spent $1.5 million in attorneys' fees when Genesco is required by law to pay for the cleanup? Let's move forward now, after eight years of discussions, to ensure clean and safe drinking water to our village.

Cynthia Brown
(b) (6) [redacted]

IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF NEW YORK

UNITED STATES OF AMERICA,

Plaintiff,

v.

GENESCO INC.,

Defendant.

CIVIL ACTION NO. 09-3917

(Bianco, J.)
(Locke, M.J.)

CONSENT JUDGMENT

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I. BACKGROUND

A. The United States of America ("United States" or "Plaintiff"), on behalf of the Administrator of the United States Environmental Protection Agency ("EPA"), filed a complaint in this matter pursuant to Sections 106 and 107 of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended ("CERCLA"), 42 U.S.C. §§ 9606, 9607.

B. The United States in its complaint seeks, *inter alia*: (1) reimbursement of costs incurred by EPA and the United States Department of Justice ("DOJ") for response actions at the Fulton Avenue Superfund Site located in Nassau County, New York ("Site"), together with accrued interest; and (2) performance of studies and response work by defendant Genesco Inc. ("Genesco" or "Settling Defendant") at the Site consistent with the National Contingency Plan, 40 C.F.R. Part 300 (as amended) ("NCP").

C. In accordance with the NCP and Section 121(f)(1)(F) of CERCLA, 42 U.S.C. § 9621(f)(1)(F), EPA notified the State of New York ("State") on April 10, 2008, of negotiations with potentially responsible parties regarding the implementation of the first operable unit ("OU1") Remedial Design and OU1 Remedial Action for the Site, and EPA has provided the State with an opportunity to participate in such negotiations and be a party to this Consent Judgment.

D. In accordance with Section 122(j)(1) of CERCLA, 42 U.S.C. § 9622(j)(1), EPA notified the United States Fish and Wildlife Service and the National Oceanic and Atmospheric Administration on April 10, 2008, of negotiations with potentially responsible parties regarding the release of hazardous substances at and from the Site that may have resulted in injury to natural resources under federal trusteeship and encouraged the trustee(s) to participate in the negotiation of this Consent Judgment.

E. Settling Defendant, by entering into this Consent Judgment, does not admit any liability to Plaintiff arising out of the transactions or occurrences alleged in the complaint, nor does it acknowledge that the release or threatened release of hazardous substance(s) at or from the Site constitutes an imminent or substantial endangerment to the public health or welfare or the environment.

F. Pursuant to Section 105 of CERCLA, 42 U.S.C. § 9605, EPA placed the Site on the National Priorities List, set forth at 40 C.F.R. Part 300, Appendix B, by publication in the Federal Register on March 6, 1998, 63 Fed. Reg. 11332.

G. In response to a release or a substantial threat of a release of a hazardous substance(s) at or from the Site, Settling Defendant commenced a Remedial Investigation and Feasibility Study ("RI/FS") for the Site pursuant to a 1997 Administrative Order on Consent, Index Number W1-0707-94-08, with the New York State Department of Environmental Conservation ("NYSDEC").

H. Genesco submitted an RI Report in August of 2005 that was revised and approved by NYSDEC in November of 2005. NYSDEC approved Genesco's proposed Feasibility Study Report on February 15, 2007. EPA also produced an addendum to the FS Report in February

2007, and became the lead agency for the Site at the conclusion of the RI/FS process.

I. On September 28, 2007, EPA issued an OU1 Record of Decision ("2007 ROD") in which EPA selected an interim remedial action to be implemented at the Site. The remedy was designated by EPA as "interim" because it focused only on a portion of the groundwater contamination plume at the Site, the tetrachloroethene ("PCE")-dominant portion, and was not the final groundwater remedy for the Site.

J. On December 14, 2007, the Incorporated Village of Garden City ("Village") filed a complaint against Settling Defendant and Gordon Atlantic Corporation in the United States District Court for the Eastern District of New York (*Incorporated Village of Garden City v. Genesco Inc. and Gordon Atlantic Corp.*, Civil Action No. 07-CV-5244 (E.D.N.Y.) (JB)), seeking, *inter alia*, injunctive relief and damages regarding the disposal of hazardous substances at the Site.

K. On September 10, 2009, the United States filed for public comment, in the United States District Court for the Eastern District of New York (Bianco, J.), a proposed Consent Judgment in which Settling Defendant agreed to implement the remedy selected in the 2007 ROD. Settling Defendant began the design of that remedy after the Consent Judgment was filed.

L. On October 19, 2009, the Village submitted to the United States comments on the proposed Consent Judgment that requested certain changes to the proposed settlement.

M. On June 17, 2011, the United States filed a Motion to Enter Consent Judgment.

N. On February 17, 2012, the Court, *sua sponte*, issued an order terminating, without prejudice, the United States' Motion to Enter Consent Judgment. The Court issued its order due to ongoing settlement discussions among the United States, Settling Defendant and the Village regarding the Village's potential intervention in this case.

O. In March of 2012, while the remedial design of the 2007 ROD was underway, Settling Defendant and the Village jointly proposed to EPA certain modifications to the 2007 ROD that would, among other things, eliminate the 2007 ROD's separate groundwater extraction and treatment system and provide for the continued operation of the wellhead treatment systems on Village water supply wells 13 and 14. Settling Defendant and the Village also recommended the elimination of in-situ chemical oxidation ("ISCO") treatment of contamination that was called for by the 2007 ROD.

P. Following EPA's review of the information provided by Settling Defendant and the Village, and after EPA's further evaluation of conditions at the Site, EPA determined that it would be appropriate to amend the 2007 ROD.

Q. Pursuant to Section 117(a) of CERCLA, 42 U.S.C. § 9617(a) and Section 300.435(c)(2)(ii) of the NCP, 40 C.F.R. § 300.435(c)(2)(ii), on April 24, 2015, EPA published, in a major local newspaper of general circulation, notice of a proposed plan that identified EPA's proposed amendments to the 2007 ROD. EPA provided the public with the opportunity to submit written and oral comments on the proposed plan during a public comment period that ran from April 24, 2015 to May 26, 2015.

R. On September 30, 2015, EPA issued an OU1 Record of Decision Amendment

("Amended OU1 ROD") in which EPA selected an amended interim OU1 remedy for the Site eliminating the separate groundwater extraction and treatment system and ISCO, and calling for the continued operation of the current treatment systems on Village water supply wells 13 and 14. The Amended OU1 ROD includes a responsiveness summary in which EPA responded to public comments raised during the public comment period. EPA published a notice of the Amended OU1 ROD in accordance with Section 117(b) of CERCLA.

S. Concurrently with the lodging of this Consent Judgment, Settling Defendant and the Village filed with the Court a settlement agreement in *Incorporated Village of Garden City v. Genesco, et al.*, Civil Action No. 07-CV-5244 (E.D.N.Y.) (the "Settlement Agreement") which provides, *inter alia*, that, in exchange for Genesco's payment of a specified sum of money, the Village will, among other things, cover all costs associated with the pumping, treatment, operation, maintenance, repair, and replacement (hereinafter, collectively referred to as, "operation") of equipment, as necessary, on Village water supply wells 13 and 14 as called for in the Amended OU1 ROD for a period of 30 years (or less if EPA agrees that the maximum contaminant levels for chlorinated solvents pursuant to 40 C.F.R. § 141.61(a) have been met and the requirements of the Amended OU1 ROD have been satisfied). The Village also agreed to operate Village water supply wells 13 and 14 for such 30 year period at pumping levels consistent with the 2009 operation of those wells, "and not to take any action that would reduce the volume, level of treatment or hydraulic control" at the wells except with the consent of EPA.

T. This Consent Judgment requires Settling Defendant to implement and/or ensure implementation of the Amended OU1 ROD, and supersedes the proposed 2009 Consent Judgment.

U. Based on the information presently available to EPA, EPA believes that the Work (as defined below) will be properly and promptly conducted by Settling Defendant if conducted in accordance with the requirements of this Consent Judgment and its appendices.

V. Solely for the purposes of Section 113(j) of CERCLA, the OU1 remedy selected in the Amended OU1 ROD and the Work to be performed by Settling Defendant shall constitute a response action taken or ordered by the President.

W. The Parties recognize, and the Court by entering this Consent Judgment finds, that this Consent Judgment has been negotiated by the Parties in good faith and implementation of this Consent Judgment will expedite the cleanup of the Site and will avoid prolonged and complicated litigation between the Parties, and that this Consent Judgment is fair, reasonable, and in the public interest.

NOW, THEREFORE, it is hereby Ordered, Adjudged, and Decreed:

II. JURISDICTION

1. This Court has jurisdiction over the subject matter of this action pursuant to 28 U.S.C. §§ 1331 and 1345, and 42 U.S.C. §§ 9606, 9607, and 9613(b). This Court also has personal jurisdiction over Settling Defendant. Solely for the purposes of this Consent Judgment

and the underlying complaint, Settling Defendant waives all objections and defenses that it may have to jurisdiction of the Court or to venue in this District. Settling Defendant shall not challenge the terms of this Consent Judgment or this Court's jurisdiction to enter and enforce this Consent Judgment.

III. PARTIES BOUND

2. This Consent Judgment applies to and is binding upon the United States and upon Settling Defendant and its heirs, successors and assigns. Any change in ownership or corporate status of Settling Defendant including, but not limited to, any transfer of assets or real or personal property, shall in no way alter Settling Defendant's responsibilities under this Consent Judgment.

3. Settling Defendant shall provide a copy of this Consent Judgment to each contractor hired to perform the Work (as defined below) required by this Consent Judgment and to each person representing Settling Defendant with respect to the Site or the Work and shall condition all contracts entered into hereunder upon performance of the Work in conformity with the terms of this Consent Judgment. Settling Defendant or its contractors shall provide written notice of the Consent Judgment to all subcontractors hired to perform any portion of the Work required by this Consent Judgment. Settling Defendant shall nonetheless be responsible for ensuring that its contractors and subcontractors perform the Work contemplated herein in accordance with this Consent Judgment. With regard to the activities undertaken pursuant to this Consent Judgment, each contractor and subcontractor shall be deemed to be in a contractual relationship with Settling Defendant within the meaning of Section 107(b)(3) of CERCLA, 42 U.S.C. § 9607(b)(3).

IV. DEFINITIONS

4. Unless otherwise expressly provided herein, terms used in this Consent Judgment which are defined in CERCLA or in regulations promulgated under CERCLA shall have the meaning assigned to them in CERCLA or in such regulations. Whenever terms listed below are used in this Consent Judgment or in the appendices attached hereto and incorporated hereunder, the following definitions shall apply:

"Amended OU1 Record of Decision" or "Amended OU1 ROD" shall mean the EPA Record of Decision Amendment relating to OU1 for the Site signed on September 30, 2015, by the Director of the Emergency and Remedial Response Division, EPA Region 2, and all attachments thereto. The Amended OU1 ROD is attached as Appendix A of this Consent Judgment.

"CERCLA" shall mean the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended, 42 U.S.C. §§ 9601-9675.

"Consent Judgment" shall mean this Consent Judgment and all appendices attached hereto (listed in Section XXIX). In the event of conflict between this Consent Judgment and any appendix, this Consent Judgment shall control.

"Day" shall mean a calendar day unless expressly stated to be a working day. "Working day" shall mean a day other than a Saturday, Sunday, or federal holiday. In computing any period of time under this Consent Judgment, where the last day would fall on a Saturday, Sunday, or federal holiday, the period shall run until the close of business of the next working day.

"Effective Date" shall be the effective date of this Consent Judgment as provided in Section XXVII.

"EPA" shall mean the United States Environmental Protection Agency and any successor departments or agencies of the United States."Fulton Property" shall mean the property located at 150 Fulton Avenue, Village of Garden City Park, Town of North Hempstead, New York.

"Future Response Costs" shall mean all costs, including, but not limited to, direct and indirect costs, that the United States incurs in reviewing or developing plans, reports and other items pursuant to this Consent Judgment, verifying the Work, or otherwise implementing, overseeing, or enforcing this Consent Judgment. Future Response Costs also include, but are not limited to, all costs that EPA incurs to conduct an investigation of vapor intrusion into structures that potentially could be affected by the PCE-dominant portion of the groundwater contamination plume at the Site, all costs that EPA incurs to evaluate the potential for vapor intrusion into new construction at the Site, and implementation of appropriate response actions(s) for vapor intrusion with respect to such structures or new construction, where such structures or new construction are located within the area bounded by Broadway Avenue to the north, the Long Island Rail Road tracks to the south, Nassau Boulevard to the west, and Armstrong Road (including the building located at 198-200 Armstrong Road) to the east. Future Response Costs also include, but are not limited to, payroll costs, contractor costs, travel costs, laboratory costs, the costs incurred pursuant to Sections VII, IX (including, but not limited to, the cost of attorney time and any monies paid to secure access and/or to secure or implement institutional controls including, but not limited to, the amount of just compensation), XV, and Paragraph 83 of Section XXI. Future Response Costs shall also include all Interim Response Costs.

"Interim Response Costs" shall mean all costs, including direct and indirect costs, (a) paid by the United States in connection with the Site between March 1, 2008, and the Effective Date, or (b) incurred prior to the Effective Date but paid after that date.

"Interest" shall mean interest at the rate specified for interest on investments of the EPA Hazardous Substance Superfund established by 26 U.S.C. § 9507, compounded annually on October 1 of each year, in accordance with 42 U.S.C. § 9607(a). The applicable rate of interest shall be the rate in effect at the time the interest accrues. The rate of interest is subject to change on October 1 of each year.

"National Contingency Plan" or "NCP" shall mean the National Oil and Hazardous Substances Pollution Contingency Plan promulgated pursuant to Section 105 of CERCLA, 42 U.S.C.§ 9605, codified at 40 C.F.R. Part 300, and any amendments thereto.

"NYSDEC" shall mean the New York State Department of Environmental Conservation and any successor departments or agencies of the State.

"Operable Unit 1" or "OU1" shall mean the amended interim remedy selected in the

Amended OU1 ROD to address the PCE-dominant portion of the groundwater contamination at the Site.

"Operation and Maintenance" or "O&M" shall mean all activities required to maintain the effectiveness of the OU1 remedy, after EPA determines that the treatment systems on Village of Garden City water supply wells 13 and 14 are Operational and Functional.

"Operational and Functional" shall mean that the OU1 Remedial Action is functioning properly and performing as designed, as determined by EPA.

"OU1 Remedial Action" shall mean those activities, except for Operation and Maintenance, to be undertaken by Settling Defendant to implement the Amended OU1 ROD, in accordance with the SOW and the final OU1 Remedial Design and OU1 Remedial Action work plans and other plans approved by EPA.

"OU1 Remedial Design" shall mean those activities to be undertaken by Settling Defendant to develop the final plans and specifications for the OU1 Remedial Action pursuant to the OU1 Remedial Design work plans.

"OU1 Remedy" shall mean the OU1 Remedial Design, OU1 Remedial Action and O&M.

"Paragraph" shall mean a portion of this Consent Judgment identified by an Arabic numeral or an upper case letter.

"Parties" shall mean the United States and Genesco.

"Performance Standards" shall mean the cleanup standards and other measures of achievement of the goals of the OU1 Remedial Action, set forth in Section II of the SOW.

"Plaintiff" shall mean the United States.

"RCRA" shall mean the Solid Waste Disposal Act, as amended, 42 U.S.C. §§ 6901 - 6992k (also known as the Resource Conservation and Recovery Act).

"Section" shall mean a portion of this Consent Judgment identified by a Roman numeral.

"Settling Defendant" shall mean Genesco Inc.

"Site" shall mean the Fulton Avenue Superfund Site, located in central Nassau County, New York, including the property located at 150 Fulton Avenue, Village of Garden City Park, Town of North Hempstead, New York, and all areas to which contamination has migrated. The Site is depicted generally on the map attached hereto as Appendix C.

"State" shall mean the State of New York.

"Statement of Work" or "SOW" shall mean the statement of work for implementation of the OU1 Remedial Design, OU1 Remedial Action, and Operation and Maintenance for OU1 at the Site, as set forth in Appendix B to this Consent Judgment and any modifications made in accordance with this Consent Judgment.

"Supervising Contractor" shall mean the principal contractor retained by Settling Defendant to supervise and direct the implementation of the Work under this Consent Judgment.

"United States" shall mean the United States of America.

"Village" shall mean the Incorporated Village of Garden City, Nassau County, New York.

"Waste Material" shall mean (1) any "hazardous substance" under Section 101(14) of CERCLA, 42 U.S.C. § 9601(14); (2) any pollutant or contaminant under Section 101(33), 42 U.S.C. § 9601(33); and (3) any "solid waste" under Section 1004(27) of RCRA, 42 U.S.C. § 6903(27).

"Work" shall mean all activities Settling Defendant is required to perform or ensure to be performed under this Consent Judgment, except those required by Section XXV (Retention of Records).

V. GENERAL PROVISIONS

5. Objectives of the Parties. The objectives of the Parties in entering into this Consent Judgment are to protect public health or welfare or the environment at the Site by the design and implementation of response actions at the Site by Settling Defendant, to reimburse response costs of Plaintiff, and to resolve the claims of Plaintiff against Settling Defendant as provided in this Consent Judgment.

6. Commitments by Settling Defendant. Settling Defendant shall perform or otherwise ensure performance of the Work in accordance with this Consent Judgment, the Amended OU1 ROD, the SOW, and all work plans and other plans, standards, specifications, and schedules set forth herein or developed by Settling Defendant and approved by EPA pursuant to this Consent Judgment. Settling Defendant shall also reimburse the United States for Future Response Costs as provided in this Consent Judgment.

7. Compliance with Applicable Law. All activities undertaken by Settling Defendant pursuant to this Consent Judgment shall be performed in accordance with the requirements of all applicable federal and state laws and regulations. Settling Defendant must also comply with all applicable or relevant and appropriate requirements of all federal and state environmental laws as set forth in the Amended OU1 ROD and the SOW. The activities conducted pursuant to this Consent Judgment, if approved by EPA, shall be considered to be consistent with the NCP.

8. Permits

a. As provided in Section 121(e) of CERCLA and Section 300.400(e) of the NCP, no permit shall be required for any portion of the Work conducted entirely on-Site (*i.e.*, within the areal extent of contamination or in very close proximity to the contamination and necessary for implementation of the Work). Where any portion of the Work that is not on-Site requires a federal or state permit or approval, Settling Defendant shall submit timely and complete applications and take all other actions necessary to obtain all such permits or approvals.

b. Settling Defendant may seek relief under the provisions of Section XVIII (Force Majeure) of this Consent Judgment for any delay in the performance of the Work resulting from a failure to obtain, or a delay in obtaining, any permit required for the Work.

c. This Consent Judgment is not, and shall not be construed to be, a permit

issued pursuant to any federal or state statute or regulation.

9. Notice to Successors-in-Title

a. Notice to Successors-in-Title

With respect to any property owned or controlled by Settling Defendant that is located within the Site, within 15 days after the entry of this Consent Judgment, Settling Defendant shall submit to EPA for review and approval a notice to be filed with the Nassau County Clerk's Office, State of New York, which shall provide notice to all successors-in-title that the property is part of the Site, that EPA selected an OU1 Remedy for the Site on September 30, 2015, and that a potentially responsible party has entered into a Consent Judgment requiring implementation of the remedy. Such notice(s) shall identify the United States District Court in which the Consent Judgment was filed, the name and civil action number of this case, and the date the Consent Judgment was entered by the Court. Settling Defendant shall record the notice(s) within ten days of EPA's approval of the notice(s). Settling Defendant shall provide EPA with a certified copy of the recorded notice(s) within ten days of recording such notice(s).

b. At least 30 days prior to the conveyance of any interest in property located within the Site including, but not limited to, fee interests, leasehold interests, and mortgage interests, Settling Defendant shall give the grantee written notice of (i) this Consent Judgment, (ii) any instrument by which an interest in real property has been conveyed that confers a right of access to the Site ("Access Easements") pursuant to Section IX (Access and Institutional Controls), and (iii) any instrument by which an interest in real property has been conveyed that confers a right to enforce restrictions on the use of such property ("Easements/Covenants") pursuant to Section IX (Access and Institutional Controls). At least 30 days prior to such conveyance, Settling Defendant shall also give written notice to EPA and the State of New York that the proposed conveyance, including the name and address of the grantee, and the date on which notice of the Consent Judgment, Access Easements, and/or Easements/Covenants was given to the grantee.

c. In the event of any such conveyance, Settling Defendant's obligations under this Consent Judgment, including, but not limited to, its obligation to provide or secure access and institutional controls, as well as to abide by such institutional controls, pursuant to Section IX (Access and Institutional Controls) of this Consent Judgment, shall continue to be met by Settling Defendant. In no event shall the conveyance release or otherwise affect the liability of Settling Defendant to comply with all provisions of this Consent Judgment, absent the prior written consent of EPA. If the United States approves, the grantee may perform some or all of the Work under this Consent Judgment.

VI. PERFORMANCE OF WORK BY SETTLING DEFENDANT

10. Selection of Supervising Contractor

a. All aspects of the Work to be performed by Settling Defendant pursuant to Sections VI (Performance of the Work by Settling Defendant), VII (Remedy Review), VIII (Quality Assurance, Sampling and Data Analysis), and XV (Emergency Response) of this

Consent Judgment shall be under the direction and supervision of the Supervising Contractor, the selection of which shall be subject to disapproval by EPA. The Supervising Contractor, as well as all other contractors and subcontractors who engage in the "practice of engineering" at the Site on behalf of Respondent (as the "practice of engineering" is defined at Section 7201 of the New York State Education Law), must comply with all applicable New York State legal requirements regarding the practice of engineering within the State of New York, including all applicable requirements of the New York State Education Law and Business Corporation Law. On November 19, 2009, EPA approved Environmental Resources Management, Inc. ("ERM"), as Settling Defendant's Supervising Contractor and issued an authorization to proceed. If at any time Settling Defendant proposes to change its Supervising Contractor, Settling Defendant shall give such notice to EPA and must obtain an authorization to proceed from EPA before the new Supervising Contractor performs, directs, or supervises any Work under this Consent Judgment.

b. If EPA disapproves a proposed new Supervising Contractor, EPA will notify Settling Defendant in writing. Settling Defendant shall submit to EPA a list of contractors, including the qualifications of each contractor that would be acceptable to it, within 30 days of receipt of EPA's disapproval of the contractor previously proposed. EPA will provide written notice of the names of any contractor(s) that it disapproves and an authorization to proceed with respect to any of the other contractors. Settling Defendant may select any contractor for which EPA has provided an authorization to proceed and shall notify EPA of the name of the contractor selected within 21 working days of EPA's authorization to proceed.

c. If EPA fails to provide written notice of an authorization to proceed or disapproval as provided in this Paragraph and this failure prevents Settling Defendant from meeting one or more deadlines in a plan approved by the EPA pursuant to this Consent Judgment, Settling Defendant may seek relief under the provisions of Section XVIII (Force Majeure) hereof.

11. OU1 Remedial Design/OU1 Remedial Action. Settling Defendant shall fully implement and comply with the SOW which is attached hereto as Appendix B. The Work to be performed or ensured to be performed by Settling Defendant pursuant to this Consent Judgment shall at a minimum achieve the requirements of, and be performed in a manner consistent with, the Amended OU1 ROD and this Consent Judgment. Settling Defendant shall ensure the continued pumping of Village water supply wells 13 and 14, regardless of whether the Village requires such wells as a potable water source.

12. Performance of O&M. Settling Defendant shall perform or otherwise ensure the performance of O&M in accordance with the SOW.

13. Modification of the SOW or Related Work Plans

a. If EPA determines that modification to the work specified in the SOW and/or in work plans developed pursuant to the SOW is necessary to achieve and maintain the Performance Standards or to carry out and maintain the effectiveness of the remedy set forth in the Amended OU1 ROD, EPA may require that such modification be incorporated in the SOW and/or such work plans, provided, however, that a modification may only be required pursuant to this Paragraph to the extent that it is consistent with the scope of the remedy selected in the Amended OU1 ROD.

b. For the purposes of this Paragraph 13 only, the "scope of the remedy selected in the Amended OU1 ROD" is:

(1) Continued O&M of the air stripping treatment systems currently installed on Village water supply wells 13 and 14 in order to protect the public from exposure to Site-related volatile organic compounds ("VOCs"), including PCE, in groundwater entering those wells. These treatment systems will be maintained and replaced or upgraded as needed in order to ensure that water distributed to the public from Village water supply wells 13 and 14 complies with applicable or relevant and appropriate requirements ("ARARs"), including the federal maximum contaminant levels ("MCLs") under the federal Safe Drinking Water Act or, if more stringent, New York State drinking water standards at 10 NYCRR Part 5, Subpart 5-1. If needed, a vapor-phase carbon unit will be added to capture and treat VOCs being discharged from the air stripper treatment units. The pumping of Village water supply wells 13 and 14 provides an incidental benefit of helping to reduce the mobility of contaminants in the OU1 portion of the plume. The Amended OU1 ROD assumes the continued operation of Village water supply wells 13 and 14 until those wells no longer are impacted by contaminants above the MCLs for PCE and trichloroethylene ("TCE").

(2) Institutional controls in the form of local laws that restrict future use of groundwater at the Site and limit exposure at the commercial facility located at the Fulton Property, a source of the groundwater contamination at the Site. Specifically, the Nassau County Sanitary Code regulates installation of private potable water supply wells in Nassau County. In addition, the commercial facility at the Fulton Property is zoned for industrial use, and EPA does not anticipate any changes to the land use in the foreseeable future. If a change in land use is proposed, additional investigation of soils may be necessary to determine whether the change in land use could affect exposure risks at the Fulton Property.

(3) A vapor intrusion evaluation of structures that are in the vicinity of the Fulton Property and that could potentially be affected by the OU1 portion of the groundwater contamination plume. An appropriate response action (such as sub-slab ventilation systems) may need to be implemented based on the results of the investigation. As part of O&M, the existing sub-slab ventilation system at the Fulton Property will continue to be operated and maintained.

(4) A site management plan ("SMP") that will provide for the proper management of all OU1 Remedy components, including compliance with institutional controls. The SMP will include: (a) O&M of the treatment systems on Village water supply wells 13 and 14 as well as monitoring of Site groundwater upgradient, sidegradient and downgradient of Village water supply wells 13 and 14; (b) conducting an evaluation of the potential for vapor intrusion, and an appropriate response action, if necessary, in the event of future construction at the Fulton Property; and (c) periodic certifications by the party(ies) implementing the remedy that any institutional and engineering controls are in place and being complied with.

c. If Settling Defendant objects to any modification of the SOW or a work plan developed pursuant to the SOW that is determined by EPA to be necessary pursuant to this Paragraph, it may seek dispute resolution pursuant to Section XIX (Dispute Resolution), Paragraph 66 (record review). The SOW and/or related work plans shall be modified in accordance with the final resolution of the dispute.

d. Settling Defendant shall implement any work required by any modifications incorporated in the SOW and/or in work plans developed pursuant to the SOW in accordance with this Paragraph, except that Settling Defendant shall not be required pursuant to this Paragraph to conduct an evaluation and/or investigation of the potential for vapor intrusion, or mitigation and/or implementation of a remedy with regard to such vapor intrusion, pursuant to subparagraphs 13.b(3) and 13.b(4), above, with the exception of O&M of the existing sub-slab ventilation system at the Fulton Property.

e. Nothing in this Paragraph shall be construed to limit EPA's authority to require performance of further response actions as otherwise provided in this Consent Judgment.

14. If EPA determines that repair, replacement or upgrades are needed for the treatment systems on Village water supply wells well 13 and 14, as called for in the Amended OU1 ROD, Settling Defendant shall seek the cooperation of and coordinate with the Village of Garden City to ensure that such repair, replacement or upgrades are implemented.

15. Settling Defendant acknowledges and agrees that nothing in this Consent Judgment, or the SOW constitutes a warranty or representation of any kind by Plaintiff that compliance with the work requirements set forth in the SOW will achieve the Performance Standards.

16. Settling Defendant shall, prior to any off-Site shipment of Waste Material from the Site to an out-of-state waste management facility, provide written notification to the appropriate state environmental official in the receiving facility's state and to the EPA Project Coordinator of such shipment of Waste Material. However, this notification requirement shall not apply to any off-Site shipments when the total volume of all such shipments will not exceed 10 cubic yards.

a. Settling Defendant shall include in the written notification the following information, where available: (1) the name and location of the facility to which the Waste Material is to be shipped; (2) the type and quantity of the Waste Material to be shipped; (3) the expected schedule for the shipment of the Waste Material; and (4) the method of transportation. Settling Defendant shall notify the state in which the planned receiving facility is located of major changes in the shipment plan, such as a decision to ship the Waste Material to another facility within the same state, or to a facility in another state.

b. The identity of the receiving facility and state will be determined by Settling Defendant following the award of the contract for OU1 Remedial Action construction. Settling Defendant shall provide the information required by Paragraph 16.a as soon as practicable after the award of the contract and before the Waste Material is actually shipped.

c. Before shipping any hazardous substances, pollutants, or contaminants from the Site to an off-Site location, Settling Defendant shall obtain EPA's certification that the proposed receiving facility is operating in compliance with the requirements of CERCLA Section 121(d)(3) and 40 C.F.R. § 300.440. Settling Defendant shall only send hazardous substances, pollutants, or contaminants from the Site to an off-Site facility that complies with the requirements of the statutory provision and regulations cited in the preceding sentence.

VII. REMEDY REVIEW

17. Periodic Review. Settling Defendant shall conduct any studies and investigations as requested by EPA, in order to permit EPA to conduct reviews of whether the OU1 Remedial Action is protective of human health and the environment at least every 5 years, as required by Section 121(c) of CERCLA and any applicable regulations.

18. EPA Selection of Further Response Actions. If EPA determines, at any time, that the OU1 Remedial Action is not protective of human health and the environment, EPA may select further response actions for OU1 in accordance with the requirements of CERCLA and the NCP.

19. Opportunity To Comment. Settling Defendant and, if required by Sections 113(k)(2) or 117 of CERCLA, the public, will be provided with an opportunity to comment on any further response actions proposed by EPA and to submit written comments for the record during the comment period.

VIII. QUALITY ASSURANCE, SAMPLING, AND DATA ANALYSIS

20. Settling Defendant shall use quality assurance, quality control, and chain of custody procedures for all design, compliance and monitoring samples in accordance with the procedures set forth in the Quality Assurance/Quality Control Project Plan ("QAPP") approved by EPA (*see* SOW, Section IV.A.). If relevant to the proceeding, the Parties agree that validated sampling data generated in accordance with the QAPP and reviewed and approved by EPA shall be admissible as evidence, without objection, in any proceeding under this Consent Judgment.

21. Upon request, Settling Defendant shall allow split or duplicate samples to be taken by EPA and its authorized representatives. Settling Defendant shall notify EPA and the State not less than 28 days in advance of any sample collection activity unless shorter notice is agreed to by EPA. In addition, EPA shall have the right to take any additional samples that EPA deems necessary. Upon request, EPA shall allow Settling Defendant to take split or duplicate samples of any samples it takes as part of Plaintiff's oversight of Settling Defendant's implementation of the Work.

22. Settling Defendant shall submit to EPA, in electronic format acceptable to EPA, the results of all sampling and/or tests or other data obtained or generated by or on behalf of Settling Defendant with respect to the Site and/or the implementation of this Consent Judgment within 15 working days of the date when those results or data become available to Settling Defendant, unless EPA agrees otherwise.

23. Notwithstanding any provision of this Consent Judgment, the United States hereby retains all of its information gathering and inspection authorities and rights, including enforcement actions related thereto, under CERCLA, RCRA and any other applicable statutes or regulations.

IX. ACCESS AND INSTITUTIONAL CONTROLS

24. If the Site, or any other property where access and/or land/water use restrictions are needed to implement this Consent Judgment, is owned or controlled by Settling Defendant, Settling Defendant shall:

a. commencing on the date of lodging of this Consent Judgment, provide the United States, the State, and their representatives, including EPA and its contractors, with access at all reasonable times to the Site, or such other property, for the purpose of conducting any activity related to this Consent Judgment including, but not limited to, the following activities:

(1) Monitoring the Work;

(2) Verifying any data or information submitted to the United States;

(3) Conducting investigations relating to contamination at or near the Site;

(4) Obtaining samples;

(5) Assessing the need for, planning, or implementing additional response actions at or near the Site;

(6) Assessing implementation of quality assurance and quality control practices as defined in the approved QAPP;

(7) Implementing the Work pursuant to the conditions set forth in Paragraph 83 (Work Takeover) of this Consent Judgment;

(8) Inspecting and copying records, operating logs, contracts, or other documents maintained or generated by Settling Defendant or its agents, consistent with Section XXIV (Access to Information);

(9) Assessing Settling Defendant's compliance with this Consent Judgment; and

(10) Determining whether the Site or other property is being used in a manner that is prohibited or restricted, or that may need to be prohibited or restricted, by or pursuant to this Consent Judgment.

b. commencing on the date of lodging of this Consent Judgment, refrain from using the Site, or such other property, in any manner that would interfere with or adversely affect the implementation, integrity, or protectiveness of the remedial measures to be performed pursuant to this Consent Judgment.

c. if EPA so requests, execute and record in the Nassau County Clerk's Office, State of New York, an easement/covenant, running with the land, that (i) grants a right of access for the purpose of conducting any activity related to this Consent Judgment including, but not limited to, those activities listed in Paragraph 24.a. of this Consent Judgment, and (ii) grants the right to enforce restrictions on use of the property pursuant to Paragraph 24.b. of this Consent Judgment, or other restrictions that EPA determines are necessary to implement, ensure

non-interference with, or ensure the protectiveness of the remedial measures to be performed in accordance with this Consent Judgment. Settling Defendant shall grant the access rights and the rights to enforce the land/water use restrictions to one or more of the following persons: (i) the State and its representatives, (ii) other potentially responsible parties for the Site who perform response actions at the Site *under* EPA direction, and/or (iii) other appropriate grantees. Settling Defendant shall, within 45 days of EPA's request, submit to EPA for review and approval with respect to such property:

(1) A draft easement, in substantially the form attached hereto as Appendix D, that is enforceable under the laws of the State of New York, and

(2) A current title insurance commitment or some other evidence of title acceptable to EPA, which shows title to the land described in the easement to be free and clear of all prior liens and encumbrances (except when those liens or encumbrances are approved by EPA or when, despite best efforts, Settling Defendant is unable to obtain release or subordination of such prior liens or encumbrances).

Within 15 days of EPA's approval and acceptance of the easement and the title evidence, Settling Defendant shall update the title search and, if it is determined that nothing has occurred since the effective date of the commitment to affect the title adversely, record the easement with the Nassau County Clerk's Office. Within 30 days of recording the easement, Settling Defendant shall provide EPA with a final title insurance policy, or other final evidence of title acceptable to EPA, and a certified copy of the original recorded easement showing the clerk's recording stamps.

25. If the Site, or any other property where access and/or land/water use restrictions are needed to implement this Consent Judgment, is owned or controlled by persons other than Settling Defendant, Settling Defendant shall use best efforts to secure from such persons:

a. an agreement to provide access thereto for Settling Defendant, as well as for the United States on behalf of EPA, and the State, as well as their representatives (including contractors), for the purpose of conducting any activity related to this Consent Judgment including, but not limited to, those activities listed in Paragraph 24.a. of this Consent Judgment;

b. an agreement, enforceable by Settling Defendant and the United States, to refrain from using the Site, or such other property, in any manner that would interfere with or adversely affect the implementation, integrity, or protectiveness of the remedial measures to be performed pursuant to this Consent Judgment; and

c. if EPA so requests, the execution and recordation in the Nassau County Clerk's Office, State of New York, of an easement/covenant, running with the land, that (i) grants a right of access for the purpose of conducting any activity related to this Consent Judgment including, but not limited to, those activities listed in Paragraph 24.a. of this Consent Judgment, and (ii) grants the right to enforce the restrictions on use of the property pursuant to Paragraph 24.b of this Consent Judgment, or other restrictions that EPA determines are necessary to implement, ensure non-interference with, or ensure the protectiveness of the remedial measures to be performed pursuant to this Consent Judgment. The access rights and/or rights to enforce land/water use restrictions shall be granted to one or more of the following persons, as

determined by EPA: (i) the United States, on behalf of EPA, and its representatives, (ii) the State and its representatives, (iii) other potentially responsible parties for the Site who perform response actions at the Site under EPA direction, and/or (iv) other appropriate grantees. Within 45 days of EPA's request, Settling Defendant shall submit to EPA for review and approval with respect to such property:

(1) A draft easement, in substantially the form attached hereto as Appendix D, that is enforceable under the laws of the State of New York, and

(2) A current title insurance commitment, or some other evidence of title acceptable to EPA, which shows title to the land described in the easement to be free and clear of all prior liens and encumbrances (except when those liens or encumbrances are approved by EPA or when, despite best efforts, Settling Defendant is unable to obtain release or subordination of such prior liens or encumbrances).

Within 15 days of EPA's approval and acceptance of the easement and the title evidence, Settling Defendant shall update the title search and, if it is determined that nothing has occurred since the effective date of the commitment to affect the title adversely, the easement shall be recorded with the Nassau County Clerk's Office. Within 30 days of the recording of the easement, Settling Defendant shall provide EPA with a final title insurance policy, or other final evidence of title acceptable to EPA, and a certified copy of the original recorded easement showing the clerk's recording stamps.

26. For purposes of Paragraphs 24 and 25 of this Consent Judgment, "best efforts" includes the payment of reasonable sums of money in consideration of access, access easements, land/water use restrictions, restrictive easements, and/or an agreement to release or subordinate a prior lien or encumbrance. If (a) any access or land/water use restriction agreements required by Paragraphs 25.a. or 25.b. of this Consent Judgment are not obtained within 45 days of the date of completion of the OU1 Remedial Action, (b) or any access easements or restrictive easements required by Paragraph 25.c. of this Consent Judgment are not submitted to EPA in draft form within 45 days of EPA's request, or (c) Settling Defendant is unable to obtain an agreement pursuant to Paragraph 24.c(1) or Paragraph 25.c(1) from the holder of a prior lien or encumbrance to release or subordinate such lien or encumbrance to the easement being created pursuant to this Consent Judgment within 45 days of the date of entry of EPA's request, Settling Defendant shall promptly notify the United States in writing, and shall include in that notification a summary of the steps that Settling Defendant has taken to attempt to comply with Paragraph 24 or 25 of this Consent Judgment. The United States may, as it deems appropriate, assist Settling Defendant in obtaining access or land/water use restrictions, either in the form of contractual agreements or in the form of easements running with the land, or in obtaining the release or subordination of a prior lien or encumbrance. Settling Defendant shall reimburse the United States in accordance with the procedures in Section XVI (Payments for Response Costs), for all costs incurred, direct or indirect, by the United States in obtaining such access, land/water use restrictions, and/or the release/subordination of prior liens or encumbrances including, but not limited to, the cost of attorney time and the amount of monetary consideration paid or just compensation.

27. If EPA determines that land/water use restrictions in the form of new state or local

laws, regulations, ordinances or other governmental controls are needed to implement the remedy selected in the Amended OU1 ROD, ensure the integrity and protectiveness thereof, or ensure non-interference therewith, Settling Defendant shall cooperate with EPA's efforts to secure such governmental controls.

28. Notwithstanding any provision of this Consent Judgment, the United States retains all of its access authorities and rights, as well as all of its rights to require land/water use restrictions, including enforcement authorities related thereto, under CERCLA, RCRA and any other applicable statute or regulations.

X. REPORTING REQUIREMENTS

29. In addition to any other requirement of this Consent Judgment, Settling Defendant shall submit to EPA and the State written quarterly progress reports that: (a) describe the actions which have been taken toward achieving compliance with this Consent Judgment during the previous quarter; (b) include a summary of all results of sampling and tests and all other data received or generated by Settling Defendant or its contractors or agents in the previous quarter; (c) identify all work plans, plans and other deliverables required by this Consent Judgment completed and submitted during the previous quarter; (d) describe all actions, including, but not limited to, data collection and implementation of work plans, which are scheduled for the next eighteen (18) weeks and provide other information relating to the progress of construction, including, but not limited to, critical path diagrams, Gantt charts and Pert charts; (e) include information regarding percentage of completion, unresolved delays encountered or anticipated that may affect the future schedule for implementation of the Work, and a description of efforts made to mitigate those delays or anticipated delays; (f) include any modifications to the work plans or other schedules that Settling Defendant has proposed to EPA or that have been approved by EPA; and (g) describe all activities undertaken in support of the community relations plan during the previous quarter and those to be undertaken in the next eighteen (18) weeks. Settling Defendant shall submit these progress reports to EPA and the State by the tenth day of every quarter following the lodging of this Consent Judgment until EPA notifies Settling Defendant pursuant to Paragraph 50.b. of Section XIV (Certification of Completion). If requested by EPA, Settling Defendant shall also provide briefings for EPA to discuss the progress of the Work.

30. Settling Defendant shall notify EPA of any change in the schedule described in the quarterly progress report for the performance of any activity, including, but not limited to, data collection and implementation of work plans, no later than 7 days prior to the performance of the activity.

31. Upon the occurrence of any event during performance of the Work that Settling Defendant is required to report pursuant to Section 103 of CERCLA or Section 304 of the Emergency Planning and Community Right-to-know Act ("EPCRA"), Settling Defendant shall within 24 hours of the onset of such event orally notify the EPA Project Coordinator or the Alternate EPA Project Coordinator (in the event of the unavailability of the EPA Project Coordinator), or, in the event that neither the EPA Project Coordinator or Alternate EPA Project Coordinator is available the Chief of the Response and Prevention Branch of the Emergency and Remedial Response Division of EPA, Region 2, at (732) 321-6656, or, if such person or his/her

delegate is unavailable, the EPA Region 2 Emergency 24-hour Hot Line at (732) 548-8730. These reporting requirements are in addition to the reporting required by CERCLA Section 103 or EPCRA Section 304.

32. Within 20 days of the onset of such an event, Settling Defendant shall furnish to EPA a written report, signed by Settling Defendant's Project Coordinator, setting forth the events which occurred and the measures taken, and to be taken, in response thereto. Within 30 days of the conclusion of such an event, Settling Defendant shall submit a report setting forth all actions taken in response thereto.

33. Settling Defendant shall submit electronic copies of all plans, reports, and data required by the SOW or any other approved plans to EPA in accordance with the schedules set forth in such plans, and in accordance with the technical specifications for electronic submission of sampling, monitoring, and spatial data specified in SOW Section IV.A. Upon request by EPA, Settling Defendant shall also provide to EPA and the State, paper copies of plans, reports or data specified by EPA. Settling Defendant shall simultaneously submit copies of all such plans, reports and data to the State.

34. All reports and other documents submitted by Settling Defendant to EPA (other than the quarterly progress reports referred to above) which purport to document Settling Defendant's compliance with the terms of this Consent Judgment shall be signed by an authorized representative of Settling Defendant.

XI. EPA APPROVAL OF PLANS AND OTHER SUBMISSIONS

35. After review of any plan, report or other item which is required to be submitted for approval pursuant to this Consent Judgment, EPA, after reasonable opportunity for review and comment by the State, shall: (a) approve, in whole or in part, the submission; (b) approve the submission upon specified conditions; (c) modify the submission to cure the deficiencies; (d) disapprove, in whole or in part, the submission, directing that Settling Defendant modify the submission; or (e) any combination of the above. However, EPA shall not modify a submission without first providing Settling Defendant at least one notice of deficiency and an opportunity to cure within 10 days, except where to do so would cause serious disruption to the Work or where previous submission(s) have been disapproved due to material defects and the deficiencies in the submission under consideration indicate a bad faith lack of effort to submit an acceptable deliverable.

36. In the event of approval, approval upon conditions, or modification by EPA, pursuant to Paragraph 35(a), (b), or (c), Settling Defendant shall proceed to take any action required by the plan, report, or other item, as approved or modified by EPA subject only to its right to invoke the Dispute Resolution procedures set forth in Section XIX (Dispute Resolution) with respect to the modifications or conditions made by EPA. In the event that EPA modifies the submission to cure the deficiencies pursuant to Paragraph 35(c) and the submission has a material defect, EPA retains its right to seek stipulated penalties, as provided in Section XX (Stipulated Penalties).

37. Resubmission of Plans

a. Upon receipt of a notice of disapproval pursuant to Paragraph 35(d), Settling Defendant shall, within 14 days or such longer time as specified by EPA in such notice, correct the deficiencies and resubmit the plan, report, or other item for approval. Any stipulated penalties applicable to the submission, as provided in Section XX, shall accrue during the 14-day period or otherwise specified period but shall not be payable unless the resubmission is disapproved or modified due to a material defect as provided in Paragraphs 38 and 39.

b. Notwithstanding the receipt of a notice of disapproval pursuant to Paragraph 35(d), Settling Defendant shall proceed, at the direction of EPA, to take any action required by any non-deficient portion of the submission. Implementation of any non-deficient portion of a submission shall not relieve Settling Defendant of any liability for stipulated penalties under Section XX (Stipulated Penalties).

38. In the event that a resubmitted plan, report or other item, or portion thereof, is disapproved by EPA, EPA may again require Settling Defendant to correct the deficiencies, in accordance with the preceding Paragraphs. EPA also retains the right to modify or develop the plan, report or other item. Settling Defendant shall implement any such plan, report, or item as modified or developed by EPA, subject only to its right to invoke the procedures set forth in Section XIX (Dispute Resolution).

39. If upon resubmission, a plan, report, or item is disapproved or modified by EPA due to a material defect, Settling Defendant shall be deemed to have failed to submit such plan, report, or item timely and adequately unless Settling Defendant invokes the dispute resolution procedures set forth in Section XIX (Dispute Resolution) and EPA's action is overturned pursuant to that Section. The provisions of Section XIX (Dispute Resolution) and Section XX (Stipulated Penalties) shall govern the implementation of the Work and accrual and payment of any stipulated penalties during Dispute Resolution. If EPA's disapproval or modification is upheld, stipulated penalties shall accrue for such violation from the date on which the initial submission was originally required, as provided in Section XX.

40. All plans, reports, and other items required to be submitted to EPA under this Consent Judgment shall, upon approval or modification by EPA, be enforceable under this Consent Judgment. In the event EPA approves or modifies a portion of a plan, report, or other item required to be submitted to EPA under this Consent Judgment, the approved or modified portion shall be enforceable under this Consent Judgment.

XII. PROJECT COORDINATORS

41. Settling Defendant and EPA have designated the following persons as their respective Project Coordinators and Alternate Project Coordinators:

As to Settling Defendant:

Project Coordinator:

Chris Wenczel
Principal Consultant
ERM Consulting and Engineering
105 Maxess Road, Ste. 316
Melville, NY 11747-3851
chris.wenczel@erm.com
(631) 756-8921

Alternate Project Coordinator:

Jim Perazzo
Principal
ERM Consulting and Engineering
105 Maxess Road, Ste. 316
Melville, NY 11747-3851
jim.perazzo@erm.com
(631) 756-8913

As to EPA:

Project Coordinator:

Kevin Willis
Remedial Project Manager
New York Remediation Branch
Emergency and Remedial Response Division
U.S. Environmental Protection Agency, Region 2
290 Broadway, 20th Floor
New York, N.Y. 10007-1866
willis.kevin@epa.gov
(212) 637-4252

Alternate Project Coordinator:

Salvatore Badalamenti
Section Chief
Eastern New York Remediation Section
New York Remediation Branch
Emergency and Remedial Response Division
U.S. Environmental Protection Agency, Region 2
290 Broadway, 20th Floor
New York, N.Y. 10007-1866
badalamenti.salvatore@epa.gov
(212) 637-3314

If a Project Coordinator or Alternate Project Coordinator designated above is changed, the identity of the successor will be given to the other Party at least 5 working days before the changes occur, unless impracticable, but in no event later than the actual day the change is made. Settling Defendant's Project Coordinator shall be subject to disapproval by EPA and shall have the technical expertise sufficient to adequately oversee all aspects of the Work. Settling Defendant's Project Coordinator shall not be an attorney. He or she may assign other representatives, including other contractors, to serve as a Site representative for oversight of performance of daily operations during remedial activities.

42. Plaintiff may designate other representatives, including, but not limited to, EPA employees, and federal contractors and consultants, to observe and monitor the progress of any activity undertaken pursuant to this Consent Judgment. EPA's Project Coordinator and Alternate Project Coordinator shall have the authority lawfully vested in a Remedial Project Manager ("RPM") and an On-Scene Coordinator ("OSC") by the National Contingency Plan, 40 C.F.R. Part 300. In addition, EPA's Project Coordinator or Alternate Project Coordinator shall have authority, consistent with the National Contingency Plan, to halt any Work required by this Consent Judgment and to take any necessary response action when s/he determines that conditions at the Site constitute an emergency situation or may present an immediate threat to public health or welfare or the environment due to release or threatened release of Waste Material.

43. EPA's Project Coordinator and Settling Defendant's Project Coordinator will meet, at a minimum, on a monthly basis.

XIII. PERFORMANCE GUARANTEE

44. In order to ensure the full and final completion of the Work, Settling Defendant shall establish and maintain a performance guarantee for the benefit of EPA ("Performance Guarantee") in the initial amount of $4,039,188 ("Estimated Cost of the Work") in one or more of the following forms, which must be satisfactory in form and substance to EPA:

a. A surety bond unconditionally guaranteeing payment and/or performance of the Work that is issued by a surety company among those listed as acceptable sureties on federal bonds as set forth in Circular 570 of the U.S. Department of the Treasury;

b. One or more irrevocable letters of credit, payable to or at the direction of EPA, that is issued by one or more financial institution(s) (i) that has the authority to issue letters of credit and (ii) whose letter-of-credit operations are regulated and examined by a U.S. Federal or State agency;

c. A trust fund established for the benefit of EPA that is administered by a trustee (i) that has the authority to act as a trustee and (ii) whose trust operations are regulated and examined by a U.S. Federal or State agency;

d. A policy of insurance that (i) provides EPA with acceptable rights as a beneficiary thereof; and (ii) is issued by an insurance carrier (a) that has the authority to issue insurance policies in the applicable jurisdiction(s) and (b) whose insurance operations are

regulated and examined by a State agency;

e. A demonstration by Settling Defendant that it meets the financial test criteria of 40 C.F.R. § 264.143(f) with respect to the Estimated Cost of the Work, provided that all other requirements of 40 C.F.R. § 264.143(f) are satisfied; or

f. A written guarantee to fund or perform the Work executed in favor of EPA by one or more of the following: (i) a direct or indirect parent company of Settling Defendant, or (ii) a company that has a "substantial business relationship" (as defined in 40 C.F.R. § 264.141(h)) with Settling Defendant; provided, however, that any company providing such a guarantee must demonstrate to the satisfaction of EPA that it satisfies the financial test requirements of 40 C.F.R. § 264.143(f) with respect to the Estimated Cost of the Work that it proposes to guarantee hereunder.

45. Settling Defendant has proposed, and EPA will consider, as an initial Performance Guarantee, a demonstration by Settling Defendant that it meets the financial test in accordance with Paragraph 44.e. Within 30 days after the Effective Date, or 30 days after EPA's approval of the form and substance of Settling Defendant's Performance Guarantee, whichever is later, Settling Defendant shall secure all executed and/or otherwise finalized mechanisms or other documents consistent with the EPA-approved form of financial assurance and shall submit such mechanisms and documents to the United States, and to EPA as specified in Section XXVI (Notices and Submissions).

46. If at any time during the effective period of this Consent Judgment, Settling Defendant provides a Performance Guarantee for completion of the Work by means of a demonstration or guarantee pursuant to Paragraph 44(e) or Paragraph 44(f), above, Settling Defendant shall also comply with the other relevant requirements of 40 C.F.R. § 264.143(f), 40 C.F.R. § 264.151(f), and 40 C.F.R. § 264.151(h)(1) relating to these methods unless otherwise provided in this Consent Judgment, including but not limited to: (i) the initial submission of required financial reports and statements from the relevant entity's chief financial officer and independent certified public accountant; and (ii) the annual re-submission of such reports and statements within 90 days after the close of any fiscal year in which such entity no longer satisfies the financial test requirements set forth at 40 C.F.R. § 264.143(f)(1). For purposes of the Performance Guarantee methods specified in this Section XIII, references in 40 C.F.R. Part 264, Subpart H, to "closure", "post-closure", and "plugging and abandonment" shall be deemed to refer to the Work required under this Consent Judgment, and the terms "current closure cost estimate", "current post-closure cost estimate", and "current plugging and abandonment cost estimate" shall be deemed to refer to the Estimated Cost of the Work.

47. In the event that EPA determines at any time that a Performance Guarantee provided by Settling Defendant pursuant to this Section is inadequate or otherwise no longer satisfies the requirements set forth in this Section, whether due to an increase in the estimated cost of completing the Work or for any other reason, or in the event that Settling Defendant becomes aware of information indicating that a Performance Guarantee provided pursuant to this Section is inadequate or otherwise no longer satisfies the requirements set forth in this Section, whether due to an increase in the estimated cost of completing the Work or for any other reason, Settling Defendant, within 30 days of receipt of notice of EPA's determination or, as the case

may be, within 30 days of Settling Defendant becoming aware of such information, shall obtain and present to EPA for approval a proposal for a revised or alternative form of Performance Guarantee listed in Paragraph 44 of this Consent Judgment that satisfies all requirements set forth in this Section XIII. In seeking approval for a revised or alternative form of Performance Guarantee, Settling Defendant shall follow the procedures set forth in Paragraph 49.b(2) of this Consent Judgment. Settling Defendant's inability to post a Performance Guarantee for completion of the Work shall in no way excuse performance of any other requirements of this Consent Judgment, including, without limitation, the obligation of Settling Defendant to complete the Work in strict accordance with the terms hereof.

48. The commencement of any Work Takeover pursuant to Paragraph 83 of this Consent Judgment shall trigger EPA's right to receive the benefit of any Performance Guarantee(s) provided pursuant to Paragraph 44(a), (b), (c), (d), or (f), and at such time EPA shall have immediate access to resources guaranteed under any such Performance Guarantee(s), whether in cash or in kind, as needed to continue and complete the Work assumed by EPA under the Work Takeover. If for any reason EPA is unable to promptly secure the resources guaranteed under any such Performance Guarantee(s), whether in cash or in kind, necessary to continue and complete the Work assumed by EPA under the Work Takeover, or in the event that the Performance Guarantee involves a demonstration of satisfaction of the financial test criteria pursuant to Paragraph 44.e., Settling Defendant shall immediately upon written demand from EPA deposit into an account specified by EPA, in immediately available funds and without setoff, counterclaim, or condition of any kind, a cash amount up to but not exceeding the estimated cost of the remaining Work to be performed as of such date, as determined by EPA.

49. Modification of Amount and/or Form of Performance Guarantee

a. Reduction of Amount of Performance Guarantee. If Settling Defendant believes that the estimated cost to complete the remaining Work has diminished below the amount set forth in Paragraph 44 above, Settling Defendant may, on any anniversary date of entry of this Consent Judgment, or at any other time agreed to by the Parties, petition EPA in writing to request a reduction in the amount of the Performance Guarantee provided pursuant to this Section so that the amount of the Performance Guarantee is equal to the estimated cost of the remaining Work to be performed. Settling Defendant shall submit a written proposal for such reduction to EPA that shall specify, at a minimum, the cost of the remaining Work to be performed and the basis upon which such cost was calculated. In seeking approval for a revised or alternative form of Performance Guarantee, Settling Defendant shall follow the procedures set forth in Paragraph 49.b(2) of this Consent Judgment. If EPA decides to accept such a proposal, EPA shall notify Settling Defendant of such decision in writing. After receiving EPA's written acceptance, Settling Defendant may reduce the amount of the Performance Guarantee in accordance with and to the extent permitted by such written acceptance. In the event of a dispute, Settling Defendant may reduce the amount of the Performance Guarantee required hereunder only in accordance with a final administrative or judicial decision resolving such dispute. No change to the form or terms of any Performance Guarantee provided under this Section, other than a reduction in amount, is authorized except as provided in Paragraphs 47 or 49.c. of this Consent Judgment.

b. Change of Form of Performance Guarantee

(1) If, after entry of this Consent Judgment, Settling Defendant desires to change the form or terms of any Performance Guarantee(s) provided pursuant to this Section, Settling Defendant may, on any anniversary date of entry of this Consent Judgment, or at any other time agreed to by the Parties, petition EPA in writing to request a change in the form of the Performance Guarantee provided hereunder. The submission of such proposed revised or alternative form of Performance Guarantee shall be as provided in Paragraph 49.b(2). of this Consent Judgment. Any decision made by EPA on a petition submitted under this subparagraph 49.b(1) shall be made in EPA's sole and unreviewable discretion, and such decision shall not be subject to challenge by Settling Defendant pursuant to the dispute resolution provisions of this Consent Judgment or in any other forum.

(2) Settling Defendant shall submit a written proposal for a revised or alternative form of Performance Guarantee to EPA which shall specify, at a minimum, the estimated cost of the remaining Work to be performed, the basis upon which such cost was calculated, and the proposed revised form of Performance Guarantee, including all proposed instruments or other documents required in order to make the proposed Performance Guarantee legally binding. The proposed revised or alternative form of Performance Guarantee must satisfy all requirements set forth or incorporated by reference in this Section. Settling Defendant shall submit such proposed revised or alternative form of Performance Guarantee to the EPA's Fulton Avenue Superfund Site Attorney in accordance with Section XXVI (Notices and Submissions) of this Consent Judgment. EPA shall notify Settling Defendant in writing of its decision to accept or reject a revised or alternative Performance Guarantee submitted pursuant to this subparagraph. Within 10 days after receiving a written decision approving the proposed revised or alternative Performance Guarantee, Settling Defendant shall execute and/or otherwise finalize all instruments or other documents required in order to make the selected Performance Guarantee(s) legally binding in a form substantially identical to the documents submitted to EPA as part of the proposal, and such Performance Guarantee(s) shall thereupon be fully effective. Settling Defendant shall submit all executed and/or otherwise finalized instruments or other documents required in order to make the selected Performance Guarantee(s) legally binding to EPA's Fulton Avenue Superfund Site Attorney within 30 days of receiving a written decision approving the proposed revised or alternative Performance Guarantee in accordance with Section XXVI (Notices and Submissions) of this Consent Judgment and to the United States and EPA as specified in Section XXVI.

c. Release of Performance Guarantee. If Settling Defendant receives written notice from EPA in accordance with Paragraph 50.b. hereof that the Work has been fully and finally completed in accordance with the terms of this Consent Judgment, or if EPA otherwise so notifies Settling Defendant in writing, Settling Defendant may thereafter release, cancel, or discontinue the Performance Guarantee(s) provided pursuant to this Section. Settling Defendant shall not release, cancel, or discontinue any Performance Guarantee provided pursuant to this Section except as provided in this subparagraph. In the event of a dispute, Settling Defendant may release, cancel, or discontinue the Performance Guarantee(s) required hereunder only in accordance with a final administrative or judicial decision resolving such dispute.

XIV. CERTIFICATION OF COMPLETION

50. Completion of the Work

a. Within 90 days after Settling Defendant concludes that all phases of the Work (including Settling Defendant's obligations to perform O&M under this Consent Judgment) have been fully performed, Settling Defendant shall schedule and conduct a pre-certification inspection to be attended by Settling Defendant, and EPA. If, after the pre-certification inspection, Settling Defendant still believes that the Work has been fully performed, Settling Defendant shall submit a written report by a registered professional engineer stating that the Work has been completed in full satisfaction of the requirements of this Consent Judgment. The report shall contain the following statement, signed by a responsible corporate official of Settling Defendant or Settling Defendant's Project Coordinator:

> To the best of my knowledge, after thorough investigation, I certify that the information contained in or accompanying this submission is true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

If, after review of the written report, and after reasonable opportunity for review and comment by the State, EPA determines that any portion of the Work has not been completed in accordance with this Consent Judgment, EPA will notify Settling Defendant in writing of the activities that must be undertaken by Settling Defendant pursuant to this Consent Judgment to complete the Work, provided, however, that EPA may only require Settling Defendant to perform such activities pursuant to this Paragraph to the extent that such activities are consistent with the "scope of the remedy selected in the Amended OU1 ROD," as that term is defined in Paragraph 13.b. EPA will set forth in the notice a schedule for performance of such activities consistent with the Consent Judgment and the SOW or require Settling Defendant to submit a schedule to EPA for approval pursuant to Section XI (EPA Approval of Plans and Other Submissions). Settling Defendant shall perform all activities described in the notice in accordance with the specifications and schedules established therein, subject to its right to invoke the dispute resolution procedures set forth in Section XIX (Dispute Resolution).

b. If EPA concludes, based on the initial or any subsequent request for Certification of Completion by Settling Defendant and after a reasonable opportunity for review and comment by the State, that the Work has been performed in accordance with this Consent Judgment, EPA will so notify Settling Defendant in writing.

XV. EMERGENCY RESPONSE

51. In the event of any action or occurrence during the performance of the Work which causes or threatens a release of Waste Material from the Site that constitutes an emergency situation or may present an immediate threat to public health or welfare or the environment, Settling Defendant shall, subject to Paragraph 52, immediately take all appropriate action to prevent, abate, or minimize such release or threat of release, and shall immediately

notify the EPA's Project Coordinator, or, if the Project Coordinator is unavailable, EPA's Alternate Project Coordinator. If neither of these persons is available, Settling Defendant shall notify the Chief of the Response and Prevention Branch of the Emergency and Remedial Response Division of EPA, Region 2, at (732) 321-6656, or, if such person or his/her delegate is unavailable, the EPA Region 2 Emergency 24-hour Hot Line at (732) 548-8730. Settling Defendant shall take such actions in consultation with EPA's Project Coordinator or other available authorized EPA officer and in accordance with all applicable provisions of the plans or documents developed pursuant to the SOW. In the event that Settling Defendant fails to take appropriate response action as required by this Section, and EPA takes such action instead, Settling Defendant shall reimburse EPA for all costs of the response action not inconsistent with the NCP pursuant to Section XVI (Payments for Response Costs).

52. Nothing in the preceding Paragraph or in this Consent Judgment shall be deemed to limit any authority of the United States to: (i) take all appropriate action to protect human health and the environment or to prevent, abate, respond to, or *minimize* an *actual* or threatened release of Waste Material on, at, or from the Site; or (ii) direct or order such action, or seek an order from the Court, to protect human health and the environment or to prevent, abate, respond to, or minimize an actual or threatened release of Waste Material on, at, or from the Site, subject to Section XXI (Covenants Not to Sue by Plaintiff).

XVI. PAYMENTS FOR RESPONSE COSTS

53. Payments for Future Response Costs

a. Settling Defendant shall pay to EPA all Future Response Costs not inconsistent with the National Contingency Plan. On a periodic basis the United States will send Settling Defendant billings for such costs. The billings will be accompanied by a printout of cost data from EPA's financial management system. Settling Defendant shall make all payments within 30 days of the date of each bill requiring payment, except as otherwise provided in Paragraph 54. Settling Defendant shall make all payments of Future Response Costs via electronic funds transfer ("EFT"). Such payments shall be remitted via EFT to the Federal Reserve Bank of New York, as follows. Settling Defendant shall provide the following information to its bank:

i. EFT to be directed to: **Federal Reserve Bank of New York**
ii. Bank Routing Number: **021030004**
iii. Bank account number receiving the payment: **68010727**
iv. SWIFT address: **FNYUS33**
v. Address: **Federal Reserve Bank of New York**
33 Liberty Street
New York NY 10045
vi. Field Tag 4200 of the Fedwire message should read (for Fedwire payments): **D 68010727 Environmental Protection Agency**
vii. Case Number: **09-CV-3917 (E.D.N.Y.)**
viii. Amount of payment: _____
ix. Name of remitter: **Genesco Inc.**

x. Site name: **Fulton Avenue Superfund Site**
xi. Site/Spill identifier: **02JN**

Along with this information, Settling Defendant shall instruct its bank to remit payment in the required amount via EFT to EPA's account at the Federal Reserve Bank of New York. To ensure that Settling Defendant's payment is properly recorded, Settling Defendant shall send a letter to the United States within one week of the EFT, which references the date of the EFT, the payment amount, the name of the Site, the case number, and Settling Defendant's name and address. Such letter shall be sent to the United States and EPA in accordance with Section XXVI (Notices and Submissions).

b. All payments by Settling Defendant pursuant to Paragraph 53.a. shall be deposited in the Fulton Avenue Superfund Site Special Account within the EPA Hazardous Substance Superfund to be retained and used to conduct or finance response actions at or in connection with the Site, or to be transferred by EPA to the EPA Hazardous Substance Superfund.

54. Settling Defendant may contest payment of any Future Response Costs under Paragraph 53 if it determines that the United States has made an accounting error or if it alleges that a cost item that is included represents costs that are inconsistent with the NCP. Such objection shall be made in writing within 30 days of receipt of the bill and must be sent to the United States. Any such objection shall specifically identify the contested Future Response Costs and the basis for objection. In the event of an objection, Settling Defendant shall within the 30-day period pay all uncontested Future Response Costs to the United States in the manner described in Paragraph 53. Simultaneously, Settling Defendant shall establish an interest-bearing escrow account in a federally-insured bank duly chartered in the State of New York and remit to that escrow account funds equivalent to the amount of the contested Future Response Costs. Settling Defendant shall send to the United States, as provided in Section XXVI (Notices and Submissions), a copy of the transmittal letter and check paying the uncontested Future Response Costs, and a copy of the correspondence that establishes and funds the escrow account, including, but not limited to, information containing the identity of the bank and bank account under which the escrow account is established as well as a bank statement showing the initial balance of the escrow account. Simultaneously with establishment of the escrow account, Settling Defendant shall initiate the Dispute Resolution procedures in Section XIX (Dispute Resolution). If the United States prevails in the dispute, within five days of the resolution of the dispute, Settling Defendant shall pay the sums due (with accrued Interest) to the United States, in the manner described in Paragraph 53. If Settling Defendant prevails concerning any aspect of the contested costs, Settling Defendant shall pay that portion of the costs (plus associated accrued Interest) for which it did not prevail to the United States in the manner described in Paragraph 53; Settling Defendant shall be disbursed any balance of the escrow account. The dispute resolution procedures set forth in this Paragraph in conjunction with the procedures set forth in Section XIX (Dispute Resolution) shall be the exclusive mechanisms for resolving disputes regarding Settling Defendant's obligation to reimburse the United States for its Future Response Costs.

55. In the event that the payments required by Paragraph 53 are not made within 30

days of Settling Defendant's receipt of the bill, Settling Defendant shall pay Interest on the unpaid balance. The Interest on Future Response Costs shall begin to accrue on the date of the bill. The Interest shall accrue through the date of Settling Defendant's payment. Payments of Interest made under this Paragraph shall be in addition to such other remedies or sanctions available to Plaintiff by virtue of Settling Defendant's failure to make timely payments under this Section including, but not limited to, payment of stipulated penalties pursuant to Paragraph 71. Settling Defendant shall make all payments required by this Paragraph in the manner described in Paragraph 53.

XVII. INDEMNIFICATION AND INSURANCE

56. Settling Defendant's Indemnification of the United States

a. The United States does not assume any liability by entering into this agreement or by virtue of any designation of Settling Defendant as EPA's authorized representatives under Section 104(e) of CERCLA. Settling Defendant shall indemnify, save and hold harmless the United States and its officials, agents, employees, contractors, subcontractors, or representatives for or from any and all claims or causes of action arising from, or on account of, negligent or other wrongful acts or omissions of Settling Defendant, its officers, directors, employees, agents, contractors, subcontractors, and any persons acting on its behalf or under its control, in carrying out activities pursuant to this Consent Judgment, including, but not limited to, any claims arising from any designation of Settling Defendant as EPA's authorized representative under Section 104(e) of CERCLA. Further, Settling Defendant agrees to pay the United States all costs it incurs including, but not limited to, attorneys' fees and other expenses of litigation and settlement arising from, or on account of, claims made against the United States based on negligent or other wrongful acts or omissions of Settling Defendant, its officers, directors, employees, agents, contractors, subcontractors, and any persons acting on its behalf or under its control, in carrying out activities pursuant to this Consent Judgment. The United States shall not be held out as a party to any contract entered into by or on behalf of Settling Defendant in carrying out activities pursuant to this Consent Judgment. Neither Settling Defendant nor any such contractor shall be considered an agent of the United States.

b. The United States shall give Settling Defendant notice of any claim for which the United States plans to seek indemnification pursuant to Paragraph 56.a. and shall consult with Settling Defendant prior to settling such claim.

57. Settling Defendant waives all claims against the United States for damages or reimbursement or for set-off of any payments made or to be made to the United States, arising from or on account of any contract, agreement, or arrangement between Settling Defendant and any person for performance of Work on or relating to the Site, including, but not limited to, claims on account of construction delays. In addition, Settling Defendant shall indemnify and hold harmless the United States with respect to any and all claims for damages or reimbursement arising from or on account of any contract, agreement, or arrangement between any one or more of Settling Defendant and any person for performance of Work on or relating to the Site, including, but not limited to, claims on account of construction delays.

58. No later than 15 days before commencing any on-Site Work, Settling Defendant shall secure, and shall maintain, comprehensive general liability insurance with limits of ten million dollars ($10,000,000.00), combined single limit, and automobile liability insurance with limits of ten million dollars ($10,000,000.00), combined single limit, naming the United States as an additional insured. In addition, for the duration of this Consent Judgment, Settling Defendant shall satisfy, or shall ensure that its contractors or subcontractors satisfy, all applicable laws and regulations regarding the provision of worker's compensation insurance for all persons performing the Work on behalf of Settling Defendant in furtherance of this Consent Judgment. Prior to commencement of the Work under this Consent Judgment, Settling Defendant shall provide to EPA certificates of such insurance and a copy of each insurance policy. Settling Defendant shall resubmit such certificates and copies of policies each year on the anniversary of the Effective Date. If Settling Defendant demonstrates by evidence satisfactory to EPA that any contractor or subcontractor maintains insurance equivalent to that described above, or insurance covering the same risks but in a lesser amount, then, with respect to that contractor or subcontractor, Settling Defendant need provide only that portion of the insurance described above which is not maintained by the contractor or subcontractor. Settling Defendant shall ensure that all submittals to EPA under this Paragraph identify the Fulton Avenue Superfund Site, Nassau County, New York and Civil Action No. 09-3917.

XVIII. FORCE MAJEURE

59. "Force majeure," for purposes of this Consent Judgment, is defined as any event arising from causes beyond the control of Settling Defendant, of any entity controlled by Settling Defendant, or of Settling Defendant's contractors, that delays or prevents the performance of any obligation under this Consent Judgment despite Settling Defendant's best efforts to fulfill the obligation. The requirement that Settling Defendant exercise "best efforts to fulfill the obligation" includes using best efforts to anticipate any potential force majeure event and best efforts to address the effects of any potential force majeure event (1) as it is occurring and (2) following the potential force majeure event, such that the delay is minimized to the greatest extent possible. "Force Majeure" does not include financial inability to complete the Work or a failure to attain the Performance Standards.

60. If any event occurs or has occurred that may delay the performance of any obligation under this Consent Judgment, whether or not caused by a force majeure event, Settling Defendant shall notify orally EPA's Project Coordinator or, in his or her absence, EPA's Alternate Project Coordinator or, in the event both of EPA's designated representatives are unavailable, the Director of the Emergency and Remedial Response Division, EPA Region 2, within 48 hours of when Settling Defendant first knew that the event might cause a delay. Within five days thereafter, Settling Defendant shall provide in writing to EPA an explanation and description of the reasons for the delay; the anticipated duration of the delay; all actions taken or to be taken to prevent or minimize the delay; a schedule for implementation of any measures to be taken to prevent or mitigate the delay or the effect of the delay; Settling Defendant's rationale for attributing such delay to a force majeure event if it intends to assert such a claim; and a statement as to whether, in the opinion of Settling Defendant, such event may cause or contribute to an endangerment to public health, welfare or the environment. Settling

Defendant shall include with any notice all available documentation supporting its claim that the delay was attributable to a force majeure. Failure to comply with the above requirements shall preclude Settling Defendant from asserting any claim of force majeure for that event for the period of time of such failure to comply, and for any additional delay caused by such failure. Settling Defendant shall be deemed to know of any circumstance of which Settling Defendant, any entity controlled by Settling Defendant, or Settling Defendant's contractors knew or should have known.

61. If EPA agrees that the delay or anticipated delay is attributable to a force majeure event, the time for performance of the obligations under this Consent Judgment that are affected by the force majeure event will be extended by EPA for such time as is necessary to complete those obligations. An extension of the time for performance of the obligations affected by the force majeure event shall not, of itself, extend the time for performance of any other obligation. If EPA does not agree that the delay or anticipated delay has been or will be caused by a force majeure event, EPA will notify Settling Defendant in writing of its decision. If EPA agrees that the delay is attributable to a force majeure event, EPA will notify Settling Defendant in writing of the length of the extension, if any, for performance of the obligations affected by the force majeure event.

62. If Settling Defendant elects to invoke the dispute resolution procedures set forth in Section XIX (Dispute Resolution) as to the force majeure event, it shall do so no later than fifteen (15) days after receipt of EPA's notice. In any such proceeding, Settling Defendant shall have the burden of demonstrating by a preponderance of the evidence that the delay or anticipated delay has been or will be caused by a force majeure event, that the duration of the delay or the extension sought was or will be warranted under the circumstances, that best efforts were exercised to avoid and mitigate the effects of the delay, and that Settling Defendant complied with the requirements of Paragraphs 57 and 58, above. If Settling Defendant carries this burden, the delay at issue shall be deemed not to be a violation by Settling Defendant of the affected obligation of this Consent Judgment identified to EPA and the Court.

XIX. DISPUTE RESOLUTION

63. Unless otherwise expressly provided for in this Consent Judgment, the dispute resolution procedures of this Section shall be the exclusive mechanism to resolve disputes arising under or with respect to this Consent Judgment. However, the procedures set forth in this Section shall not apply to actions by the United States to enforce obligations of Settling Defendant that have not been disputed in accordance with this Section.

64. Any dispute which arises under or with respect to this Consent Judgment shall in the first instance be the subject of informal negotiations between the Parties to the dispute. The period for informal negotiations shall not exceed 20 days from the time the dispute arises, unless it is modified by written agreement of the Parties to the dispute. The dispute shall be considered to have arisen when one party sends the other party a written Notice of Dispute.

65. Statements of Position

a. In the event that the Parties cannot resolve a dispute by informal

negotiations under the preceding Paragraph, then the position advanced by EPA shall be considered binding unless, within 10 days after the conclusion of the informal negotiation period, Settling Defendant invokes the formal dispute resolution procedures of this Section by serving on the United States a written Statement of Position on the matter in dispute, including, but not limited to, any factual data, analysis or opinion supporting that position and any supporting documentation relied upon by Settling Defendant. The Statement of Position shall specify Settling Defendant's position as to whether formal dispute resolution should proceed under Paragraph 66 or 67.

b. Within 14 days after receipt of Settling Defendant's Statement of Position, EPA will serve on Settling Defendant its Statement of Position, including, but not limited to, any factual data, analysis, or opinion supporting that position and all supporting documentation relied upon by EPA. EPA's Statement of Position shall include a statement as to whether formal dispute resolution should proceed under Paragraph 66 or 67. Within 14 days after receipt of EPA's Statement of Position, Settling Defendant may submit a Reply.

c. If there is disagreement between EPA and Settling Defendant as to whether dispute resolution should proceed under Paragraph 66 or 67, the parties to the dispute shall follow the procedures set forth in the paragraph determined by EPA to be applicable. However, if Settling Defendant ultimately appeals to the Court to resolve the dispute, the Court shall determine which paragraph is applicable in accordance with the standards of applicability set forth in Paragraphs 66 or 67.

66. Formal dispute resolution for disputes pertaining to the selection or adequacy of any response action and all other disputes that are accorded review on the administrative record under applicable principles of administrative law shall be conducted pursuant to the procedures set forth in this Paragraph. For purposes of this Paragraph, the adequacy of any response action includes, without limitation: (1) the adequacy or appropriateness of plans, procedures to implement plans, or any other items requiring approval by EPA under this Consent Judgment; and (2) the adequacy of the performance of response actions taken pursuant to this Consent Judgment. Nothing in this Consent Judgment shall be construed to allow any dispute by Settling Defendant regarding the validity of the Amended OU1 ROD's provisions.

a. An administrative record of the dispute shall be maintained by EPA and shall contain all statements of position, including supporting documentation, submitted pursuant to this Section. Where appropriate, EPA may allow submission of supplemental statements of position by the parties to the dispute.

b. The Director of the Emergency and Remedial Response Division, EPA Region 2, will issue a final administrative decision resolving the dispute based on the administrative record described in Paragraph 64.a. This decision shall be binding upon Settling Defendant, subject only to the right to seek judicial review pursuant to Paragraphs 66.c. and 66.d.

c. Any administrative decision made by EPA pursuant to Paragraph 66.b. shall be reviewable by this Court, provided that a motion for judicial review of the decision is filed by Settling Defendant with the Court and served on the United States within 10 days of receipt of EPA's decision. The motion shall include a description of the matter in dispute, the efforts made by the Parties to resolve it, the relief requested, and the schedule, if any, within

which the dispute must be resolved to ensure orderly implementation of this Consent Judgment. The United States may file a response to Settling Defendant's motion.

d. In proceedings on any dispute governed by this Paragraph, Settling Defendant shall have the burden of demonstrating that the decision of the Emergency and Remedial Response Division Director is arbitrary and capricious or otherwise not in accordance with law. Judicial review of EPA's decision shall be on the administrative record compiled pursuant to Paragraph 64.a.

67. Formal dispute resolution for disputes that neither pertain to the selection or adequacy of any response action nor are otherwise accorded review on the administrative record under applicable principles of administrative law, shall be governed by this Paragraph.

a. Following receipt of Settling Defendant's Statement of Position submitted pursuant to Paragraph 65, the Director of the Emergency and Remedial Response Division, EPA Region 2, will issue a final decision resolving the dispute. The Emergency and Remedial Response Division Director's decision shall be binding on Settling Defendant unless, within 10 days of receipt of the decision, Settling Defendant files with the Court and serves on the United States a motion for judicial review of the decision setting forth the matter in dispute, the efforts made by the Parties to resolve it, the relief requested, and the schedule, if any, within which the dispute must be resolved to ensure orderly implementation of the Consent Judgment. The United States may file a response to Settling Defendant's motion.

b. Notwithstanding Paragraph X of Section I (Background) of this Consent Judgment, judicial review of any dispute governed by this Paragraph shall be governed by applicable principles of law.

68. The invocation of formal dispute resolution procedures under this Section shall not extend, postpone or affect in any way any obligation of Settling Defendant under this Consent Judgment, not directly in dispute, unless EPA or the Court agrees otherwise. Stipulated penalties with respect to the disputed matter shall continue to accrue but payment shall be stayed pending resolution of the dispute as provided in Paragraph 75. Notwithstanding the stay of payment, stipulated penalties shall accrue from the first day of noncompliance with any applicable provision of this Consent Judgment. In the event that Settling Defendant does not prevail on the disputed issue, stipulated penalties shall be assessed and paid as provided in Section XX (Stipulated Penalties).

XX. STIPULATED PENALTIES

69. Settling Defendant shall be liable for stipulated penalties in the amounts set forth in Paragraphs 70 and 71 to the United States for failure to comply with the requirements of this Consent Judgment specified below, unless excused under Section XVIII (Force Majeure). "Compliance" by Settling Defendant shall include completion of the activities under this Consent Judgment or any work plan or other plan approved under this Consent Judgment identified below in accordance with all applicable requirements of law, this Consent Judgment, the SOW, and any plans or other documents approved by EPA pursuant to this Consent Judgment and within the specified time schedules established by and approved under this Consent Judgment.

70. Stipulated Penalty Amounts - First Tier

a. The following stipulated penalties shall accrue per violation per day for any noncompliance identified in subparagraph b. of this Paragraph:

Penalty Per Violation Per Day	Period of Noncompliance
$ 2,500	1st through 14th day
$ 7,500	15th through 30th day
$10,000	31st day and beyond

b. Compliance Milestones

(1) submission and, if necessary, revision and resubmission of any plan, report, or other deliverable required by Section VI (Performance of the Work by Settling Defendant) or by the SOW or by any plan which is prepared pursuant to Section VI or the SOW and approved by EPA;

(2) any deadline imposed by the SOW or by any plan which is prepared pursuant to Section VI or the SOW and approved by EPA;

(3) obligations imposed by Section XV (Emergency Response);

(4) obligations imposed by Section IX (Access and Institutional Controls);

(5) performance of pre-remedial design activities and preparation of the OU1 Remedial Design in accordance with the Amended OU1 ROD, the SOW, and this Consent Judgment;

(6) implementation of the OU1 Remedial Action in accordance with the Amended OU1 ROD, the SOW, and this Consent Judgment;

(7) modification of the SOW or related work plans pursuant to Paragraph 13, and implementation of the work called for by such modifications in accordance with the modified SOW or work plans;

(8) implementation of O&M, including post-remediation monitoring in accordance with the Amended OU1 ROD and this Consent Judgment;

(9) performance of studies and investigations pursuant to Section VII (Remedy Review).

71. Stipulated Penalty Amounts - Second Tier

a. The following stipulated penalties shall accrue per violation per day for any noncompliance with the requirements identified in subparagraph b. of this Paragraph:

Penalty Per Violation Per Day	Period of Noncompliance
$ 1,000	1st through 14th day
$ 3,000	15th through 30th day
$ 5,000	31st day and beyond

b. Compliance Milestones

(1) permitting split or duplicate samples, quality assurance, and other requirements pursuant to Section VIII (Quality Assurance, Sampling, and Data Analysis);

(2) designation of Settling Defendant's Project Coordinator as required by Section XII (Project Coordinators);

(3) obligations imposed by Section XIII (Performance Guarantee);

(4) timely submission and, if necessary, revision and resubmission of the name, title and qualifications of the proposed Supervising Contractor pursuant to Section VI (Performance of Work by Settling Defendant);

(5) certification of completion requirements set forth in Section XIV (Certification of Completion), including both the requirement to make the certification and the requirement that the certification be truthful;

(6) timely notification regarding any delay or anticipated delay, consistent with Paragraph 60;

(7) indemnification and insurance requirements set forth in Section XVII (Indemnification and Insurance);

(8) reporting requirements set forth in Section X (Reporting Requirements);

(9) timely submission of written notification of any off-Site shipment of Waste Material from the Site to an out-of-state waste management facility pursuant to Paragraph 16;

(10) submission of documents and other information in accordance with Section XXIV (Access to Information);

(11) payments required by Section XVI (Payments for Response Costs); and

(12) any other requirement of this Consent Judgment that applies to

Settling Defendant and that is not identified in Paragraphs 70.b. and 69.b.

72. In the event that EPA assumes performance of a portion or all of the Work pursuant to Paragraph 83 (Work Takeover) of Section XXI, Settling Defendant shall be liable for a stipulated penalty in the amount of one million dollars ($1,000,000.00).

73. All penalties shall begin to accrue on the day after the complete performance is due or the day a violation occurs, and shall continue to accrue through the final day of the correction of the noncompliance or completion of the activity. However, stipulated penalties shall not accrue: (1) with respect to a deficient submission under Section XI (EPA Approval of Plans and Other Submissions), during the period, if any, beginning on the 31st day after EPA's receipt of such submission until the date that EPA notifies Settling Defendant of any deficiency; (2) with respect to a decision by the Director of the Emergency and Remedial Response Division, EPA Region 2, under Paragraph 66.b. or 67.a. of Section XIX (Dispute Resolution), during the period, if any, beginning on the 21st day after the date that Settling Defendant's reply to EPA's Statement of Position is received until the date that the Director issues a final decision regarding such dispute; or (3) with respect to judicial review by this Court of any dispute under Section XIX (Dispute Resolution), during the period, if any, beginning on the 31st day after the Court's receipt of the final submission regarding the dispute until the date that the Court issues a final decision regarding such dispute. Nothing herein shall prevent the simultaneous accrual of separate penalties for separate violations of this Consent Judgment.

74. Following EPA's determination that Settling Defendant has failed to comply with a requirement of this Consent Judgment, EPA may give Settling Defendant written notification of the same and describe the noncompliance. EPA may send Settling Defendant a written demand for the payment of the penalties. However, penalties shall accrue as provided in the preceding Paragraph regardless of whether EPA has notified Settling Defendant of a violation.

75. All penalties accruing under this Section shall be due and payable to the United States within 30 days of Settling Defendant's receipt from EPA of a demand for payment of the penalties, unless Settling Defendant invokes the Dispute Resolution procedures under Section XIX (Dispute Resolution). All payments to the United States under this Section shall be made by EFT, consistent with the payment procedures set forth in Paragraph 53, above. Settling Defendant shall send a letter to the United States within one (1) week of the EFT, which references the date of the EFT; the payment amount and that the payment is for stipulated penalties; the name of the Site; the case number; and Settling Defendant's name and address. Such letter shall be sent to the United States and EPA as provided in Section XXVI (Notices and Submissions).

76. The payment of penalties shall not alter in any way Settling Defendant's obligation to complete the performance of the Work required under this Consent Judgment.

77. Penalties shall continue to accrue as provided in Paragraph 73 during any dispute resolution period, but need not be paid until the following:

a. If the dispute is resolved by agreement or by a decision of EPA that is not appealed to this Court, accrued penalties determined to be owing shall be paid to EPA within 15 days of the agreement or the receipt of EPA's decision or order;

b. If the dispute is appealed to this Court and the United States prevails in whole or in part, Settling Defendant shall pay all accrued penalties determined by the Court to be owed to EPA within 60 days of receipt of the Court's decision or order, except as provided in subparagraph c., below;

c. If the District Court's decision is appealed by any Party, Settling Defendant shall pay all accrued penalties determined by the District Court to be owing to the United States into an interest-bearing escrow account within 60 days of receipt of the Court's decision or order. Penalties shall be paid into this account as they continue to accrue, at least every 60 days. Within 15 days of receipt of the final appellate court decision, the escrow agent shall pay the balance of the account to EPA or to Settling Defendant to the extent that it prevails.

78. If Settling Defendant fails to pay stipulated penalties when due, the United States may institute proceedings to collect the penalties, as well as Interest. Settling Defendant shall pay Interest on the unpaid balance, which shall begin to accrue on the date of demand made pursuant to Paragraph 75.

79. Nothing in this Consent Judgment shall be construed as prohibiting, altering, or in any way limiting the ability of the United States to seek any other remedies or sanctions available by virtue of Settling Defendant's violation of this Consent Judgment or of the statutes and regulations upon which it is based, including, but not limited to, penalties pursuant to Section 122(l) of CERCLA, provided, however, that the United States shall not seek civil penalties pursuant to Section 122(l) of CERCLA for any violation for which a stipulated penalty is provided herein, except in the case of a willful violation of the Consent Judgment.

80. Notwithstanding any other provision of this Section, the United States may, in its unreviewable discretion, waive any portion of stipulated penalties that have accrued pursuant to this Consent Judgment.

XXI. COVENANTS NOT TO SUE BY PLAINTIFF

81. In consideration of the actions that will be performed and the payments that will be made by Settling Defendant under the terms of the Consent Judgment, and except as specifically provided in Paragraph 82 of this Section, the United States covenants not to sue or to take administrative action against Settling Defendant pursuant to Sections 106 and 107(a) of CERCLA for performance of the Work and for recovery of Future Response Costs. These covenants not to sue shall take effect upon the Effective Date. These covenants not to sue are conditioned upon the satisfactory performance by Settling Defendant of its obligations under this Consent Judgment. These covenants not to sue extend only to Settling Defendant and do not extend to any other person.

82. General reservations of rights. The United States reserves, and this Consent Judgment is without prejudice to, all rights against Settling Defendant with respect to all matters not expressly included within Plaintiff's covenant not to sue. Notwithstanding any other provision of this Consent Judgment, the United States reserves all rights against Settling Defendant with respect to:

a. claims based on a failure by Settling Defendant to meet a requirement of this Consent Judgment;

b. liability arising from the past, present, or future disposal, release, or threat of release of Waste Material outside of the Site;

c. liability based upon Settling Defendant's ownership or operation of the Site, or upon Settling Defendant's transportation, treatment, storage, or disposal, or the arrangement for the transportation, treatment, storage, or disposal of Waste Material at or in connection with the Site, other than the Work or as otherwise ordered by EPA, after signature of this Consent Judgment by Settling Defendant;

d. liability for damages for injury to, destruction of, or loss of natural resources, and for the costs of any natural resource damage assessments;

e. criminal liability;

f. liability for violations of federal or state law which occur during or after implementation of the OU1 Remedial Action;

g. liability, prior to Certification of Completion of the OU1 Remedial Action, for additional response actions that EPA determines are necessary to achieve Performance Standards, but that cannot be required pursuant to Paragraph 13 (Modification of the SOW or Related Work Plans);

h. liability for additional operable units at the Site or the final response action;

i. liability for response costs, including, but not limited to, direct and indirect costs, that the United States incurred at or in connection with the Site through February 29, 2008, plus Interest on all such costs that has accrued pursuant to 42 U.S.C. § 9607(a) through such date;

j. liability for costs that the United States will incur related to the Site but are not within the definition of Future Response Costs; or

k. liability for costs incurred or to be incurred by the Agency for Toxic Substances and Disease Registry related to the Site.

83. Work Takeover

a. In the event EPA determines that Settling Defendant had (i) ceased implementation of any portion of the Work, or (ii) is seriously or repeatedly deficient or late in its performance of the Work, or (iii) is implementing the Work in a manner which may cause an endangerment to human health or the environment, EPA may issue a written notice ("Work Takeover Notice") to Settling Defendant. Any Work Takeover Notice issued by EPA will specify the grounds upon which such notice was issued and will provide Settling Defendant a period of ten days within which to remedy the circumstances giving rise to EPA's issuance of such notice.

b. If, after expiration of the ten-day notice period specified in Paragraph

83.a., Settling Defendant has not remedied to EPA's satisfaction the circumstances giving rise to EPA's issuance of the relevant Work Takeover Notice, EPA may at any time thereafter assume the performance of all or any portions of the Work as EPA deems necessary ("Work Takeover"). EPA shall notify Settling Defendant in writing (which writing may be electronic) if EPA determines that implementation of a Work Takeover is warranted under this Paragraph 83.b.

c. Settling Defendant may invoke the procedures set forth in Section XIX (Dispute Resolution), Paragraph 66, to dispute EPA's implementation of a Work Takeover under Paragraph 81.b. However, notwithstanding Settling Defendant's invocation of such dispute resolution procedures, and during the pendency of any such dispute, EPA may in its sole discretion commence and continue a Work Takeover under Paragraph 81.b. until the earlier of (i) the date that Settling Defendant remedies, to EPA's satisfaction, the circumstances giving rise to EPA's issuance of the relevant Work Takeover Notice or (ii) the date that a final decision is rendered in accordance with Section XIX (Dispute Resolution), Paragraph 64, requiring EPA to terminate such Work Takeover.

d. After commencement and for the duration of any Work Takeover, EPA shall have immediate access to and benefit of any Performance Guarantee(s) provided pursuant to Section XIII of this Consent Judgment, in accordance with the provisions of Paragraph 48 of that Section. If and to the extent that EPA is unable to secure the resources guaranteed under any such Performance Guarantee(s) and Settling Defendant fails to remit a cash amount up to but not exceeding the estimated cost of the remaining Work to be performed, all in accordance with the provisions of Paragraph 48, any unreimbursed costs incurred by EPA in performing Work under the Work Takeover shall be considered Future Response Costs that Settling Defendant shall pay pursuant to Section XVI (Payments for Response Costs).

84. Notwithstanding any other provision of this Consent Judgment, the United States retains all authority and reserves all rights to take any and all response actions authorized by law.

XXII. COVENANTS BY SETTLING DEFENDANT

85. Covenant Not to Sue. Subject to the reservations in Paragraph 86, Settling Defendant hereby covenants not to sue and agrees not to assert any claims or causes of action against the United States with respect to the Work, past response actions, and past and Future Response Costs as defined herein or this Consent Judgment, including, but not limited to:

a. any direct or indirect claim for reimbursement from the Hazardous Substance Superfund (established pursuant to the Internal Revenue Code, 26 U.S.C. § 9507) through CERCLA Sections 106(b)(2), 107, 111, 112, 113 or any other provision of law;

b. any claims against the United States, including any department, agency or instrumentality of the United States under CERCLA Sections 107 or 113 related to the Site; or

c. any claims arising out of response actions at or in connection with the Site, including any claim under the United States Constitution, the Tucker Act, 28 U.S.C. § 1491, the Equal Access to Justice Act, 28 U.S.C. § 2412, as amended, or at common law.

Except as provided in Paragraph 88 (Waiver of Claims Against *De Micromis* Parties) and Paragraph 93 (waiver of Claim-Splitting Defenses), these covenants not to sue shall not apply in the event that the United States brings a cause of action or issues an order pursuant to the reservations set forth in Paragraphs 80.b.-d. or 80.g.-k., but only to the extent that Settling Defendant's claims arise from the same response action, response costs, or damages that the United States is seeking pursuant to the applicable reservation.

86. Settling Defendant reserves, and this Consent Judgment is without prejudice to, claims against the United States, subject to the provisions of Chapter 171 of Title 28 of the United States Code, for money damages for injury or loss of property or personal injury or death caused by the negligent or wrongful act or omission of any employee of the United States while acting within the scope of his office or employment under circumstances where the United States, if a private person, would be liable to the claimant in accordance with the law of the place where the act or omission occurred. However, any such claim shall not include a claim for any damages caused, in whole or in part, by the act or omission of any person, including any contractor, who is not a federal employee as that term is defined in 28 U.S.C. § 2671; nor shall any such claim include a claim based on EPA's selection of response actions, or the oversight or approval of Settling Defendant's plans or activities. The foregoing applies only to claims which are brought pursuant to any statute other than CERCLA and for which the waiver of sovereign immunity is found in a statute other than CERCLA.

87. Nothing in this Consent Judgment shall be deemed to constitute preauthorization of a claim within the meaning of Section 111 of CERCLA, 42 U.S.C. § 9611, or 40 C.F.R. § 300.700(d).

88. Settling Defendant agrees not to assert any claims and to waive all claims or causes of action that it may have for all matters relating to the Site, including but not limited to, claims or causes of action under Sections 107(a)(4)(B) and 113(f) of CERCLA, against any person where the person's liability to Settling Defendant with respect to the Site is based solely on having arranged for disposal or treatment, or for transport for disposal or treatment, of hazardous substances at the Site, or having accepted for transport for disposal or treatment of hazardous substances at the Site, if:

a. the materials contributed by such person to the Site containing hazardous substances did not exceed the greater of: (i) 0.002% of the total volume of waste at the Site; or (ii) 110 gallons of liquid materials or 200 pounds of solid materials.

b. This waiver shall not apply to any claim or cause of action against any person meeting the above criteria if EPA has determined that the materials contributed to the Site by such person contributed or could contribute significantly to the costs of response at the Site. This waiver also shall not apply with respect to any defense, claim, or cause of action that Settling Defendant may have against any person if such person asserts a claim or cause of action relating to the Site against Settling Defendant.

XXIII. EFFECT OF SETTLEMENT; CONTRIBUTION PROTECTION

89. Except as provided in Paragraph 86 (Waiver of Claims Against *De Micromis*

Parties), nothing in this Consent Judgment shall be construed to create any rights in, or grant any cause of action to, any person not a Party to this Consent Judgment. The preceding sentence shall not be construed to waive or nullify any rights that any person not a signatory to this Consent Judgment may have under applicable law. Each of the Parties expressly reserves any and all rights (including, but not limited to, any right to contribution), defenses, claims, demands, and causes of action which each Party may have with respect to any matter, transaction, or occurrence relating in any way to the Site against any person not a Party hereto.

90. The Parties agree, and by entering this Consent Judgment this Court finds, that Settling Defendant is entitled, as of the Effective Date, to protection from contribution actions or claims as provided by CERCLA Section 113(f)(2), 42 U.S.C. § 9613(f)(2) for matters addressed in this Consent Judgment. For purposes of the preceding sentence, the "matters addressed" in this Consent Judgment are Future Response Costs, and the Work as defined herein.

91. Settling Defendant agrees that with respect to any suit or claim for contribution brought by it for matters related to this Consent Judgment it will notify the United States in writing no later than 60 days prior to the initiation of such suit or claim.

92. Settling Defendant also agrees that with respect to any suit or claim for contribution brought against it for matters related to this Consent Judgment it will notify in writing the United States within ten days of service of the complaint on it. In addition, Settling Defendant shall notify the United States within ten days of service or receipt of any Motion for Summary Judgment and within ten days of receipt of any order from a court setting a case for trial.

93. In any subsequent administrative or judicial proceeding initiated by the United States for injunctive relief, recovery of response costs, or other appropriate relief relating to the Site, Settling Defendant shall not assert, and may not maintain, any defense or claim based upon the principles of waiver, res judicata, collateral estoppel, issue preclusion, claim-splitting, or other defenses based upon any contention that the claims raised by the United States in the subsequent proceeding were or should have been brought in the instant case; provided, however, that nothing in this Paragraph affects the enforceability of the covenants not to sue set forth in Section XXI (Covenants Not to Sue by Plaintiff).

XXIV. ACCESS TO INFORMATION

94. Settling Defendant shall provide to EPA, upon request, copies of all documents and information within its possession or control or that of its contractors or agents relating to activities at the Site or to the implementation of this Consent Judgment, including, but not limited to, sampling, analysis, chain of custody records, manifests, trucking logs, receipts, reports, sample traffic routing, correspondence, or other documents or information related to the Work. Settling Defendant shall also make available to EPA, for purposes of investigation, information gathering, or testimony, its employees, agents, or representatives with knowledge of relevant facts concerning the performance of the Work.

95. Business Confidential and Privileged Documents

a. Settling Defendant may assert business confidentiality claims covering part or all of the documents or information submitted to Plaintiff under this Consent Judgment to the extent permitted by and in accordance with Section 104(e)(7) of CERCLA, 42 U.S.C. § 9604(e)(7), and 40 C.F.R. § 2.203(b). Documents or information determined to be confidential by EPA will be afforded the protection specified in 40 C.F.R. Part 2, Subpart B. If no claim of confidentiality accompanies documents or information when they are submitted to EPA, or if EPA has notified Settling Defendant that the documents or information are not confidential under the standards of Section 104(e)(7) of CERCLA or 40 C.F.R. Part 2, Subpart B, the public may be given access to such documents or information without further notice to Settling Defendant.

b. Settling Defendant may assert that certain documents, records and other information are privileged under the attorney-client privilege or any other privilege recognized by federal law. If Settling Defendant asserts such a privilege in lieu of providing documents, it shall provide Plaintiff with the following: (1) the title of the document, record, or information; (2) the date of the document, record, or information; (3) the name and title of the author of the document, record, or information; (4) the name and title of each addressee and recipient; (5) a description of the contents of the document, record, or information: and (6) the privilege asserted by Settling Defendant. However, no documents, reports or other information created or generated pursuant to the requirements of the Consent Judgment shall be withheld on the grounds that they are privileged.

96. No claim of confidentiality shall be made with respect to any data, including, but not limited to, all sampling, analytical, monitoring, hydrogeologic, scientific, chemical, or engineering data, or any other documents or information evidencing conditions at or around the Site.

XXV. RETENTION OF RECORDS

97. Until 10 years after Settling Defendant's receipt of EPA's notification pursuant to Paragraph 50.b. of Section XIV (Certification of Completion of the Work), Settling Defendant shall preserve and retain all non-identical copies of records and documents (including records or documents in electronic form) now in its possession or control or which come into its possession or control that relate in any manner to its liability under CERCLA with respect to the Site, including all documents and records that relate to the liability of any other person under CERCLA with respect to the Site. Settling Defendant must also retain, and instruct its contractors and agents to preserve, for the same period of time specified above all non-identical copies of the last draft or final version of any documents or records (including documents or records in electronic form) now in its possession or control or which come into its possession or control that relate in any manner to the performance of the Work, provided, however, that Settling Defendant (and its contractors and agents) must retain, in addition, copies of all data generated during the performance of the Work and not contained in the aforementioned documents required to be retained. Each of the above record retention requirements shall apply regardless of any corporate retention policy to the contrary.

98. At the conclusion of this document retention period, Settling Defendant shall notify the United States at least 90 days prior to the destruction of any such records or documents, and, upon request by the United States, Settling Defendant shall deliver any such records or documents to EPA. Settling Defendant may assert that certain documents, records and other information are privileged under the attorney-client privilege or any other privilege recognized by federal law. If Settling Defendant asserts such a privilege, it shall provide Plaintiff with the following: (1) the title of the document, record, or information; (2) the date of the document, record, or information; (3) the name and title of the author of the document, record, or information; (4) the name and title of each addressee and recipient; (5) a description of the subject of the document, record, or information; and (6) the privilege asserted by Settling Defendant. However, no documents, reports or other information created or generated pursuant to the requirements of the Consent Judgment shall be withheld on the grounds that they are privileged.

99. Settling Defendant hereby certifies that, to the best of its knowledge and belief, after thorough inquiry, it has not altered, mutilated, discarded, destroyed or otherwise disposed of any records, documents or other information (other than identical copies) relating to its potential liability regarding the Site since notification of potential liability by the United States or the State or the filing of suit against it regarding the Site and that it has fully complied with any and all EPA requests for information pursuant to Section 104(e) and 122(e) of CERCLA, 42 U.S.C. §§ 9604(e) and 9622(e), and Section 3007 of RCRA, 42 U.S.C. § 6927.

XXVI. NOTICES AND SUBMISSIONS

100. Whenever, under the terms of this Consent Judgment, written notice is required to be given or a report or other document is required to be sent by one Party to another, it shall be directed to the individuals at the addresses specified below, unless those individuals or its successors give notice of a change to the other Parties in writing. All notices and submissions shall be considered effective upon receipt, unless otherwise provided. Written notice as specified herein shall constitute complete satisfaction of any written notice requirement of the Consent Judgment with respect to the United States, EPA, and Settling Defendant, respectively.

As to the United States or EPA:

Chief, Eastern New York Remediation Section
New York Remediation Branch
Emergency and Remedial Response Division\
U.S. Environmental Protection Agency, Region 2
290 Broadway, 20th Floor
New York, N.Y. 10007-1866

Attention: Fulton Avenue Superfund Site Remedial Project Manager

Chief, New York/Caribbean Superfund Branch
Office of Regional Counsel
U.S. Environmental Protection Agency, Region 2
290 Broadway, 17th Floor
New York, N.Y. 10007-1866

Attention: Fulton Avenue Superfund Site Attorney

EES Case Management Unit
U.S. Department of Justice
Environment and Natural Resources Division
P.O. Box 7611
Washington, D.C. 20044-7611
eescdcopy.enrd@usdoj.gov
Re: DJ # 90-11-2-09329

Robert B. Kambic
Assistant United States Attorney
United States Attorney's Office
Eastern District of New York
610 Federal Plaza, 5th Floor
Central Islip, N.Y. 11722-4454
Re: USAO File No. 2008V00178

The original of any Performance Guarantee document submitted pursuant to Section XIII shall be sent to the following address, with copies to the EPA and United States addressees above:

Chief, Resource Management/Cost Recovery Section
Program Support Branch
Emergency and Remedial Response Division
U.S. Environmental Protection Agency, Region 2
290 Broadway, 18th Floor
New York, NY 10007-1866

Notices required under Section XVI. shall also be sent to the following address:

U.S. Environmental Protection Agency
26 W. Martin Luther King Drive
Cincinnati Finance Center, MS: NWD
Cincinnati, Ohio 45268
E-MAIL: AcctsReceivable.CINWD@epa.gov

As to the State:

Steven M. Scharf, P.E, Project Manager
New York State Department of Environmental Conservation
Division of Environmental Remediation
Remedial Action, Bureau A
625 Broadway
Albany, NY 12233-7015

As to Settling Defendant:

Chris Wenczel
ERM Consulting and Engineering
105 Maxess Road, Ste. 316
Melville, N.Y. 11747-3851

Paul A. Alexis, Esq.
Bradley Arant Boult Cummings LLP
Roundabout Plaza
1600 Division Street
Suite 700
Nashville, TN 37203

James J. Periconi, Esq.
Periconi, LLC
260 Madison Avenue, 17th Floor
New York, New York 10016

Roger Sisson, Esq.
Senior Vice President and General Counsel
Genesco Inc.
1415 Murfreesboro Road
Suite 490
Nashville, TN 37217

Thor Y. Urness, Esq.
Bradley Arant Boult Cummings LLP
Roundabout Plaza
1600 Division Street
Suite 700
Nashville, TN 37203

Technical specifications for submissions of sampling and monitoring data and spatial data are addressed in Section IV.A. of the SOW. All other deliverables shall be submitted in an electronic

form acceptable to the EPA Project Coordinator. If any deliverable includes maps, drawings, or other exhibits that are larger than 8.5" by 11", Settling Defendant shall also provide each EPA recipient with one paper copy of each such exhibit.

XXVII. EFFECTIVE DATE

101. The effective date of this Consent Judgment shall be the date upon which this Consent Judgment is entered by the Court, except as otherwise provided herein.

XXVIII. RETENTION OF JURISDICTION

102. This Court retains jurisdiction over both the subject matter of this Consent Judgment and Settling Defendant for the duration of the performance of the terms and provisions of this Consent Judgment for the purpose of enabling either of the Parties to apply to the Court at any time for such further order, direction, and relief as may be necessary or appropriate for the construction or modification of this Consent Judgment, or to effectuate or enforce compliance with its terms, or to resolve disputes in accordance with Section XIX (Dispute Resolution) hereof.

XXIX. APPENDICES

103. The following appendices are attached to and incorporated into this Consent Judgment:

"Appendix A" is the Amended OU1 ROD.

"Appendix B" is the SOW.

"Appendix C" is the description and/or map of the Site.

"Appendix D" is the draft Easement.

XXX. COMMUNITY RELATIONS

104. Settling Defendant shall propose to EPA its participation in the community relations plan to be developed by EPA ("Community Relations Plan"). EPA will determine the appropriate role for Settling Defendant under the Community Relations Plan. Settling Defendant shall also cooperate with EPA in providing information regarding the Work to the public. As requested by EPA, Settling Defendant shall participate in the preparation of such information for dissemination to the public and in public meetings which may be held or sponsored by EPA to explain activities at or relating to the Site.

XXXI. MODIFICATION

105. Schedules specified in this Consent Judgment for completion of the Work may be modified by agreement of EPA and Settling Defendant. All such modifications shall be made in writing.

106. Except as provided in Paragraph 13 (Modification of the SOW or Related Work Plans), no material modifications shall be made to the SOW without written notification to and written approval of the United States, Settling Defendant, and the Court, if such modifications fundamentally alter the basic features of the selected remedy within the meaning of 40 C.F.R. 300.435(c)(2)(B)(ii). Prior to providing its approval to any modification, the United States will provide the State with a reasonable opportunity to review and comment on the proposed modification. Modifications to the SOW that do not materially alter that document, or material modifications to the SOW that do not fundamentally alter the basic features of the selected remedy within the meaning of 40 C.F.R. § 300.435(c)(2)(B)(ii), may be made by written agreement between EPA, after providing the State with a reasonable opportunity to review and comment on the proposed modification, and Settling Defendant.

107. Nothing in this Consent Judgment shall be deemed to alter the Court's power to enforce, supervise or approve modifications to this Consent Judgment.

XXXII. LODGING AND OPPORTUNITY FOR PUBLIC COMMENT

108. This Consent Judgment shall be lodged with the Court for a period of not less than 30 days for public notice and comment in accordance with Section 122(d)(2) of CERCLA, 42 U.S.C.§ 9622(d)(2), and 28 C.F.R. § 50.7. The United States reserves the right to withdraw or withhold its consent if the comments regarding the Consent Judgment disclose facts or considerations which indicate that the Consent Judgment is inappropriate, improper, or inadequate. Settling Defendant consents to the entry of this Consent Judgment without further notice.

109. If for any reason the Court should decline to approve this Consent Judgment in the form presented, this agreement is voidable at the sole discretion of any Party and the terms of the agreement may not be used as evidence in any litigation between the Parties.

XXXIII. SIGNATORIES/SERVICE

110. Each undersigned representative of Settling Defendant and the Assistant Attorney General for the Environment and Natural Resources Division of the Department of Justice certifies that he or she is fully authorized to enter into the terms and conditions of this Consent Judgment and to execute and legally bind such Party to this document.

111. Settling Defendant hereby agrees not to oppose entry of this Consent Judgment by this Court or to challenge any provision of this Consent Judgment unless the United States has notified Settling Defendant in writing that it no longer supports entry of the Consent Judgment.

112. Settling Defendant shall identify, on the attached signature page, the name,

address and telephone number of an agent who is authorized to accept service of process by mail on behalf of Settling Defendant with respect to all matters arising under or relating to this Consent Judgment. Settling Defendant hereby agrees to accept service in that manner and to waive the formal service requirements set forth in Rule 4 of the Federal Rules of Civil Procedure and any applicable local rules of this Court, including, but not limited to, service of a summons.

XXXIV. FINAL JUDGMENT

113. This Consent Judgment and its appendices constitute the final, complete, and exclusive agreement and understanding between the Parties with respect to the settlement embodied in the Consent Judgment. The Parties acknowledge that there are no representations, agreements or understandings relating to the settlement other than those expressly contained in this Consent Judgment.

114. Upon approval and entry of this Consent Judgment by the Court, this Consent Judgment shall constitute a final judgment between and among the United States and Settling Defendant. The Court finds that there is no just reason for delay and therefore enters this judgment as a final judgment under Fed. R. Civ. P. 54 and 58.

SO ORDERED THIS 15th DAY OF August, 2016.

United States District Judge

THE UNDERSIGNED PARTY enters into this Consent Judgment in the matter of *United States v. Genesco Inc.*, relating to the Fulton Avenue Superfund Site.

FOR THE UNITED STATES OF AMERICA

June 21, 2016
Date

ELLEN M. MAHAN
Deputy Section Chief
U.S. Department of Justice
Environment and Natural Resources Division
Environmental Enforcement Section
P.O. Box 7611
Washington, D.C. 20044-7611

ROBERT L. CAPERS
United States Attorney
Eastern District of New York

By:

ROBERT B. KAMBIC
Assistant United States Attorney
United States Attorney's Office
Eastern District of New York
610 Federal Plaza, 5th Fl.
Central Islip, New York 11722-4454

THE UNDERSIGNED PARTY enters into this Consent Judgment in the matter of *United States v. Genesco Inc.*, relating to the Fulton Avenue Superfund Site.

Walter E. Mugdan, Director
Emergency and Remedial Response Division
U.S. Environmental Protection Agency, Region 2
290 Broadway, 19th Floor
New York, New York 10007-1866

THE UNDERSIGNED PARTY enters into this Consent Judgment in the matter of *United States v. Genesco Inc.*, relating to the Fulton Avenue Superfund Site.

FOR GENESCO INC.

6-8-2016
Date

Signature: _____

Roger Sisson
Sr. Vice President and General Counsel
1415 Murfreesboro Road
Suite 490
Nashville, TN 37217

Agent Authorized to Accept Service on Behalf of Above-signed Party:

Roger Sisson
Sr. Vice President and General Counsel
1415 Murfreesboro Road
Suite 490
Nashville, TN 37217
(615) 367-8444

Appendix B

STATEMENT OF WORK
Fulton Ave. Superfund Site, First Operable Unit
Nassau County, New York

I. WORK TO BE PERFORMED

The objectives of the work (hereinafter "Work," as defined in Section IV of the Consent Judgment to which this Statement of Work ("SOW") is attached) to be conducted for the first operable unit ("OU1") interim remedial action ("OU1 Remedial Action") for the Fulton Avenue Superfund site ("Site") are to:

- Minimize and/or eliminate the potential for future human exposure to Site contaminants via contact with contaminated drinking water; and
- Help reduce migration of contaminated groundwater.

The foregoing objectives shall be met through implementation of the OU1 remedy selected in the U.S. Environmental Protection Agency's ("EPA's") OU1 Record of Decision Amendment ("Amended OU1 ROD") for the Site issued on September 30, 2015, attached as Appendix A to the Consent Judgment.

The Village of Garden City ("Village") has been operating treatment systems on Village water supply wells 13 and 14 since 1989. The Village and Settling Defendant have entered into a separate agreement in *Incorporated Village of Garden City v. Genesco Inc. and Gordon Atlantic Corp.*, Civil Action No. 07-cv-5244 (E.D.N.Y.) whereby, in exchange for a lump sum payment, the Village has agreed to operate Village of Garden City water supply wells 13 and 14 for 30 years, regardless of whether those wells are needed for a potable water supply, and to operate, maintain, repair, and replace equipment of, as necessary, the two air strippers on those wells as called for in the Amended OU1 ROD.

The Settling Defendant shall perform or ensure the performance of the Work in accordance with the Consent Judgment, the Amended OU1 ROD, and this SOW, including all terms, conditions and schedules set forth herein or developed and approved

hereunder. The major components of the OU1 Remedial Action that are included within the Work to be implemented pursuant to this Consent Judgment are:[1]

- Continued operation, maintenance and monitoring ("O&M") of the air stripping treatment systems currently installed on Village water supply wells 13 and 14 in order to protect the public from exposure to Site-related volatile organic compounds ("VOCs"), including PCE, in groundwater entering those wells. These treatment systems will be maintained and replaced or upgraded as needed in order to ensure that water distributed to the public from Village water supply wells 13 and 14 complies with applicable or relevant and appropriate requirements ("ARARs"), including maximum contaminant levels ("MCLs") under the federal Safe Drinking Water Act or, if more stringent, New York State drinking water standards at 10 NYCRR Part 5, Subpart 5-1. If needed, a vapor-phase carbon unit will be added to capture and treat VOCs being discharged from the air stripper treatment units. The pumping of Village water supply wells 13 and 14 provides an incidental benefit of helping to reduce the mobility of contaminants in the OU1 portion of the plume. The Amended OU1 ROD assumes the continued operation of Village water supply wells 13 and 14 until those wells no longer are impacted by contaminants above the MCLs for PCE and TCE.

- A monitoring plan that will include groundwater sampling to monitor contaminant levels in groundwater at the Site. The monitoring program will include monitoring of contamination that is entering Village water supply wells 13 and 14, monitoring of groundwater upgradient, sidegradient and downgradient of those wells, and graphic depictions of the results.

- Institutional controls in the form of local laws that restrict future use of groundwater at the Site and limit exposure at the commercial facility located at 150 Fulton Avenue in Garden City Park, New York (the "Fulton Property"), a source of the groundwater contamination at the Site. Specifically, the Nassau County Sanitary Code regulates installation of private potable water supply wells in Nassau County. In addition, the commercial facility at the Fulton Property is zoned for industrial use, and the EPA does not anticipate any changes to the land use in the foreseeable future. If a change in land use at the Fulton Property is proposed, additional investigation of soils may be necessary to determine whether the change in land use could affect exposure risks at the Fulton Property.

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[1] Except as otherwise provided in this SOW, the Amended OU1 ROD elements dealing with vapor intrusion will be conducted by EPA and, pursuant to the Consent Judgment, Settling Defendant will be reimbursing EPA for the costs thereof.

- A site management plan ("SMP") that will provide for the proper management of all OU1 remedy components, including compliance with institutional controls. The SMP will include: (a) O&M of the treatment systems on Village water supply wells 13 and 14 as well as monitoring of Site groundwater upgradient, sidegradient and downgradient of wells 13 and 14; and (b) periodic certifications by the party(ies) implementing the remedy that any institutional and engineering controls are in place and being complied with.

- Evaluation of the need for a vapor-phase carbon unit to capture and treat volatile organic compounds ("VOCs") discharged from the air stripper treatment units in order to comply with the New York State Department of Environmental Conservation's Division of Air Resources DAR-1 ("Air Guide-1") and, if determined by EPA to be needed, the design, installation, operation and maintenance of such a unit.

- A periodic review of Site conditions will be conducted no less often than once every five years because due to the interim nature of the OU1 remedy, performance standards may take longer than five years to achieve.

Because the well 13 and 14 air strippers have already been constructed, the construction activities required for the Work are the installation of monitoring wells and, if needed, the installation of treatment equipment to treat air discharges from the air strippers.

Settling Defendant's design and implementation of elements of the OU1 Remedial Action that have not already been constructed shall be in accordance with EPA Region 2's *Clean and Green Policy* ("Green Strategy"). This policy may be found at http://www.epa.gov/region02/superfund/green_remediation/ policy.html.

II. PERFORMANCE STANDARDS

The OU1 Remedial Action shall be designed and conducted to achieve compliance with the Performance Standards, which shall include and be consistent with the requirements set forth in the Amended OU1 ROD. The Performance Standards for the Remedial Action are:

A. Minimize and/or eliminate potential, current, and future human exposures, including inhalation of vapors and ingestion of groundwater contaminated with volatile organic compounds;

B. Help to reduce further migration of groundwater contaminated with PCE and TCE in the PCE-dominant portion of the groundwater plume; and

C. Compliance with all ARARs as set forth in the Amended OU1 ROD.

III. PROJECT SUPERVISION/MANAGEMENT: SUPERVISING CONTRACTOR AND PROJECT COORDINATOR

Supervising Contractor

The OU1 Remedial Design, OU1 Remedial Action, and any other technical work performed by Settling Defendant pursuant to the Consent Judgment shall meet any and all requirements of applicable federal, state and local laws and be performed under the direction and supervision of a qualified licensed professional engineering firm. All plans and specifications shall be prepared under the supervision of, and signed/certified by, a licensed New York professional engineer. On November 19, 2009, EPA approved Environmental Resources Management, Inc., as Settling Defendant's Supervising Contractor and issued an authorization to proceed. If at any time Settling Defendant proposes to change its Supervising Contractor, Settling Defendant shall, in accordance with Paragraph 10 of the Consent Judgment, give such notice to EPA and must obtain an authorization to proceed from EPA before the new Supervising Contractor performs, directs, or supervises any Work under the Consent Judgment.

Project Coordinator

Settling Defendant's Project Coordinator shall be responsible for the management of all Work to be performed pursuant to the Consent Judgment. The Project Coordinator shall have adequate technical and managerial experience to manage all Work described in this Statement of Work and under the Consent Judgment. The Project Coordinator shall be knowledgeable at all times about all matters relating to activities regarding the OU1 Remedial Design and OU1 Remedial Action. The Project Coordinator shall be the primary contact for EPA on all matters relating to Work at the Site and should be available for EPA to contact during all working days. The Project Coordinator shall not be an attorney. Settling Defendant's Project Coordinator and Alternate Project Coordinator are identified in Paragraph 41 of the Consent Judgment.

IV. AMENDED REMEDIAL DESIGN WORK PLAN

Within sixty (60) days of the Effective Date of the Consent Judgment, Settling Defendant shall submit, for review and approval pursuant to Section XI of the Consent Judgment, an Amended RD Work Plan, which shall be an amended version of Settling Defendant's RD Work Plan that EPA conditionally approved on October 13, 2011. The Amended RD

Work Plan shall provide for the collection of all data needed for performing the necessary OU1 Remedial Design activities.

The Amended RD Work Plan shall comply with CERCLA and relevant EPA guidance, including the EPA document entitled *Guidance on Oversight of Remedial Designs and Remedial Actions performed by Potentially Responsible Parties* (OSWER directive 9355.5-01, EPA/540/g-90-001), dated April 1990 and shall be in conformance, *inter alia*, with the *Superfund Remedial Design and Remedial Action Guidance*, dated June 1986, and other relevant EPA guidance documents.

The Amended RD Work Plan shall include plans and schedules for implementation of OU1 Remedial Design tasks, and shall include, but not be limited to, the following items listed in Paragraphs IV.A.-J., below.

A. Quality Assurance Project Plan

A Quality Assurance Project Plan ("QAPP") shall be prepared consistent with EPA *Requirements for Quality Assurance Project Plans for Environmental Data Operations*, (EPA QA/R-5, March 2001), and *Guidance for Quality Assurance Project Plans*, (EPA QA/G-5, EPA/240/R-02/009, December 2002), and subsequent amendments to such guidelines. The QAPP shall also be consistent with the *Uniform Federal Policy for Implementing Quality Systems* (UFP-QS), EPA-505-F-03-001, March 2005 or newer, *Uniform Federal Policy for Quality Assurance Project Plans* (UFP-QAPP), Parts 1, 2 and 3, EPA-505-B-04-900A, B and C, March 2005 or newer, and other guidance documents referenced in the aforementioned guidance documents. Amended guidelines shall apply only to procedures conducted after such notification. The QAPP shall include the following elements:

1. A detailed description of the sampling, analysis, and monitoring that shall be performed during the remedial design phase, consistent with this SOW, the Amended OU1 ROD, and the Consent Judgment.

2. All sampling, analysis, data assessment, and monitoring shall be performed in accordance with the guidance provided on EPA Region 2 Quality Assurance Homepage (https://www.epa.gov/quality/managing-quality-environmental-data-epa-region-2) or an alternate EPA- approved test method, and any updates thereto and the guidelines set forth in the Consent

Judgment. All testing methods and procedures shall be fully documented and referenced to current and established methods or standards.

3. The QAPP shall also specifically include the following items:

   a. An explanation of the way(s) the sampling, analysis, and monitoring will produce data for the remedial design phase;

   b. A detailed description of the sampling, analysis, and testing to be performed, including sampling methods, analytical and testing methods, sampling locations and frequency of sampling;

   c. A map depicting sampling locations; and

   d. A schedule for performance of specific tasks.

4. In the event that additional sampling locations and analyses are utilized or required, Settling Defendant shall submit to EPA an addendum to the QAPP for approval by EPA.

5. In order to provide quality assurance and maintain quality control with respect to all samples to be collected, Settling Defendant shall ensure the following:

   a. Quality assurance and chain-of-custody procedures shall be performed in accordance with standard EPA protocol and guidance, as provided in the Region 2 Quality Assurance Homepage referred to above, and the guidelines as set forth in the Consent Judgment.

   b. The laboratory to be used must be specified. Any laboratory certified for the analytic service to be provided by one of the following accreditation/certification programs: USEPA Contract Laboratory Program ("CLP"), National Environmental Laboratory Accreditation Program ("NELAP"), American Association for Laboratory Accreditation ("A2LA"), or a certification issued by a program conducted (or approved) by a state, and acceptable to EPA, will not require project-specific Performance Evaluation ("PE") samples, as these certifications require

PE samples on a quarterly basis. For EPA to approve use of a laboratory that does not participate in any of the certification programs listed above for the analyses required, PE samples must be analyzed to demonstrate the capability to conduct the required analysis. Once a noncertified laboratory demonstrates capability by analyzing PE samples, the laboratory should submit a copy of its Laboratory Quality Assurance Program Plan to EPA for review and approval.

c. Laboratories utilized for analyses of samples must perform all analyses according to accepted EPA methods as documented in the *Contract Lab Program Statement of Work for Organic Analysis* (OLM04.3) or the latest revision, and the *Contract Lab Program Statement of Work for Inorganic Analysis* (ILM05.3) or the latest revision, or other EPA approved methods. Information on the Superfund Analytical Services/Contract Laboratory Program is available at: https://www.epa.gov/clp

d. Unless indicated otherwise in the approved QAPP, all data will be validated upon receipt from the laboratory.

e. Unless indicated otherwise in the approved QAPP, submission of the validation package (checklist, report, and Form 1 containing the final data) to EPA, prepared in accordance with the provisions of subparagraph f., below.

f. Assurance that all analytical data that are validated as required by the QAPP are validated according to the procedures stated in the *EPA Region II Contract Lab Program Organics Data Review and Preliminary Review* (SOP #HW-6, Revision 12), dated March 2001, or the latest revision, and the *Evaluation of Metals Data for the Contract Laboratory Program* (SOP #HW-2, Revision 11), dated January 1992 or the latest revision, or EPA-approved equivalent procedures. Unless indicated otherwise in the approved QAPP, Settling Defendant shall require deliverables equivalent to CLP data packages from the laboratory for analytical data. Upon EPA's request, Settling Defendant shall submit to EPA the full

documentation (including raw data) for this analytical data. EPA reserves the right to perform an independent data validation, data validation check, or qualification check on generated data.

g. Settling Defendant shall insert a provision in its contract(s) with all laboratories utilized for analyses of samples, which will require granting of access to EPA personnel and authorized representatives of EPA for the purpose of ensuring the accuracy of laboratory results related to the Site.

h. Upon request, Settling Defendant shall allow split or duplicate samples to be taken by EPA and the State or their authorized representatives. Settling Defendant shall notify EPA not less than twenty-eight (28) days in advance of any sample collection activity unless shorter notice is agreed to by EPA. In addition, EPA shall have the right to take any additional samples that EPA deems necessary. Upon request, EPA shall allow Settling Defendant to take split or duplicate samples of any samples it takes as part of EPA's oversight of Settling Defendant's implementation of the Work.

i. Settling Defendant shall submit to EPA, in electronic format as described below. The results of all sampling and/or tests or other data obtained or generated by or on behalf of Settling Defendant with respect to the Site and/or the implementation of this Consent Judgment within 15 working days of the date when those results or data become available to Settling Defendant, unless EPA agrees otherwise:

i. Sampling and monitoring data shall be submitted in standard regional Electronic Data Deliverable ("EDD") format which can be found at http://www.epa.gov/region2/superfund/medd.htm. Other delivery methods may be allowed by EPA if electronic direct submission presents a significant burden or as technology changes;

ii. Spatial data, including spatially-referenced data and geospatial data, shall be submitted: (1) in the Environmental Systems Research Institute ("ESRI") File Geodatabase format; and (2) as unprojected geographic coordinates in decimal degree format using North American Datum 1983 ("NAD83") or World Geodetic System 1984 ("WGS84") as the datum. If applicable, submissions shall include the collection method(s). Projected coordinates may optionally be included but must be documented. Spatial data shall be accompanied by metadata, and such metadata shall be compliant with the Federal Geographic Data Committee ("FGDC") Content Standard for Digital Geospatial Metadata and its EPA profile, the EPA Geospatial Metadata Technical Specification. An add-on metadata editor for ESRI software, the EPA Metadata Editor ("EME"), complies with these FGDC and EPA metadata requirements and is available at https://edg.epa.gov/EME/;

iii. Each file must include an attribute name for each Site unit or sub-unit submitted. Consult http://www.epa.gov/geospatial/geospatial-policies-and-standards for any further available guidance on attribute identification and naming; and

iv. Spatial data submitted by SDs does not, and is not intended to, define the boundaries of the Site.

B. Health and Safety Contingency Plan

A Health and Safety Contingency Plan ("HSCP") for all activities performed under the Consent Judgment shall be developed by Settling Defendant to address the protection of public health and safety and the response to contingencies that could impact public health, safety, and the environment. The HSCP shall satisfy the requirements of the *Occupational Safety and Health Guidance for Hazardous Waste Site Activities* (June 1990, DHHS NIOSH Publication No. 90-117) and the Occupational Safety and Health Administration, U.S. Department of Labor ("OSHA") requirements cited below:

1. All Site activities shall be performed in such a manner as to ensure the safety and health of personnel so engaged. All Site activities shall be conducted in accordance with all pertinent general industry (29 CFR Part 1910) and construction (29 CFR Part 1926) OSHA standards, and EPA's *Standards Operating Safety Guides* (OSWER, 1988), as well as any other applicable State and municipal codes or ordinances. All Site activities shall comply with those requirements set forth in OSHA's final rule entitled *Hazardous Waste Operations and Emergency Response*, 29 CFR § 1910.120, Subpart H.

2. The HSCP shall include, at a minimum, the following elements:

   a. Plans showing the location and layout of any temporary facilities to be constructed on or near the Site;

   b. Description of the known hazards and evaluation of the risks associated with the Site and the potential health impacts related to the Site activities;

   c. List of key personnel and alternates responsible for Site safety, response operations, and protection of the public;

   d. Description of levels of protection (based on specified standards) to be utilized by all personnel;

   e. Delineation of Work, decontamination, and safe zones, and definitions of the movement of zones;

   f. Description of decontamination procedures for personnel and equipment, and handling and removal of disposable clothing or equipment;

   g. Incidental emergency procedures which address emergency care for personnel injuries and exposure problems, and containment measures. These procedures shall include evacuation routes, internal and external communications procedures for response to fire, explosion, or other emergencies, the name of the nearest hospital and the route to that hospital. Local agencies with the capability to respond to emergencies shall be identified and their

capabilities shall be described. A description of the procedures for informing the community of these measures shall be outlined;

h. Description of the personnel medical surveillance program in effect;

i. Description of monitoring for personnel safety;

j. Description of routine and special personnel training programs; and

k. Description of an air monitoring program to determine concentrations of airborne contaminants to which workers on-Site and persons near the Site boundary may be exposed. The results of work-zone air monitoring may be used as a trigger for implementing Site-boundary air monitoring, additional control measures, and/or cessation of work.

C. Access and Other Approvals

The Amended RD Work Plan shall include descriptions of any approvals which Settling Defendant will need to comply with the Consent Judgment, with the exception of those approvals needed from EPA. This description shall detail how such approvals will be sought, and shall include a schedule for obtaining all necessary approvals. Such approvals shall include the consent of owners of property at or near the Site regarding access to conduct sampling, monitoring, remediation, restoration or other activities, in accordance with the Consent Judgment, and approval from any off-Site facility accepting Waste Material from the Site. This description shall be amended if subsequent approvals are required.

D. Remedial Design Schedules, Draft Schedule for Remedial Action, and Monitoring

The Amended RD Work Plan shall include a schedule covering all RD activities, including but not limited to, the submittal of the Final RD Report pursuant to Section VI, below. The Amended RD Work Plan shall also include a draft schedule for OU1 Remedial Action and monitoring

activities. The schedule shall be in the form of a task/subtask activity bar chart or critical path method sequence of events.

1. The draft schedule for OU1 Remedial Action and monitoring activities may be revised during the remedial process, subject to EPA's approval.

2. The OU1 Remedial Design schedule shall provide for completion and submittal to EPA of the Final RD Report within six (6) months of EPA's written notification of approval of the Amended RD Work Plan.

3. The draft schedule for the OU1 Remedial Action shall provide for completion and submittal to EPA of the Final OU1 Remedial Action Report within six (6) months of EPA's written notification of approval of the OU1 Remedial Design Report.

E. Copies of Any State and County Approvals

Copies of any New York State Department of Health and Nassau County Department of Health approvals for the air stripping units on Village water supply wells 13 and 14. Such information will be used by EPA in determining whether the treatment systems are Operational and Functional as defined in Paragraph 4 of the Consent Judgment.

F. Groundwater Monitoring Plan

A Groundwater Monitoring Plan shall be developed to determine the long-term effectiveness of the OU1 remedy, including assessing whether the concentrations and extent of groundwater contaminants related to OU1 are continuing to decrease or whether they pose a risk of exceeding the treatment capacity of the Village water supply wells 13 and 14 so as to warrant upgrades to the treatment systems. The Groundwater Monitoring Plan shall include, but not be limited to, the following:

1. At a minimum, groundwater samples shall be collected and analyzed from the following wells at the Site: MW-15A-B, MW-20A-C, MW-21A-C, MW-22A-C, MW-23A-D, GCP-08, GCP-15S, GCP-01S/D and GCP-18S/D, MW-26A-H, and MW-27A-H. In addition, the following two additional groundwater wells shall be installed: (i) one additional eight-zone groundwater monitoring

well ("MW-28A-H") shall be installed downgradient of Village water supply wells 13 and 14 to assist in monitoring whether the OU-1 groundwater contamination is migrating beyond the capture zones of those wells; and (ii) one additional deep groundwater monitoring well ("MW-21D") shall be added to the existing MW-21A-C well cluster.

2. Each groundwater monitoring well identified in the preceding subparagraph shall be sampled at the frequency identified on Attachment 1 to this SOW (Monitoring Well Sampling Program). Sampling and analysis may be performed less frequently if approved by EPA, or more frequently if required by EPA. Any decision by EPA to increase the sampling frequency shall be made by the Chief of EPA Region 2's New York Remediation Branch or a more senior EPA official. Any decision by EPA to increase the sampling frequency prior to the issuance of EPA's report for the first periodic review of the OU1 Remedial Action pursuant to CERCLA Section 121(c), 42 U.S.C. § 9621(c), shall not be subject to dispute resolution pursuant to Section XIX of the Consent Judgment. However, Settling Defendant may invoke dispute resolution pursuant to Section XIX after the issuance of EPA's report for the first such periodic review with respect to (i) any sampling frequency in effect at the time that EPA issues such report and that is more frequent than the sampling frequency provided for the corresponding well(s) in Attachment 1 or (ii) any EPA decision to increase the sampling frequency after such report is issued.

3. All groundwater samples shall be analyzed for Target Compound List volatile organic compounds using USEPA Method 8260B or another method as required by EPA.

G. Existing Air Stripper Treatment System

A plan to evaluate the existing air stripper treatment systems for Village water supply wells 13 and 14 shall be developed to determine if replacing components of, or repairing or upgrading, such existing systems for Village water supply wells 13 and 14 is necessary to ensure the protectiveness of human health. The evaluation shall include technical specifications, including treatment capacity, for those air stripping units, and shall propose the criteria for when such replacement, repair or

upgrade shall be required. Settling Defendant shall coordinate with the Village of Garden City Water District regarding such evaluation.

H. Vapor Phase Evaluation Report

A report shall be developed to evaluate whether a vapor-phase carbon unit is needed to capture and treat VOCs discharged from the air stripper treatment units on Village water supply wells 13 and 14 in order to comply with NYSDEC's DAR-1 and, if determined by EPA to be needed, the design, installation, operation and maintenance of such a unit.

I. Site Management Plan

An SMP that will provide for the proper management of all OU1 remedy components including compliance with institutional controls, with the exception of vapor intrusion work performed by EPA. The SMP shall include the O&M Plan (by reference) and shall provide for: (a) O&M of the treatment systems on Village wells 13 and 14 as well as monitoring of Site groundwater upgradient, sidegradient and downgradient of Village water supply wells 13 and 14; and (b) periodic certifications by the party(ies) implementing the remedy that any institutional and engineering controls are in place and being complied with.

J. Green Remediation Plan

A Green Remediation Plan ("GRP") that specifies how the OU1 Remedial Action will be implemented using the principles in EPA Region 2's *Clean and Green Policy*.

V. APPROVAL OF AMENDED REMEDIAL DESIGN WORK PLAN

EPA will either approve the Amended RD Work Plan, or require modification of such plan, in accordance with the procedures set forth in Section XI of the Consent Judgment. Settling Defendant shall implement the EPA-approved Amended RD Work Plan in accordance with the schedules contained therein.

VI. REMEDIAL DESIGN

Settling Defendant shall perform the OU1 Remedial Design activities in conformance with the Amended RD Work Plan approved by EPA and within the time frames specified in the remedial design schedule contained therein. The OU1 Remedial Design shall include the preparation of a Final RD Report.

A. Final Remedial Design Report

Settling Defendant shall submit a Final Remedial Design Report to EPA and NYSDEC in accordance with the schedule set forth in the approved Amended RD Work Plan. The Remedial Design Report shall include a discussion of the design criteria and objectives, with emphasis on the capacity and ability to meet design objectives successfully, and the final plans and specifications for the design. The Remedial Design Report shall also include the following items (to the extent that work has been performed regarding the items):

1. A technical specification for photographic documentation of the remedial construction work;

2. A discussion of the manner in which the OU1 Remedial Action will achieve the Performance Standards; and

3. A draft schedule for OU1 Remedial Action activities, and a preliminary schedule for operation and monitoring activities.

B. Additional Final Remedial Design Report Requirements

The Final RD report shall include final plans and specifications, and shall also include:

1. A discussion of the manner in which the design components detailed in Section IV, above, for the OU1 Remedial Action are considered in the design;

2. Table of Contents, as necessary, for the specifications, including a listing of items from the Construction Specifications Institute master format that are expected to be included in the construction specifications. This master format is presented in the Construction Specifications Institute's *Manual of Practice*, 1985 edition, available from the Construction Specifications Institute, 601 Madison Street, Alexandria, Virginia 22314;

3. Engineering plans representing an accurate identification of existing Site conditions and an illustration of the work proposed.

Typical items to be provided on such drawings include, at a minimum, the following:

a. Title sheet including at least the title of the project, a key map, the name of the designer, date prepared, sheet index, and EPA/NYSDEC Project identification numbers;

b. A site survey including the distance and bearing of all property lines for 150 Fulton Avenue and all other properties on which OU1 Remedial Action activities will be performed;

c. All easements, rights-of-way, and reservations;

d. All buildings, structures, wells, facilities, and equipment (existing and proposed) if any;

e. A topographic survey, including existing and proposed contours and spot elevations for all areas that will be affected by the remedial activities, based on U.S. Coast and Geodetic Survey data;

f. All utilities, existing and proposed, in areas where OU1 Remedial Action construction activities will be performed;

g. Location and identification of all significant natural features including, *inter alia*, wooded areas, water courses, wetlands, flood hazard areas, and depressions;

h. Flood hazard data and 100-year and 500-year flood plain delineation;

i. North arrow, scale, sheet numbers and the person responsible for preparing each sheet;

j. Decontamination areas, staging areas, borrow areas and stockpiling areas;

k. Miscellaneous detail sheets;

l. Definitions of all symbols and abbreviations;

m. A specification for any signs to be posted at the Site. Such signs should describe the project, the name of the contractor performing the OU1 Remedial Design and OU1 Remedial Action work or the Settling Defendant, state that the project is being performed under EPA oversight, and provide an EPA contact for further information;

n. Site security measures;

o. Roadways; and

p. Electrical, mechanical, and/or structural plans, as required.

4. Survey work that is appropriately marked, recorded and interpreted for mapping, property easements and design completion;

5. Drawings, as necessary, of all proposed equipment, improvements, details and all other construction and installation items to be developed in accordance with the current standards and guidelines of the State of New York. Drawings shall be of standard size, approximately 24" x 36". A list of drawing sheet titles will be provided;

6. Any value engineering proposals;

7. An O&M Plan which shall include the elements of the SMP. The O&M Plan shall be prepared in accordance with the Superfund Remedial Design and Remedial Action Guidance, OSWER Directive 9355.0-4A. The O&M Plan shall also include, but not be limited to, descriptions of the following:

a. personnel requirements, responsibilities, and duties, including a discussion for training, lines of authority;

b. all construction-related sampling, analysis, and monitoring to be conducted under the Consent Judgment;

c. A discussion of potential problems and remedies for such problems;

d. A schedule for equipment replacement;

e. A plan for ensuring the continued operation of Village water supply wells 13 and 14 and the continued O&M (including repair, replacement or upgrades, as needed) of the air stripper treatment systems on those wells after the Village of Garden City is no longer required to operate and maintain the wells and treatment systems pursuant to the Settlement Agreement and Release in *Incorporated Village of Garden City v. Genesco Inc. and Gordon Atlantic Corp.*, Civil Action No. 07-CV-5244 (E.D.N.Y.);

f. A plan for the monitoring and maintenance of the existing sub-slab ventilation system at the Fulton Property until EPA determines that such system is no longer needed to protect human health;

g. All OU1 Remedial Action-related monitoring requirements;

h. An O&M and monitoring schedule; and

i. How the O&M will be performed in accordance with EPA Region 2's Clean and Green Policy.

8. A report describing those efforts made to secure access and institutional controls and obtain other approvals and the results of those efforts (*see* Section IV.C., above). Legal descriptions of property or easements to be acquired shall be provided, along with the final engineer's construction cost estimate;

9. The GRP, which shall describe how the OU1 Remedial Action will be performed in accordance with EPA Region 2's *Clean and Green Policy*.

10. A plan for implementation of construction and construction oversight including any GRP requirements;

11. A method for selection of the construction contractor(s);

12. A final engineer's construction cost estimate; and

13. A proposed schedule for implementing all of the above.

VII. REMEDIAL ACTION

A. Performance of the OU1 Remedial Action

1. Within thirty (30) days of EPA's written approval of the RD Report, Settling Defendant shall initiate and perform the remedial action in accordance with the approved Final Remedial Design Report, which includes the approved OU1 Remedial Action schedule.

2. During performance of the OU1 Remedial Action, Settling Defendant may identify and request EPA approval for field changes to the approved Final Remedial Design Report and remedial action schedule, as necessary, to complete the Work. EPA will approve, disapprove, or require modification of any requests for field changes in accordance with the procedures set forth in Section XI of the Consent Judgment.

B. Operation and Maintenance Plan

1. In accordance with the schedule in the EPA approved Final Remedial Design Report, Settling Defendant shall submit to EPA a revised O&M Plan submitted pursuant to Section VI.B.7., above, by addressing the O&M requirements for the remedy as actually constructed.

2. EPA will either approve the O&M Plan or require modification of it, in accordance Section XI of the Consent Judgment.

3. Proposed modifications to the approved O&M Plan may be submitted to EPA for consideration upon completion of construction or thereafter if Settling Defendant can demonstrate that such modifications would enhance and/or maintain the environmental monitoring programs.

4. EPA will approve, disapprove, or require modifications of the request for modification of the O&M Plan in accordance with the procedures set forth in Section XI of the Consent Judgment.

VIII. PRE-FINAL AND FINAL INSPECTIONS, REMEDIAL ACTION REPORT, NOTICE OF CONSTRUCTION COMPLETION

A. At least fourteen (14) days prior to the completion of construction, Settling Defendant and its contractor(s) shall be available to accompany EPA personnel and/or their representatives on a pre-final inspection. The prefinal inspection shall consist of a walkover of the Site to determine the completeness of the construction and its consistency with the RD Reports, the Consent Judgment, the Amended OU1 ROD, and applicable federal and state laws, rules, and regulations.

B. Following the pre-final inspection, EPA will either specify the necessary corrective measures to the construction phase of the RA, or determine that construction is complete. If EPA requires corrective measures, Settling Defendant shall undertake the corrective measures according to a schedule approved by EPA. Within fourteen (14) days after completion of the construction of the corrective measures, Settling Defendant and its contractor(s) shall be available to accompany EPA personnel or their representatives on an inspection as provided for in the preceding paragraph. Such inspection will be followed by further directions and/or notifications by EPA as provided in this paragraph. Within forty-five (45) days of EPA's determination that construction is complete and is consistent with the Amended OU1 ROD, this SOW, and the Consent Judgment, the Settling Defendant shall submit to EPA, for review and approval pursuant to Section XI of the Consent Judgment, a Draft RA Report, as set forth in Subsection D, below.

C. Within twenty-one (21) days of the date that Settling Defendant concludes that it has met the Performance Standards as specified in this SOW, Settling Defendant shall schedule and conduct a final inspection to be attended by Settling Defendant, EPA, NYSDEC, and/or their respective representatives. The final inspection will consist of a walk-through of the project to determine the completeness of the RA and its consistency with the Amended OU1 ROD, this SOW, and the Consent Judgment. EPA may direct Settling Defendant to correct any deficiencies identified during the inspection. Settling Defendant shall implement the tasks necessary to correct any deficiencies in accordance with the specifications and

schedules established by EPA. Within forty-five (45) days of EPA's determination that Performance Standards and cleanup objectives have been attained, as specified in this paragraph, Settling Defendant shall submit to EPA, for review and approval pursuant to Section XI of the Consent Judgment, a Final RA Report, as set forth in Subsection D, below.

D. The Draft and Final RA Reports set forth in Subsections B and C, above, shall include the following sections:

1. Introduction

a. Include a brief description of the location, size, environmental setting, and operational history of the Site.

b. Describe the operations and waste management practices that contributed to contamination of the Site.

c. Describe the regulatory and enforcement history of the Site.

d. Describe the major findings and results of Site investigation activities.

e. Describe prior removal and remedial activities at the Site.

2. Background

a. Summarize requirements specified in the Amended OU1 ROD. Include information on the cleanup goals, institutional controls, monitoring requirements, operation and maintenance requirements, and other parameters applicable to the design, construction, operation, and performance of the RA.

b. Provide additional information regarding the basis for determining the cleanup goals, including planned future land use.

c. Summarize the OU1 Remedial Design, including any

significant regulatory or technical considerations or events occurring during the preparation of the OU1 Remedial Design.

d. Identify and briefly discuss any ROD amendments, explanation of significant differences, or technical impracticability waivers.

3. Construction Activities

Provide a step-by-step summary description of the activities undertaken to construct and implement the OU1 Remedial Action (*e.g.*, mobilization and Site preparatory work; associated Site work; and sampling activities).

4. Chronology of Events

a. Provide a tabular summary that lists the major events for the OU1 Remedial Action and associated dates of those events, starting with the Amended OU1 ROD signature.

b. Include significant milestones and dates, such as Final Remedial Design Report submittal and approval; ROD amendments; mobilization and construction for the remedy; monitoring and sampling events; final sampling and confirmation-of-performance results; required inspections; demobilization; and startup of post-construction operation & maintenance activities.

5. Performance Standards and Construction Quality Control

a. Describe the overall performance of the construction in terms of comparison to Performance Standards.

b. Provide an explanation of the approved construction quality assurance and construction quality control requirements or cite the appropriate reference for this material. Explain any substantial problems or deviations.

c. Provide an assessment of the performance data quality, including the overall quality of the analytical data, with a

brief discussion of QA/QC procedures followed, use of a QAPP, comparison of analytical data with data quality objectives.

6. Final Inspection and Certifications

a. Report the results of the various OU1 Remedial Action contract inspections, and identify noted deficiencies.

b. Briefly describe adherence to health and safety requirements while implementing the OU1 Remedial Action. Explain any substantial problems or deviations.

c. Summarize details of the institutional controls (*e.g.*, the type of institutional control, who will maintain the control, who will enforce the control).

d. Describe results of pre-certification inspection. This section shall include a certification statement, signed by a responsible corporate official of one or more of the Settling Defendant or by the Settling Defendant's Project Coordinator, which states the following:

> To the best of my knowledge, after thorough investigation, I certify that the information contained in or accompanying this submission is true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

7. Summary of Project Costs

a. Provide the actual final costs for the project. If actual costs are not available, provide estimated costs.

b. Provide the costs previously estimated in the Amended OU1 ROD for the OU1 remedy, including OU1 Remedial Action capital costs. Adjust the estimates to the same dollar basis year as the actual project costs, and provide the index used.

c. Compare actual RA costs to the adjusted Amended OU1 ROD estimates. If outside the range of -30 to +50 percent, explain the reasons for differences.

d. Refer the reader to the applicable Appendix, described below, for a detailed breakdown of costs.

8. Observations and Lessons Learned

Provide Site-specific observations and lessons learned from the project, highlighting successes and problems encountered and how they were resolved.

9. Contact Information

Provide contact information (names, addresses, phone numbers, and contract/reference data) for the major design and remediation contractors, as applicable.

10. Appendices: Cost and Performance Summary

a. The specific parameters for documenting cost and performance information are presented in the *Guide to Documenting and Managing Cost and Performance Information for Remediation Projects*, EPA 542-B-98-007.

b. Identify the matrix characteristics and Site conditions that affected the cost and performance, the corresponding values measured for each characteristic or condition, and the procedures used for measuring those characteristics or conditions.

c. Identify the operating parameters specified by the remediation contractor that most affected the cost and performance, the corresponding values measured for each parameter, and the procedures used for measuring those parameters.

d. Provide a detailed breakout of the actual OU1 Remedial Action capital costs.

e. Provide supplemental information in appendices to the OU1 Remedial Action Report. These could include a map of the Site, supplemental performance information, and a list of references.

E. Pursuant to Section XI of the Consent Judgment, EPA either will approve the Draft RA Report, thus making it the Final RA Report, require modifications, and/or require, in accordance with Subsection VIII.B. or C., above, corrective measures to fully and properly implement the OU1 Remedial Action.

IX. PERFORMANCE OF CONTINUED OPERATION OF THE REMEDIAL ACTION

Upon EPA's approval of the Draft Remedial Action Report (*see* Section VIII.E., above), Settling Defendant shall continue remedial action and monitoring activities in accordance with the approved O&M Plan.

Attachment 1

Monitoring Well Sampling Program

Group 1 Wells are as follows:

GCP-01 S/D
GCP 08
GCP-18 S/D
GCP-15S
MW-15 A-B
MW-20 A-C
MW-22 A-C
MW-23 A-D

Group 1 Wells shall be sampled and analyzed at the following frequency:

The first sampling round shall commence within 20 days of EPA approval of the RD Work Plan, and sampling shall be performed every 24 months thereafter.

Group 2 Wells are as follows:

MW-21 A-D

Group 2 Wells shall be sampled and analyzed at the following frequency:

Year 1 – quarterly, to commence approximately 30 days after completion of construction of MW 21 D and MW 28 A-H
Year 2 – semi-annually (every six months)
Year 3 – semi-annually (every six months)
Year 4 – no sampling and analysis
Year 5 (and beyond) – once in year 5 and every 24 months thereafter.

Group 3 Wells are as follows:

MW-26 A-H
MW-27 A-H
MW-28 A-H

Group 3 Wells shall be sampled and analyzed at the following frequency:

Year 1 – quarterly, to commence approximately 30 days after completion of construction of MW 21 D and MW 28 A-H

Year 2 – 9 of 24 zones, with EPA approval of the specific zones, semi-annually (every six months)
Year 3 – 9 of 24 zones with EPA approval of the specific zones semi-annually (every six months)
Year 4 – no sampling and analysis
Year 5 (and beyond) – once in year 5 and every 24 months thereafter.

APPENDIX B

20 November 2003 Garden City Country Club Access Agreement

GARDEN CITY COUNTRY CLUB
206 Stewart Ave.
Garden City, N.Y. 11530

Sam Nerses
General Manager

Phone: (516) 746-8070
Fax: (516) 742-9126
E-Mail: samnerses@aol.com

November 25, 2003

Ms. April A. Ingram, Esq.
Boult, Cummings, Conners & Berry PLC
414 Union Street (Suite 1600)
P.O. Box 198062
Nashville, TN 37219

Dear Ms. Ingram:

Enclosed is a copy of the revised agreement between Genesco Inc. and the Garden City Country Club as you requested.

If you have any further questions, please feel free to contact me.

Respectfully,

Sam Nerses
General Manager

SN:es

SITE ACCESS AGREEMENT

THIS SITE ACCESS AGREEMENT is made and entered into as of the later of the dates signifying execution below, by and between Genesco Inc. and the Garden City Country Club ("Owner"), as well as their successors and assigns.

W I T N E S S E T H:

WHEREAS, Owner owns the property which is located at 206 Stewart Avenue in Garden City, New York (the "Property"); and

WHEREAS, Genesco Inc. wishes to conduct certain investigatory and/or remedial activities on the Property, including but not limited to the installation, maintenance, and monitoring of groundwater wells and collection of groundwater samples for analysis in cooperation with the U.S. Environmental Protection Agency and the New York State Department of Environmental Conservation (the "Work"); and

WHEREAS, Owner has agreed to allow Genesco Inc., together with its agents, consultants, contractors and/or other representatives (hereinafter "**Genesco**"), access to the Property in order to conduct the Work in accordance with this Access Agreement;

NOW, THEREFORE, in consideration of the foregoing premises and other valuable considerations, the receipt and sufficiency of which are hereby acknowledged by both parties, the parties do hereby agree as follows:

1. Owner hereby grants **Genesco** a license to access the Property for the purpose of conducting the Work, provided that **Genesco** complies with the terms of this Access Agreement.

2. All Work shall be performed at the sole cost and expense of Genesco Inc. The Work and any disposal of residues generated therefrom will be conducted or supervised by **Genesco**. In carrying out the Work, **Genesco** shall comply with all applicable governmental laws and regulations. Genesco shall promptly notify Owner of any dangerous conditions and hazardous substances or materials discovered on the Property, including without limitation, conditions, substances and materials which due to the nature of the Work to be performed by or on behalf of **Genesco** may pose a danger to Owner, or Owner's agents, employees, members, invitees and guests.

3. **Genesco** shall provide Owner with reasonable advance notice of Work activities at the Property for the purpose of adopting a mutually acceptable schedule (the "Schedule") for the performance of the Work. No Work shall be performed until the Schedule has been approved by Owner and **Genesco**. No Work shall be performed until Owner has approved in writing the specific location of each site at which **Genesco** proposes to drill a well or otherwise disturb the soil or to install any

equipment of any kind as well as the routes Genesco may utilize to traverse the Property. Genesco agrees to provide Owner with advance written notice of any proposed deviation(s) from the Schedule and Owner agrees to cooperate reasonably with Genesco thereafter in developing mutually acceptable amendments to the Schedule. Genesco agrees not to interfere with or interrupt the normal use of the Property and agrees to minimize any unavoidable inconvenience to Owner or Owner's agents, employees, members, invitees and guests.

4. Genesco Inc. agrees to indemnify and hold Owner harmless from and against any and all liability, loss, damage and expense (including liability for personal injury or death), including reasonable attorney's fees, caused by or resulting from (i) the actions of Genesco during the performance of the Work, whether as a consequence of any physical disturbance of the Property, releases or threatened releases of hazardous substances, damage or injury to the Property, waste, nuisance, loss of use or value or other injury whatsoever incurred or suffered by Owner, Owner's agents, employees, members, invitees and guests, (ii) any noncompliance by Genesco with any applicable statute, ordinance, governmental rule or regulation, judicial decree or administrative order to which Genesco is subject, except to the extent that such liability, loss, damage or expense is caused solely as a result of Owner's negligence.

5. Access granted hereunder does not constitute a grant of permanent easement and shall terminate upon completion of the Work. Genesco acknowledges that its performance of the Work and of any additional activities undertaken to complete the Work may require physical disturbance of the Property. Genesco agrees not to physically disturb the Property in any way without having first received Owner's written consent thereto, which consent Owner agrees not unreasonably to withhold. Upon termination of this Agreement or completion of the Work, whichever occurs first, the Property shall be restored by Genesco to the condition existing prior to the commencement of any of the Work, including without limitation, the removal and appropriate disposal of all equipment, debris, refuse, cuttings, excess soil, and drums related to the Work.

6. Owner hereby agrees to allow Genesco continued access to the Property for purposes of maintaining and further sampling the groundwater monitoring wells. Any monitoring well so placed on the Property by Genesco shall remain the sole property of Genesco Inc. At the conclusion of the Work, or once all relevant regulatory agencies determine such monitoring well is no longer needed, Genesco shall plug and abandon the monitoring well according to approved procedures and

at the sole expense of Genesco Inc., subject, however, to Genesco's restoration obligations under paragraph 5, above.

7. Nothing in this Access Agreement shall constitute an admission or evidence of liability by Genesco Inc. for conditions at the Property, and the Access Agreement shall not evidence activities by Genesco Inc. that constitute participation in the handling, storage, generation or transportation of hazardous materials.

8. Nothing in this Access Agreement shall constitute an admission by Genesco Inc. that it is in any way responsible for any existing contamination at the Property. Genesco Inc. does not in any way assume responsibility for cleanup, abatement, or restoration at the Property other than as set out in this Access Agreement, and other than for contamination at the Property arising from the activities, misfeasance or nonfeasance of **Genesco.**

9. Genesco Inc. agrees to reimburse Owner promptly upon demand for any costs or expenses Owner may incur in connection with the performance of the Work, including reasonable attorneys' fees not to exceed $1,500.00 in connection with the preparation of this Agreement.

IN WITNESS WHEREOF Owner and Genesco Inc. have caused this Agreement to be executed on the later of the dates set forth below.

Genesco Inc.

By: _____
Title: Vice President, Secy. & Gen'l Counsel
Date: 11/5/03

Garden City Country Club

By: _____
Title: GEN'L MANAGER
Date: 11/20/03

BOULT ▪ CUMMINGS
CONNERS ▪ BERRY PLC

April A. Ingram
(615) 252-2302
Fax: (615) 252-6302
Email: aingram@boultcummings.com

November 6, 2003

J. Gregory Saver, Esq.
Satterlee Stephens Burke & Burke LLP
230 Park Avenue, 11th Floor
New York, NY 10169

Re: Access Agreement with Genesco Inc.

Dear Mr. Saver:

I understand from Howard Neuman that Garden City Country Club and Genesco are in concurrence on the negotiated terms of the Access Agreement. According to his instructions, I am enclosing two executed originals of the revised Agreement. Please circulate these to your client GCCC and return one of them to me at your earliest convenience.

Best regards.

Very truly yours,

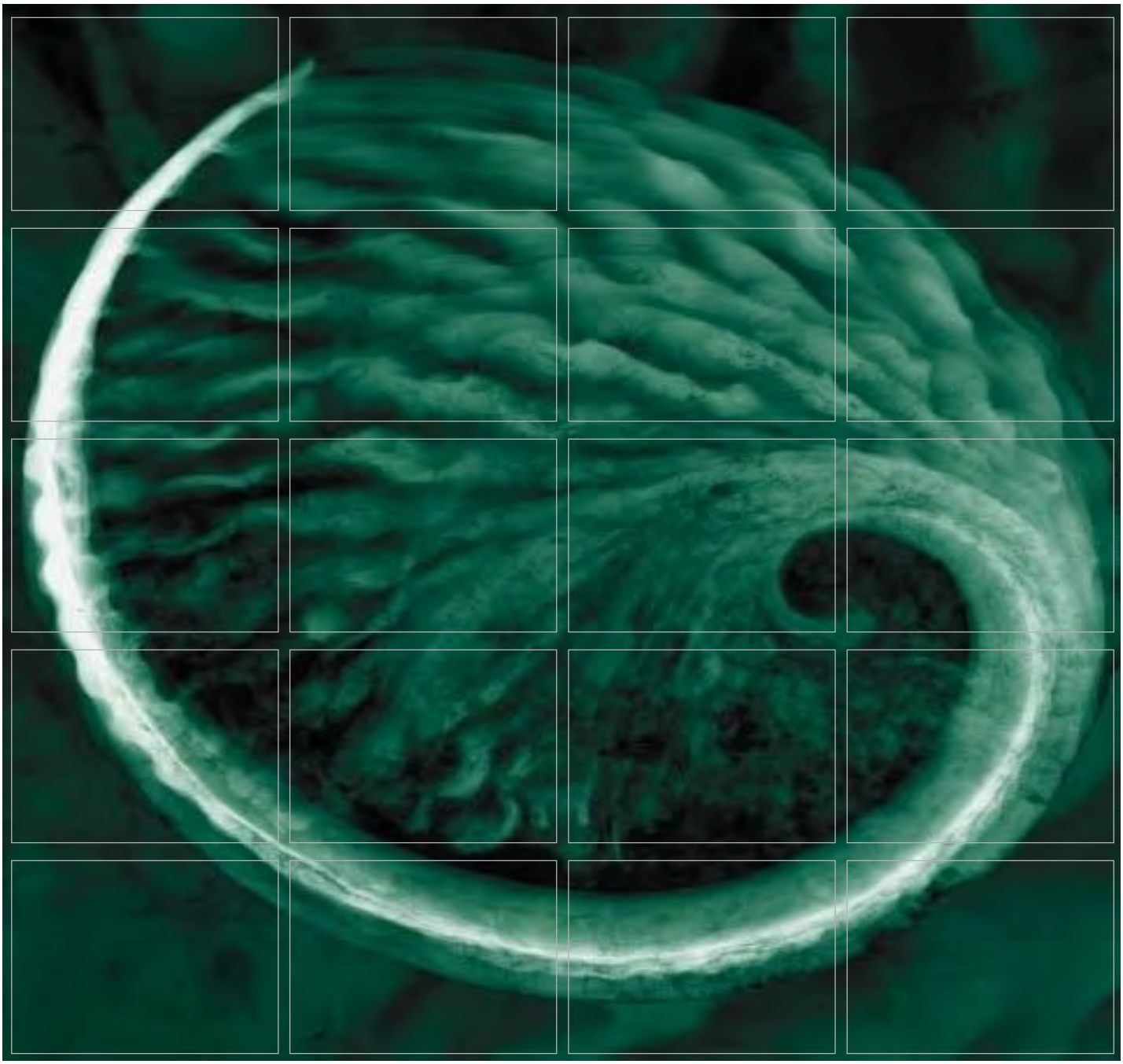
BOULT, CUMMINGS, CONNERS & BERRY, PLC

By:
April A. Ingram

AAI/aai
Enclosures

APPENDIX C

OU1 Quality Assurance Project Plan



Operable Unit 1
Quality Assurance Project Plan

Fulton Avenue Superfund Site
150 Fulton Avenue
Garden City Park, Nassau County, New York

August 2018

ERM *The business of sustainability*

www.erm.com

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ATTACHMENT C - Laboratory Certification & Operating Procedures

ATTACHMENT D – Well Location Figures & Photos

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INTRODUCTION

This first operable unit (OU1), interim remedial action (RA), remedial design (RD) Quality Assurance Project Plan (QAPP) for the Fulton Avenue Superfund Site (Site) presents the policies, organization, objectives, functional activities and specific Quality Assurance (QA) and Quality Control (QC) activities designed to achieve the data quality goals associated with the OU1 RD activities, and subsequent implementation of the OU1 RA.

The work to be performed and described herein is in accordance with the OU1 remedy selected in the U.S. Environmental Protection Agency (EPA) 30 September 2015 OU1 Record of Decision Amendment (Amended OU1 ROD) for the Site. The work will be implemented in accordance with the revised OU1 Consent Judgment No. CV–09–3917 (2016 CJ) and revised OU1 Statement of Work (2016 SOW) approved and entered by the United States District Court for the Eastern District of New York on 15 August 2016.

The purpose and objective of the QAPP is to ensure that the analytical results are accurate and representative of field conditions. The analytical methods and QA/QC procedures presented in this QAPP are referenced from and consistent with the guidelines established in the *Uniform Federal Policy for Quality Assurance Project Plans* (UFP-QAPP) and Section 6 (Part B) of *Quality Systems for Environmental Data and Technology Programs - Requirements with guidance for use*, ANSI/ASQ E4 (February 2004).

The *Uniform Federal Policy for Quality Assurance Project Plans* (UFP-QAPP) is a consensus quality systems document prepared by the Intergovernmental Data Quality Task Force (IDQTF), a working group made up of representatives from the EPA, the Department of Defense (DoD), and the Department of Energy (DOE). Originally issued in 2005, the UFP-QAPP was developed to provide procedures and guidance for consistently implementing the national consensus standard ANSI/ASQ E-4, *Quality Systems for Environmental Data and Technology Programs,* for the collection and use of environmental data at Federal facilities.

The UFP-QAPP is a workbook that consists of a collection of templates or worksheets that, once completed, addresses all required elements of a QAPP. While use of the term QAPP has been retained, the information contained in the worksheets captures the elements that would comprise related project-planning documents, such as a Sampling and Analysis Plan (SAP), Work Plan (WP), and Field Sampling Plan (FSP). Hence, this QAPP is designed to be a stand-alone document containing certain background supporting information (Worksheet #10: Conceptual Site Model), specifications, and procedures necessary for project personnel to carry out their assigned responsibilities. For example, the field team should be able to rely on the QAPP for complete sampling instructions/standard operating procedures, including how to sample, where to sample, how many samples to collect, the types of bottles, preservatives, related QC, etc.

This QAPP is an integral part of the OU1 Site Management Plan (SMP) for long-term Site management that is a dynamic document which will be subject to revision from time to time during the course of the OU1 RA. Revisions will likely be required to address changes in regulatory requirements or field conditions to ensure the scope of the QAPP is aligned with the needs of the OU1 RA, and that data goals are met including the accuracy and representativeness of all analytical results.

QAPP Worksheet #1 & 2: Title & Approval Page

SITE NAME/PROJECT NAME:	Fulton Avenue Superfund Site Operable Unit 1
TITLE:	Quality Assurance Project Plan
SITE LOCATION:	150 Fulton Avenue, Garden City Park, New York
PREPARATION DATE:	05 January 2017
REVISION NUMBER:	5.0
REVISION DATE:	21 August 2018
SITE NUMBER/CODE:	CERCLA Site No.: NY0000110247 New York State Registry of Inactive Hazardous Waste Disposal Sites Site Number 130073
OPERABLE UNIT:	1 (OU1)
LEAD ORGANIZATION	ERM Consulting & Engineering, Inc. (ERM)
DOCUMENT TITLE:	Operable Unit 1, Quality Assurance Project Plan Fulton Avenue Superfund Site 150 Fulton Avenue, Garden City Park, New York

PREPARER'S NAME & ORGANIZATIONAL AFFILIATION:

Chris Wenczel, P.G. - ERM
Brice Lynch, P.G. - ERM

PREPARER'S ADDRESS, TELEPHONE NUMBER, AND E-MAIL ADDRESS:

105 Maxess Road, Suite 316
Melville, New York 11747,
631-756-8900

chris.wenczel@erm.com brice.lynch@erm.com

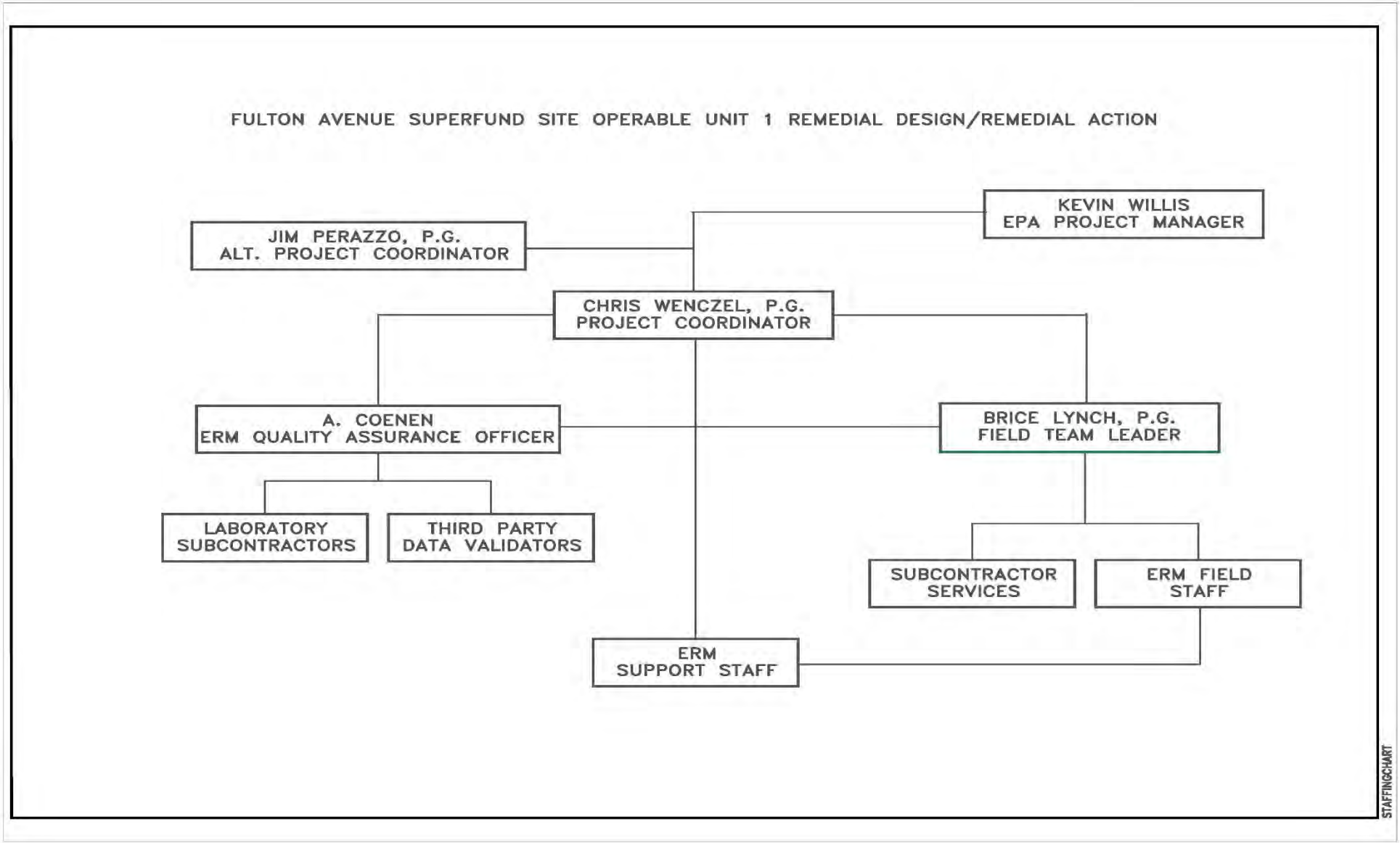
Project Coordinator/Lead Organization Project Manager (Sign and Date)
Chris Wenczel, P.G. - ERM

United States Environmental Protection Agency (USEPA) (Sign and Date)
Kevin Willis, USEPA Remedial Project Manager

QAPP Worksheet #3 & 5: Project Organization & QAPP Distribution

QAPP Recipients	Title	Organization	Telephone Number	Fax Number	E-mail Address
Kevin Willis	Remedial Project Manager	EPA Region II	212-637-4252	212-637-4279	willis.kevin@epamail.epa.gov
Steven M. Scharf, P.E.	Remedial Project Manager	NYSDEC	518-402-9620	518-402-9022	sxscharf@gw.dec.state.ny.us
John Swartwout	Chief - Section C, Remedial Bureau A	NYSDEC	518-402-9620	518-402-9022	jbswarto@gw.dec.state.ny.us
Douglas Fischer	Assistant Regional Counsel New York/Caribbean Superfund Branch Office of Regional Counsel	USEPA	212-637-3180	212-637-3104	fischer.douglas@epamail.epa.gov
Robert Kambic	Assistant U.S. Attorney U.S. Attorney's Office, EDNY	USDOJ	631-715-7852	631-715-7920	robert.kambic@usdoj.gov
Thor Urness	Partner	Bradley, LLP	615-252-23845	-	turness@bradley.com
Melissa Alexander, Esq.	Partner	Bradley, LLP	615-252-2326	615-252-6326	malexander@babc.com
James Periconi, Esq.	Principal	Periconi, LLC	212-213-5500	212-213-5030	jpericoni@periconi.com
Roger Sisson, Esq.	Senior Vice President, Corporate Secretary & General Counsel	Genesco Inc.	615-367-7000	615-367-7073	rsisson@genesco.com
James Perazzo, P.G.	Principal Partner	ERM	631-756-8913	631-756-8901	jim.perazzo@erm.com
Chris Wenczel, P.G.	Principal Consultant	ERM	631-756-8920	631-756-8901	chris.wenczel@erm.com
Andrew Coenen	Senior Chemist	ERM	631-756-8959	631-756-8901	andrew.coenen@erm.com
Brice Lynch, P.G.	Senior Project Geologist	ERM	631-756-8944	631-756-8901	brice.lynch@erm.com
Tammy McCloskey	Laboratory Project Manager	Accutest Laboratories	732-355-4562	732-329-3499	tammym@accutest.com

QAPP Worksheet #5: Project Organization Chart



QAPP Worksheet #4, 7 & 8: Personnel Qualifications, Responsibilities & Sign-off Sheet

Name	Title	Organizational Affiliation	Education, Experience & Specialize Training Qualifications[1]	Responsibilities	Signature*
James Perazzo, P.G.	Alternate Project Coordinator/ERM Principal-In-Charge/ Hydrogeologist	ERM	See Professional Profile In Attachment A	• Provide overall corporate project and technical management, • Ensures professional services provided by ERM are cost effective and of the highest quality, • Ensures all resources of ERM are available on an as-required basis, • Conduct technical discussions for key technical issues with the Respondents, • Managerial and technical guidance to ERM Site manager and other staff, and • Final review of ERM submittals prior to issue, primary support in technical discussions with Agencies.	
Chris Wenczel, P.G.	Project Coordinator/ERM Principal Consultant/ Hydrogeologist	ERM	See Professional Profile In Attachment A	• Provide overall corporate project and technical management, • Ensures professional services provided by ERM are cost effective and of the highest quality, • Ensures all resources of ERM are available on an as-required basis, • Conduct technical discussions for key technical issues with the Respondents, • Managerial and technical guidance to ERM Site manager and other staff, and • Primary review of ERM submittals prior to issue, primary support in technical discussions with Agencies.	
Andrew Coenen	Project QA Officer/ERM Senior Chemist	ERM	See Professional Profile In Attachment A	• Field and laboratory QA/QC oversight. • Provides managerial/technical expertise support function as needed, • Procurement and contracting for analytical laboratory, • Overview of laboratory activities, • Decides laboratory data corrective action, • Performs analytical data assessment and validation, and • Assist in preparation of reporting packages.	
Brice Lynch, P.G.	Project Field Team Leader/ERM Senior Project Geologist	ERM	See Professional Profile In Attachment A	• Field team oversight, • Ensure field adherence to QAPP, • Subcontractor/laboratory coordination, and • Assist in preparation of reporting packages.	

*Signatures indicate personnel have read and agree to implement this QAPP as written.

1. ERM staff and subcontractors who will provide field services at the site will be trained, at a minimum, per the requirements of 29 Code of Federal Regulations (CFR) 1910.120 "Hazardous Waste Operations and Emergency Response" (HAZWOPER), including both the one time 40-hour training and annual 8-hour refreshers. This training includes discussions of potential hazards, exposure limits, and a review of personal protective equipment, emergency procedures, and respirator selection and fit testing. Training has been completed on an individual basis to complete the required project specific functions. See Professional Profiles provided as Attachment A for specific ERM employee training and certifications. ERM training certificates are available upon request.

Special service needs for this project such as drilling, laboratory analytical services, underground utility clearance, investigative-derived waste (IDW) disposal, i.e., well purge water, etc. will be provided by specialty subcontractors for each service area. While many of the aforementioned service disciplines do not necessarily have formal specialized training resulting in some form of a certification, ERM will make diligent inquiry to confirm that only experienced and qualified subcontractor personnel will be performing the work.

QAPP Worksheet #6: Communication Pathways

Communication Drivers	Organization	Name	Contact Information	Procedure (Timing, Pathways, etc.)
Regulatory Agency Interface: Primary Point of Contact with EPA Remedial Project Manager and Genesco Inc.	ERM Project Coordinator/ERM Principal Consultant/ Hydrogeologist	Chris Wenczel, P.G.	See QAPP Worksheet #3 & 5: Project Organization & QAPP Distribution	All documents and information about the project will be forwarded to the Agencies by Mr. Wenczel. Mr. Wenczel will have responsibility for all phases of the OU1 RA at the Site. Mr. Wenczel will delegate project tasks. All materials and information about the project will be forwarded to Genesco by Mr. Wenczel.
3General Project Technical Support and QA/QC Review.	ERM Project Team Members	James Perazzo, P.G. Andrew Coenen Brice Lynch, P.G.		Project team will provide project support and correspondence by e-mail, telephone and personal communications.
Field Team Leader • Daily field progress reports • Stop work due to safety issues • Contact with public and/or media • Changes in field conditions from expected • Field corrective actions	ERM Project Field Team Leader	Brice Lynch, P.G.		Mr. Lynch will be responsible for providing daily and real-time updates from the Site to Mr. Wenczel and EPA as requested by e-mail, telephone and personal communications.
Primary Liaison With Analytical Laboratory • QAPP changes prior to fieldwork and/or during fieldwork execution • Sample receipt variances • Laboratory quality control variances • Analytical corrective action actions • Data verification issues • Data review corrective action	ERM Senior Chemist	Andrew Coenen		Mr. Coenen will serve as the point of contact for the analytical laboratory and will be responsible for all laboratory and analytical data QA/QC review. All correspondence with the laboratory will be conducted by e-mail or telephone communications.

QAPP Worksheet #9: Project Planning Session Summary

Project Name: Fulton Avenue Superfund Site OU1 Remedial Design & Long Term Groundwater Monitoring Projected Date(s) of Sampling: Fall 2017 + 30 Years Project Coordinator: Chris Wenczel	**Site Name:** Fulton Avenue Superfund Site OU1 **Site Location:** 150 Fulton Avenue Garden City Park, New York

Date of Session: 16 May 2016

Scoping Session Purpose: Finalize scope of Remedial Design and Long-Term Groundwater Monitoring Program that was subsequently reflected in the Amended OU1 ROD for the Site, and in accordance with the 2016 CJ and 2016 SOW.

Name	Title	Affiliation	Phone #	E-mail Address	Project Role
Nicoletta Diforte	Deputy Director for Enforcement and Homeland Security	USEPA	212-637-3466	DiForte.Nicoletta@epa.gov	USEPA Senior Management
Douglas Fischer	Assistant Regional Counsel New York/Caribbean Superfund Branch Office of Regional Counsel	USEPA	212-637-3180	Fischer.Douglas@epa.gov	USEPA Counsel
Virginia F. Capon	Supervisory General Attorney Section Chief of New York/Caribbean Superfund Section	USEPA	212-637-3163	Capon.Virginia@epamail.epa.gov	Oversight of USEPA Counsel
Robert Kambic	Assistant U.S. Attorney	U.S. Attorney's Office, EDNY	631-715-7852	robert.kambic@usdoj.gov	Represent US Attorney's Office
Doug Garbarini	Branch Chief of the New York Remediation Branch	USEPA	212-637-4288	Garbarini.doug@Epa.gov	Oversight of USEPA Section Chief
Kevin Willis	Remedial Project Manager	USEPA	212-637-4252	Willis.kevin@Epa.gov	USEPA Project Manager
James Periconi	Attorney/Partner	Periconi, LLC	212-213-5500	JPericoni@periconi.com	Counsel For Respondent
Melissa Alexander-Ballengee	Attorney/Partner	Bradley, LLP	307-766-2289	malexander@bradley.com	Counsel For Respondent
Thor Urness	Attorney/Partner	Bradley, LLP	615-252-2384	mailto:turness@bradley.com	Counsel For Respondent

Project Name: Fulton Avenue Superfund Site OU1 Remedial Design & Long Term Groundwater Monitoring Projected Date(s) of Sampling: Fall 2017 + 30 Years Project Coordinator: Chris Wenczel	**Site Name:** Fulton Avenue Superfund Site OU1 **Site Location:** 150 Fulton Avenue Garden City Park, New York

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Scoping Session Purpose: Finalize scope of Remedial Design and Long-Term Groundwater Monitoring Program that was subsequently reflected in the Amended OU1 ROD for the Site, and in accordance with the 2016 CJ and 2016 SOW.

Name	Title	Affiliation	Phone #	E-mail Address	Project Role
Jim Perazzo, P.G.	Principal Partner/Hydrogeologist	ERM Consulting & Engineering, Inc.	631-756-8913	Jim.perazzo@erm.com	Consultant For Respondent, Oversight of Project Manager
Chris Wenczel, P.G.	Principal Consultant/Hydrogeologist	ERM Consulting & Engineering, Inc.	631-756-8920	Chris.wenczel@erm.com	Project Coordinator/ Manager

Comments/Decisions: See Below

Action Items: See Below

Consensus Decisions: The project scoping was completed by ERM in developing the 14 October 2016 OU1 Remedial Design Work Plan the OU1 remedy based on the Amended OU1 ROD for the Site, and in accordance with the 2016 CJ and 2016 SOW.

QAPP Worksheet #10: Conceptual Site Model

Consistent with EPA UFP-QAPP guidance, the Conceptual Site Model (CSM) presented in this worksheet provides summary information from prior Site documents regarding:

- Background: Site history & key physical aspects (e.g., site geology, hydrology, topography, land use, etc.);
- Sources of known contaminants;
- The primary release mechanism;
- Secondary contaminant migration;
- Fate and transport considerations; and
- Potential receptors and exposure pathways.

BACKGROUND INFORMATION

Site Definition

The property located at 150 Fulton Avenue, Garden City Park, Nassau County, New York (Fulton Property) is owned by Gordon Atlantic Corporation. It is located within the Garden City Park Industrial Area (GCPIA), Village of Garden City Park, Town of North Hempstead (TNH), Nassau County, New York. The Fulton Property is currently occupied by a business machine support company. Figure 1 shows the location of the Fulton Property.

Operations at the Fulton Property from approximately 1 January 1965 through approximately 31 December 1974 are alleged to have included dry-cleaning of fabric with tetrachloroethylene (PCE), a volatile organic compound (VOC). The Fulton Property has been identified as a contributing source of PCE contamination of groundwater beneath the Site creating a plume of PCE-dominant groundwater contamination in the Upper Glacial and Magothy aquifers which extends to the southwest, impacting certain public supply wells owned by the Village of Garden City (VGC).

In 1996, the Fulton Property was listed on the Registry of Inactive Hazardous Waste Disposal Sites in New York State (Registry) as Site Number 130073. EPA also included the Fulton Property on the National Priorities List (NPL) of Federal Superfund Sites as part of EPA's Fulton Avenue Superfund Site in April 1998.

The NYSDEC defines the Site as the 0.8-acre Fulton Property and environmental conditions, including groundwater contamination that has migrated beyond the Fulton Property boundary (the NYSDEC Site).

In contrast, the EPA Amended OU1 ROD states:

The Fulton Avenue Superfund Site (the Site) includes a 0.8-acre property located at 150 Fulton Avenue, Garden City Park, Nassau County, New York (hereinafter, the Fulton Property). In addition, the Site includes all locations impacted by contamination released at the Fulton Property, and all other contamination impacting the groundwater and indoor air in the vicinity of the Fulton Property. The Site also includes an overlapping groundwater plume, primarily contaminated with trichloroethene (TCE) in the Upper Glacial and Magothy aquifers, the origin(s) of which are not fully known but are under study by EPA as part of the second operable unit (OU2) for the Site.

For clarity, it should be noted that EPA views the VOC impacts in groundwater at the VGC public supply wells Nos. 9, 13 & 14 as the result of one regional plume containing contamination from multiple sources, some known and some unknown as reported in the 2005 Remedial Investigation (RI) Report for the Site. The general historical outlines of the PCE- and TCE-dominant portions of the plume are shown in Figure 2.

The EPA is investigating the TCE-dominant portion of the plume as well as possible other sources of PCE and TCE as part of OU2 for the Site. The EPA currently is performing a Remedial Investigation and Feasibility Study (RI/FS) for OU2, and expects to issue a ROD for OU2 that will constitute the final groundwater remedy for the Site and that will serve as a final decision for OU1.

General Site Characteristics

The Site is situated in the glacial outwash plain on Long Island, New York which is relatively flat, with local relief of approximately 12 feet over a distance of 2,600 feet. Nearer to the Fulton Property, the area is slightly sloping with local relief of approximately five feet.

The soil at the Site is classified as urban land (defined as areas where at least 88% of the surface is covered with asphalt, concrete, or other paving material). Approximately 500 feet of interbedded sands and limited clay lenses overlay Precambrian bedrock. Soils underlying the Site are classified as a sandy loam. There are three aquifers that exist beneath the Site, two of which are affected. The Upper Glacial aquifer is the surficial unit which overlies the Magothy aquifer. The Magothy is the primary source for public water in the area. The Upper Glacial and Magothy aquifers are in hydraulic communication, i.e., as groundwater flows southwesterly beneath the Site, it also moves downward into the Magothy aquifer.

The land uses within the Site are a mix of residential, commercial, and industrial. The Fulton Property is located within the GCPIA which is an industrial/commercial area and the area south of the Long Island Railroad tracks is largely residential, i.e., VGC. Approximately 208,000 people live within three miles of the Fulton Property. There are about 20,000 people living within one-mile of the Fulton Property. Residents within the area obtain their drinking water from public supply wells. The vicinity of the Fulton Property is industrial but residential areas are immediately adjacent to the industrial area.

Storm water runoff from the GCPIA and VGC streets is collected into storm drains and recharged to the Upper Glacial aquifer via local recharge basins. The Garden City Country Club lies south of the residential area. Its manicured grassland surrounds a pond which accepts storm water runoff from the VGC streets surrounding the golf course.

Detailed information concerning the Site geology, hydrogeology, and the nature and extent of impacts to soil and groundwater is presented in the 2005 RI Report, Part 2 of the Amended OU1 ROD, as well as numerous technical documents submitted to EPA during 2011 - 2015 listed in the Administrative Record of the Amended OU1 ROD.

SITE INVESTIGATIVE, REMEDIAL & ADMINISTRATIVE HISTORY

An overview of the Site investigative, remedial and administrative history is presented below. Greater detail can be found in the Amended OU1 ROD.

Beginning in 1986, numerous investigations were conducted by the Nassau County Departments of Health and Public Works to identify the source(s) of VOCs impacting public supply wells in Nassau County located downgradient of the GCPIA. Subsequent investigations undertaken by

NYSDEC identified the Fulton Property as one of several contributing sources of PCE contamination of groundwater beneath the NYSDEC Site which led to listing the Fulton Property on the NYS Registry as well as the NPL.

Although NYSDEC initially assumed the role of lead regulatory agency, the NYSDEC and EPA cooperatively oversaw the implementation of an RI/FS and a Soil Interim Remedial Measure (Soil IRM) described below. NYSDEC and EPA agreed that EPA would be designated as the lead agency for the Fulton Avenue Site at the conclusion of the RI/FS process.

The source of PCE contamination at the Fulton Property was identified as a former drywell which was subject to a Soil IRM that involved soil/sediment removal and subsequent remediation by air sparging (AS) of shallow groundwater and soil vapor extraction (SVE). The former dry well was closed as part of the Soil IRM. The SVE/AS system was operated until NYSDEC Technical and Administrative Guidance Memorandum (TAGM) soil cleanup levels were achieved. The Soil IRM removed an estimated 10,000 pounds of PCE during its period of operation (1999 – 2001). The completion of the Soil IRM was approved by NYSDEC and the dismantling of the SVE system was authorized on 2 January 2002. A sub-slab depressurization system was installed beneath the building at the conclusion of the Soil IRM to mitigate the potential for intrusion of soil vapor containing residual PCE into the existing building. This system remains in operation to protect the indoor air quality.

Between 1999 – 2006, an RI/FS that included an Exposure Pathways Analysis and Baseline Risk Assessment was performed under a NYSDEC Administrative Order on Consent (AOC), Index # W1-0707-94-08. The RI/FS focused on environmental conditions at the Fulton Property and contamination that had migrated beyond the property boundary.

The RI and FS Reports were reviewed by NYSDEC and EPA, and approved under the AOC. After approval, lead-agency status changed from NYSDEC to EPA. EPA subsequently developed a Proposed Remedial Action Plan (PRAP) for OU1 which, following a public comment period, was finalized and presented as a selected remedy in a Record of Decision (ROD) issued on 28 September 2007 (2007 ROD). The 2007 ROD described EPA's preferred action to address the PCE-dominant portion of the plume which included among other things:

- In-Situ Chemical Oxidation (ISCO) treatment of source contamination in groundwater at and near the Fulton Property; and
- Construction and operation of a groundwater extraction and treatment system midway along the spine of the PCE-dominant portion of the plume.

Thereafter, EPA issued a Statement of Work (SOW) for the OU1 RA and commenced negotiation with a number of potentially responsible parties (PRPs) to implement the RA set forth in the 2007 ROD. One of the identified PRPs, Genesco Inc. (Respondent) agreed to implement the OU1 RA and executed a Consent Judgment with EPA.

The Consent Judgment (EPA CJ No. CV–09–3917) (2009 CJ) and attached SOW (2009 SOW) were lodged with the United States District Court for the Eastern District of New York on 10 September 2009. Notice of the same inviting public comment was published in the Federal Register /Vol. 74, No. 179, 17 September 2009. On 18 November 2009, EPA issued notice to proceed initiating the OU1 Remedial Design (RD) and subsequent implementation of the OU1 RA. Although EPA never sought Court entry of the 2009 CJ, the Respondent began implementing the OU1 RD.

In March of 2012, while the OU1 RD was underway, the VGC and the Respondent proposed modifications to the 2007 ROD that would, among other things, eliminate the interim groundwater extraction and treatment system while ensuring the continued operation of the wellhead treatment systems on VGC water supply wells 13 and 14.

Following the Respondent's submittal of several technical evaluations prepared at EPA's request, and after EPA's further evaluation of conditions at the Site, EPA determined that it would be appropriate to amend the 2007 ROD. EPA subsequently developed a new PRAP for OU1 which, following a public comment period, was finalized and presented the current selected remedy in the Amended OU1 ROD for the Site. Therein, the EPA concluded that eliminating the groundwater extraction and treatment system from the OU1 remedy would be appropriate because PCE levels in groundwater reaching the intakes of water supply wells 13 and 14, which had been increasing at the time of the 2007 ROD, instead have been declining since the summer of 2007. The lower PCE levels in groundwater suggest that the extraction well system contemplated in the 2007 ROD is not needed to prevent more highly elevated levels of contamination from reaching wells 13 and 14. The existing treatment systems at VGC water supply wells 13 and 14 have been, and are expected to continue to effectively provide a safe drinking water supply. The attenuating nature of the PCE-dominant portion of the plume indicates that the source of the PCE may be depleting and that the highest levels of contamination have already passed through the well head treatment systems at VGC supply wells 13 and 14. A final decision regarding the groundwater contamination will be made following the EPA's completion of additional investigations at the Site.

In addition, RD sampling conducted by the Respondent at, and in the area around the Fulton Property did not identify PCE source material in the shallow aquifer in the immediate vicinity of the former drywell nor immediately downgradient of the Fulton Property. Consequently, the Amended OU1 ROD also eliminated ISCO treatment of the shallow aquifer at or immediately downgradient of the Fulton Property.

PCE concentrations in the PCE-dominant portion of the plume are generally declining while elevated levels of PCE continue to be present in one monitoring well approximately 400 feet downgradient of the Fulton Property, the source(s) of such PCE are believed to be other unrelated properties in the vicinity. The EPA expects to continue the investigation of potential source material.

During 2015-2016, the 2016 CJ and 2016 SOW were negotiated, signed by the Respondent and EPA, and approved and entered by the United States District Court for the Eastern District of New York on 15 August 2016. Further, the VGC and the Respondent have entered into a separate agreement in *Incorporated Village of Garden City v. Genesco Inc. and Gordon Atlantic Corp.*, Civil Action No. 07-cv-5244 (E.D.N.Y.) whereby, in exchange for a lump sum payment, the VGC has agreed to, among other things:

- Operate VGC water supply wells 13 and 14 with the air stripper treatment systems for 30 years at pumping levels consistent with the 2009 operation of those wells;
- Not to take any action that would reduce the volume, level of treatment or hydraulic control at the wells except with the consent of EPA regardless of whether those wells are needed for a potable water supply; and
- Operate, maintain, repair, and replace equipment of, as necessary, the two air strippers on those wells as called for in the Amended OU1 ROD.

The aforementioned agreement will facilitate the Respondent's performance of the Work in accordance with the Amended OU1 ROD, and the 2016 CJ with attached 2016 SOW, including all terms, conditions and schedules set forth herein or developed and approved thereunder.

CONTAMINANT FATE AND TRANSPORT

The greatest potential for transport of VOCs at the Site is via groundwater migration. The PCE-dominant portion of the plume was found to extend approximately 6,500 feet downgradient of the Fulton Property. The average width of the PCE-dominant portion of the plume was estimated in the 2007 ROD to be about 1,000 feet. PCE in the PCE-dominant portion of the plume extends to a depth of approximately 420 feet, exhibiting an average thickness of approximately 250 feet.

POTENTIAL RECEPTORS AND EXPOSURE PATHWAYS;

For there to be an exposure, there must be a completed pathway through which a receptor (e.g., person, animal or receiving media like surface water) comes into contact with one or more of the identified contaminants of concern. The current land use of the Fulton Property is commercial/industrial, and it is not expected that the land use will change in the foreseeable future. The surrounding properties are also expected to retain their current land use, which is commercial/industrial and residential. In addition, based on existing data, there are no potential exposure pathways for ecological receptors at the Site nor is groundwater is likely to affect any surface water bodies.

The area is served by municipal water which is treated to meet EPA drinking water standards, and it is not likely that the groundwater underlying the Fulton Property or the surrounding commercial/industrial or residential areas will be used privately by individuals for potable purposes in the foreseeable future. However, since the groundwater downgradient of the Fulton Property is used and treated for municipal water supplies and the regional groundwater is designated as a drinking water source, potential exposure pathways considered for contaminated groundwater associated with the Site included:

- ingestion of, dermal contact with and inhalation of vapors released from municipal water during showering/bathing by residents;
- ingestion of groundwater by a current/future worker at the Site but off the Fulton Property; and
- inhalation of VOCs released from the nearby irrigation holding pond that receives occasional water supply well bypass discharge during well maintenance activities by golf course employees/landscapers.

The other exposure pathway considered was the potential for inhalation of indoor air via vapor intrusion into buildings by residents and commercial workers on and off the Fulton Property.

QAPP Worksheet #11: Project/Data Quality Objectives

PROBLEM STATEMENT: Pursuant to the the 2016 CJ and 2016 SOW, this QAPP supports long-term groundwater monitoring that is required to be conducted as part for the OU1 Remedial Action for the Site to evaluate whether or not the following objectives are being met:

- Minimize and/or eliminate the potential for future human exposure to Site contaminants via contact with contaminated drinking water; and
- Help reduce migration of contaminated groundwater.

As discussed in Worksheet #10, following the Respondent's submittal of several technical evaluations prepared at EPA's request, and after EPA's further evaluation of conditions at the Site, EPA determined that it would be appropriate to amend the 2007 ROD. EPA subsequently developed a new PRAP for OU1 which, following a public comment period, was finalized and presented the current selected remedy in the Amended OU1 ROD for the Site. Therein, the EPA concluded that eliminating the groundwater extraction and treatment system from the OU1 remedy would be appropriate because PCE levels in groundwater reaching the intakes of water supply wells 13 and 14, which had been increasing at the time of the 2007 ROD, instead have been declining since the summer of 2007. The lower PCE levels in groundwater suggest that the extraction well system contemplated in the 2007 ROD is not needed to prevent more highly elevated levels of contamination from reaching wells 13 and 14. The existing treatment systems at VGC water supply wells 13 and 14 have been, and are expected to continue to effectively provide a safe drinking water supply. The attenuating nature of the PCE-dominant portion of the plume indicates that the source of the PCE may be depleting and that the highest levels of contamination have already passed through the well head treatment systems at VGC supply wells 13 and 14. A final decision regarding the groundwater contamination will be made following the EPA's completion of additional investigations at the Site.

In addition, RD sampling conducted by the Respondent at, and in the area around the Fulton Property did not identify PCE source material in the shallow aquifer in the immediate vicinity of the former drywell nor immediately downgradient of the Fulton Property. Consequently, the Amended OU1 ROD also eliminated ISCO treatment of the shallow aquifer at or immediately downgradient of the Fulton Property.

PCE concentrations in the PCE-dominant portion of the plume are generally declining while elevated levels of PCE continue to be present in one monitoring well approximately 400 feet downgradient of the Fulton Property, the source(s) of such PCE are believed to be other unrelated properties in the vicinity. The EPA expects to continue the investigation of potential source material.

During 2015-2016, the 2016 CJ and 2016 SOW were negotiated, signed by the Respondent and EPA, and approved and entered by the United States District Court for the Eastern District of New York on 15 August 2016. Further, the VGC and the Respondent have entered into a separate agreement in *Incorporated Village of Garden City v. Genesco Inc. and Gordon Atlantic Corp.*, Civil Action No. 07-cv-5244 (E.D.N.Y.) whereby, in exchange for a lump sum payment, the VGC has agreed to, among other things:

- Operate VGC water supply wells 13 and 14 with the air stripper treatment systems for 30 years at pumping levels consistent with the 2009 operation of those wells;
- Not to take any action that would reduce the volume, level of treatment or hydraulic control at the wells except with the consent of EPA regardless of whether those wells are needed for a potable water supply; and
- Operate, maintain, repair, and replace equipment of, as necessary, the two air strippers on those wells as called for in the Amended OU1 ROD.

The aforementioned agreement will facilitate the Respondent's performance of the Work in accordance with the Amended OU1 ROD, and the 2016 CJ with attached 2016 SOW, including all terms, conditions and schedules set forth herein or developed and approved thereunder.

GOALS OF THE WORK: A Long-Term Groundwater Monitoring Plan will be developed to determine the long-term effectiveness of the OU1 remedy. In particular:

- Assessing whether the concentrations and extent of groundwater contaminants related to OU1 are continuing to decrease or whether they pose a risk of exceeding the treatment capacity of the VGC water supply wells 13 and 14 so as to warrant upgrades to the treatment systems; and
- To confirm that the PCE-dominant portion of the plume continues to be captured and treated by VGC water supply wells 13 and 14 and not migrating past those wells toward the Franklin Square wells located further downgradient.

Other monitoring actions will be confirming that the VGC:

- Continues to operate VGC water supply wells 13 and 14 with the air stripper treatment systems for 30 years at pumping levels consistent with the 2009 operation of those wells;
- Does not to take any action that would reduce the volume, level of treatment or hydraulic control at the wells except with the consent of EPA regardless of whether those wells are needed for a potable water supply; and
- Continues to operate, maintain, repair, and replace equipment of, as necessary, the two air strippers on those wells as called for in the Amended OU1 ROD.

KEY INFORMATION INPUTS: The work will primarily rely on groundwater monitoring well data set which will be supplemented by routine VGC water supply well pumpage and sampling results provided by the VGC Department of Public Works. Those data will be used to evaluate the long-term effectiveness of the remedy and VGC conformance to agreed-upon terms as listed above in #2.

BOUNDARIES OF THE WORK: The 2016 SOW prepared by EPA establishes a long-term groundwater monitoring and reporting program. Groundwater samples for VOC analysis will be collected from wells located within the footprint of the PCE-dominant portion of the plume extending from the Garden City Park Industrial Area within which the Fulton Property is located to the multi-level wells on the Garden City Country Club golf course that are located downgradient of VGC water supply wells 13 & 14.

ANALYTIC APPROACH/ DATA ACQUISITION OVERVIEW: The 2016 SOW establishes a long-term groundwater monitoring and reporting program. Groundwater samples will be collected from wells located within the footprint of the PCE-dominant portion of the plume extending from the Garden City Park Industrial Area within which the Fulton Property is located to the multi-level wells on the Garden City Country Club golf course that are located downgradient of VGC water supply wells 13 & 14.

Well sampling frequencies are based on relative position within the groundwater plume and proximity to VGC water supply wells 13 & 14 where the wells have been divided into three groups and will be sampled according to the schedules set forth below. All groundwater samples shall be analyzed for Target Compound List VOCs using EPA Method 8260C or another method as required by EPA. See Worksheet #17: Sample Design & Rationale, for specific details along with Worksheets #18-28 & 30 that specify both sampling and analytical design requirements.

Groundwater monitoring will be performed to determine the long-term effectiveness of the OU1 remedy, including assessing whether the concentrations and extent of groundwater contaminants related to OU1 are continuing to decrease or whether they pose a risk of exceeding the treatment capacity of the VGC water supply wells 13 & 14 so as to warrant upgrades to the existing treatment systems. The groundwater monitoring data set will be supplemented by routine VGC water supply well sampling results provided by the VGC Department of Public Works.

PERFORMANCE/ACCEPTANCE CRITERIA: Field and laboratory performance and data quality acceptance criteria are guided by Data Quality Objectives (DQOs) which are qualitative and quantitative criteria required supporting the decision-making process. DQOs define the uncertainty in a data set

and are expressed in terms of precision, accuracy, representativeness, completeness, and comparability (PARCC). The DQOs apply to both characterization and confirmation samples at the site. These parameters are defined as follows:

- **Precision:** a measure of mutual agreement among measurements of the same property usually under prescribed similar conditions. Precision is best expressed in terms of the standard deviation. Various measures of precision exist depending upon the "prescribed similar conditions".
- **Accuracy:** the degree of agreement of a measurement (or an average of measurements) with an accepted reference of "true value". Accuracy is one estimate of the bias in a system.
- **Representativeness:** expresses the degree to which data accurately and precisely represent a characteristic of a population, parameter variations at a sampling point, a process condition, or an environmental condition.
- **Completeness:** a measure of the amount of valid data obtained from a measurement system compared to the amount that was expected to be obtained under correct normal conditions
- **Comparability:** expresses the confidence with which one data set can be compared with another. Comparability is a qualitative, not quantitative measurement, as in the case of accuracy and precision. Comparability is assessed by reviewing results or procedures for data that do not agree with expected results.

It is the responsibility of the field team to collect representative and complete samples. It is the responsibility of the analytical laboratory personnel to analyze these samples using accepted protocols resulting in data that meet PARCC standards.

Field Sampling Quality Objectives: The overall quality of sample results depends on proper sample management. Management of samples begins prior to sample collection and continues throughout the analytical and data validation process. To ensure samples are collected and managed properly and consistently, field procedures for sample collection activities have been developed for the project. The laboratory also has procedures that ensure a proper and consistent analytical process.

Field procedures include descriptions of equipment and procedures required to perform a specific task. The purpose is to increase reproducibility and to document each of the steps required to perform the task. Approved and correctly implemented field procedures should produce data of acceptable quality that meet project DQOs. See Worksheets #14, 16-22, 26, 27, 29 & 30.

Laboratory Data Quality Objectives: Accutest Laboratories of Dayton, New Jersey is the selected project laboratory. This laboratory will demonstrate analytical precision and accuracy by the analysis of laboratory duplicates and by adherence to accepted manufacture and procedural methodologies. See Worksheets #12, 15, 19, 23 – 28 & 30.

Laboratory performance will be evaluated by the Project Coordinator and the Project Quality Assurance Officer during data reduction. The evaluation will include a review of all deliverables for completeness and accuracy when applicable. This evaluation process is outlined in Worksheets #31-37.

DETAILED PLAN FOR OBTAINING DATA: Groundwater monitoring well sampling frequencies are based on relative position within the groundwater plume and proximity to VGC water supply wells 13 & 14 where the wells have been divided into three groups and will be sampled according to the schedules set forth below. All groundwater samples shall be analyzed for Target Compound List VOCs using EPA Method 8260C or another method as required by EPA. See Worksheet #17: Sample Design & Rationale, for specific details along with Worksheets #18-28 & 30 that specify both sampling and analytical design requirements.

QAPP Worksheet #12: Measurement Performance Criteria

Matrix	Aqueous
Analytical Group	Volatile Organic Compounds
Concentration Level	**All**

Sampling Procedure[1]	**Analytical Method/SOP[2]**	**Data Quality Indicators (DQIs)**	**Measurement Performance Criteria**	**QC Sample and/or Activity Used to Assess Measurement Performance**	**QC Sample Assesses Error for Sampling (S), Analytical (A) or Both (S & A)**
All SOPs See Attachment B	8260C/EMS8260C-18 See Attachment C	Laboratory Accuracy/bias-Contamination Control	Concentration of the target analyte must be less than the RL.	Method Blank	A
		Precision	Various per compound; see Worksheet #15	Laboratory Duplicate, Matrix Spike Duplicate (MSD), Field Duplicates	A & S
		Accuracy/bias Matrix effects	Various per compound; see Worksheet #15	Matrix Spike	A & S
		Laboratory Accuracy	The laboratory control sample will be used by the laboratory to assess efficiency of the instrument. Various per compound see Worksheet #15	Laboratory Control Sample	A
		Accuracy/bias	± 30% of true value	Initial Calibration Verification	A
		Accuracy/bias	± 20% of true value	Continuing Calibration Verification	A
		Completeness	90%	Sample Count	S
		Representativeness/ bias (contamination)	<RL; except for methylene chloride, acetone, and 2-butanone, which must be 2 times the RL	Trip Blank Field Blank	A & S

1. See Attachment B & Worksheet #21 for detailed information.
2. See Attachment C & Worksheet #23 for detailed information.
3. Only data undergoing validation may be rejected.

QAPP Worksheet #13: Secondary Data Uses & Limitations

Secondary Data	Data Source	Data Generator(s)	How Data Will Be Used	Limitations on Data Use
VGC Public Supply Well Monthly Sampling, Analytical And Pumpage Data	VGC Department of Public Works - Water Department	VGC Water Department & H2M Laboratories, monthly sampling	Monitoring the long-term effectiveness of the OU1 remedy, including assessing whether the concentrations and extent of groundwater contaminants related to OU1 are continuing to decrease or whether they pose a risk of exceeding the treatment capacity of the VGC water supply wells 13 and 14 so as to warrant upgrades to the treatment systems.	N/A
EPA OU2 Investigative Data	EPA & Various Contractors	EPA & CLP laboratories		
Regional Hydrogeologic Information	United States Geological Survey			

QAPP Worksheet #14/16: Project Tasks & Schedule

Key Project Task	Description
Field Sampling Mobilization/Demobilization	Access arrangements, notifications to Garden City Country Club, VGC Department of Public Works, VGC Police Department, VGC Water Department and owner of Fulton Property for use of the staging area, subcontractor procurement, laboratory coordination for groundwater sample collection, and sampling equipment rental, decontamination, calibration & return.
Environmental Sample Collection	Collection of groundwater monitoring well samples.
Laboratory Analysis	Accutest Laboratories will perform all laboratory analyses. The specific criteria for each project sampling task are detailed in Worksheet #18.
Quality Control	QA/QC sampling requirements are outlined in Worksheet #20. All project personnel are expected to review and comply with the QA/QC protocol and guidance presented in this document.
Secondary Data Acquisition	Secondary Data: See Worksheet #13.
Data Management	After appropriate QA/QC review, data will be compiled in an electronic database and presented in the quarterly progress, letter reports and the RD and RA Reports.
Data Review	QA/QC review and validation of data will be managed by ERM QA officer.
Documentation & Records	All documents will be managed and retained by the ERM Project Coordinator in the central project file.
Assessments/Audits	QA/QC audits will be performed by Project Coordinator, ERM Principal In Charge and ERM QA Officer.
Five-Year Reviews	EPA will perform Site condition reviews on a 5-year frequency.
Institutional/Engineering Control Certifications	Certifications that any institutional and engineering controls are in-place and being complied with will be provided by the Respondent every five years to coincide with the EPA Five-Year Reviews.

The above tasks are primarily related to long-term, recurring groundwater monitoring and reporting. The associated schedules and key deliverables are outlined in the OU1 RA project schedules presented in Figure 3.

QAPP Worksheet #15: Project Action, Laboratory-Specific Detection/Quantitation & Control Limits

Sample Type: Groundwater Monitoring Well Samples
Matrix: Aqueous
Concentration Level: Low
Analytical Group: VOCs

Target Compound List (TCL) [1]	CAS Number [2]	Project Action Limit (µg/l) [3]	Achievable Laboratory Limits [4]		Laboratory Control Limits (%)			
			Reporting Limit (µg/l)	Method Detection Limit (µg/l)	Matrix Spike/Matrix Spike Duplicate	Relative Percent Difference	Blank Spike	Duplicates
1,1,1-Trichloroethane	71-55-6	5	1	0.22	70-147	13	83-134	20
1,1,2,2-Tetrachloroethane	79-34-5	5	1	0.39	70-122	10	74-119	20
1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	5	5	1.2	56-179	17	67-159	20
1,1,2-Trichloroethane	79-00-5	1	1	0.28	78-122	10	84-119	20
1,1-Dichloroethane	75-34-3	5	1	0.21	71-131	12	79-124	20
1,1-Dichloroethene	75-35-4	5	1	0.2	57-149	14	69-136	20
1,2,3-Trichlorobenzene	87-61-6	5	1	0.5	68-135	13	73-130	20
1,2,4-Trichlorobenzene	120-82-1	5	1	0.5	73-136	13	79-129	20
1,2-Dibromo-3-chloropropane	96-12-8	0.04	2	0.69	66-128	12	71-124	20
1,2-Dibromoethane	106-93-4	0.0006	1	0.22	77-119	10	79-120	20
1,2-Dichlorobenzene	95-50-1	3	1	0.23	78-122	10	84-117	20
1,2-Dichloroethane	107-06-2	0.6	1	0.39	72-135	11	81-127	20
1,2-Dichloropropane	78-87-5	1	1	0.33	76-122	11	81-118	20
1,3-Dichlorobenzene	541-73-1	3	1	0.19	77-120	10	83-114	20
1,4-Dichlorobenzene	106-46-7	3	1	0.21	75-122	10	83-115	20
2-Butanone	78-93-3	50	10	1.9	57-141	16	71-127	20
2-Hexanone	591-78-6	50	5	1.5	63-135	13	71-125	20
4-Methyl-2-pentanone	108-10-1	5	5	1.2	71-131	12	77-123	20
Acetone	67-64-1	50	10	5	39-143	16	49-137	20
Benzene	71-43-2	1	0.5	0.14	54-138	11	80-118	20
Bromochloromethane	74-97-5	5	1	0.46	79-123	11	84-120	20
Bromodichloromethane	75-27-4	50	1	0.55	78-123	10	83-119	20
Bromoform	75-25-2	50	1	0.34	71-128	11	77-126	20
Bromomethane	74-83-9	5	2	0.46	52-140	16	57-133	20
Carbon disulfide	75-15-0	60	2	0.33	51-156	14	61-144	20

Target Compound List (TCL) [1]	CAS Number [2]	Project Action Limit (µg/l) [3]	Achievable Laboratory Limits [4]		Laboratory Control Limits (%)			
			Reporting Limit (µg/l)	Method Detection Limit (µg/l)	Matrix Spike/Matrix Spike Duplicate	Relative Percent Difference	Blank Spike	Duplicates
Carbon tetrachloride	56-23-5	5	1	0.54	65-148	13	77-134	20
Chlorobenzene	108-90-7	5	1	0.17	76-125	10	85-116	20
Chloroethane	75-00-3	5	1	0.44	55-142	16	62-133	20
Chloroform	67-66-3	7	1	0.23	77-131	11	84-125	20
Chloromethane	74-87-3	5	1	0.96	43-144	17	51-134	20
cis-1,2-Dichloroethene	156-59-2	5	1	0.31	59-134	11	79-118	20
cis-1,3-Dichloropropene	10061-01-5	0.4	1	0.19	80-124	10	86-119	20
Cyclohexane	110-82-7	5	5	0.73	41-160	18	60-134	20
Dibromochloromethane	124-48-1	50	1	0.23	77-124	10	82-121	20
Dichlorodifluoromethane	75-71-8	5	2	0.7	31-155	20	43-135	20
Ethylbenzene	100-41-4	5	1	0.2	48-143	11	84-115	20
Isopropylbenzene	98-82-8	5	1	0.16	70-131	12	80-121	20
m,p-Xylene	179601-23-1	5	1	0.42	50-144	12	85-117	20
Methyl acetate	79-20-9	5	5	1.5	60-127	13	69-126	20
Methyl tert-butyl ether	1634-04-4	10	1	0.34	70-127	11	80-121	20
Methylcyclohexane	108-87-2	5	5	0.78	43-163	17	61-138	20
Methylene chloride	75-09-2	5	2	1	69-127	12	75-122	20
o-Xylene	95-47-6	5	1	0.21	62-137	12	85-119	20
Styrene	100-42-5	5	1	0.27	76-128	11	86-118	20
Tetrachloroethene	127-18-4	5	1	0.23	55-144	12	70-134	20
Toluene	108-88-3	5	1	0.23	61-136	11	84-117	20
trans-1,2-Dichloroethene	156-60-5	5	1	0.36	64-134	12	73-125	20
trans-1,3-Dichloropropene	10061-02-6	0.4	1	0.26	78-124	11	84-121	20
Trichloroethene	79-01-6	5	1	0.26	62-141	11	84-120	20
Trichlorofluoromethane	75-69-4	5	2	0.58	50-152	16	63-133	20
Vinyl chloride	75-01-4	2	1	0.33	44-136	16	55-121	20
Xylene (total)	1330-20-7	5	1	0.21	56-141	11	85-117	20

1. Target Compound List (TCL) from Multi-Media, Multi-Concentration Organics Analysis, SOM01.2, Exhibit C, 1.0.
2. Chemical Abstracts Service (CAS) Registry Number.
3. New York State Ambient Ground Water Quality Standards and Guidance Values (AWGS) as listed in TOGS 1.1.1 (June 1998) and in 6 NYCRR 703.5.
4. As per Accutest Laboratories, 2235 Route 130, Dayton, New Jersey 08810.

QAPP Worksheet #17: Sampling Design & Rationale

This section describes the rationale for, and specific details of the long-term groundwater monitoring and reporting program designed by EPA and specified in the 2016 SOW. Groundwater monitoring will be performed to determine the long-term effectiveness of the OU1 remedy, including assessing whether the concentrations and extent of groundwater contaminants related to OU1 are continuing to decrease or whether they pose a risk of exceeding the treatment capacity of the VGC water supply wells 13 & 14 that could warrant upgrades to the treatment systems. Groundwater samples will be collected from wells located within the footprint of the PCE-dominant portion of the plume extending from the Garden City Park Industrial Area within which the Fulton Property is located to the multi-level wells on the Garden City Country Club Golf Course that are located downgradient of VGC water supply wells 13 & 14. These wells were installed at locations and depths that encompass the PCE-dominant portion of the plume in three dimensions inclusive of wells that are generally aligned with the longitudinal axis of the plume, i.e., biased toward the core of the plume. The groundwater monitoring data set will be supplemented by collection of QA/QC samples to support data review/validation and confirm DQOs are being met, as well as routine VGC water supply well sampling results provided by the VGC Department of Public Works.

In accordance with the requirements set forth in the 2016 SOW, groundwater samples shall be collected and analyzed from the following wells at the Site:

GCP-01S/D, GCP-08, GCP-15S, GCP-18S/D MW15A-B, MW20A-C, MW21A-D, MW22A-C, MW23A-D, MW26A-H, MW27A-H & MW28A-H.

Local groundwater monitoring and public supply well locations and the general historical outline of the PCE- and the known extent of the TCE-dominant portion of the plume are shown in Figure 2. Groundwater monitoring well locations are shown in the figure/photo log in Attachment D. Well sampling frequencies are based on relative position within the groundwater plume and proximity to VGC water supply wells 13 & 14 where the wells have been divided into three groups and will be sampled according to the schedules set forth below. All groundwater samples shall be analyzed for Target Compound List VOCs using EPA Method 8260C or another method as required by EPA.

Group 1 Wells consist of the following 18 wells: GCP-01S/D, GCP-08, GCP-18S/D, GCP-15S, MW15A-B, MW20A-C, MW22A-C & MW23A-D that shall be sampled at the following frequency:

- The first sampling round shall commence within 20 days of EPA approval of the RD Work Plan, and
- Sampling shall be performed every 24 months thereafter.

Group 2 Wells are the following four wells: MW21A-D that shall be sampled and analyzed at the following frequency:

- Year 1 – quarterly, to commence approximately 30 days after completion of construction of MW21D and MW28A-H
- Year 2 – semi-annually (every six months)
- Year 3 – semi-annually (every six months)
- Year 4 – no sampling and analysis
- Year 5 (and beyond) – once in year 5 and every 24 months thereafter.

Group 3 Wells are the following 24 wells: MW26A-H, MW27A-H & MW28A-H that shall be sampled and analyzed at the following frequency:

- Year 1 – quarterly, to commence approximately 30 days after completion of construction of MW21D and MW28A-H
- Year 2 –9 of 24 zones with EPA approval of the specific zones, semi-annually (every six months)
- Year 3 – 9 of 24 zones with EPA approval of the specific zones, semi-annually (every six months)
- Year 4 – no sampling and analysis
- Year 5 (and beyond) – once in year 5 and every 24 months thereafter.

See Tables 1 & 2 and Worksheets #18, 19, 20, 21, 22, 26, 27 & 30 for specific information regarding well construction information, sampling methods/requirements, sample containers, preservation & hold times, field QC requirements, field SOPs, and field equipment calibration, maintenance, testing & inspection requirements.

QAPP Worksheet #18: Sampling Locations & Methods

Sampling Location	Matrix	Sample Depth (feet)	Analytical Group	Analytical Method	Number of Samples [1]	Sampling SOP Reference [2]	Rationale for Sampling Locations
Monitoring Wells		Tables 1 & 2 [3]			**See Preceding Worksheet #17** Number of Samples and Schedule Varies By Group & Year	SOP 1: Water Level Measurement Procedures SOP 2: Groundwater Sampling Procedures SOP 3: Field Blanks SOP 4: Trip Blanks SOP 5: Decontamination Procedures SOP 6: Waste Management & Disposal	Described In Worksheet #17
GCP01	Aqueous	54	TCL VOCs	8260C			
GCP01D	Aqueous	110	TCL VOCs	8260C			
GCP08	Aqueous	55	TCL VOCs	8260C			
GCP15S	Aqueous	49	TCL VOCs	8260C			
MW15A	Aqueous	145	TCL VOCs	8260C			
MW15B	Aqueous	355	TCL VOCs	8260C			
GCP18D	Aqueous	118	TCL VOCs	8260C			
GCP18S	Aqueous	46.5	TCL VOCs	8260C			
MW20A	Aqueous	145	TCL VOCs	8260C			
MW20B	Aqueous	249	TCL VOCs	8260C			
MW20C	Aqueous	405	TCL VOCs	8260C			
MW21A	Aqueous	125	TCL VOCs	8260C			
MW21B	Aqueous	335	TCL VOCs	8260C			
MW21C	Aqueous	395	TCL VOCs	8260C			
MW21D	Aqueous	TBD	TCL VOCs	8260C			
MW22A	Aqueous	125	TCL VOCs	8260C			
MW22B	Aqueous	275	TCL VOCs	8260C			
MW22C	Aqueous	315	TCL VOCs	8260C			
MW23A	Aqueous	265	TCL VOCs	8260C			
MW23B	Aqueous	349	TCL VOCs	8260C			
MW23C	Aqueous	403	TCL VOCs	8260C			
MW23D	Aqueous	447	TCL VOCs	8260C			
MW26A	Aqueous	229	TCL VOCs	8260C			

Sampling Location	Matrix	Sample Depth (feet)	Analytical Group	Analytical Method	Number of Samples [1]	Sampling SOP Reference [2]	Rationale for Sampling Locations
MW26B	Aqueous	271.5	TCL VOCs	8260C	**See Preceding Worksheet #17** Number of Samples and Schedule Varies By Group & Year	SOP 1: Water Level Measurement Procedures SOP 2: Groundwater Sampling Procedures SOP 3: Field Blanks SOP 4: Trip Blanks SOP 5: Decontamination Procedures SOP 6: Waste Management & Disposal	Described In Worksheet #17
MW26C	Aqueous	325	TCL VOCs	8260C			
MW26D	Aqueous	350.5	TCL VOCs	8260C			
MW26E	Aqueous	377	TCL VOCs	8260C			
MW26F	Aqueous	410.5	TCL VOCs	8260C			
MW26G	Aqueous	443	TCL VOCs	8260C			
MW26H	Aqueous	478.5	TCL VOCs	8260C			
MW27A	Aqueous	197	TCL VOCs	8260C			
MW27B	Aqueous	241.5	TCL VOCs	8260C			
MW27C	Aqueous	289	TCL VOCs	8260C			
MW27D	Aqueous	329.5	TCL VOCs	8260C			
MW27E	Aqueous	369	TCL VOCs	8260C			
MW27F	Aqueous	413.5	TCL VOCs	8260C			
MW27G	Aqueous	443	TCL VOCs	8260C			
MW27H	Aqueous	476.5	TCL VOCs	8260C			
MW28A	Aqueous	97	TCL VOCs	8260C			
MW28B	Aqueous	219.5	TCL VOCs	8260C			
MW28C	Aqueous	317	TCL VOCs	8260C			
MW28D	Aqueous	345.5	TCL VOCs	8260C			
MW28E	Aqueous	367	TCL VOCs	8260C			
MW28F	Aqueous	403.5	TCL VOCs	8260C			
MW28G	Aqueous	439	TCL VOCs	8260C			
MW28H	Aqueous	490.5	TCL VOCs	8260C			

1. QA/QC samples collected at the frequency specified on Worksheet #20.
2. See Attachment B & Worksheet #21 for additional information.
3. Detailed well construction and relevant sampling information is provided in Tables 1 & 2.

QAPP Worksheet #19 & 30: Sample Containers, Preservation & Hold Times

Sample Location	Matrix	Analytical Group	Preparation & Analytical Method/SOP Reference [1]	Containers (number, size, and type)	Preservation Requirements	Maximum Holding Time [2] (preparation/analysis)
Groundwater Monitoring Samples	Aqueous	TCL VOCs	8260C /EMS8260C-18	3 – 40 ml glass VOA vials	Cool 4°C, pH<2 (HCl)	NA/10 days

1. See Worksheet #23 for additional information.
2. New York State Analytical Services Protocol (NYS ASP) holding times and are from date of sample receipt.

Analytical Services

Matrix	Analytical Group	Concentration Level	Sample Location/ID Numbers	Analytical SOP	Laboratory Data Package Turnaround [1]	Laboratory/Certification/ Organization Contact	Backup Laboratory/ Organization
Aqueous	TCL VOCs	All	As Noted In Preceding Worksheets #17 & #18, The Number of Samples & Sampling Schedule Varies By Group & Year	Accutest SOP EMS8260C-18: Method 8260C Volatile Organic Compounds By Gas Chromatography/ Mass Spectometry (GC/MS) See Attachment C	21 days	Accutest Laboratories 2235 Route 130 Dayton, New Jersey 08810 NY Cert 10983 DoD ELAP (LAB L2248) Current NYSDOH Certificates of Approval For Laboratory Service with expiry of 4/1/19 is provided in Attachment C Tammy McCloskey Accutest Project Manager 732-355-4562	It is not anticipated that a backup laboratory will be required. However Accutest has an extensive laboratory network. The Acutest New England facility follows all QA/QC protocol as the Accutest New Jersey facility. 295 Technology Center West Building One Malborough, MA 01752 508-481-6200 NY Cert 11791

1. Final laboratory deliverable will be a NYSDEC Category B deliverable.

QAPP Worksheet #20: Field QC Summary

Sample Location	Matrix	Analytical Group	Analytical & Preparation SOP Reference [1]	No. of Sampling Locations	Blind Field Duplicate Samples	MS/MSD Pairs	Field Equipment Blanks	Trip Blanks	PT Samples	Total No. of Samples to Lab
Groundwater Monitoring Samples As Listed In Worksheet #18	Aqueous	TCL VOCs	8260C / EMS8260C-18	As Noted In Preceding Worksheets #17 & #18, The Number of Samples & Sampling Schedule Varies By Group & Year	1 minimum frequency of 1 out of every 20 samples.	1 minimum frequency of 1 out of every 20 samples.	Equipment blanks shall be collected daily after the equipment has been deconned.	Each cooler of samples sent to the laboratory for analysis containing VOC samples shall contain a trip blank	None	
				>1,000	>50	>50	>50	>50		>1,200

TBD: To Be Determined

1. Specify the appropriate reference letter or number from the Analytical SOP References table (Worksheet #23).

BLIND FIELD DUPLICATES

Blind field duplicate samples are two (or more) field samples taken at the same time in the same location. They are intended to represent the same population and are taken through all steps of the analytical procedure in an identical manner. These samples are used to assess precision of the entire data collection activity, including sampling, analysis, and site heterogeneity. One of the samples is given identification such that the laboratory does not know the true location of the sample. Blind field duplicate samples are collected simultaneously or in immediate succession, using identical recovery techniques, and are treated in an identical manner during storage, transportation, and analysis. The Field Team Leader shall assign to the sample containers a unique identification number in the field. Specific locations should be designated for collection of Blind field duplicate samples prior to the beginning of sample collection. A minimum of one Blind field duplicate sample shall be included for every 20 field samples per matrix and evaluated as detailed on Worksheet #28.

MATRIX SPIKE/MATRIX SPIKE DUPLICATE

The matrix spike (MS) and matrix spike duplicate (MSD) is an aliquot of sample spiked with known concentrations of all target analytes. The spiking occurs prior to sample preparation and analysis. Each analyte in the MS and MSD shall be spiked at a level less than or equal to the midpoint of the calibration curve for each analyte. The MS/MSDs are used to document potential matrix effects. A minimum of one MS and one MSD shall be analyzed for every 20 samples. The performance of the MS and MSD is evaluated as detailed on Worksheet #28.

FIELD EQUIPMENT BLANK

The field equipment blank is a sample of American Society for Testing and Materials (ASTM) Type II reagent grade water or organic-free water poured into or over or pumped through the sampling device, collected in a sample container, and transported to the laboratory for analysis. These may also be called rinse blanks or rinsate blanks. In instances where dedicated sampling equipment is used for sample collection, equipment blanks will not be collected. In these instances, field blanks will be used to assess field QC procedures. Equipment blanks are used to assess the effectiveness of equipment decontamination procedures. Equipment blanks shall be collected daily, immediately after the equipment has been decontaminated after each sampling event. The equipment blank samples shall be analyzed for all laboratory analytes requested for the environmental samples collected at the site. Results associated with a contaminated blank shall be qualified accordingly.

TRIP BLANK

The trip blank consists of a VOC sample vial filled in the laboratory by the laboratory with ASTM Type II reagent grade or organic-free water, transported to the sampling site, handled like an environmental sample and returned to the laboratory for analysis. Trip blanks are not opened in the field. Trip blanks are analyzed for VOCs only. Trip blanks are used to assess the potential introduction of contaminants from sample containers or during the transportation and storage procedures. Each cooler of samples sent to the laboratory for analysis containing VOC samples shall contain a trip blank. Trip blanks will be evaluated as detailed on Worksheet #28.

PROFICIENCY TESTING (PT) SAMPLES

PT samples will not be analyzed for this project.

QAPP Worksheet #21: Field SOPs

Reference Number	Title, Revision Date and/or Number	Originating Organization	Equipment Type	Modified for Project Work? (Check if yes)	Comments
SOP-1	Water Level Measurement Procedures	ERM	N/A	☐	Attachment B
SOP-2	Groundwater Sampling Procedures	ERM	N/A	☐	Attachment B
SOP-3	Field Blanks	ERM	N/A	☐	Attachment B
SOP-4	Trip Blanks	ERM	N/A	☐	Attachment B
SOP-5	Decontamination Procedures	ERM	N/A	☐	Attachment B
SOP-6	Waste Management and Disposal	ERM	N/A	☐	Attachment B

QAPP Worksheet #22: Field Equipment Calibration, Maintenance, Testing & Inspection

Field Equipment	Calibration Activity	Maintenance Activity	Daily Testing Activity	Daily Inspection Activity	Acceptance Criteria	Corrective Action	Responsible Person	SOP Reference[1]
Photo Ionization Detector (PID) MinRAe 2000 or equivalent	2-point calibration with isobutylene & zero gas	Cleaning as required and replacement of consumable filters. All maintenance to be performed by equipment rental facility	Test operation of unit comparable to a known calibration standard gas before each use	Condition & operation of unit will be inspected before each use	0 ppm fresh air; 100 ppm Isobutylene –within ±10% of gas concentration	Contact equipment rental firm	Field Team Leader	N/A, reference manufacturer instructions
Water Quality Instrument: dissolved oxygen, temperature conductivity, pH and oxidation-reduction potential (ORP) Horiba U-52 Flow Cell or equivalent	Calibrate with rental facility supplied standard(s)	All maintenance to be performed by equipment rental facility	Test operation of unit comparable to a known calibration standard	Condition & operation of unit will be inspected before each use	+/- 0.03 mg/l for DO, +/- 0.1 pH unit, +/- 0.03% for conductivity, +/- 0.15 C for temp, +/- 1 mv for ORP +/- 5 NTU for tubdity (assumes low range calibration w/ 100 NTU or less standards)	Contact equipment rental firm	Field Team Leader	N/A, reference manufacturer instructions

FIELD INSTRUMENT PREVENTATIVE MAINTENANCE

Preventative maintenance of field instruments will include cleaning after each use and replacement of consumable components such as used filters. Field instruments will also be examined prior to each mobilization for field activities to identify maintenance issues. If maintenance issues exist, maintenance will be performed by the equipment rental facility. The equipment rental facility will be responsible for providing a timely replacement for any malfunctioning equipment.

CALIBRATION PROCEDURES AND FREQUENCY

Before a field instrument is used, the calibration will be verified using standard reference materials. The calibration verification may range from a single point to multiple points. The concentration of the standard, reference identification number, instrument response, instrument identification number, date, and time will be recorded on the daily instrument calibration log and referenced in the site field book. The calibration verification will be performed at least daily, or more frequently as warranted by field conditions. Instruments which do not meet minimum requirements for calibration will not be used and will be replaced by a properly calibrated instrument. It is anticipated that all field instruments which will require calibration will be provided by an equipment rental vendor. The specific model of the instrument provided may vary and the manufacturer's calibration and maintenance instructions should be referenced.

QAPP Worksheet #23: Analytical SOPs

Analytical Group	Matrix	Analytical SOP Title [1]	Analytical SOP Document Number	Analytical SOP Revision Number	Analytical SOP Revision Date	Organization Performing Analysis	Definitive or Screening Data	Modified for Project Work?
VOCs	Aqueous	Method 8260C, Volatile Organics by gas chromatography/mass spectrometry (GC/MS)	EMS8260C-18	18	04/13/17	Accutest	Definitive	No

1. See Attachment C.

QAPP Worksheet #24: Analytical Instrument Calibration

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action (CA)	Person Responsible for CA [1]	SOP Reference [2]
GC/MS HP 5890/5970 HP 6890/5973 Agilent 6890/5975	Initial Multi point with verification	As Required	target compounds <20% RSD, or Corr Coeff R ≥ 0.99, meet min.RF	Instrument maintenance, standard, inspection, recalibration	Laboratory Analyst	EMS8260C-18
	Initial calibration verification (ICV)	After every initial calibration	≤ 30% Diff			
	Continuing Calibration Verification (CCV)	Daily	≤ 20 % Diff			

1. Each instrument has a different analyst.
2. See Attachment C & Worksheet #23 for additional information.

QAPP Worksheet #25: Analytical Instrument/Equipment Maintenance, Testing & Inspection

Instrument/ Equipment	Maintenance Activity	Inspection Activity	Frequency	Acceptance Criteria	Corrective Action	Responsible Person [1]	SOP Reference[2]
GC/MS HP 5890/5970 HP 6890/5973 Agilent 6890/5975	Bake Purge tube, trap, transfer line, clip column	Leak test, column and injection port inspection, source insulator integrity	Daily or as needed	Passing BFB and CCV, passing internal standards response	Perform maintenance, check standards, recalibrate	Laboratory Analyst	EMS8260C-18

1. Each instrument has a different analyst.
2. See Attachment C & Worksheet #23 for additional information.

QAPP Worksheet #26 & 27: Sample Handling, Custody & Disposal

SAMPLE COLLECTION, PACKAGING, AND SHIPMENT
Sample Collection (Personnel/Organization): Brice Lynch, P.G. / ERM
Sample Packaging (Personnel/Organization): Brice Lynch, P.G. / ERM
Coordination of Shipment (Personnel/Organization): Brice Lynch, P.G. / ERM
Type of Shipment/Carrier: Accutest Laboratories employee/courier or Priority Overnight / Federal Express
SAMPLE RECEIPT AND ANALYSIS
Sample Receipt (Personnel/Organization): Sample Custodian / Accutest Laboratories (Dayton, New Jersey)
Sample Custody and Storage (Personnel/Organization): Sample Custodian / Accutest Laboratories (Dayton, New Jersey)
Sample Preparation (Personnel/Organization): Individual Department Heads / Accutest Laboratories (Dayton, New Jersey)
Sample Determinative Analysis (Personnel/Organization): Project Manager – Accutest Laboratories (Dayton, New Jersey)
SAMPLE ARCHIVING
Field Sample Storage (# of days from sample collection): Samples collected in the field will be preserved as specified in Worksheet #19 and placed in a chilled cooler for priority overnight shipment to the analytical laboratory. It is the responsibility of the sample collection personnel to maintain appropriate custody of the cooler, ensure samples are packed appropriately to prevent breakage and ensure that the samples are preserved appropriately (e.g., chilled on ice). If special circumstances arise and the samples cannot be shipped the same day of sample collection, it is the sampler's responsibility to maintain appropriate custody and the temperature of the cooler until the samples are shipped the next day. Sample holding times and preservation methods are presented in Table #19.
Sample Extract/Digestate Storage (# of days from extraction/digestion): See Worksheet #19
Biological Sample Storage (No. of days from sample collection): N/A
SAMPLE DISPOSAL
Personnel/Organization: Sample Custodian/Accutest Laboratories (Dayton, New Jersey)
Number of Days from Analysis: 1 month from submission of the hard copy report to ERM unless otherwise requested.

SAMPLE CUSTODY PROCEDURES

Field Sample Custody Procedures (sample collection, packaging, shipment, and delivery to laboratory):

The following documentation procedures will be used during sampling and analysis to provide custody control during transfer of samples from collection through storage. A sample is defined as being under a person's custody if any of the following conditions exist: 1) it is in their possession, 2) it is in their view, after being in their possession, 3) it was in their possession and they locked it up, or 4) it is in a designated secure area. Recordkeeping documentation will include the use of the following:

- A field logbook (bound, with numbered pages) to document sampling activities in the field,
- Labels to identify individual samples,
- And- chain-of-custody forms to document the analyses to be performed

In the field the sampler will record in the field logbook the following information for each sample collected:

- Sample identification,
- Sample matrix,
- Name of the sampler,
- Sample location,
- Sample time and date,
- Additional pertinent data,
- Analysis to be conducted,
- Sampling method,
- Sample appearance (e.g., color, turbidity),
- Preservative (if required),
- Number of sample bottles an types, and- weather conditions

Samples will be packaged in a manner to prevent breakage of sample containers in a pre-chilled cooler. Custody of the samples and cooler will be the responsibility of the sampling personnel. Samples will be picked up by an Accutest courier or shipped via Federal Express Priority Overnight service to the analytical laboratory the same day samples are collected.

Laboratory Sample Custody Procedures (receipt of samples, archiving, and disposal): Each sample or group of samples shipped to the laboratory for analysis will be given a unique identification number. The laboratory sample custodian will record the client name, number of samples and date of receipt of the samples. The remaining sample aliquots not used by the laboratory for analysis will be archived for a period of 30 days. After the archive period has passed the sample will be disposed of by the laboratory unless a request to hold the sample is made by ERM.

Sample Identification Procedures: Each sample collected will be designated by an alpha-numeric code that will identify the type of sampling location and a specific sample designation (identifier). Location types will be identified by a two-letter code. Groundwater samples collected from various existing and future groundwater monitoring wells. For example sample nomenclature for monitoring well samples will be assigned as indicated in the following example:

MW-1A = Monitoring Well Sample-Well ID

In the case of QC samples such as field blanks, trip blanks and blind field duplicate samples, six digits will follow FB, TB and DUP respectively to represent the date (e.g., FB (050117) would represent a field blank collected on 01 April 2017). For matrix spike/matrix spike duplicate samples, MS/MSD will be added following the applicable sample identification.

Chain-of-Custody Procedures: The sampling crew shall maintain chain-of-custody records for all field and field QC samples. The following information concerning the sample shall be documented on the chain of custody form:

- Unique sample identification for each container,
- Date and time of sample collection,
- Source of sample (including name, location, and sample type),
- Designation of MS/MSD;
- Preservative used;
- Analyses required;
- Name of collector(s);
- Serial numbers of custody seals and transportation cases (if used);
- Custody transfer signatures, dates & times of sample transfer from the field to transporters & to the laboratory or laboratories; and
- Bill of lading or transporter tracking number (if applicable).

QAPP Worksheet #28: Analytical Quality Control & Corrective Action

Matrix Analytical Group	**Aqueous TCL VOCs**		**Sampler's Name**	**To Be Determined**	
Concentration Level	**Low**		**Field Sampling Organization**	**ERM**	
Sampling SOP	**SOPS 1, 2, 3, 4, 5 & 6**		**Analytical Organization**	**Accutest Laboratories**	
Analytical Method/SOP Reference	**8260C/ EMS8260C-18**		**No. of Sample Locations**	**To Be Determined By Specific Sampling Activity**	
QC Sample:	**Frequency/Number**	**Method/SOP QC Acceptance Limits**	**Corrective Action**	**Person(s) Responsible for Corrective Action**	**Data Quality Indicator (DQI)**
Method Blank	Each batch not to exceed 20 samples or every 12 hours thereafter	No targets above compound-specific MDLs listed in Worksheet #15	Reanalyze entire batch	Assigned Lab Analyst & Tammy McCloskey (Accutest)	Accuracy/Sensitivity/ Bias-Contamination
Lab Check Sample (Blank Spike)	Each batch not to exceed 20 samples	Recovery must fall within compound-specific in-house QC criteria[1] listed in Worksheet #15	Reanalyze entire batch	Assigned Lab Analyst & Tammy McCloskey (Accutest)	Laboratory Accuracy
Surrogates	Every sample and QC	Recovery must fall within in-house QC criteria[1] listed in Worksheet #15	Re-extract and reanalyze sample in order to determine matrix effect.	Assigned Lab Analyst & Tammy McCloskey (Accutest)	Accuracy/Bias
Internal Standard	Every sample and QC	-50 - + 100% of the midpoint of the ICAL standard	Reanalyze sample	Assigned Lab Analyst & Tammy McCloskey (Accutest)	Accuracy/Bias
Matrix Spike / Matrix Spike Duplicate Pair	1 / 20 samples	Recovery must fall within compound-specific in-house QC criteria[1]	Investigate possible matrix effect. Record in case narrative. Qualify data during validation process.	Assigned Lab Analyst & Andrew Coenen (ERM)	Accuracy/Bias
Blind Field Duplicate	1 / 20 samples	Relative percent difference (RPD) 20%	Qualify data during validation process.	Andrew Coenen (ERM)	Precision / Reproducibility
Field Blank Trip Blank	1 / day 1 / shipment of VOCs	Monitor for detected target compounds<RL; except for methylene chloride, acetone, and 2-butanone, which must be 2 times the RL	Qualify data during validation process.	Andrew Coenen (ERM)	Representativeness/Bias (Contamination)

1. In house QC criteria subject to change throughout the project. Will be monitored during the validation process.

QAPP Worksheet #29: Project Documents & Records

Sample Collection Documents & Records	On-site Analysis Documents & Records	Off-site Analysis Documents & Records	Data Assessment Documents & Records	Other
• Field Notebook • Monitoring Well Construction Logs • Well Development Log sheets • Sampling Equipment Checklists • Groundwater Sampling Log Sheets • Chain-of-Custody Forms • Air Bills	• Daily Instrument Calibration Logs • Field Notebook	• Sample Receipt Custody & Tracking Records • Laboratory Analytical Reports • Raw Data (archived electronically • Correspondence	• Data Validation Reports • Field Audit Checklists • Data Usability Summary Report.	All documents generated during the project will be recompiled and retained in the central project file. At the conclusion of the project an RA Report will be presented which will include as appendices many of the related project documents and records. Any documents not provided in the report will be presented to EPA upon request.

QAPP Worksheet #31 32 & 33: Assessments & Corrective Action

QAPP Worksheet #31: Planned Project Assessments

Assessment Type	Frequency	Internal or External	Organization Performing Assessment	Person(s) Responsible for Performing Assessment (Title & Organization)	Person(s) Responsible for Responding to Assessment Findings (Title & Organization)	Person(s) Responsible for Identifying and Implementing Corrective Actions (CA) (Title & Organization)	Person(s) Responsible for Monitoring Effectiveness of CA (Title & Organization)
Field Sampling Protocol	Once at a minimum during sampling activities	Internal	ERM	ERM QA Officer ERM Field Team Leader	ERM Principal In Charge ERM QA Officer	Project Coordinator/ERM Principal Consultant	Project Coordinator/ERM Principal Consultant
Handling and Custody of Samples	Once at a minimum during sampling activities	Internal	ERM	ERM QA Officer ERM Field Team Leader	ERM Principal In Charge ERM Laboratory QA Officer	Project Coordinator/ERM Principal Consultant	Project Coordinator/ERM Principal Consultant
Analytical Laboratory Performance	The data validation process will satisfy the requirements of this audit	External	ERM	ERM Laboratory QA Officer	ERM Principal In Charge ERM Laboratory QA Officer	Project Coordinator/ERM Principal Consultant	Project Coordinator/ERM Principal Consultant

QAPP Worksheet #32: Assessment Findings & Corrective Action Responses

Assessment Type	Nature of Deficiencies Documentation	Individual(s) Notified of Findings (Name, Title & Organization)	Timeframe of Notification	Nature of Corrective Action Response Documentation	Individual(s) Receiving Corrective Action Response	Timeframe for Response
Field Sampling Protocol	Electronic mail which documents the results of the audit will be submitted to the Project Coordinator.	Chris Wenczel Project Coordinator/ERM Principal Consultant/ Hydrogeologist	24 hours after audit	Electronic mail	All ERM project personnel listed on Worksheet #4-2	24 hours after notification
Handling and Custody of Samples	Electronic mail which documents the results of the audit will be submitted to the Project Coordinator.	Chris Wenczel Project Coordinator/ERM Principal Consultant/ Hydrogeologist	24 hours after audit	Electronic mail	All ERM project personnel listed on Worksheet #4-2	24 hours after notification
Analytical Laboratory Performance	Electronic mail which documents the results of the audit will be submitted to the Project Coordinator.	Chris Wenczel Project Coordinator/ERM Principal Consultant/ Hydrogeologist	24 hours after audit	Electronic mail	All ERM project personnel listed on Worksheet #4-2	24 hours after notification

QAPP Worksheet #33: QA Management Reports Table

Type of Report	Frequency (Daily Weekly Monthly Quarterly Annually Etc.)	Projected Delivery Date(s)	Person(s) Responsible for Report Preparation (Title & Organization)	Report Recipient(s) (Title & Organization)
Data Validation Reports See Worksheets # 35 & #36	Applicable only to groundwater monitoring samples	Three weeks after receipt of the laboratory data deliverable.	Mr. Andrew Coenen Laboratory QA Officer/ERM Senior Chemist	Chris Wenczel Project Coordinator/ERM Principal Consultant/ Hydrogeologist
Data Usability Assessment See Worksheet #37	Once after validated data is reviewed.	End of the Project prior to completion of final project report.	Mr. James Perazzo, P.G. Mr. Chris Wenczel, P.G. Mr. Brice Lynch, P.G. Mr. Andrew Coenen All ERM Personnel	Chris Wenczel Project Coordinator/ERM Principal Consultant/ Hydrogeologist
Final RA Report	Once at the end of the Project.	End of the Project.	Mr. Chris Wenczel Project Coordinator/ERM Principal Consultant/ Hydrogeologist	Distribution List presented on Worksheet # 3 less Mrs. Tammy McCloskey Accutest Laboratories

QAPP Worksheet #34: Data Verification & Validation Inputs

Verification Input	Description	Internal/ External	Responsible for Verification (Name & Organization)
Chain of Custody Forms	Chain of Custody (COC) Forms and FedEx shipping papers will be reviewed after the forms have been completed by the ERM sampler but prior to shipping any laboratory samples off-Site. All elements of the COC (requested analysis bottle qty. project information etc.) will be compared to the analytical criteria specified in the QAPP and to confirm that the labels and qty. of bottles in the cooler match the information specified on the COC. The FedEx shipping form will be reviewed to certify that the address information is correct all requested information is provided and that the appropriate shipping method (e.g. priority overnight Saturday delivery) has been marked so that the samples arrive at the lab according to holding time and temperature preservation requirements specified in the QAPP.	Internal	Brice Lynch, P.G. ERM Field Team Leader
Audit Reports	The results of the audit reports and project assessments presented in Worksheets #31 through #33 will be retained in the project file. As specified the results and findings will be reviewed with the appropriate members of the project team and confirmation that all corrective measures have been completed will be the responsibility of the Project Coordinator. Reference Worksheets #31 through #33 for further details.	Internal	Mr. Chris Wenczel, P.G. Project Coordinator/ERM Principal Consultant/ Hydrogeologist
Field Notes	It is imperative that detailed field notes are recorded real-time in the field to document project field activities. The field notes will be referenced during preparation of the OU1 RD Package and the Final RA Report and will be retained in the project file. A copy of the field notes will be provided as an Appendix to the final RA Report.	Internal	Brice Lynch ERM Field Team Leader Mr. Chris Wenczel, P.G. Project Coordinator/ERM Principal Consultant/ Hydrogeologist
Laboratory Data	All laboratory data will be reviewed internally by the analytical laboratory prior to reporting analytical results to ERM. All analytical laboratory data packages will comply with the 2005 NYSDEC ASP Category B reporting and deliverable requirements presented in Attachment E. Data generated from the Groundwater Monitoring samples will be validated according to the procedures specified in Worksheets # 35 and #36. A Data Usability Assessment will be prepared at the end of the project according to the protocol specified in Worksheet #37.	External Internal	Mrs. Tammy McCloskey Accutest Laboratories Project Manager Mr. Andrew Coenen ERM Laboratory QA Officer

QAPP Worksheet #35: Data Verification Procedures

Validation Input	Description	Responsible for Validation (Name Organization)
Review of Chain of Custodies (COCs)	The validator will review each COC as it is received by the laboratory from the field for accuracy of sample nomenclature and requested analysis. Issues will be brought to the attention of the laboratory contact and corrected immediately.	Mr. Andrew Coenen ERM Laboratory QA Officer
Field documentation	The Project Coordinator will review all field forms for completeness and adherence to the QAPP.	Mr. Chris Wenczel, P.G. ERM Project Coordinator
Review of SOPs	The validator will confirm that samples were collected and analyzed in accordance with applicable SOPs.	Mr. Andrew Coenen ERM Laboratory QA Officer
Documentation of Method QC Results	The validator will confirm that the appropriate number of QA/QC samples were collected by ERM and analyzed by the laboratory.	Mr. Andrew Coenen ERM Laboratory QA Officer
Review Raw Data	The validator will review 10% of the raw laboratory data to confirm the laboratories calculations.	Mr. Andrew Coenen ERM Laboratory QA Officer
Project Quantitation Limits	The validator will confirm that the sample results meet the project quantitation limits specified in the QAPP. If they do not the laboratory will be contacted and possible reanalysis may be required.	Mr. Andrew Coenen ERM Laboratory QA Officer

Groundwater monitoring samples only will undergo data validation. For each laboratory data deliverable the validator will prepare a Data Usability Report (DUSR). The DUSR will be prepared according to the guidelines established by Division of Environmental Remediation Quality Assurance Group and will review the following:

- Is the data package complete as defined under the requirements for the NYSDEC ASP Category B?
- Have all holding times been met?
- Do all the QC data: blanks instrument tunings calibration standards calibration verifications surrogate recoveries spike recoveries replicate analyses laboratory controls and sample data fall within the protocol required limits and specifications?
- Have all of the data been generated using established and agreed upon analytical protocols?
- Does an evaluation of the raw data confirm the results provided in the data summary sheets and qualify control verification forms?
- Have the correct data qualifiers been used?

Once the data package has been reviewed and the above questions asked and answered the DUSR will describe the samples and the analytical parameters data deficiencies analytical protocol deviations and quality control problems and their effect on the data. The DUSR shall also include recommendations on resampling/reanalysis if applicable. All data qualifications will be documented following the NYSDEC ASP '05 Rev. Guidelines.

QAPP Worksheet #36: Data Validation Procedures

Analytical Group/Method:	Volatile Organics – SW-846 8260C
Data Deliverable Requirements:	NYSDEC ASP Category B (pdf)
Analytical Specifications:	**Method 8260C: Accutest SOPEMS8260C-18**
Measurement Performance Criteria:	Provided In Both Worksheets #12 & 28
Percent Of Data Packages To Be Validated:	100%
Percent Of Raw Data Reviewed:	100%
Percent Of Results To Be Recalculated:	10%
Validation Procedure:	USEPA Hazardous Waste Support Section SOP Number HW-24 Revision 4 Validating Volatile Organic Compounds by Gas Chromotagraphy/Mass Spectometry SW-846 Method 8260B & 8260C – Signed October 2014[1,2]
Validation Code (*See Attached Table):	S3VM
Electronic Validation Program/Version:	N/A

1. The order in which the aforementioned guidance documents and/or criteria are listed does not imply a hierarchy of reliance on a particular document for validation.
2. The reviewer's professional judgment is an integral part of the validation process.

QAPP Worksheet #37: Data Usability Assessment

The Data Usability Assessment will revisit the DQOs to ascertain whether the data collected is adequate in quantity and quality to meet the project objectives. Also the usability assessment will be used to determine whether qualified data can be used to make project decisions.

The Data Usability Assessment will be performed by Mr. Chris Wenczel, P.G. **and Mr. Andrew Coenen.** Mr. Wenczel will be responsible for information in the Usability Assessment. He will also be responsible for assigning task work to the individual task members who will be supporting the Data Usability Assessment. Note that the Data Usability Assessment will be conducted on validated data only. The results of the Data Usability Assessment will be presented in the final report.

The following five step process that identifies key items will be used to assess the data set and draw conclusions based on their results:

Step 1	**Review The Project's Objectives And Sampling Design** Key project outputs defined during planning (i.e.,PQOs or DQOs and MPCs) will be reviewed to make sure they are still applicable. The sampling design will be reviewed for consistency with stated objectives to identify any deviations that provide context for interpreting the data in subsequent steps.
Step 2	**Review The Data Verification And Data Validation Outputs** Available QA reports, including the data verification and data validation reports will be reviewed. Basic calculations will be performed and the data will be summarized using graphs, maps, tables, etc. and evaluated to identify patterns, trends, and anomalies (i.e., unexpected results). Review deviations from planned activities (e.g., number and locations of samples, holding time exceedances, damaged samples, non-compliant PT sample results, and SOP deviations) will be reviewed to determine their impacts on the data usability. The implications of unacceptable QC sample results will be considered/evaluated.
Step 3	**Verify The Assumptions Of The Selected Statistical Method** The underlying assumptions for selected statistical methods will be reviewed to verify they are valid. Common assumptions include the distributional form of the data, independence of the data, dispersion characteristics, homogeneity, etc. Depending on the robustness of the statistical method, minor deviations from assumptions usually are not critical to statistical analysis and data interpretation. However, if serious deviations from assumptions are discovered, then another statistical method may need to be selected.
Step 4	**Implement The Statistical Method** The data set will be evaluated using the following statistical/ quantitative methods/criteria: **Precision –** Results of all blind field duplicates will be discussed for each analysis. For each duplicate pair the relative percent difference (RPD) will be calculated for each analyte whose original and duplicate values are either greater than or equal to the quantitation limit. The RPDs will be checked against the measurement performance criteria presented on Worksheets #12 & 15. The RPDs exceeding criteria will be identified. The discussion will summarize the results. Any conclusions about the precision of the analyses will be drawn and any limitations on the use of the data will be described.

If calculated from duplicate measurements:

$$RPD = \frac{(C1 - C2) \times 100\%}{(C1 + C2) / 2}$$

where,
RPD = relative percent difference
C1 = larger of the two observed values
C2 = smaller of the two observed values

Accuracy/Bias Contamination – Results for all laboratory method blanks and instrument blanks will be discussed for each analysis for Confirmatory Post Excavation and Post-Removal Ground water samples only. The results for each analyte will be checked against the measurement performance criteria presented on Worksheet #12. Results for analytes that exceed criteria will be discussed. The discussion will summarize the results of the laboratory accuracy/bias. Any conclusions about the accuracy/bias of the analyses based on contamination will be drawn and any limitations on the use of the data will be described.

For measurements where matrix spikes are used:

$$\%R = 100\% \times \frac{S - U}{Csa}$$

where,
%R = percent recovery
S = measured concentration in spike aliquot
U = measured concentration in unspiked aliquot
Csa = actual concentration of spike added

Completeness – A completeness check will be done on all of the data generated by the laboratory. Completeness criteria are presented on Worksheet #12. Completeness will be calculated for each analyte as follows. For each analyte completeness will be calculated as the number of data points for each analyte that meets the measurement performance criteria for precision accuracy/bias and sensitivity divided by the total number of data points for each analyte. A discussion will follow summarizing the calculation of data completeness. Any conclusions about the completeness of the data for each analyte will be drawn and any limitations on the use of the data will be described.

Defined as follows for all measurements:

$$\%C = 100\% \times \frac{V}{T}$$

where,
%C = percent completeness
V = number of measurements judged valid
T = total number of measurements

Sensitivity – Results for all Lab Check Samples will be presented discussed for each analysis. The results for each analyte will be checked against the measurement performance criteria presented on Worksheet #12 & 15 and cross-checked against the quantitation limits presented on Worksheet #15. Results for analytes that exceed criteria will be discussed. The discussion will summarize the results of the laboratory sensitivity. Any conclusions about the sensitivity of the analyses will be drawn and any limitations on the use of the data will be described.

Comparability - The degree of confidence with which results from two or more data sets, or two or more laboratories, may be compared. To achieve comparability, standard environmental methodologies will be employed in the field and in the laboratory, including:

- Using identified standard procedures/methods for both sampling and analysis phases of the project;
- Ensuring traceability of all analytical standards and/or source materials;
- Verifying all calibrations;
- Using standard reporting units and reporting formats, including the reporting of QA/QC data;
- Validating analytical results, including using data qualifiers in all cases where appropriate;
- Requiring that validation qualifiers be provided at all times (e.g., text, tables, figures, etc.) with the associated analytical result; and
- Requiring that any metadata on the data set (i.e., information for purposes of description, administration, technical functionality and requirements, use and usage, and/or preservation) be documented and provided with the data set at all times.

These steps will ensure all future users of either the data or the conclusions drawn from them will have a basis for establishing the acceptance criteria for its use and will be able to judge the comparability of these data and conclusions.

When a definitive off-site laboratory analysis is performed to verify field screening results (e.g., the soil gas survey samples), the comparability between the two sets of results must be established. This evaluation will determine the acceptability of the screening results for use in meeting PQOs and making project decisions. Acceptability will be based on a Percent Different (%D) criterion of 20 percent, calculated using the following equation:

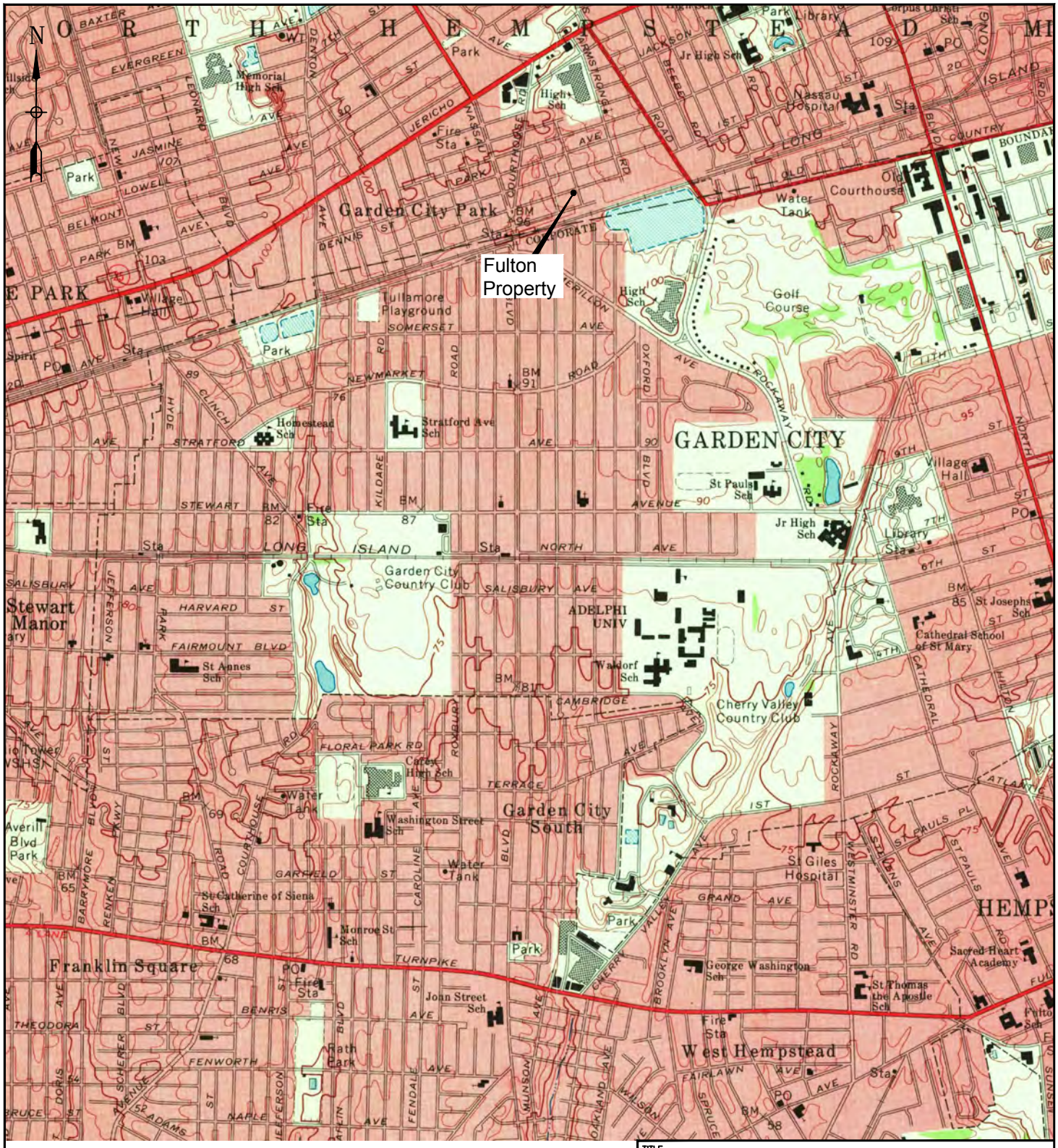
$$\%D = \frac{Vd - Vs}{Vd} \times 100$$

Where,
Vd = the definitive value
Vs = the screening method sample concentration value.

For the overall evaluation of comparability, at least 75 percent of the calculated %Ds must meet the 20 percent acceptance criteria.

Representativeness - The degree to which the results of the analyses accurately and precisely represent a characteristic of a population, a process condition, or an environmental condition. In this case, representativeness is the degree to which the data reflect the contaminants present and their concentration magnitudes in the sampled site areas. Sample homogeneity and sampling/subsampling variability must

	be considered during project planning to obtain a higher degree of representativeness. Representativeness of data will be obtained through the proper selection of sampling locations and implementation of approved sampling and analytical procedures. Results from environmental field duplicate sample analyses can be used to assess representativeness, in addition to precision.
Step 5	**Document data usability and draw conclusions** **Reconciliation –** Important information regarding the Data Quality Objectives (DQOs)/Project Quality Objectives (PQOs) process are provided by Worksheets #11, #12, #15 and # 28. The DQOs/PQO presented on Worksheets #11, #12, #15 and # 28 will be examined to determine if the objective was met. This examination will include a combined overall assessment of the results of each analysis pertinent to an objective. Each analysis will first be evaluated separately in terms of the major impacts observed from the Data Validation Data Quality Indicators and measurement performance criteria assessments. Based on the results of these assessments the quality of the data will be determined. Based on the quality determined the usability of the data for each analysis will be determined. Based on the combined usability of the data from all analyses for an objective it will be determined if the PQO was met and whether project action limits were exceeded. The final report will include a summary of all the points that went into the reconciliation of each objective. As part of the reconciliation of each objective conclusions will be drawn and any limitations on the usability of any of the data will be described.



SOURCE: U.S.G.S. QUADRANGLE MAPS, LYNBROOK, N.Y., 1969

TITLE

Property Location Map
Fulton Avenue Superfund Site
Garden City/Garden City Park, NY

PREPARED FOR

Genesco Inc.

Environmental Resources Management

FIGURE 1

DRAWN BY	SCALE	DATE	JOB NO.
EMF	AS SHOWN	01/05/17	0097881

Z:\Drawings-2012\Genesco\Fulton Ave\CAD Dwgs\30% Submittal\2011-02-10 - Fulton Avenue - 30% Design - Figure 1-1 - v01.dwg (07/13/2016 - 4:42pm Melville)

GARDEN CITY PARK
SUPPLY WELL No. 9
N-08409 (340'-400')

GARDEN CITY SUPPLY
WELL No. 9
N-03881 (426'-468')

GARDEN CITY SUPPLY
WELL Nos. 13 & 14
N-07058 (380'-440')
N-08339 (308'-358')

FRANKLIN SQUARE
SUPPLY WELL Nos. 1 & 2
N-03603 (443'-493')
N-03604 (433'-483')

LONG ISLAND RAILROAD
(PORT JEFFERSON BRANCH)

LONG ISLAND RAILROAD (HEMPSTEAD BRANCH)

GARDEN CITY COUNTRY CLUB GOLF COURSE

150 Fulton
Avenue Property

ADELPHI UNIVERSITY

VP-04 VERTICAL PROFILE LOCATION

GCP Or MW # EXISTING MONITORING WELL LOCATION

GCP or MW # LONG-TERM GROUNDWATER MONITORING WELL LOCATION

SB27 SOIL BORING LOCATION

No.9/N-03881 SUPPLY WELL (426'-468')=SCREEN INTERVAL

N-07799 IRRIGATION WELL

HISTORICAL EXTENT OF OU1 PLUME (TETRACHLOROETHENE {PCE}-DOMINANT PLUME) WHERE THE TOTAL VOLATILE ORGANIC CONCENTRATION WAS >100 UG/l*

HISTORICAL EXTENT OF OU2 PLUME (TRICHLOROETHENE {TCE}-DOMINANT PLUME) WHERE THE TOTAL VOLATILE ORGANIC CONCENTRATION WAS >100 UG/l*

* NOTE:
THE AREAL EXTENT OF CHLORINATED VOLATILE ORGANIC COMPOUNDS DEPICTED IN THIS FIGURE IS BASED ON THE MAXIMUM CONCENTRATIONS DETECTED IN GROUNDWATER SAMPLES OBTAINED FROM VERTICAL PROFILE TEMPORARY WELLS INSTALLED DURING 1999 - 2000, AND PERMANENT WELLS DURING SEPTEMBER 2001 - MAY 2005.

GENERALIZED GROUNDWATER FLOW PATH

Scale (1"=800')
400' 0 400' 800' 1600'
Graphic Scale in Feet

TITLE
Long-Term Groundwater Monitoring Well Network Locations Fulton Avenue Superfund Site Garden City/Garden City Park, NY

PREPARED FOR
Genesco Inc.

Environmental Resources Management

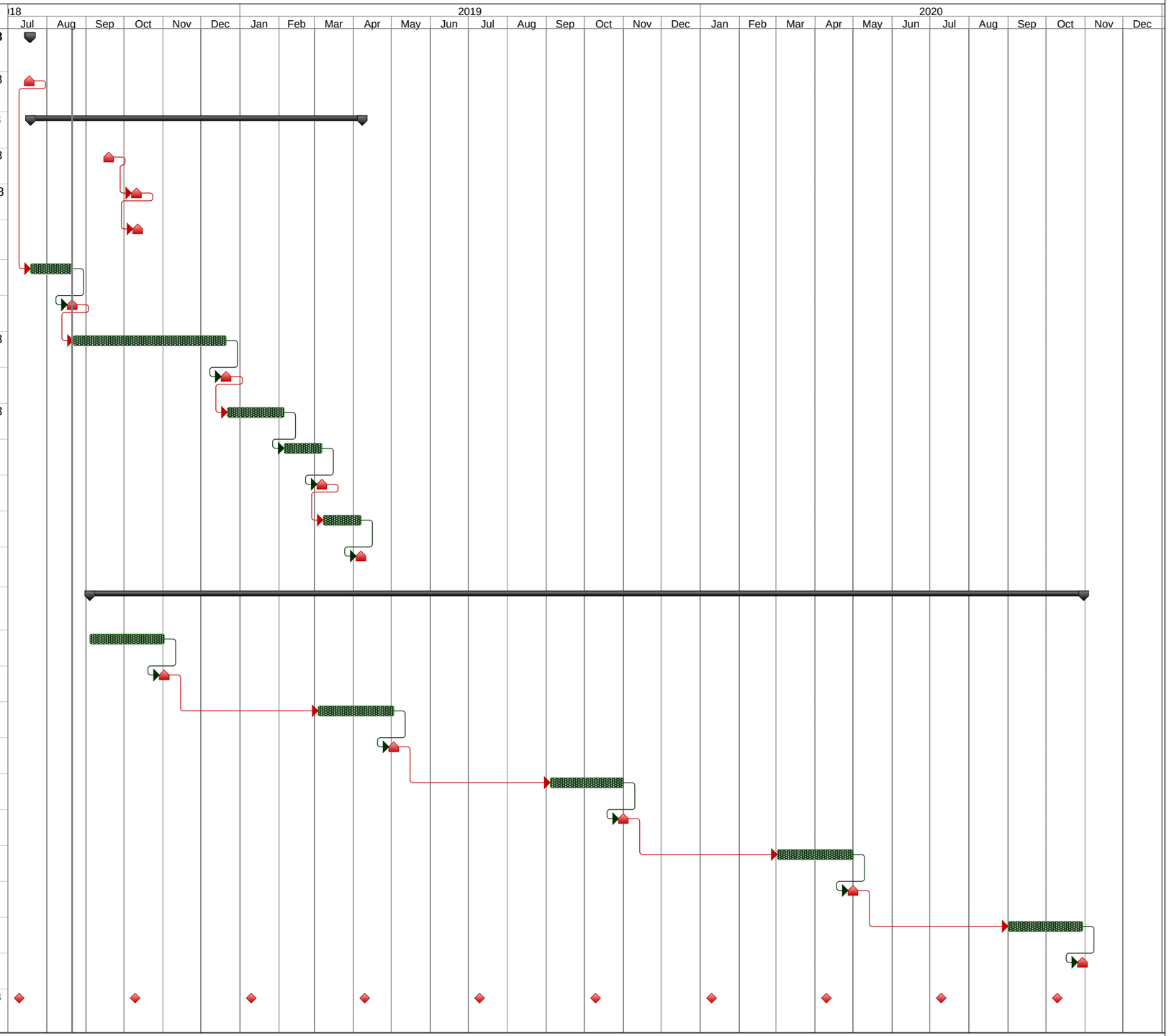
FIGURE 2

DRAWN BY	SCALE	DATE	JOB NO.
EMF	AS SHOWN	10/04/16	0097881

Y:\GENESCO\150 Fulton Ave\NYCAD\2016\2016-12-29 - Fulton Avenue QAPP Wells.dwg (05/10/2017 - 6:10pm Melville)

FIGURE 3
REMEDIAL ACTION AND MONITORING SCHEDULE
FULTON AVENUE SUPERFUND SITE : OPERABLE UNIT 1
NASSAU COUNTY, NEW YORK

ID	Task Name	Duration	Start
1	**Remedial Action**	**1 day**	**Wed 7/18/18**
2	**EPA Approval of OU1 Remedial Design Report/Package**	1 day	Wed 7/18/18
3	**Inspections and RA Report**	**263 days**	**Thu 7/19/18**
4	Pre-Final Construction Inspection	1 day	Wed 9/19/18
5	Final Construction Inspection	1 day	Thu 10/11/18
6	**EPA Approval of Construction**	1 day	Fri 10/12/18
7	Update Site Management Plan	33 days	Thu 7/19/18
8	Submit Site Management Plan To USEPA	1 day	Tue 8/21/18
9	Preparation of Draft RA Report	121 days	Wed 8/22/18
10	Submit Draft RA Report To USEPA	1 day	Fri 12/21/18
11	USEPA Review of Draft RA Report	45 days	Sat 12/22/18
12	Finalization of Draft RA Report	30 days	Tue 2/5/19
13	Submit Revised RA Report To USEPA	1 day	Thu 3/7/19
14	USEPA Review of Revised RA Report	30 days	Fri 3/8/19
15	**USEPA Approval of Revised RA Report**	1 day	Sun 4/7/19
16	**Groundwater Monitoring**	**788 days**	**Tue 9/4/18**
17	Group 2/3Sampling, Laboratory Analysis, Validation #5	59 days	Tue 9/4/18
18	Submit Group 2/3 Sampling Results To EPA #5	1 day	Fri 11/2/18
19	Group 2/3Sampling, Laboratory Analysis, Validation #6	60 days	Mon 3/4/19
20	Submit Group 2/3 Sampling Results To EPA #6	1 day	Fri 5/3/19
21	Group 1/2/3Sampling, Laboratory Analysis, Validation #7	58 days	Wed 9/4/19
22	Submit Group 1/2/3 Sampling Results To EPA #7	1 day	Fri 11/1/19
23	Group 2/3Sampling, Laboratory Analysis, Validation #8	60 days	Mon 3/2/20
24	Submit Group 2/3 Sampling Results To EPA #8	1 day	Fri 5/1/20
25	Group 2/3Sampling, Laboratory Analysis, Validation #9	59 days	Tue 9/1/20
26	Submit Group 2/3 Sampling Results To EPA #9	1 day	Fri 10/30/20
27	**Quarterly Progress Reports**	**824 days**	**Tue 7/10/18**



Date: Tue 8/21/18 | Task | Milestone | Recurring Task | Summary

TABLE 1
SUMMARY OF LONG-TERM GROUNDWATER MONITORING WELLS
FULTON AVENUE SUPERFUND SITE, GARDEN CITY/GARDEN CITY PARK, NASSAU COUNTY, NEW YORK

Well Local No.	Top of Casing Elevation	Depth to Top of Screen	Depth to Bottom of Screen	Casing Length	Sump Length in Feet	Total Well Depth in Feet	Top of Screen Elevation	Bottom of Screen Elevation	Total Well Bottom Elevation	Well Material	Well Diameter in Feet	Well Construction Start Date	Well Construction End Date	X Coordinate	Y Coordinate
GCP01	89.5	49	59	49	0	59	40.5	30.5	30.5	PVC	0.17	10/24/84	10/24/84	1078541.38	207727.149
GCP01D	89.76	105	115	105	3	118	-15.24	-25.24	-28.24	PVC	0.17	07/27/95	08/03/95	1078543.38	207727.578
GCP08	94.85	50	60	50	0	62	44.85	34.85	32.85	PVC	0.17	09/11/85	09/11/85	1078149.08	207270.878
GCP15S	91.74	36	56	36	5	61	55.74	35.74	30.74	PVC	0.33	10/24/91	10/25/91	1077389.31	206096.642
MW15A	91.46	140	150	140	3	153	-48.54	-58.54	-61.54	STEEL	0.17	06/07/01	06/08/01	1077375.04	206097.32
MW15B	91.14	350	360	350	3	363	-258.86	-268.86	-271.86	STEEL	0.17	06/11/01	06/19/01	1077382.78	206098.236
GCP18D	90.75	113	123	113	3	126	-22.25	-32.25	-35.25	PVC	0.17	06/21/95	07/24/95	1078842.22	207771.984
GCP18S	91.04	39	54	39	0	54	52.04	37.04	37.04	PVC	0.17	06/20/95	06/21/95	1078843.91	207766.63
MW20A	84.53	140	150	140	3	153	-55.47	-65.47	-68.47	STEEL	0.17	04/17/01	04/18/01	1073673.09	203600.03
MW20B	84.13	244	254	244	3	257	-159.87	-169.87	-172.87	STEEL	0.17	04/20/01	04/24/01	1073672.16	203604.324
MW20C	84.14	400	410	400	3	413	-315.86	-325.86	-328.86	STEEL	0.17	04/25/01	04/27/01	1073674.08	203597.067
MW21A	81.95	120	130	120	3	133	-38.05	-48.05	-51.05	STEEL	0.17	05/15/01	05/16/01	1075872.09	203680.567
MW21B	81.86	330	340	330	3	343	-248.14	-258.14	-261.14	STEEL	0.17	05/18/01	05/22/01	1075870.75	203675.325
MW21C	81.66	390	400	390	3	403	-308.34	-318.34	-321.34	STEEL	0.17	06/01/01	06/05/01	1075871.2	203669.66
MW21D	81.73	448	458	448	3	462	-366.27	-376.27	-380.27	STEEL	0.17	9/19/2017	10/6/2017	1075875.1	203622.6
MW22A	86.42	120	130	120	3	133	-33.58	-43.58	-46.58	STEEL	0.17	05/01/01	05/01/01	1077478.84	203653.953
MW22B	86.49	270	280	270	3	283	-183.51	-193.51	-196.51	STEEL	0.17	05/02/01	05/04/01	1077478	203649.45
MW22C	86.56	310	320	310	3	323	-223.44	-233.44	-236.44	STEEL	0.17	05/08/01	05/10/01	1077481.86	203645.556
MW23A	81.58	260	270	260	3	273	-178.42	-188.42	-191.42	STEEL	0.17	03/30/01	04/03/01	1074925.82	202292.348
MW23B	81.72	344	354	344	3	357	-262.28	-272.28	-275.28	STEEL	0.17	04/04/01	04/06/01	1074918.18	202293.054
MW23C	81.7	398	408	398	3	411	-316.3	-326.3	-329.3	STEEL	0.17	06/28/01	07/03/01	1074939.21	202292.236
MW23D	81.74	442	452	442	3	455	-360.26	-370.26	-373.26	STEEL	0.17	06/28/01	07/03/01	1074933.45	202292.653
MW26A	79.01	224	234	224	5	489	-144.99	-154.99	-409.99	STEEL	0.33	02/25/04	02/26/04	1075127.04	201508.808
MW26B	79.01	266	276	266	5	489	-186.99	-196.99	-409.99	STEEL	0.33	02/25/04	02/26/04	1075127.04	201508.808
MW26C	79.01	320	330	320	5	489	-240.99	-250.99	-409.99	STEEL	0.33	02/25/04	02/26/04	1075127.04	201508.808
MW26D	79.01	345	355	345	5	489	-265.99	-275.99	-409.99	STEEL	0.33	02/25/04	02/26/04	1075127.04	201508.808
MW26E	79.01	372	382	372	5	489	-292.99	-302.99	-409.99	STEEL	0.33	02/25/04	02/26/04	1075127.04	201508.808
MW26F	79.01	405	415	405	5	489	-325.99	-335.99	-409.99	STEEL	0.33	02/25/04	02/26/04	1075127.04	201508.808
MW26G	79.01	438	448	438	5	489	-358.99	-368.99	-409.99	STEEL	0.33	02/25/04	02/26/04	1075127.04	201508.808
MW26H	79.01	474	484	474	5	489	-394.99	-404.99	-409.99	STEEL	0.33	02/25/04	02/26/04	1075127.04	201508.808

TABLE 1
SUMMARY OF LONG-TERM GROUNDWATER MONITORING WELLS
FULTON AVENUE SUPERFUND SITE, GARDEN CITY/GARDEN CITY PARK, NASSAU COUNTY, NEW YORK

Well Local No.	Top of Casing Elevation	Depth to Top of Screen	Depth to Bottom of Screen	Casing Length	Sump Length in Feet	Total Well Depth in Feet	Top of Screen Elevation	Bottom of Screen Elevation	Total Well Bottom Elevation	Well Material	Well Diameter in Feet	Well Construction Start Date	Well Construction End Date	X Coordinate	Y Coordinate
MW27A	62.17	192	202	192	5	487	-129.83	-139.83	-424.83	STEEL	0.33	03/17/04	03/18/04	1075414.51	200700.409
MW27B	62.17	236	246	236	5	487	-173.83	-183.83	-424.83	STEEL	0.33	03/17/04	03/18/04	1075414.51	200700.409
MW27C	62.17	284	294	284	5	487	-221.83	-231.83	-424.83	STEEL	0.33	03/17/04	03/18/04	1075414.51	200700.409
MW27D	62.17	324	334	324	5	487	-261.83	-271.83	-424.83	STEEL	0.33	03/17/04	03/18/04	1075414.51	200700.409
MW27E	62.17	364	374	364	5	487	-301.83	-311.83	-424.83	STEEL	0.33	03/17/04	03/18/04	1075414.51	200700.409
MW27F	62.17	408	418	408	5	487	-345.83	-355.83	-424.83	STEEL	0.33	03/17/04	03/18/04	1075414.51	200700.409
MW27G	62.17	438	448	438	5	487	-375.83	-385.83	-424.83	STEEL	0.33	03/17/04	03/18/04	1075414.51	200700.409
MW27H	62.17	472	482	472	5	487	-409.83	-419.83	-424.83	STEEL	0.33	03/17/04	03/18/04	1075414.51	200700.409
MW28A	67	92	102	92	5	500	-25	-35	-433	STEEL	0.33	3/9/17	3/11/17	1076260.3	200974.7
MW28B	67	214	224	214	5	500	-147	-157	-433	STEEL	0.33	3/9/17	3/11/17	1076260.3	200974.7
MW28C	67	312	322	312	5	500	-245	-255	-433	STEEL	0.33	3/9/17	3/11/17	1076260.3	200974.7
MW28D	67	340	350	340	5	500	-273	-283	-433	STEEL	0.33	3/9/17	3/11/17	1076260.3	200974.7
MW28E	67	362	372	362	5	500	-295	-305	-433	STEEL	0.33	3/9/17	3/11/17	1076260.3	200974.7
MW28F	67	398	408	398	5	500	-331	-341	-433	STEEL	0.33	3/9/17	3/11/17	1076260.3	200974.7
MW28G	67	434	444	434	5	500	-367	-377	-433	STEEL	0.33	3/9/17	3/11/17	1076260.3	200974.7
MW28H	67	485	495	485	5	500	-418	-428	-433	STEEL	0.33	3/9/17	3/11/17	1076260.3	200974.7

TABLE 2
DETAILED SAMPLING INFORMATION FOR LONG-TERM GROUNDWATER MONITORING WELLS
FULTON AVENUE SUPERFUND SITE, GARDEN CITY/GARDEN CITY PARK, NASSAU COUNTY, NEW YORK

Well Local No.	Depth to Top of Screen	Depth to Bottom of Screen	Sump Length in Feet	Total Well Depth in Feet	Screen Length	Submerged Screen Midpoint	Top of Pump Depth	Bottom of Pump Depth	Drop Line Length	Pump Set up	Comments	Required Sample Identification	GEOTECH BLADDER PUMP SETTINGS					
													Depth of Pump	PSI Setting	Depth of Pump	PSI Setting	Depth of Pump	PSI Setting
GCP01	49	59	0	59	10	54	51	54	0	Standard Low-Flow (MP-15)		GCP01-52.5	50	35	84	52	118	69
GCP01D	105	115	3	118	10	110	107	110	0	QED Bladder Pump		GCP01D-110	51	35.5	85	52.5	119	69.5
GCP08	50	60	0	60	10	55	52	55	0	Standard Low-Flow (MP-15)		GCP08-54.2	52	36	86	53	120	70
GCP15S	36	56	5	61	20	49	46	49	0	Standard Low-Flow (MP-15)		GCP15S-51	53	36.5	87	53.5	121	70.5
MW15A	140	150	3	153	10	145	142	145	0	QED Bladder Pump		MW15A-145	54	37	88	54	122	71
MW15B	350	360	3	363	10	355	85	88	267	QED Bladder Pump with Drop Line		MW15B-356	55	37.5	89	54.5	123	71.5
GCP18D	113	123	3	126	10	118	115	118	0	QED Bladder Pump		GCP18D-118	56	38	90	55	124	72
GCP18S	39	54	0	54	15	46.5	43.5	46.5	0	Standard Low-Flow (MP-15)		GCP18S-48.5	57	38.5	91	55.5	125	72.5
MW20A	140	150	3	153	10	145	142	145	0	QED Bladder Pump		MW20A-145	58	39	92	56	126	73
MW20B	244	254	3	257	10	249	85	88	161	QED Bladder Pump with Drop Line		MW20B-250	59	39.5	93	56.5	127	73.5
MW20C	400	410	3	413	10	405	85	88	317	QED Bladder Pump with Drop Line		MW20C-405	60	40	94	57	128	74
MW21A	120	130	3	133	10	125	122	125	0	QED Bladder Pump		MW21A-125	61	40.5	95	57.5	129	74.5
MW21B	330	340	3	343	10	335	85	88	247	QED Bladder Pump with Drop Line		MW21B-335	62	41	96	58	130	75
MW21C	390	400	3	403	10	395	85	88	307	QED Bladder Pump with Drop Line		MW21C-395	63	41.5	97	58.5	131	75.5
MW21D	448	458	3	461	10	453	85	88	365	QED Bladder Pump with Drop Line		MW21D-453	64	42	98	59	132	76
MW22A	120	130	3	133	10	125	122	125	0	QED Bladder Pump		MW22A-125	65	42.5	99	59.5	133	76.5
MW22B	270	280	3	283	10	275	272	88	187	QED Bladder Pump with Drop Line		MW22B-275	66	43	100	60	134	77
MW22C	310	320	3	323	10	315	312	88	227	QED Bladder Pump with Drop Line		MW22C-315	67	43.5	101	60.5	135	77.5
MW23A	260	270	3	273	10	265	85	88	177	QED Bladder Pump with Drop Line		MW23A-265	68	44	102	61	136	78
MW23B	344	354	3	357	10	349	NA	NA	300		(Note 1)	MW23B-350	69	44.5	103	61.5	137	78.5
MW23C	398	408	3	411	10	403	85	88	315	QED Bladder Pump with Drop Line		MW23C-403	70	45	104	62	138	79
MW23D	442	452	3	455	10	447	NA	NA	275		(Note 2)	MW23D-447	71	45.5	105	62.5	139	79.5
													72	46	106	63	140	80
													73	46.5	107	63.5	141	80.5
													74	47	108	64	142	81
													75	47.5	109	64.5	143	81.5
													76	48	110	65	144	82
													77	48.5	111	65.5	145	82.5
													78	49	112	66	146	83
													79	49.5	113	66.5	147	83.5
													80	50	114	67	148	84
													81	50.5	115	67.5	149	84.5
													82	51	116	68	150	85
													83	51.5	117	68.5	151	85.5

Well Local No.	Depth to Top of Screen	Depth to Bottom of Screen	Sump Length in Feet	Total Well Depth in Feet	Screen Length	Depth of Sample Port Intake	Field Port ID #	Required Sample Identification
MW26A	224	234	5	489	10	229	Port 8	MW26A-229
MW26B	266	276	5	489	10	271.5	Port 7	MW26B-271.5
MW26C	320	330	5	489	10	325	Port 6	MW26C-325
MW26D	345	355	5	489	10	350.5	Port 5	MW26D-350.5
MW26E	372	382	5	489	10	377	Port 4	MW26E-377
MW26F	405	415	5	489	10	410.5	Port 3	MW26F-410.5
MW26G	438	448	5	489	10	443	Port 2	MW26G-443
MW26H	474	484	5	489	10	478.5	Port 1	MW26H-478.5
MW27A	192	202	5	487	10	197	Port 8	MW27A-197
MW27B	236	246	5	487	10	241.5	Port 7	MW27B-241.5
MW27C	284	294	5	487	10	289	Port 6	MW27C-289
MW27D	324	334	5	487	10	329.5	Port 5	MW27D-329.5
MW27E	364	374	5	487	10	369	Port 4	MW27E-369
MW27F	408	418	5	487	10	413.5	Port 3	MW27F-413.5
MW27G	438	448	5	487	10	443	Port 2	MW27G-443
MW27H	472	482	5	487	10	476.5	Port 1	MW27H-476.5
MW28A	92	102	5	500	10	97	Port 8	MW28A-97
MW28B	214	224	5	500	10	219.5	Port 7	MW28B-219.5
MW28C	312	322	5	500	10	317	Port 6	MW28C-317
MW28D	340	350	5	500	10	345.5	Port 5	MW28D-345.5
MW28E	362	372	5	500	10	367	Port 4	MW28E-367
MW28F	398	408	5	500	10	403.5	Port 3	MW28F-403.5
MW28G	434	444	5	500	10	439	Port 2	MW28G-439
MW28H	485	495	5	500	10	490.5	Port 1	MW28H-490.5

Important Well Notes

(1) MW23B casing bent, use Grundfos Pump only, set pump at 300 feet bgs, purge 3 well volumes and then perform low flow rate purge/sampling.

(2) Obstruction at 300 feet bgs in MW23D, use Grundfos pump only, set pump no deeper than 275 feet bgs, purge 3 well volumes and then perform low flow rate puge/sampling.

Bladder Pump Notes

PSI setting is 0.5 PSI/ft of airline plus 10.

Charge should be 5 seconds (bladder squeeze)

Exhaust should be 15 to 20 seconds (pump refill)

Optional
To lower the flow, turn the brass valve to the right all the way, then turn back a half turn.

If you turn back the brass valve a half turn, increase the exhaust to 30 seconds.

LIST OF ATTACHMENTS

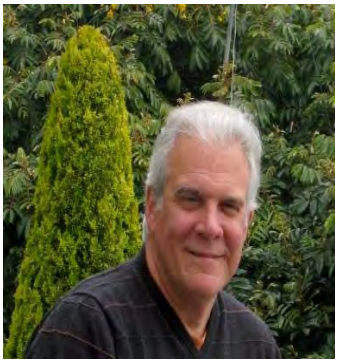
ATTACHMENT A - Professional Profiles
ATTACHMENT B – Standard Operating Procedures
ATTACHMENT C - Laboratory Certification & Operating Procedures
ATTACHMENT D – Well Location Figures & Photos
ATTACHMENT E - New York State Department Of Environmental Conservation Analytical Service Protocol

ATTACHMENT A - Professional Profiles

Jim Perazzo

Partner Principal
North America

Mr. Perazzo advises clients in making strategic business decisions regarding legacy environmental liabilities as part of portfolio management including evaluation of practical realistic cash flows and exit strategies. He has provided expert support in cost recovery claims under CERCLA, navigation law and other environmental statues in arbitrations, mediations and litigation. By combining technical and financial analysis, he enables clients to assess short long-term costs of environmental liabilities and obligations for financial reporting. Mr. Perazzo also works with clients, regulators and other stakeholders to assess sediment impacts in urban waterways to facilitating risk management decisions that address resource impacts.



Experience: Over 25 years of experience dealing with legacy environmental problems under CERCLA, RCRA, TSCA and related brownfield environmental programs.

Email: Jim.Perazzo@erm.com

LinkedIn: https://www.linkedin.com/in/jim-perazzo-79a4159/

Education

- M.B.A. , Long Island University (C.W. Post), New York, 2006
- M.S. Earth Science, Adelphi University, New York, 1981
- B.S. Geology, The State University of New York at Stony Brook, 1978

Professional Affiliations and Registrations

- Professional Geologist in Pennsylvania

Languages

- English, native speaker

Fields of Competence

- CERCLA RI/FS and removal actions
- RCRA (RFA, RFI CMS and CMI)
- TSCA (PCBs & lead)
- UST assessment and hydrocarbon remediation
- UST assessment and hydrocarbon remediation
- Soil and ground water investigations
- Hydrogeological assessments
- Regulatory negotiation and strategic guidance
- Financial analysis (legacy environmental and compliance costs)
- Expert witness (CERCLA cost recovery, Navigation Law claims)

Key Industry Sectors

- Mining
- Chemical
- Manufacturing
- Oil & Gas

Publications

- “The Intersection of Governance, Performance, Assurance and Reporting in Asset Retirement Obligations Related to Mine Reclamation & Closure” Perazzo, James, A. & Eddy, Stuart , SME Conference, Seattle, WA February 22, 2012
- “Financial Reporting of Environmental Matters & the Influence on a Company’s Sustainable Business Strategy” AWMA/NYEWA Seminar, Rochester Institute of Technology Conference Center, February 12, 2009.If this list is extensive, relocate this entire sub-section to the end (after Key Projects)
- “Real Estate Transactions & Brownfield’s” NYSBA CLE Program, May 24, 2004
- "CERCLA - The Technical Perspective," Environmental Regulations Course, Executive Enterprises, Inc., June ‘95, October ‘95, and February ‘96.

- “Remedial Investigation and Feasibility Study Process," New York Hazardous Regulation Course, Executive Enterprises, Inc., November 16 17, 1990.
- “Groundwater Remediation; Performance Goals," Haztech International, Cleveland, Ohio, September 20 22, 1988.
- "Remedial Design Needs to Consider in Planning Hazardous Waste Site Investigations," with J. Iannone and J. Mack; Haztech International, St. Louis, Missouri, August 26 27, 1987.
- "Long Term Confidence in Ground Water Monitoring Systems," Groundwater Monitoring Review, Vol. 4, No. 4, all 1984.

Key Projects

Principal-in-Charge involving a major urban waterbody project in the Superfund program in USEPA Region 2.
Coordinates a diverse staff of environmental professionals in support of a contributing PRP. Also, liaison with common consultant, USEPA and NYC to advance PRP group objectives and initiatives with the intent of assuring a comprehensive, technically supported and protective and practical RI/FS and eventual RA.

Project Director to develop environmental liability estimates for the purpose of financial re-statement to facilitate registrant’s filing of an S-1 with the SEC.
The portfolio involved review and assessment of over 2500 properties (historic and current) with projected environmental liabilities and asset retirement obligations in excess of $700MM. Financial estimates were developed in accordance with US GAAP.

Project Director for federal superfund site involving PCE impacts to regional aquifer and allegations of public supply well impacts.
Developed technical strategy and coordinated implementation of a RI/FS leading to a ROD that narrowly defined impacts from client site versus regional impacts from other sources of similar contamination. Direct RD/RA effort to implement the selected remedy and, together with post-ROD information and support from local municipality, resulted in EPA issuing a modified ROD.

Part of a multi-disciplined team providing technical consultation to a city planning board to ensure development of a comprehensive draft and final environmental impact assessment.
Ensured that residual environmental impacts at properties within a project area in both federal and state Superfund programs were addressed and/or incorporated into a 50+ acre regional waterfront redevelopment in the northeast with significant public amenities. The effort led to a successful adoption of a FEIS and issuance of Findings that ensured the integrity of future site plans.

Project Principal for responsible for a former industrial facility requiring completion of an RI/FS at a NYS Superfund site.
Secured a ROD that was used to facilitate transfer of the property into the NYS Brownfield Cleanup Program and, combined with a finite risk insurance policy enabled the responsible party to cap environmental liabilities.

Project Director for Chapter 11 bankruptcy settlement and re-organization involving major mining company.
Lead team to develop environmental liability and asset retirement estimates for a portfolio of formerly owed, non-operating sites. Provided proffer and testimony in support of debtor’s settlement of outstanding liabilities that was affirmed by the court.

Project Director for large Superfund site affected from former lead and copper recovery operations.
Project responsibilities included work plan preparation, RI implementation, coordination of human health risk and ecological assessments, a feasibility study, and remedial design and construction of the remediation action.

Provided Director for conversion of former industrial facility to multi-tenant commercial space.
Successfully completed cleanup obligations at NYC manufacturing site under the Voluntary Cleanup Program involving disassembly of manufacturing lines, and soil/ground water remediation (combined ex-situ and in-situ) beneath a facility adjacent the East River to enable re-development to commercial use.

Developed a tank management program for 36 locations in New York and Connecticut.
Planned site assessments and remedial programs. Formulated monitoring programs for early warning of potential environmental problems. Negotiated financial estimates and justification for outstanding environmental liability allowing owner to divest with protection against future liabilities.

Served as a technical expert for one airline in litigation with multiple airlines over a claim of $100 MM in environmental cleanup costs at JFK airport.
Engaged in mediation on behalf of client setting out technical positions that were used as the basis for cost allocation potions in mediation.

Project Director for three removal actions under CERCLA 106at two separate Superfund sites in receivership.
Performed removal of anhydrous ammonia vessel, ASTs, laboratory chemicals, drums, PCB oils, transformers, and closure of USTs. Also directed a radiological survey with a health physicist to locate and remove materials exhibiting anomalous levels of radiation. These efforts were done on behalf of a Savings and Loan in receivership.

Project Director for development and implementation of remedial system to extract chlorinated VOCs from soil and ground water from a source area at a Superfund site.
Coordinated program involving dewatering and vacuum extraction. Established basis for performance analysis and effectiveness evaluation to determine proper time for system termination.

RI/FS and ROD critiques, in support of petition to amend.
After EPA rejection of the petition a corresponding US claim for cost recovery enabled a client to file a cross-claim that resulted in client recovering one-third of the of the ROD remedy costs via a mixed funding application secured by ERM.

Developed technical approach to ongoing cases for the New York State Environmental Protection Bureau of the Attorney General's office.
Prepared scientific reports and represented the Attorney General in adversarial discussions, public meetings, and court hearings. As part of a multi-disciplined technical team, developed a comprehensive remedial program at a dioxin-contaminated landfill in Western New York.
The program involved collection and treatment of dissolved and non-aqueous phase liquids (NAPLs) in overburden and bedrock.

Technical representative for the AG Office in developing a comprehensive soil and aquifer remediation project in Nassau County, New York.
The project involved a soil and ground water remediation program including installation of a slurry wall via the vibrating beam technique, soil flushing system and staged ground water recovery from a shallow and deep aquifer. Maintained a key role in establishing performance criteria for cleanup and effectiveness monitoring.

Christopher W. Wenczel, P.G.

Principal Consultant/Hydrogeologist
North America

Mr. Wenczel is an ERM Principal Consultant/Hydrogeologist and a New York State-licensed Professional Geologist who has more than 30 years of diversified experience in the environmental consulting/engineering field specializing in hydrogeology, hazardous waste management/remediation, and water supply. Mr. Wenczel's diverse project experience includes planning and directing large complex projects under CERCLA, RCRA, TSCA, NEPA, SEQRA, NJDEP Site Remediation Program, NJPDES, NYSDEC Voluntary Cleanup, State Superfund and Oil Spill Programs. These activities include preparation of regulatory documentation, strategic advice, regulatory interface/negotiations on behalf of clients, site assessments, remedial investigations, remedial design/remedial actions, and long-term monitoring programs at landfills, manufacturing/commercial properties and Federal facilities.

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Education

- M.S. Earth Sciences/Hydrogeology, Adelphi University, New York, 1990
- B.S. Geology, State University of New York at Oneonta, 1985
- NJDEP UST License Renewal Courses, 1998 - 2013
- State of New Jersey Certified Cleanup Star Program Participant, 2004
- 40-Hour OSHA 1910.120 Health and Safety Training, 1987, and 8-Hour OSHA Annual Refresher Training, 1987 – 2016
- 8-Hour OSHA Supervisory Training For Level B Activities, 1989
- 10-Hour OSHA Construction Safety Training 2008
- ERM Subsurface Clearance/Field Safety Officer Certified
- International Symposium on Environmental Geotechnology, Lehigh University and the International Committee on Environmental Geotechnology, Allentown, PA, 21 -23 April 1986
- Theory and Application of Vadose Zone Monitoring, Sampling and Remediation, NGWA, Somerville, MA, 7-9 April 1992
- Assessment, Control and Remediation of LNAPL Contaminated Sites, API/USEPA, East Brunswick, NJ, 20 October 1994
- Environmental Horizontal Well Symposium, NGWA, Indianapolis, IA, 28-30 October 1995,
- Petroleum Hydrocarbons & Organic Chemicals in Ground Water: Prevention, Detection and Remediation, NGWA, Houston, TX, 13-15 November 1996
- NJDEP Technical Requirements For Site Remediation Seminar, Cook College @ Rutgers, 27 May 1998
- DNAPLs in Fractured Geologic Media: Monitoring, Remediation & Natural Attenuation, Univ. of Waterloo, San Francisco, CA, 8-10 December 1999
- Hydrogeology of Fractured Rock: Characterization, Monitoring, Assessment & Remediation, Fractured Rock Educational Services, Princeton, NJ, 19-22 May 2003
- Systematic Approach To Ground Water Capture Zone Analysis, USEPA Region 2 Headquarters, New York City, New York, 21 August 2007
- Environmental Forensics: Current Methods of Contaminant Age Dating, Cook College @

Rutgers University, New Brunswick, NJ 6 October 2011
- Marcellus Shale: New Regulations and Challenges, New York State Bar Association, Concierge Conference Center, New York City, New York, 22 June 2012
- Emerging Contaminants Summit, Westminster, Colorado, 6-7 March 2018

Professional Affiliations and Registrations

- New York State Professional Geologist, License No. 000744
- Qualified Environmental Professional (New York)
- National Groundwater Association
- New York State Council of Professional Geologists, Outreach Committee Member
- Long Island Association of Professional Geologists, President, 2016-Present

Languages

- English, native speaker

Fields of Competence

- Site Investigation/Remediation Strategy & Implementation
- Ground Water Resource Development
- Multi-Media Sampling & Remediation
- Hydrogeologic Testing, Analyses & Interpretation
- Analysis of Surface & Ground Water Flow Systems
- Surface & Ground Water Quality Monitoring
- Vapor Intrusion Assessment & Mitigation
- Applied Geophysics
- RCRA Closure Planning, Decommissioning, Dismantling, Decontamination & Demolition
- UST Assessment, Removal & Remediation
- Soil Vapor Extraction/Air Sparging
- Ground Water Pumping & Treatment
- Subsurface Clearance
- CPR/First Aid

Key Industry Sectors

- Manufacturing
- Oil & Gas
- Chemical
- Government
- Real Estate & Land Development

Key Projects

USEPA Superfund Program: Participated in Remedial Investigations/Feasibility Studies (RI/FS), Remedial Design (RD) and/or Remedial Operations programs at the following NPL Sites:

- Lipari Landfill
- Lone Pine Landfill
- Vestal Well 1-1
- Robintech Inc./ National Pipe Co.
- Combe Landfill South
- Swope Oil & Chemical Company
- Port Washington Landfill
- Fulton Avenue
- AES/Shore Realty Site
- Sinclair Refinery
- Pfohl Bros. Landfill
- New Cassel/Hicksville Groundwater Contamination Site
- Islip Municipal Sanitary Landfill
- Sarney Farm

Brookhaven National Laboratory: Project Manager responsible for execution of multiple projects at Brookhaven National Laboratory, Upton, NY (BNL), with revenues in excess of $2.8 million. These projects include extensive ground water delineation projects for volatile organic compounds, metals, and radionuclides. These ground water surveys include Operable Unit 3 and Operable Unit 5, the High Flux Beam Reactor emergency response tritium delineation project conducted in March 1997. In a six-week period, ERM's team installed and sampled a total of 72 temporary ground water vertical profile wells to depths ranging between 200 and 300 feet below grade. In addition, these projects have included walk-over radiation surveys for landscape soils across the site and at the former Low-Mass Criticality Facility, and geotechnical studies for BNL's sewage treatment plant.

Long Island Solar Farm (LISF) at BNL: Principal Consultant/Senior ERM Project Team Member assisting ERM's confidential client to develop the Long Island Solar Farm (LISF) in Upton, New York, which is the largest photovoltaic (PV) solar project in the Northeast United States. The facility is located on an approximately 200-acre easement at the US Department of Energy's (DOE) Brookhaven National Laboratory (BNL) on Long Island, New York. The arrays utilized, where possible, areas already cleared (agricultural field, firebreaks, and brownfields) at BNL. Power generated at the 32-MW facility is sold to the Long Island Power Authority (LIPA) under a 20-year power purchase agreement. The project is noteworthy for success in a region that is considered an unlikely geographic location, as large-scale solar farms are more typically located in the Southwest. In addition, the site has had to overcome a number of challenges because of its proximity to World War II artifacts, environmentally sensitive habitat (wetlands), radiological contamination and the presence of the endangered Tiger Salamander.

Mr. Wenczel's involvement included working collaboratively worked with the DOE to prepare a National Environmental Protection Act (NEPA)-required Environmental Assessment (EA) Report, and with LIPA to complete necessary New York State Environmental Quality Review (SEQR) assessments and documents for this private PV Solar Farm demonstration project. Specific studies related to the EA and NYSEQR processes, and due diligence/project financing/investor assurance activities included:

- Analysis of potential:
  - visual impacts (ViewShed/Desktop Visual/field reconnaissance);
  - construction noise impacts (Noise Sound Studies); and
  - impacts to wetlands and ecosystems;
- Assessments for the potential of radiological impacts adjacent to and within easement areas at BNL.

- Phase I and Phase IA site investigations in order to determine if any chemical constituent and/or radiological contamination resulting from past practices at the property, which had long been in use both as a military base and a US Atomic Energy Commission/DOE research facility, might be detrimental to the construction and operation of a PV solar facility at BNL;
- Third-party oversight of radiological impact ("hotspot") remedial actions undertaken by DOE within the 200-acre project footprint, and review/comment on resultant post-remedial action reports.

RCRA Closure/Corrective Action (NYS Part 373) or TSCA (40 CFR Part 761) Cleanup Projects: that were successfully, safely and profitably implemented. These projects involved provision of turn-key DDD services for our clients which were completed in advance of lease exits, property divestures, structure demolition and/or commercial redevelopment. Services provided spanning the entire project life cycle included: regulatory/health/safety planning, competitive procurement and contract management of the remedial subcontractors, implementation/oversight/effectiveness verification sampling, resultant waste disposal, and reporting for regulatory approval and closeouts.

Brooklyn Navy Yard, Brooklyn, New York: A TSCA Interim Remedial Measure (IRM) conducted on former electrical substation that had suffered a major fire to mitigate PCB contamination resulting from releases of electrical transformer dielectric fluids. The IRM included characterizing the extent of PCB contamination on concrete surfaces and soils/sediments associated with the former transformers. The IRM included the removal, containment and disposal of soils/sediments containing high levels of PCBs from a subsurface vault, cleaning, scarification, and final encapsulation of all effected concrete surfaces within the vault and other concrete surfaces associated with the former transformers. A Final Remediation Report was prepared and submitted to NYSDEC for review and official acknowledgment that "no further action" is required at this electrical substation.

Konica Minolta Graphic Imaging USA, Inc., Glen Cove, New York: RCRA Closure of five separate areas. The planning phase of this work involved an appropriate survey and development of project specific Health & Safety Plan, and a RCRA Closure Plan that was approved by the NYSDEC. All tanks, remaining equipment, trenches, pits, floors, walls and appurtenances were accessed, cleaned, and dismantled. The areas included:

- 1,000-Gallon Fiberglass Hazardous Waste Photographic Fixer Tank;
- 750-Gallon Fiberglass Hazardous Waste Photographic Fixer Tank;
- Spill Area Surrounding the Hazardous Waste (Silver) Photographic Fixer Drainpipe located in the Fixer-Developer Lab;
- Hazardous Waste (Silver) Emulsion Spill Area in the Basement; and
- Flammable Hazardous Waste Storage Pad/Shed.

Time Equities, Westbury, New York: A pre-demolition RCRA Closure of a former wastewater treatment (WWT) building. The planning phase of this work involved an appropriate survey and development of project specific Health & Safety Plan, and a RCRA Closure Plan that was approved by the NYSDEC. All tanks, remaining equipment, trenches, pits, floors, walls and appurtenances were accessed, cleaned, and dismantled. The areas included:

- The former 4-inch diameter wastewater line running from the Main Building to the concrete receiving vault of the WWT Building;
- The concrete receiving vault of the WWT Building;
- The three 10,000-gallon steel ASTs in the WWT Building;
- The 1,000-gallon fiberglass process sludge tank in the vault within the WWT Building;

- All secondary containment structures that may have come into contact with wastewater including the concrete and tiled floors, the concrete block walls of the WWT Building, the concrete piping trenches and associated protective steel grating, concrete sludge tank vault; and
- All associated polyvinyl chloride (PVC) and steel piping systems within the WWT Building.
- Residual wastes, sludges and washwaters were handled for disposal as scrap or containerized, characterized and disposed of at properly permitted waste disposal facilities. The decontamination procedures were then followed by visual inspection to confirm the absence of, and finally confirmation sampling and analysis. Some minor soil excavation and disposal was performed. The final report was reviewed and approved by the NYSDEC with a no further action letter allowing subsequent demolition to proceed.

Stewart Stamping EFI, Yonkers, New York: A pre-demolition RCRA Closure of a former metals stamping facility. The planning phase of this work involved an appropriate survey to identify areas requiring closure and development of project specific Health & Safety Plan, and a RCRA Closure Plan. Applicable areas and the basic work scope for each area included:

- Tumbling Room
- Chemical Storage Areas
- Plating Areas
- Drum Cleaning Area
- Waste Oil Collection/Storage Areas
- Compressor Room
- Wastewater Treatment Areas
- PVC Piping (1000'+)

Residual wastes, sludges and washwaters were handled for disposal as scrap or containerized, characterized and disposed of at properly permitted waste disposal facilities. The decontamination procedures were followed by visual inspection to confirm the absence of, and finally confirmation sampling and analysis. Some minor soil excavation and disposal was performed.

Former Pall Corporation Facility, East Hills, New York: Supported due diligence activities for a major New York area commercial developer client - Steel Equities whom was purchasing this facility for commercial redevelopment. Retained to review and opine the adequacy of extensive RCRA Closure/Corrective Action work performed by others. Xerox Corporation, Rochester, New York – Developed a RCRA Partial Closure Plan for a wastewater treatment facility in Building 208. The document was approved by the NYSDEC but ERM RCM was not the successful bidder to implement the DDD work.

Involved in due diligence/site investigation (Phase I & II Environmental Site Assessments), and DDD services throughout my career. Developed good experience in recognition of potential ACM, lead (lead-based paint {LBP}, PCBs, radiation, hazardous materials and universal wastes, and can perform these surveys. Also know the requirements for sampling, testing, abatement/abatement monitoring (ACM), and disposal thereof.

Radionuclides: Extensive experience in leading various types of radiation surveys at multiple sites including Brookhaven National Laboratory, Upton, NY, the Phohl Brothers Inactive Hazardous Waste Site in Williamsville, NY, and multiple commercial property acquisitions for a major developer in the New York City area.

Land Disturbance/Subsurface Structure/Soil Remediation Projects: Extensive experience managing or providing senior technical support on land disturbance/subsurface structure/soil remediation projects. These projects have involved excavation and disposal of large quantities of soil/sediments impacted with VOCs, SVOCS, PCBs, and metals related to discharges from chemical and

petroleum bulk storage (ASTs/USTs), manufacturing process areas, vapor degreasing operations, roof ventilation, septic tanks, septic system leaching pools, stormwater drywell and drains, and recharge basins.
Examples of larger projects that resulted in 500+ tons of material for disposal include:

- **Former Parker Hannifin Facility, Dayton, New Jersey:** Septic systems, stormwater systems (15+ structures), USTs (petroleum), and an AST (TCE).
- **Anderol (fka Royal Lubricants) East Hanover, New Jersey:** Fuel Oil UST that was subsequently used for storage of waste oil, spent solvents, PCBs and mercury.
- **Becton Dickenson, East Rutherford, New Jersey:** Remedial excavation of petroleum, chlorinated solvent and mercury-impacted soil, some of which originated from USTs.
- **Brooklyn Navy Yard, Brooklyn, New York:** Petroleum (10+USTs) and PCB impacts (electrical substation transformer releases).
- **Genesco Inc., 150 Fulton Avenue Superfund Site, Garden City Park, New York:** Significant quantities of PCE discharged to a stormwater drywell
- **Steel Equities, Emjay Boulevard, Brentwood, New York:** Facility-wide stormwater drywell and on-site septic system structure cleanouts (40+ structures) plus a stormwater recharge basin cleanout. Sediments and soils were impacted with VOCs, SVOCs, and metals.
- **Steel Equities, Alkier Street, Brentwood, New York:** Facility-wide stormwater drywell and on-site septic system structure cleanouts (10+ structures). Sediments and soils were impacted with VOCs, SVOCs, and metals.
- **Steel Equities, 2200 Northern Boulevard, East Hills, New York:** Facility-wide stormwater drywell and on-site septic system structure cleanouts (50+ structures) plus a large stormwater recharge basin cleanout. Sediments and soils were impacted with VOCs, SVOCs, and metals.
- **Northrop Grumman, Melville Park Road, Melville, New York:** Facility-wide stormwater drywell and on-site septic system structure cleanouts (10+ structures). Sediments and soils were impacted with VOCs, SVOCs, and metals.

Chemical & Petroleum Bulk Storage: Maintained a New Jersey UST License Since 1993. Provided turn-key services and managed those projects primarily in New York and New Jersey that involved the cleaning and proper removal of ASTs, and cleaning and removal or abandonment in-place of several dozen USTs. ERM's turnkey approach provided the clients with a single entity to properly investigate and close the USTs/ASTs in a safe and environmentally responsible manner meeting the substantive requirements of Federal, State and County regulations. All work was completed in a manner to cause the least disruption to facility client operations. ERM met with, and facilitated inspections by the Federal, State, County agencies and Fire Departments, and prepared final comprehensive closure reports for submittal to, and approval by the lead agencies. These services included:

- Pre-closure site investigations at each UST location using geophysical methods such as cable avoidance tools, terrain conductivity and ground penetrating radar, installation of soil borings with the collection of soil and ground water samples for laboratory analyses to assess pre-closure conditions;
- Preparation of UST Closure Work Plans; Sampling and Analysis/Quality Assurance Project Plans, and a Health and Safety Plans;
- Notification of interested regulatory agencies (Federal, State, County (Health), and Fire Departments);
- Procurement of all necessary permits;
- Procurement and contract management of the remedial subcontractors;
- Engineering support services for the implementation of the on-site closure activities;
- Closure by in-place abandonment, excavation and removal of the USTs and effected soils;
- On-site health and safety oversight;
- All end-point soil sampling;

- Complete restoration of each former UST location; and
- Preparation of a final comprehensive UST Closure Report for submittal to regulatory agency.

UST/AST Project Examples:

- 6,000-gallon heating/waste oil USTs - Anderol (fka Royal Lubricants) East Hanover New Jersey
- 10+ Gasoline/Heating Oil USTs up to 20,000-gallons capacity - Brooklyn Navy Yard – Brooklyn NY
- 1,000-gallon and 750-gallon Fiberglass Hazardous Waste Photographic Fixer ASTs - Konica Minolta Graphic Imaging USA, Inc., Glen Cove, New York
- 5,000-gallon heating oil USTs - Commercial Property - Oceanside, NY
- 8,000-gallon heating oil USTs - Elmsford Associates (Commercial Property), Elmsford NY
- 1,000-gallon heating oil USTs- Workman's Benefit Fund, Hicksville, NY
- 500-gallon gasoline and heating oil USTs - Steel Equities - Little Neck, NY
- 10,000-gallon & 5,000-gallon heating oil, 1,000-gallon gasoline Former Parker Hannifin facility – Dayton, NJ
- 3 10,000-gallon wastewater ASTs -Time Equities, Westbury, NY

Delta Airlines, John F. Kennedy International Airport (JFK) in Jamaica, NY: Directed all phases of multiple petroleum spill investigations on behalf of Delta Airlines. Coordinated the regulatory approval and execution of detailed investigative work plans. Obtained approvals from the Port Authority of NY & NJ (PA) for Tenant Alteration Applications (TAA), for soil and groundwater investigations along several hundred feet of subsurface aircraft fuel piping and hydrants on the airside of the aircraft terminal. Coordinated PA and subcontractors to perform, subsurface clearance, multi-phase extraction, soil borings, groundwater sampling, and disposal of investigative derived waste. All work to date has been successfully and safely completed in concert with the PA and local client operations teams.

TRW Aeronautical Systems, Utica, New York: Project Manager responsible for execution of multiple projects at this major aeronautical systems manufacturing facility in Utica, New York. These projects include a NYSDEC RCRA Corrective Action program, facility relocation support and permitting, and implementation of multiple Interim Remedial Measures (IRM). The RCRA Corrective Action included the regulatory negotiation, development, and implementation of key program documents including the RCRA Facility Assessment and the RCRA Facility Investigation Work Plan. Both on-site and off-site investigations were required to characterize impacted media including soils, ground water, storm water, surface water, and building materials such as concrete and metals. Contaminants of concern at the facility included volatile organic compounds, semi-volatile organic compounds, polychlorinated biphenyls (PCBs), metals, and cyanide. IRMs included removal and disposal of structures, vent stacks, stormwater conveyance systems, soil, and concrete. Facility relocation support included procurement of permits/registrations for sanitary wastewater discharges, air discharges, petroleum bulk storage tanks, waste management, development of a spill control, containment and countermeasures plan (SPCC), and revisions to both waste management and emergency control procedure plans.

Fulton Avenue Superfund Site, Garden City Park, New York: Designated Project Coordinator/Manager responsible for the implementation of an extensive RI/FS, Soil IRM, Remedial Design and Remedial Action at the Fulton Avenue Superfund Site. The Fulton Avenue site is listed on both the NYSDEC Registry of Inactive Hazardous Waste Sites and the USEPA NPL. Past discharges of chlorinated solvents (tetrachloroethene) have caused extensive ground water contamination in the Upper Glacial and

Magothy aquifers. The ground water contaminant plume has allegedly migrated a distance of 2 miles from the site to depths of up to 500 feet to affect up to 5 public supply wells encompassing an area of approximately 5 square miles within Nassau County. The RI/FS focuses on a ground water vertical profiling task using temporary wells to further define the extent of ground water contamination within the upper glacial aquifer and the Magothy aquifer, and to select permanent ground water monitoring well locations and screen settings; installation of permanent conventional and multi-level ground water monitoring wells to act as permanent monitoring and/or compliance points within the upper glacial aquifer and the Magothy aquifer; collection of ground water samples from over 60 ground water monitoring wells; collection of several rounds of synoptic ground water level data; a three-dimensional ground water flow computer model; a risk assessment for ground water; and a feasibility study for ground water. The soil IRM is comprised of a source area soil removal action, and the installation of a soil vapor extraction (SVE) and air sparging (AS) to remove contaminants from the vadose zone soils and the shallow ground water table. Since the SVE/as system went online in October 1998, approximately 10,000 pounds of tetrachloroethene has been removed from the ground. The post-IRM Site closure included indoor air sampling and installation of a sub-slab venting system beneath the building at the Site.

Former Parker Hannifin Facility, Dayton, New Jersey: Project Manager/Senior Hydrogeologist responsible for the coordination and performance of a major off-site hydrogeologic investigation for a manufacturing facility and ISRA site (NJDEP Site Remediation) in South Brunswick, NJ. Conducted an extensive volatile organic compound plume delineation task in a dual aquifer ground water system which utilized the terrain conductivity, resistivity and VLF geophysical mapping techniques and the Hydropunch ground water sampling technique. Other site investigative activities have included: the phased installation of an extensive ground water monitoring well network, performance of multiple aquifer tests, characterization of the subsurface geologic and hydrogeologic regime, test pitting, soil sampling, an UST investigation, ground water sampling, performance of a soil vapor extraction pilot study, design/installation/testing of a ground water recovery well, data analyses, interpretation, and preparation of an Site Assessment Report, an extensive Pump Test Report, Soil and Ground Water Remedial Action Work Plans, a Comprehensive Hydrogeologic Report, a SVE Pilot Study Report. Remedial Action Work Plans proposed the use of SVE, biosparging, and pump and treat technologies. All three systems are currently in operation and effectively remediating soil and ground water contamination at the site.

Ashland Chemical, Fords, New Jersey: Management and supervision of hydrogeologic investigation at an Ashland Drum Landfill Site, Fords, New Jersey (NJDEP Site Remediation). The investigation included: the installation of a ground water monitoring well network, characterization of the subsurface geologic and hydrogeologic regime, a study of tidal influence on ground water flow, test pitting, soil sampling, ground water sampling, drum sampling, data analyses and preparation of an RI Report.

NYSDEC Pfohl Brothers State Superfund, Williamsville, NY: Senior Hydrogeologist responsible for the coordination and supervision of a comprehensive RI at the Pfohl Brothers NYSDEC State Superfund site (120 acres) located in Williamsville, NY. The site investigation of Pfohl Brothers Landfill included: preparation of a RI work plan, Health and Safety Plan (HASP), a Quality Assurance Plan (QAPP), geophysical surveys using terrain conductivity, magnetometry and ground penetrating radar, soil borings, ground water monitoring well installation in both bedrock and overburden aquifers, soil sampling, sludge sampling,

hydrologic monitoring of surface water bodies, surface water sampling, ground water sampling, landfill leachate sampling, test pitting and drum sampling. In addition to the overall site characterization, evaluated the presence of low-level radionuclide contamination on the site, delineated, and mapped over 450 radioactive "hot- spots" using scintillometers. Radionuclides found at the site included radium-226, thorium-232, cesium-132 and uranium-238 in the form of discarded machine parts, radioluminescent badges, and ore rocks.

Port Washington Municipal Landfill Superfund Site, Port Washington, New York: Installation of ground water and landfill gas monitoring wells as part of an RI. Additionally, participated in the development and implementation of a landfill gas sampling program using flux boxes, landfill gas monitoring wells and summa canisters.

Wickland Oil, San Nicholas, Aruba: Senior Hydrogeologist responsible for the coordination and performance of a comprehensive environmental assessment at the former ESSO petroleum refinery, San Nicholas, Aruba, N.V. The investigation included: the installation of a ground water monitoring well network, characterization of the subsurface geologic and hydrogeologic regime, test pitting, soil sampling, an above ground storage tank investigation, ground water sampling, mapping of extensive LNAPL bodies, data analyses/interpretation, and preparation of an Site Assessment Report.

Participated in two NPL site RD programs, Vestal Well 1-1, Vestal, New York and the Lipari Landfill, Pitman, New Jersey. Activities for the Vestal Well 1-1 site included the preparation of a Remedial Design work plan, HASP and QAPP, performance of a soil boring program and design of a 1,000-gpm air stripper. Activities for the Lipari Landfill included the design of an automated extraction/injection well network and a 300-gpm production well.

Brooklyn Navy Yard, Brooklyn, New York: Project Manager responsible for execution several major environmental investigative/cleanup tasks at the former Brooklyn Navy Yard (Brooklyn Navy Yard Industrial Park {BNYIP}), that have included: Phase I & II Site Assessment/Investigation Services Related To a NYSDEC Voluntary Cleanup Agreement, Implementation of Interim Remedial Measures, and Investigation/Closure of Underground Storage Tanks

ERM performed a Phase I Preliminary Site Assessment data gathering and evaluation process in conjunction with a Phase II Site Investigation to address key data gaps for potential area and activity-specific sources of hazardous substances. The Phase I Preliminary Site Assessment included site inspections, review of all historic data/records, previous investigations performed at the BNYIP to date, inspection of BNYIP facilities, interviews of facility personnel regarding current and past operations.

The Phase II investigation included the sampling and characterization of environmental conditions at electrical substations/transformer areas, drum storage areas, dry docks, and facility-wide ground water characterization. The Phase II Investigative findings were then integrated with the Phase I Site Assessment information to prepare a Comprehensive Environmental Assessment Report (CEAR) for the BNYIP.

ERM provided complete turnkey services for investigation and closure of 10 underground petroleum storage tanks located in seven separate areas at the BNYIP. These services included pre-closure site investigations at each tank locations, preparation of all regulatory required work plan documents, notification of interested regulatory agencies (NYSDEC, NYCFD), procurement of necessary permits, closure by excavation and

removal of the USTs and effected soils, complete restoration of each former tank location, and preparation of a final comprehensive UST Closure Report for submittal to NYSDEC.

ERM performed an Interim Remedial Measure (IRM) at former electrical substation to mitigate PCB contamination resulting from releases of electrical transformer dielectric fluids. The IRM included characterizing the extent of PCB contamination on concrete surfaces and soils/sediments associated with the former transformers. The IRM included the removal, containment and disposal of soils/sediments containing high levels of PCBs from a subsurface vault, cleaning, scarification, and final encapsulation of all effected concrete surfaces within the vault and other concrete surfaces associated with the former transformers. A Final Remediation Report was prepared and submitted to NYSDEC for review and official acknowledgment that "no further action" is required at this electrical substation.

NYSDEC Utility Manufacturing State Superfund Site, New Cassel, New York: Project Manager responsible for the implementation of an off-Site RI/FS at the NYSDEC Utility Manufacturing State Superfund Site. The Utility Manufacturing Site is listed on the NYSDEC Registry of Inactive Hazardous Waste Sites. Past discharges of chlorinated solvents have caused extensive ground water contamination in the Upper Glacial and Magothy aquifers affecting several deep public supply wells in the Bowling Green Water District. The RI features the off-site installation of soil borings to collect both lithologic samples to characterize off-site stratigraphic conditions, and groundwater samples using a Hydropunch to characterize off-site groundwater quality/impacts (i.e. determine if site-related contaminants have migrated off-site); installation of groundwater monitoring wells to confirm the results of the Hydropunch sampling; and the collection of soil gas samples to evaluate potential risks from soil vapor migration.

Project Manager responsible for third-party oversight on behalf of ERM's client to ensure responsible parties (former owners) comply with all applicable NJDEP soil and ground water remediation standards and the NJDEP-approved Remedial Action Plan for an NJDEP ISRA site in Paramus, New Jersey. Additional activities include oversight of an asbestos removal action at the same site.

AES/Shore Realty NPL & State Superfund Site, Glenwood Landing, New York: Project Coordinator/Principal Consultant/Hydrogeologist responsible for the continued operation and assessment of remedial systems Applied Environmental Services/Shore Realty Site (Site) in Glenwood Landing, New York. The Site, a 3.2 acre parcel located adjacent to Hempstead Harbor, is listed on both the NYSDEC Registry of Inactive Hazardous Waste Sites and the USEPA NPL. Past discharges of petroleum have caused extensive shallow soil and ground water contamination in the Upper Glacial aquifers where groundwater discharges to the adjacent Hempstead Harbor. Remedial systems consist of air sparge/soil vapor extraction (AS/SVE), groundwater pump and treat with bioremediation facilitated by adding nutrient amendments to treated groundwater that is reinjected on-Site up at an upgradient infiltration gallery. The remedial systems have operated since 1995 and the NYSDEC/USEPA required a subsurface site investigation to evaluate remedial progress, the occurrence and distribution of remaining contaminants, concurrent groundwater movement and interaction with the adjacent surface water body. Responsible for planning and negotiating the investigative scope of work that included a tidal influence study using remote pressure transducer/data loggers to evaluate hydrodynamic response to tidal flux in shallow, intermediate and deep aquifer zones beneath the Site, and Site-wide comprehensive groundwater

sampling. The tidal influence study results were analyzed to confirm significant tidal influence in the intermediate and deep zones. The tidal influence study results and the groundwater results were used to develop and updated conceptual site model, identify recalcitrant pockets of contamination (hotspots) and develop a plan for remedial systems optimization that was presented in a Remedial Effectiveness Report that was review and approved by NYSDEC and USEPA. The optimization plan included soil borings for stratigraphic definition at the locations of two new groundwater recovery wells, collection of soil samples for geotechnical analyses to design the new recovery wells intended to collect groundwater as well as depress the water table to enhance the efficacy of the AS/SVE systems, installation of the new recovery wells, pulsed-remedial operations and continued groundwater and remedial system monitoring.

Confidential Client, Hoosick Falls, New York: Principal Consultant/Hydrogeologist embedded into a team of senior scientists as a senior hydrogeologist/technical resource responsible for the planning, implementation of characterization/remedial investigations for perfluorinated compounds and chlorinated VOCs at multiple sites listed or under consideration for list on the New York State Registry of Inactive Hazardous Waste Sites in a complex regional bedrock, post-glacial and fluvial depositional geologic environment. Responsible for a regional bedrock lineament analyses using topographic maps, aerial photographs and high resolution LIDAR imagery, oversight of geophysical subcontractor for multi-site seismic, resistivity and VLF surveys – interpretation of the results thereof, stratigraphic correlation/hydrogeologic interpretation, preparation of geologic cross-sections/isoconcentration plots, speciation analysis, a conceptual site model to understand the distribution and movement of groundwater and contaminants. Responsible for development of multiple site investigation scopes/work plans that include surface geophysical methods for subsurface clearance, the installation of soil borings to collect lithologic samples to characterize off-site stratigraphic conditions, installation of groundwater monitoring wells, and multi-media via sampling of soil, groundwater, sediment, surface water and soil vapor. Use of geoprobe direct push rigs, Waterloo APS (groundwater and estimate hydraulic conductivity), hollow-stem auger and rotosonic drilling methods.

Andrew Coenen

Senior Project Manager
North America

Mr. Coenen has knowledge of numerous analytical methodologies and experience in data validation of analytical data package deliverables for adherence to USEPA CLP and non-CLP, NYSDEC ASP, and NJDEP protocols. He is proficient with GIS/Key environmental management software and has operated a mobile gas chromatograph laboratory used to test soil and water samples for quick-turn volatile analysis.

Experience Mr. Coenen has 19 years of general analytical chemistry experience, 6 years of analytical laboratory experience, and 13 years of environmental consulting experience, including analytical data validation, sampling and analysis programs, quality assurance programs, technical support, laboratory audits, and QA oversight for fixed laboratory and field analysis. Mr. Coenen is an expert in GIS Solutions GIS\Key software. GIS\Key is a comprehensive, environmental data management and reporting tool. The software suite includes specific modules for storing and presenting Chemistry, Geology, Hydrology, NPDES, and Radiology data and has implemented the system's cutting edge data management protocols and processes for numerous large and small scale site investigation and remediation projects throughout the United States.

Email: Andrew.Coenen@erm.com

Education

- Rutgers University/Cook College - NJDEP Using GIS for Environmental Evaluations, October 1999
- 8-Hour OSHA Annual Refresher Training, 1999 current
- 40-Hour OSHA [29 CFR 1910.120 (e) (2)] Health and Safety Training, 1998
- Computer Aided Drafting, 50-Hour Course, Island Drafting and Technical Institute, 1998
- Immunoassay Testing Training Program, Strategic Diagnostics Inc., 1998
- B.S. Chemistry, University of Michigan, 1991

Languages

- English, native speaker
- Knowledge of German and Spanish

Fields of Competence

- Analytical data review and validation
- Environmental Database Management (GIS/Key)
- Laboratory Subcontractor Management
- Analytical protocols for pollutants by USEPA methodologies
- Methods of analysis of organic and inorganic parameters
- Review and preparation of QA/QC plans
- Field analytical techniques
- Multi-Media Sampling
- Briefly list areas of specialization

Key Projects

Environmental Data Management: Contaminated Site Management.
Data validation for numerous projects located in New York, New Jersey, California, Connecticut, Illinois, Iowa, Indiana, Maryland, Massachusetts, Michigan, Pennsylvania, Rhode Island, and Wisconsin, involving evaluation of aqueous, soil, sediment, leachate, and air samples analyzed by USEPA Contract Laboratory Protocols, State Protocols and numerous methodologies for organic, inorganic, wet chemistry parameters, TPH, and various other analyses.
Reviewed sampling and laboratory chemical data for adherence to New Jersey Department of Environmental Protection protocols and New York State Department of Environmental Conservation on numerous projects. Constructed electronic deliverables for submission to NJDEP and NYSDEC in required electronic formats.

Database construction & management for numerous investigations utilizing GIS/Key software.
Compiled field and laboratory data and generated result summary tables, contours, isopleths, contaminant plume maps, cross-sections, and boring logs.

Project Manager responsible for the coordination and performance of a major hydrogeologic investigation for an ISRA site (NJDEP Site Remediation) in East Rutherford, NJ.
Conducted an extensive volatile organic compound plume delineation, a vapor intrusion investigation, installation of an extensive ground water monitoring well network, ground water sampling.

Quality Assurance Officer.
responsible for review of all data collected at several sites including the former Brooklyn Navy Yard Industrial Park, several NYSDEC Standby Contract Projects, Sherwin Williams Superfund Site, Hydrite Chemical Company in Waterloo, Iowa.

Project management and technical support.
Special Analytical Services required to delineate low-level PAH contamination at a Superfund Site. This included method development and validation of a Selected Ion Monitoring (SIM) GC/MS technique.

Utilized Immunoassay test kits for field measurement of PCB contamination at the former Brooklyn Navy Yard, Brooklyn, New York.
Performed data validation of all field analytical samples and off-site laboratory samples and compared off-site results to test kits.

Prepared numerous Sampling and Analysis Plans (SAPs) and Quality Assurance Project Plans (QAPPs) for adherence to state and federal guidelines.

Conducted subsurface investigations with a Geoprobe. Performed various field tests.

Supervision of tank removal and subsequent soils evaluation for contamination.

Brice Lynch

Mr. Brice Lynch is a consultant within ERM based in Melville, NY. He has eight years of experience in the field of environmental consulting industry specializing in Geology and site remediation services.

His experience has dealt with groundwater, soil and air sampling events at spill and superfund sites, field parameter measurements, monitoring well installation, multi-level well installation, installation of vertical profile wells, soil logging, air rotary drilling, mud rotary drilling, bedrock coring and logging, construction oversight, brownfield site remediation oversight and CAMP, underground storage tank removal oversight and operations and maintenance of remediation systems. He has conducted multiple Phase II Environmental Assessments for multiple private entities.

Professional Affiliations & Registrations

- 40-hour Health and Safety Certification (OSHA)
- New York State Professional Geologist License

Fields of Competence

- Site assessment and remediation
- Geologic and hydrogeologic correlation, analysis, interpretation and assessments
- Groundwater investigations
- Soil investigations
- Air quality investigations and monitoring
- Remediation system design, construction, maintenance and oversight
- Health and safety site officer
- Field Management and Team Leader

Education

- Bachelor of Science, Geology, Stony Brook University, United States, 2010

Languages

- English, native speaker
- Spanish, beginner

Key Projects

Remediation System Operation and Maintenance, Groundwater and Air Sampling, Uniondale, NY
Performed regular operation and maintenance on SVE/AS-Air Sparge System, Ozone System, quarterly groundwater and air sampling.

Municipality, Nassau County, NY
Prepared and conducted groundwater sampling events at various sites. Field parameter measurements and product recovery of hydraulic oil and gasoline at contaminated site.

New Castle, Westbury, NY
Prepared and conducted quarterly groundwater sampling events and remediation system operations and maintenance.

Data management, Uniondale, NY
Inputted data using EQuIS software in order to develop and interpret trend plots of contamination over time.

Steel Equities, Little Neck, NY
Health and Safety Officer for Remedial Investigation. Performed oversight of mud rotary drilling and sampled and logged soils throughout the site.

Beckton Dickenson, East Rutherford, NJ
Field Team Leader for Becton Dickinson ISRA project. Prepared and conducted groundwater sampling events.

BICC, New Brunswick, NJ
Prepared and conducted groundwater sampling events. Mud rotary and Air rotary bedrock coring and FLUTe FACT liner installation oversight and sampling.

Genesco, Garden City Park, NY
Field Team Leader for groundwater sampling event at superfund site. Developed sampling schedule, prepared and executed all field activities and communicated effectively and efficiently with project managers and field staff.

Northwell Health, Lake Succes, NY
Conducted soil sampling for an active superfund site. Managed community air monitoring program (CAMP) and soil stockpiles to be transported off site.

Ultraflex, Brooklyn, NY
Conducted interior soil borings throughout an active printing facility. Installed sub slab vapor points and collected sub slab and indoor air samples. Installed tempororay monitoring wells and collected groundwater samples. Collected active and passive indoor air samples for OSHA compliance.

Borinquen Court, Bronx, NY
Installed temporary monitoring wells for an injection program at a Brownfield Site in the south Bronx in order to reduce soil and groundwater contamination on site. Responsible for implementing the CAMP for the entire site. Conducted groundwater sampling events in order to analyze effectiveness of the injection program.

Bluestone Organization, Jamaica, NY
Conducted groundwater and soil sampling event. Oversight of hazardous waste mass excavation at a Brownfield Site. Managed the removal of a UST that leaked and delineated the impacted soil. Collected end point samples to verify spill closure. Responsible for implementing the CAMP for the entire site.

Northrop Grumman, Bethpage, NY
Field Team Leader for Hydrualic Effectiveness project at a superfund site. Contaminants of concern at the site included chlorinated volatile organic compounds (VOCs). Installed monitoring wells and collected groundwater samples. Installed vertical profiles, collected groundwater samples and logged the soils throughout the site. With the soil and groundwater data composed geologic cross sections with the soil classification data and analytical results and discussed findings in the RIR.

ATTACHMENT B - Standard Operating Procedures

Section	Standard Operating Procedure
C.1	SOP 1 Water Level Measurement Procedures
C.2	SOP 2 Groundwater Sampling Procedures
C.3	SOP 3 Field Blanks
C.4	SOP 4 Trip Blanks
C.5	SOP 5 Decontamination Procedures
C.6	SOP 6 Waste Management and Disposal

C.1 WATER LEVEL MEASUREMENT PROCEDURES

The following procedure shall be used for water level measurements:

- Clean all water-level measuring equipment using appropriate decontamination procedures.
- Wear appropriate health and safety equipment as outlined in the Health and Safety Plan. In addition, samplers shall don new sampling gloves at each individual well prior to sampling.
- Visually examine the exterior of the monitoring well for signs of damage or tampering and record in the field logbook.
- Unlock well cap.
- Take and record in field logbook PID and/or OVA readings.
- Measure the static water level in the well with an electronic water level indicator. The water level indicator shall be rinsed with deionized water in between individual wells to prevent cross-contamination. Synoptic round of water level measurements shall all be completed on the same day.
- For wells located within the GCPIA, an interface probe will be used to check the bottom well sump for the presence of DNAPL. If it appears that DNAPL is present, an attempt will be made to collect a sample of the DNAPL using a discrete depth-sampling device such as a Bacon Bomb sampler. Groundwater samples will not be collected from any well containing DNAPL. Attach a pre-cleaned decontaminated discrete depth-sampling device to a new, dedicated length of polypropylene string. Set the sampler in the open position, and slowly lower the device to the bottom of the well. Upon reaching the well bottom, close the sampler using the wire-line or bottom actuated release mechanism to collect a sample. Slowly retrieve the sampler from the well, and collect a sample of the fluids into a sample jar for analysis and characterization.
- If DNAPL is not detected in the well, continue with the procedures described below.

C.2 SOP 2: GROUNDWATER SAMPLING PROCEDURES

Groundwater sampling will be performed using USEPA low-flow well purging/sample collection techniques. The following subsections present general preliminary well sampling procedures common to both techniques followed by low-flow sampling procedures, and if for some reason it is not possible to perform low-flow sampling, conventional procedures are also presented for reference.

The low-flow groundwater purging/sampling technique employs the use of a flow-through cell equipped with probes and a meter for measuring groundwater quality parameters such as pH, temperature, specific conductivity, dissolved oxygen and oxidation/reduction potential. One example of this equipment is the Horiba U-22 Flow-Through Cell and the specific manufacturer's calibration and operation instructions should be followed.

C.2.1 General Procedures

The following procedure will be used for all monitoring well groundwater sampling:

- Clean all water-level measuring equipment using appropriate decontamination procedures.
- Wear appropriate health and safety equipment as outlined in the HASP. In addition, samplers will don new sampling gloves at each individual well prior to sampling.
- Visually examine the exterior of the monitoring well for signs of damage or tampering and record in the field logbook.
- Unlock well cap.
- Take and record in field logbook PID and/or Organic Vapor Analyzer (OVA) readings.
- Measure the static water level in the well with a decontaminated steel tape or electronic water level indicator. The tape or water level indicator will be rinsed with deionized water in between individual wells to prevent cross-contamination. Synoptic round of water level measurements will all be completed on the same day.
- All wells will also be checked for the presence and thickness of Light or Dense Non Aqueous Phase Liquids (LNAPL/DNAPL).
- If LNAPL or DNAPL is encountered on the top of the water table at the time of sampling, a sample of the LNAPL or DNAPL will be collected for analysis if accumulations are sufficient. Measurement of the thickness of this layer will be taken using an interface probe. A sample of the LNAPL or DNAPL may be obtained using a dedicated bottom-loading bailer. The sample will be sent to the laboratory for analysis of its chemical composition and physical properties (e.g., specific

gravity, and gas chromatograph (GC) fingerprint). Initially, no groundwater sample will be collected from wells that contain LNAPL or DNAPL.

- If LNAPL or DNAPL is not detected in the well, continue with the low-flow sampling procedures described below.

C.2.2 Low-Flow Sampling

The low-flow sampling procedure is intended to reduce the amount of purge water generated during groundwater monitoring well sampling.

Sample Equipment

- Adjustable-rate, positive displacement pumps (e.g., centrifugal or bladder pumps constructed of stainless-steel or Teflon®). The selected pump must be specifically designed for low-flow rates (i.e., use of a high volume pump that is adjusted down to a low flow setting is not permitted).
- Tubing used in purging and sampling each well must be dedicated to that well. Once properly located, moving the pump in the well should be avoided. Consequently, the same tubing should be used for purging and sampling. Teflon® and Teflon®-lined polyethylene tubing must be used to collect samples for organic analysis.
- Electronic water level measuring device, 0.01-foot accuracy.
- Flow measurement supplies (e.g., graduated cylinder and stop watch).
- Interface probe.
- Power or air source (generator, compressed air tank, etc.).
- In-line purge criteria parameter monitoring instruments - pH, turbidity, specific conductance, temperature, ORP, and dissolved oxygen.
- Decontamination supplies.
- Logbook and field forms.
- Sample bottles.
- Sample preservation supplies (as specified by the analytical methods).
- Sample tags or labels, chain of custody forms.
- Well construction data, location map, field data from last sampling event.

Sample Procedure

1) Lower pump, safety cable, tubing, and electrical lines very slowly into the well to a depth corresponding to the center of the saturated screen section of the well. The pump intake must be kept at least two feet above the bottom of the well to prevent

mobilization of any sediment. Lowering the pump quickly, or even at a moderate rate, will result in disturbing sediment in the well. This is one of the most important steps in low flow sampling at the Site.

2) Measure the water level again with the pump in well before starting the pump. Start pumping the well at 100 to 500 milliliters per minute. Ideally, the pump rate should cause little or no water level drawdown in the well (less than 0.3 foot and the water level should stabilize).

- Measure and record the depth to water and pumping rate every 3 to 5 minutes (or as appropriate) during pumping. If purging continues for more than 30 minutes, readings will be recorded at approximately 10-minute intervals. However, once stabilization is indicated, a minimum of 3 consecutive readings at 3 to 5 minute intervals will be recorded prior to sample collection.
- Care should be taken not to cause pump suction to be broken or entrainment of air in the sample. Do not allow the groundwater level to go below the pump intake.
- Pumping rates should, if needed, be reduced to the minimum capabilities of the pump to minimize drawdown and/or to ensure stabilization of indicator parameters.

3) During purging, measure and record the field indicator parameters using the in-line meter (turbidity, temperature, specific conductance, pH, Eh, and dissolved oxygen) every 3 to 5 minutes (or as appropriate). If purging continues for more than 30 minutes, readings will be recorded at approximately 10-minute intervals. However, once stabilization is indicated, a minimum of 3 consecutive readings at 3 to 5 minute intervals will be recorded prior to sample collection.

- The well is considered stabilized and ready for sample collection once all the field indicator parameter values remain within 10 percent for 3 consecutive readings.
- If drawdown in the well is measured at 1 foot or more, continue to low flow purge until a minimum of the equivalent volume of 1 well casing volume is removed. Using the flow equation to calculate the volume of purge water. Then collect the ground water sample.

4) Before sampling, either disconnect the in-line cell or use a by pass assembly to collect groundwater samples before the in-line cell. All sample containers should be filled by allowing the pump discharge to flow gently down the inside of the container with minimal turbulence.

5) Label the samples using waterproof labels, or apply clear tape over the paper labels. Place all samples in a cooler as described in the QAPP with bagged ice or frozen cold packs and maintain at 4°C for delivery to the laboratory.

6) Do not use ice for packing material; melting will cause bottle contact and possible breakage.

7) Measure and record well depth. Take final water quality reading using low flow cell.

8) Secure the well.

C.2.3 Standard Purging and Sampling Procedure

1) Calculate the volume of water in the well as follows:

$$\text{Volume (in gallons)} = 3.14r^2(h) \times 7.48 \text{ gal/ft}^3$$

Where

h - well depth (feet) - static water level (feet)

r = well radius (feet)

2) Lower the decontaminated submersible pump with new, dedicated lengths of polyethylene tubing into the well so the pump is set at the screen interval. Purge 3 to 5 volumes of water from the well, using the submersible pump.

3) Measure and record time, temperature, pH, turbidity, and specific conductance as each volume of well water is purged. Once the temperature, pH, and specific conductance have stabilized to within 10% for two successive well volumes and the turbidity is less than 50 NTUs, a groundwater sample may be collected. Measure DO and remove the submersible pump from the well.

4) After purging, allow static water level to recover to approximate original level.

5) Place polyethylene sheeting around well casing to prevent contamination of sampling equipment in the event equipment is dropped.

6) Obtain sample from well with a dedicated, factory pre-cleaned polyethylene Voss ™ bailer. The bailer will be suspended on a new, dedicated length of polypropylene string. The maximum time between purging and sampling will be three (3) hours. All the bailers for one day of sampling will be pre-cleaned and dedicated to each individual wells.

   Sample for VOCs first by lowering the bailer slowly to avoid degassing, then collect any other organic and inorganic samples by pouring directly into sample bottles from bailers.

   The sample preservation procedure will be to immediately place analytical samples in the cooler and chill to 4°C. Samples will be delivered to the appropriate laboratory within 24 hours. Samples will be maintained at 4°C until time of analysis.

7) Decontaminate the submersible pump and discard the pump discharge line.

8) Re-lock well cap.

Fill out field notebook, Well Sample Log Sheet, labels, Custody Seals and Chain-of-Custody forms.

C.3 SOP 3: FIELD BLANKS

Field blanks shall be taken to evaluate the cleanliness of groundwater sampling equipment, sample bottles and the potential for cross-contamination of samples due to airborne contaminants present in the air at the site and handling of equipment and sample bottles. Field blank samples shall be performed on the groundwater sample bailers and any filtering equipment. The frequency of field blanks taken shall be one per decontamination event for each type of sampling equipment, and each media being sampled (e.g., a groundwater bailer for groundwater, and a hand auger for soil sampling), at a minimum of one per equipment type and/or media per day.

Where required, field blanks shall be obtained prior to the occurrence of any analytical field sampling event by pouring deionized or potable water over a particular piece of sampling equipment and into a sample container. The analytical laboratory shall provide field blank water and sample jars with preservatives for the collection of all field blanks. Glass jars shall be used for organic blanks. The field blanks as well as the trip blanks shall accompany field personnel to the sampling location. The field blanks shall be analyzed for the same analytes as the environmental samples being collected that day and shall be shipped with the samples taken subsequently that day.

Field blanks shall be taken in accordance with the procedure described below:

(1) Decontaminate sampler using the procedures specified in this plan.

(2) Pour distilled/deionized water over the sampling equipment and collect the rinsate water in the appropriate sample bottles.

(3) The sample shall be immediately placed in a sample cooler and maintained at a temperature of 4°C until receipt by the laboratory.

(4) Fill out sample log, labels and chain-of-custody forms, and record in field notebook.

C.4 SOP 4: TRIP BLANKS

A laboratory supplied trip blank shall be an aliquot of distilled, deionized water which shall be sealed in a sample bottle prior to initiation of each day of field work. The trip blank shall be used to determine if any cross-contamination occurs between aqueous samples during shipment. Trip blanks are analyzed for aqueous VOCs only. Glass vials (40 ml) with teflon-lined lids shall be used for VOC blanks. A trip blank shall be prepared by the laboratory prior to each day of field sampling for aqueous volatiles. The sealed trip blank bottles shall be placed in a cooler with the empty sample bottles and shall be brought to the site by the laboratory personnel. If multiple coolers are required to store and transport aqueous VOC samples, then each cooler must contain an individual trip blank.

C.5 SOP 5: DECONTAMINATION PROCEDURES

The submersible sampling pumps that are placed in the borehole shall be decontaminated with an Alconox detergent rinse and by pumping approximately 20 gallons of potable water through the pump. Since dedicated new lengths of polyethylene tubing shall be used for sampling each well, the tubing shall not be decontaminated. Unless otherwise specified, the submersible pumps shall be decontaminated prior to the sampling the first well and between each subsequent well as follows:

- Potable water rinse.
- Alconox detergent and potable water scrub.
- Potable water rinse.
- Distilled/deionized water rinse.
- Wrap in aluminum foil, shiny side facing out.

Unless otherwise specified, all non-detect sampling equipment utilized to obtain groundwater environmental samples for chemical analyses (e.g., stainless steel bailers) shall be decontaminated between sampling points as follows:

- Potable water rinse.
- Alconox and water detergent and potable water scrub.
- Potable water rinse.
- Methanol (at least pesticide grade) rinse: Light spray to minimize material used. Segregate and store rinsate separately.
- Distilled/deionized water rinse.
- Air dry.
- Wrap or cover in aluminum foil shiny side facing out.

C.6 SOP 6: WASTE MANAGEMENT AND DISPOSAL

The following section describes the handling and ultimate disposal of solid and liquid wastes generated during the field activities. Waste generated is expected to consist of trash (boxes, paper, etc.), decontamination wash water, purge water, and used protective clothing.

The PCE in ground water at the Fulton Avenue site is a listed hazardous waste. Accordingly, its derived-from wastes are considered hazardous for handling and disposal purposes. In regards to disposal, disposal options for generated wastes will depend on contaminant levels in the waste. The following standards and regulations have been identified as being applicable, relevant and appropriate to any removal, management, and off-site or on-site disposal of Fulton Avenue-generated waste materials:

NYSDEC's RCRA TAGM #3028 on "Contained-In Criteria for Environmental Media" {November 30, 1992};

- 40 C. F.R. Part 262 (Standards Applicable to Generators of Hazardous Waste);
- 40 C. F. R. Part 263 (Standards Applicable to Transporters of Hazardous Waste;
- 40 C. F. R. Part 264 (Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities); and
- 40 C. F. R. Part 268 (Land Disposal Restrictions)

Accordingly, handling and disposal will be as follows:

- Non-contaminated trash and debris will be placed in a trash dumpster and disposed of by a local garbage hauler.
- Non-contaminated protective clothing will be packed in plastic bags and placed in a trash dumpster for disposal by a local garbage hauler.
- Liquids generated from equipment decontamination and permanent ground water monitoring well purging will be collected in drums at the point of generation, transported to the Fulton Property, and staged for off-Site disposal at a properly permitted/licensed disposal facility. It is intended that these liquids will not be staged for more than 90 days in order to comply with applicable RCRA storage regulations.
- Used protective clothing and equipment that is suspected to be contaminated with hazardous waste will be placed in plastic bags, packed in 55-gallon ring-top drums, and disposed of in accordance with any applicable federal and state regulation in addition to those referenced above by a waste subcontractor.

ATTACHMENT C - Laboratory Certification & Operating Procedures

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER

Expires 12:01 AM April 01, 2019
Issued April 01, 2018
Revised August 02, 2018

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

MR. PAUL IOANNIDIS
SGS NORTH AMERICA INC. - DAYTON
2235 ROUTE 130
DAYTON, NJ 08810

NY Lab Id No: 10983

is hereby APPROVED as an Environmental Laboratory in conformance with the National Environmental Laboratory Accreditation Conference Standards (2003) for the category ENVIRONMENTAL ANALYSES NON POTABLE WATER
All approved analytes are listed below:

Acrylates	
Acrolein (Propenal)	EPA 8260C
	EPA 624.1
Acrylonitrile	EPA 8260C
	EPA 624.1
Ethyl methacrylate	EPA 8260C
Methyl acrylonitrile	EPA 8260C
Methyl methacrylate	EPA 8260C
Amines	
1,2-Diphenylhydrazine	EPA 8270D
1,4-Phenylenediamine	EPA 8270D
1-Naphthylamine	EPA 8270D
2,3-Dichloroaniline	EPA 625.1
2-Naphthylamine	EPA 8270D
2-Nitroaniline	EPA 8270D
3-Nitroaniline	EPA 8270D
4-Chloroaniline	EPA 8270D
4-Nitroaniline	EPA 8270D
5-Nitro-o-toluidine	EPA 8270D
a,a-Dimethylphenethylamine	EPA 8270D
Aniline	EPA 625.1
	EPA 8270D
Carbazole	EPA 625.1
	EPA 8270D
Diphenylamine	EPA 8270D
Methapyrilene	EPA 8270D

Amines	
Pronamide	EPA 8270D
Propionitrile	EPA 8260C
Pyridine	EPA 625.1
	EPA 8270D
Bacteriology	
Coliform, Fecal	SM 9222D-2006
Coliform, Total	SM 9222B-2006
Heterotrophic Plate Count	SM 18-21 9215B
Benzidines	
3,3'-Dichlorobenzidine	EPA 625.1
	EPA 8270D
3,3'-Dimethylbenzidine	EPA 8270D
Benzidine	EPA 625.1
	EPA 8270D
Chlorinated Hydrocarbon Pesticides	
4,4'-DDD	EPA 8081B
	EPA 608.3
4,4'-DDE	EPA 8081B
	EPA 608.3
4,4'-DDT	EPA 8081B
	EPA 608.3
Aldrin	EPA 8081B
	EPA 608.3
alpha-BHC	EPA 8081B

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Chlorinated Hydrocarbon Pesticides	
alpha-BHC	EPA 608.3
alpha-Chlordane	EPA 8081B
beta-BHC	EPA 8081B
	EPA 608.3
Chlordane Total	EPA 8081B
	EPA 608.3
Chlorobenzilate	EPA 8270D
delta-BHC	EPA 8081B
	EPA 608.3
Diallate	EPA 8270D
Dieldrin	EPA 8081B
	EPA 608.3
Endosulfan I	EPA 8081B
	EPA 608.3
Endosulfan II	EPA 8081B
	EPA 608.3
Endosulfan sulfate	EPA 8081B
	EPA 608.3
Endrin	EPA 8081B
	EPA 608.3
Endrin aldehyde	EPA 8081B
	EPA 608.3
Endrin Ketone	EPA 8081B
gamma-Chlordane	EPA 8081B
Heptachlor	EPA 8081B
	EPA 608.3

Chlorinated Hydrocarbon Pesticides	
Heptachlor epoxide	EPA 8081B
	EPA 608.3
Isodrin	EPA 8270D
Kepone	EPA 8270D
Lindane	EPA 8081B
	EPA 608.3
Methoxychlor	EPA 8081B
	EPA 608.3
Mirex	EPA 8081B
PCNB	EPA 8270D
Toxaphene	EPA 8081B
	EPA 608.3
Chlorinated Hydrocarbons	
1,2,3-Trichlorobenzene	EPA 8260C
1,2,4,5-Tetrachlorobenzene	EPA 8270D
1,2,4-Trichlorobenzene	EPA 625.1
	EPA 8270D
2-Chloronaphthalene	EPA 625.1
	EPA 8270D
Hexachlorobenzene	EPA 625.1
	EPA 8270D
Hexachlorobutadiene	EPA 625.1
	EPA 8270D
Hexachlorocyclopentadiene	EPA 625.1
	EPA 8270D

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Chlorinated Hydrocarbons	
Hexachloroethane	EPA 8260C
	EPA 625.1
	EPA 8270D
Hexachloropropene	EPA 8270D
Pentachlorobenzene	EPA 8270D
Chlorophenoxy Acid Pesticides	
2,4,5-T	EPA 8151A
2,4,5-TP (Silvex)	EPA 8151A
2,4-D	EPA 8151A
2,4-DB	EPA 8151A
Dalapon	EPA 8151A
Dicamba	EPA 8151A
Dichloroprop	EPA 8151A
Dinoseb	EPA 8151A
	EPA 8270D
Pentachlorophenol	EPA 8151A
Demand	
Biochemical Oxygen Demand	SM 5210B-2011
Carbonaceous BOD	SM 5210B-2011
Chemical Oxygen Demand	SM 5220C-2011
Dissolved Gases	
Ethane	RSK-175
Ethene (Ethylene)	RSK-175
Methane	RSK-175
Dissolved Gases	
Propane	RSK-175
Fuel Oxygenates	
Di-isopropyl ether	EPA 8260C
Ethanol	EPA 8260C
	EPA 8015C
Methyl tert-butyl ether	EPA 8260C
	EPA 624.1
tert-amyl methyl ether (TAME)	EPA 8260C
tert-butyl alcohol	EPA 8260C
	EPA 8015C
tert-butyl ethyl ether (ETBE)	EPA 8260C
Haloethers	
2,2'-Oxybis(1-chloropropane)	EPA 625.1
	EPA 8270D
4-Bromophenylphenyl ether	EPA 625.1
	EPA 8270D
4-Chlorophenylphenyl ether	EPA 625.1
	EPA 8270D
Bis(2-chloroethoxy)methane	EPA 625.1
	EPA 8270D
Bis(2-chloroethyl)ether	EPA 625.1
	EPA 8270D
Low Level Halocarbons	
1,2,3-Trichloropropane, Low Level	EPA 8011

Serial No.: 58533

Property of the New York State Department of Health. Certificates are valid only at the address shown, must be conspicuously posted, and are printed on secure paper. Continued accreditation depends on successful ongoing participation in the Program. Consumers are urged to call (518) 485-5570 to verify the laboratory's accreditation status.

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All approved analytes are listed below:

Low Level Halocarbons	
1,2-Dibromo-3-chloropropane, Low Level	EPA 8011
1,2-Dibromoethane, Low Level	EPA 8011
Low Level Polynuclear Aromatics	
Acenaphthene Low Level	EPA 8270D SIM
Acenaphthylene Low Level	EPA 8270D SIM
Anthracene Low Level	EPA 8270D SIM
Benzo(a)anthracene Low Level	EPA 8270D SIM
Benzo(a)pyrene Low Level	EPA 8270D SIM
Benzo(b)fluoranthene Low Level	EPA 8270D SIM
Benzo(g,h,i)perylene Low Level	EPA 8270D SIM
Benzo(k)fluoranthene Low Level	EPA 8270D SIM
Chrysene Low Level	EPA 8270D SIM
Dibenzo(a,h)anthracene Low Level	EPA 8270D SIM
Fluoranthene Low Level	EPA 8270D SIM
Fluorene Low Level	EPA 8270D SIM
Indeno(1,2,3-cd)pyrene Low Level	EPA 8270D SIM
Naphthalene Low Level	EPA 8270D SIM
Phenanthrene Low Level	EPA 8270D SIM
Pyrene Low Level	EPA 8270D SIM
Metals I	
Barium, Total	EPA 200.7, Rev. 4.4 (1994)
	EPA 6010C
	EPA 6010D
	EPA 6020A
	EPA 6020B

Metals I	
Barium, Total	EPA 200.8, Rev. 5.4 (1994)
Cadmium, Total	EPA 200.7, Rev. 4.4 (1994)
	EPA 6010C
	EPA 6010D
	EPA 6020A
	EPA 6020B
	EPA 200.8, Rev. 5.4 (1994)
Calcium, Total	EPA 200.7, Rev. 4.4 (1994)
	EPA 6010C
	EPA 6010D
	EPA 6020A
	EPA 6020B
	EPA 200.8, Rev. 5.4 (1994)
Chromium, Total	EPA 200.7, Rev. 4.4 (1994)
	EPA 6010C
	EPA 6010D
	EPA 6020A
	EPA 6020B
	EPA 200.8, Rev. 5.4 (1994)
Copper, Total	EPA 200.7, Rev. 4.4 (1994)
	EPA 6010C
	EPA 6010D
	EPA 6020A
	EPA 6020B
	EPA 200.8, Rev. 5.4 (1994)
Iron, Total	EPA 200.7, Rev. 4.4 (1994)

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MR. PAUL IOANNIDIS
SGS NORTH AMERICA INC. - DAYTON
2235 ROUTE 130
DAYTON, NJ 08810

NY Lab Id No: 10983

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Metals I	
Iron, Total	EPA 6010C
	EPA 6010D
	EPA 6020A
	EPA 6020B
	EPA 200.8, Rev. 5.4 (1994)
Lead, Total	EPA 200.7, Rev. 4.4 (1994)
	EPA 6010C
	EPA 6010D
	EPA 6020A
	EPA 6020B
	EPA 200.8, Rev. 5.4 (1994)
Magnesium, Total	EPA 200.7, Rev. 4.4 (1994)
	EPA 6010C
	EPA 6010D
	EPA 6020A
	EPA 6020B
	EPA 200.8, Rev. 5.4 (1994)
Manganese, Total	EPA 200.7, Rev. 4.4 (1994)
	EPA 6010C
	EPA 6010D
	EPA 6020A
	EPA 6020B
	EPA 200.8, Rev. 5.4 (1994)
Nickel, Total	EPA 200.7, Rev. 4.4 (1994)
	EPA 6010C
	EPA 6010D

Metals I	
Nickel, Total	EPA 6020A
	EPA 6020B
	EPA 200.8, Rev. 5.4 (1994)
Potassium, Total	EPA 200.7, Rev. 4.4 (1994)
	EPA 6010C
	EPA 6010D
	EPA 6020A
	EPA 6020B
	EPA 200.8, Rev. 5.4 (1994)
Silver, Total	EPA 200.7, Rev. 4.4 (1994)
	EPA 6010C
	EPA 6010D
	EPA 6020A
	EPA 6020B
	EPA 200.8, Rev. 5.4 (1994)
Sodium, Total	EPA 200.7, Rev. 4.4 (1994)
	EPA 6010C
	EPA 6010D
	EPA 6020A
	EPA 6020B
	EPA 200.8, Rev. 5.4 (1994)
Strontium, Total	EPA 200.7, Rev. 4.4 (1994)
	EPA 6010C
	EPA 6010D
	EPA 6020A
	EPA 6020B

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Metals II		**Metals II**	
Aluminum, Total	EPA 200.7, Rev. 4.4 (1994)	Chromium VI	SM 3500-Cr B-2011
	EPA 6010C	Mercury, Low Level	EPA 245.7, Rev. 2.0 (2005)
	EPA 6010D		EPA 1631E
	EPA 6020A	Mercury, Total	EPA 245.1, Rev. 3.0 (1994)
	EPA 6020B		EPA 7470A
	EPA 200.8, Rev. 5.4 (1994)	Selenium, Total	EPA 200.7, Rev. 4.4 (1994)
Antimony, Total	EPA 200.7, Rev. 4.4 (1994)		EPA 6010C
	EPA 6010C		EPA 6010D
	EPA 6010D		EPA 6020A
	EPA 6020A		EPA 6020B
	EPA 6020B		EPA 200.8, Rev. 5.4 (1994)
	EPA 200.8, Rev. 5.4 (1994)	Vanadium, Total	EPA 200.7, Rev. 4.4 (1994)
Arsenic, Total	EPA 200.7, Rev. 4.4 (1994)		EPA 6010C
	EPA 6010C		EPA 6010D
	EPA 6010D		EPA 6020A
	EPA 6020A		EPA 6020B
	EPA 6020B		EPA 200.8, Rev. 5.4 (1994)
	EPA 200.8, Rev. 5.4 (1994)	Zinc, Total	EPA 200.7, Rev. 4.4 (1994)
Beryllium, Total	EPA 200.7, Rev. 4.4 (1994)		EPA 6010C
	EPA 6010C		EPA 6010D
	EPA 6010D		EPA 6020A
	EPA 6020A		EPA 6020B
	EPA 6020B		EPA 200.8, Rev. 5.4 (1994)
	EPA 200.8, Rev. 5.4 (1994)	**Metals III**	
Chromium VI	EPA 7196A	Cobalt, Total	EPA 200.7, Rev. 4.4 (1994)
	EPA 7199		

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Metals III		
Cobalt, Total	EPA 6010C	
	EPA 6010D	
	EPA 6020A	
	EPA 6020B	
	EPA 200.8, Rev. 5.4 (1994)	
Molybdenum, Total	EPA 200.7, Rev. 4.4 (1994)	
	EPA 6010C	
	EPA 6010D	
	EPA 6020A	
	EPA 6020B	
	EPA 200.8, Rev. 5.4 (1994)	
Thallium, Total	EPA 200.7, Rev. 4.4 (1994)	
	EPA 6010C	
	EPA 6010D	
	EPA 6020A	
	EPA 6020B	
	EPA 200.8, Rev. 5.4 (1994)	
Tin, Total	EPA 200.7, Rev. 4.4 (1994)	
	EPA 6010C	
	EPA 6010D	
	EPA 6020A	
	EPA 6020B	
	EPA 200.8, Rev. 5.4 (1994)	
Titanium, Total	EPA 200.7, Rev. 4.4 (1994)	
	EPA 6010C	
	EPA 6010D	

Metals III		
Titanium, Total	EPA 6020A	
	EPA 6020B	
	EPA 200.8, Rev. 5.4 (1994)	
Mineral		
Acidity	SM 2310B-2011	
Alkalinity	SM 2320B-2011	
Chloride	EPA 300.0, Rev. 2.1 (1993)	
	SM 4500-Cl- C-2011	
	EPA 9056A	
Fluoride, Total	EPA 300.0, Rev. 2.1 (1993)	
	EPA 9056A	
Hardness, Total	SM 2340C-2011	
	EPA 200.7, Rev. 4.4 (1994)	
Sulfate (as SO4)	EPA 300.0, Rev. 2.1 (1993)	
	EPA 9056A	
Miscellaneous		
Boron, Total	EPA 200.7, Rev. 4.4 (1994)	
	EPA 6010C	
	EPA 6020A	
	EPA 200.8, Rev. 5.4 (1994)	
Bromide	EPA 300.0, Rev. 2.1 (1993)	
	EPA 9056A	
Color	SM 2120B-2011	
Cyanide, Total	EPA 335.4, Rev. 1.0 (1993)	
	EPA 9012B	

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Miscellaneous

Oil and Grease Total Recoverable (HEM)	EPA 1664A
Organic Carbon, Total	SM 5310B-2011
	EPA 9060A
Perchlorate	EPA 314.0
Phenols	EPA 420.4, Rev. 1.0 (1993)
Silica, Dissolved	EPA 200.7, Rev. 4.4 (1994)
	SM 4500-SiO2 C-2011
Specific Conductance	SM 2510B-2011
	EPA 9050A
Sulfide (as S)	SM 4500-S2- F-2011
	EPA 9034
Surfactant (MBAS)	SM 5540C-2011
Total Organic Halides	EPA 9020B
Total Recoverable Petroleum Hydrocarbor	EPA 1664A
Turbidity	EPA 180.1, Rev. 2.0 (1993)

Nitroaromatics and Isophorone

1,3,5-Trinitrobenzene	EPA 8270D
1,3-Dinitrobenzene	EPA 8270D
1,4-Naphthoquinone	EPA 8270D
2,4-Dinitrotoluene	EPA 625.1
	EPA 8270D
2,6-Dinitrotoluene	EPA 625.1
	EPA 8270D
4-Nitroquinoline-1-oxide	EPA 8270D
Isophorone	EPA 625.1

Nitroaromatics and Isophorone

Isophorone	EPA 8270D
Nitrobenzene	EPA 625.1
	EPA 8270D

Nitrosoamines

N-Nitrosodiethylamine	EPA 8270D
N-Nitrosodimethylamine	EPA 625.1
	EPA 8270D
N-Nitrosodi-n-butylamine	EPA 8270D
N-Nitrosodi-n-propylamine	EPA 625.1
	EPA 8270D
N-Nitrosodiphenylamine	EPA 625.1
	EPA 8270D
N-nitrosomethylethylamine	EPA 8270D
N-nitrosomorpholine	EPA 8270D
N-nitrosopiperidine	EPA 8270D
N-Nitrosopyrrolidine	EPA 8270D

Nutrient

Ammonia (as N)	SM 4500-NH3 H-2011
Kjeldahl Nitrogen, Total	EPA 351.2, Rev. 2.0 (1993)
Nitrate (as N)	EPA 353.2, Rev. 2.0 (1993)
Nitrate-Nitrite (as N)	EPA 353.2, Rev. 2.0 (1993)
Nitrite (as N)	SM 4500-NO2 B-2011
Orthophosphate (as P)	EPA 365.3 (Issued 1978)
Phosphorus, Total	EPA 365.3 (Issued 1978)

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Organophosphate Pesticides	
Atrazine	EPA 8270D
Dimethoate	EPA 8270D
Disulfoton	EPA 8270D
Famphur	EPA 8270D
Parathion ethyl	EPA 8270D
Parathion methyl	EPA 8270D
Phorate	EPA 8270D
Thionazin	EPA 8270D
Petroleum Hydrocarbons	
Diesel Range Organics	EPA 8015C
Gasoline Range Organics	EPA 8015C
Phthalate Esters	
Benzyl butyl phthalate	EPA 625.1
	EPA 8270D
Bis(2-ethylhexyl) phthalate	EPA 625.1
	EPA 8270D
Diethyl phthalate	EPA 625.1
	EPA 8270D
Dimethyl phthalate	EPA 625.1
	EPA 8270D
Di-n-butyl phthalate	EPA 625.1
	EPA 8270D
Di-n-octyl phthalate	EPA 625.1
	EPA 8270D
Polychlorinated Biphenyls	
PCB-1016	EPA 8082A
	EPA 608.3
PCB-1221	EPA 8082A
	EPA 608.3
PCB-1232	EPA 8082A
	EPA 608.3
PCB-1242	EPA 8082A
	EPA 608.3
PCB-1248	EPA 8082A
	EPA 608.3
PCB-1254	EPA 8082A
	EPA 608.3
PCB-1260	EPA 8082A
	EPA 608.3
PCB-1262	EPA 8082A
PCB-1268	EPA 8082A
Polynuclear Aromatics	
2-Acetylaminofluorene	EPA 8270D
3-Methylcholanthrene	EPA 8270D
7,12-Dimethylbenzyl (a) anthracene	EPA 8270D
Acenaphthene	EPA 625.1
	EPA 8270D
Acenaphthylene	EPA 625.1
	EPA 8270D
Anthracene	EPA 625.1

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Polynuclear Aromatics	
Anthracene	EPA 8270D
Benzo(a)anthracene	EPA 625.1
	EPA 8270D
Benzo(a)pyrene	EPA 625.1
	EPA 8270D
Benzo(b)fluoranthene	EPA 625.1
	EPA 8270D
Benzo(ghi)perylene	EPA 625.1
	EPA 8270D
Benzo(k)fluoranthene	EPA 625.1
	EPA 8270D
Chrysene	EPA 625.1
	EPA 8270D
Dibenzo(a,h)anthracene	EPA 625.1
	EPA 8270D
Fluoranthene	EPA 625.1
	EPA 8270D
Fluorene	EPA 625.1
	EPA 8270D
Indeno(1,2,3-cd)pyrene	EPA 625.1
	EPA 8270D
Naphthalene	EPA 625.1
	EPA 8270D
Phenanthrene	EPA 625.1
	EPA 8270D
Pyrene	EPA 625.1

Polynuclear Aromatics	
Pyrene	EPA 8270D
Priority Pollutant Phenols	
2,3,4,6 Tetrachlorophenol	EPA 8270D
2,4,5-Trichlorophenol	EPA 625.1
	EPA 8270D
2,4,6-Trichlorophenol	EPA 625.1
	EPA 8270D
2,4-Dichlorophenol	EPA 625.1
	EPA 8270D
2,4-Dimethylphenol	EPA 625.1
	EPA 8270D
2,4-Dinitrophenol	EPA 625.1
	EPA 8270D
2,6-Dichlorophenol	EPA 8270D
2-Chlorophenol	EPA 625.1
	EPA 8270D
2-Methyl-4,6-dinitrophenol	EPA 625.1
	EPA 8270D
2-Methylphenol	EPA 625.1
	EPA 8270D
2-Nitrophenol	EPA 625.1
	EPA 8270D
3-Methylphenol	EPA 625.1
	EPA 8270D
4-Chloro-3-methylphenol	EPA 625.1

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Priority Pollutant Phenols	
4-Chloro-3-methylphenol	EPA 8270D
4-Methylphenol	EPA 625.1
	EPA 8270D
4-Nitrophenol	EPA 625.1
	EPA 8270D
Pentachlorophenol	EPA 625.1
	EPA 8270D
Phenol	EPA 625.1
	EPA 8270D
Residue	
Settleable Solids	SM 2540 F-2011
Solids, Total	SM 2540 B-2011
Solids, Total Dissolved	SM 2540 C-2011
Solids, Total Suspended	SM 2540 D-2011
Solids, Volatile	EPA 160.4 (Issued 1971)
Semi-Volatile Organics	
1,1'-Biphenyl	EPA 8270D
1,2-Dichlorobenzene, Semi-volatile	EPA 8270D
1,3-Dichlorobenzene, Semi-volatile	EPA 8270D
1,4-Dichlorobenzene, Semi-volatile	EPA 8270D
2-Methylnaphthalene	EPA 8270D
2-Picoline	EPA 8270D
4-Amino biphenyl	EPA 8270D
Acetophenone	EPA 625.1
	EPA 8270D

Semi-Volatile Organics	
alpha-Terpineol	EPA 625.1
Aramite	EPA 8270D
Benzaldehyde	EPA 8270D
Benzoic Acid	EPA 8270D
Benzyl alcohol	EPA 8270D
Caprolactam	EPA 8270D
Dibenzofuran	EPA 8270D
Ethyl methanesulfonate	EPA 8270D
Isosafrole	EPA 8270D
Methyl methanesulfonate	EPA 8270D
n-Decane	EPA 625.1
n-Octadecane	EPA 625.1
O,O,O-Triethyl phosphorothioate	EPA 8270D
p-Dimethylaminoazobenzene	EPA 8270D
Phenacetin	EPA 8270D
Safrole	EPA 8270D
Volatile Aromatics	
1,2,4-Trichlorobenzene, Volatile	EPA 8260C
1,2,4-Trimethylbenzene	EPA 8260C
1,2-Dichlorobenzene	EPA 8260C
	EPA 624.1
1,3,5-Trimethylbenzene	EPA 8260C
1,3-Dichlorobenzene	EPA 8260C
	EPA 624.1
1,4-Dichlorobenzene	EPA 8260C

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Volatile Aromatics	
1,4-Dichlorobenzene	EPA 624.1
2-Chlorotoluene	EPA 8260C
4-Chlorotoluene	EPA 8260C
Benzene	EPA 8260C
	EPA 624.1
Bromobenzene	EPA 8260C
Chlorobenzene	EPA 8260C
	EPA 624.1
Ethyl benzene	EPA 8260C
	EPA 624.1
Isopropylbenzene	EPA 8260C
m/p-Xylenes	EPA 8260C
	EPA 624.1
Naphthalene, Volatile	EPA 8260C
n-Butylbenzene	EPA 8260C
n-Propylbenzene	EPA 8260C
o-Xylene	EPA 8260C
	EPA 624.1
p-Isopropyltoluene (P-Cymene)	EPA 8260C
sec-Butylbenzene	EPA 8260C
Styrene	EPA 8260C
	EPA 624.1
tert-Butylbenzene	EPA 8260C
Toluene	EPA 8260C
	EPA 624.1
Total Xylenes	EPA 8260C
Volatile Aromatics	
Total Xylenes	EPA 624.1
Volatile Chlorinated Organics	
Benzyl chloride	EPA 8260C
Volatile Halocarbons	
1,1,1,2-Tetrachloroethane	EPA 8260C
1,1,1-Trichloroethane	EPA 8260C
	EPA 624.1
1,1,2,2-Tetrachloroethane	EPA 8260C
	EPA 624.1
1,1,2-Trichloro-1,2,2-Trifluoroethane	EPA 8260C
1,1,2-Trichloroethane	EPA 8260C
	EPA 624.1
1,1-Dichloroethane	EPA 8260C
	EPA 624.1
1,1-Dichloroethene	EPA 8260C
	EPA 624.1
1,1-Dichloropropene	EPA 8260C
1,2,3-Trichloropropane	EPA 8260C
1,2-Dibromo-3-chloropropane	EPA 8260C
1,2-Dibromoethane	EPA 8260C
1,2-Dichloroethane	EPA 8260C
	EPA 624.1
1,2-Dichloropropane	EPA 8260C
	EPA 624.1
1,3-Dichloropropane	EPA 8260C

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Volatile Halocarbons	
2,2-Dichloropropane	EPA 8260C
2-Chloro-1,3-butadiene (Chloroprene)	EPA 8260C
2-Chloroethylvinyl ether	EPA 8260C
	EPA 624.1
3-Chloropropene (Allyl chloride)	EPA 8260C
Bromochloromethane	EPA 8260C
Bromodichloromethane	EPA 8260C
	EPA 624.1
Bromoform	EPA 8260C
	EPA 624.1
Bromomethane	EPA 8260C
	EPA 624.1
Carbon tetrachloride	EPA 8260C
	EPA 624.1
Chloroethane	EPA 8260C
	EPA 624.1
Chloroform	EPA 8260C
	EPA 624.1
Chloromethane	EPA 8260C
	EPA 624.1
cis-1,2-Dichloroethene	EPA 8260C
	EPA 624.1
cis-1,3-Dichloropropene	EPA 8260C
	EPA 624.1
Dibromochloromethane	EPA 8260C
	EPA 624.1

Volatile Halocarbons	
Dibromomethane	EPA 8260C
Dichlorodifluoromethane	EPA 8260C
	EPA 624.1
Hexachlorobutadiene, Volatile	EPA 8260C
Methyl iodide	EPA 8260C
Methylene chloride	EPA 8260C
	EPA 624.1
Tetrachloroethene	EPA 8260C
	EPA 624.1
trans-1,2-Dichloroethene	EPA 8260C
	EPA 624.1
trans-1,3-Dichloropropene	EPA 8260C
	EPA 624.1
trans-1,4-Dichloro-2-butene	EPA 8260C
Trichloroethene	EPA 8260C
	EPA 624.1
Trichlorofluoromethane	EPA 8260C
	EPA 624.1
Vinyl chloride	EPA 8260C
	EPA 624.1
Volatiles Organics	
1,4-Dioxane	EPA 8260C
	EPA 8270D
2-Butanone (Methylethyl ketone)	EPA 8260C
2-Hexanone	EPA 8260C

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CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

MR. PAUL IOANNIDIS
SGS NORTH AMERICA INC. - DAYTON
2235 ROUTE 130
DAYTON, NJ 08810

NY Lab Id No: 10983

is hereby APPROVED as an Environmental Laboratory in conformance with the National Environmental Laboratory Accreditation Conference Standards (2003) for the category ENVIRONMENTAL ANALYSES NON POTABLE WATER
All approved analytes are listed below:

Volatiles Organics

2-Nitropropane	EPA 8260C
4-Methyl-2-Pentanone	EPA 8260C
Acetone	EPA 8260C
	EPA 624.1
Acetonitrile	EPA 8260C
Carbon Disulfide	EPA 8260C
Cyclohexane	EPA 8260C
Di-ethyl ether	EPA 8260C
Ethyl Acetate	EPA 8260C
Isobutyl alcohol	EPA 8260C
	EPA 8015C
Methanol	EPA 8015C
Methyl acetate	EPA 8260C
Methyl cyclohexane	EPA 8260C
n-Butanol	EPA 8260C
o-Toluidine	EPA 8270D
Vinyl acetate	EPA 8260C
	EPA 624.1

Sample Preparation Methods

SM 4500-CN B-2011 and C-2011
EPA 3010A
EPA 3005A
EPA 3510C
EPA 3520C
SM 4500-NH3 B-2011

Serial No.: 58533

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER

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Bacteriology	
Coliform, Total / E. coli (Qualitative)	SM 18-22 9223B (-97, -04) (Colilert)
Heterotrophic Plate Count	SM 18-22 9215B (-04)
Fuel Additives	
Methyl tert-butyl ether	EPA 524.2
Naphthalene	EPA 524.2
Metals I	
Arsenic, Total	EPA 200.8 Rev. 5.4
Barium, Total	EPA 200.7 Rev. 4.4
	EPA 200.8 Rev. 5.4
Cadmium, Total	EPA 200.7 Rev. 4.4
	EPA 200.8 Rev. 5.4
Chromium, Total	EPA 200.7 Rev. 4.4
	EPA 200.8 Rev. 5.4
Copper, Total	EPA 200.7 Rev. 4.4
	EPA 200.8 Rev. 5.4
Iron, Total	EPA 200.7 Rev. 4.4
Lead, Total	EPA 200.8 Rev. 5.4
Manganese, Total	EPA 200.7 Rev. 4.4
	EPA 200.8 Rev. 5.4
Mercury, Total	EPA 245.1 Rev. 3.0
Selenium, Total	EPA 200.8 Rev. 5.4
Silver, Total	EPA 200.7 Rev. 4.4
	EPA 200.8 Rev. 5.4
Zinc, Total	EPA 200.7 Rev. 4.4
	EPA 200.8 Rev. 5.4
Metals II	
Aluminum, Total	EPA 200.7 Rev. 4.4
	EPA 200.8 Rev. 5.4
Antimony, Total	EPA 200.8 Rev. 5.4
Beryllium, Total	EPA 200.7 Rev. 4.4
	EPA 200.8 Rev. 5.4
Molybdenum, Total	EPA 200.7 Rev. 4.4
	EPA 200.8 Rev. 5.4
Nickel, Total	EPA 200.7 Rev. 4.4
	EPA 200.8 Rev. 5.4
Thallium, Total	EPA 200.8 Rev. 5.4
Vanadium, Total	EPA 200.7 Rev. 4.4
	EPA 200.8 Rev. 5.4
Metals III	
Boron, Total	EPA 200.7 Rev. 4.4
Calcium, Total	EPA 200.7 Rev. 4.4
Magnesium, Total	EPA 200.7 Rev. 4.4
Potassium, Total	EPA 200.7 Rev. 4.4
Sodium, Total	EPA 200.7 Rev. 4.4
Microextractibles	
1,2-Dibromo-3-chloropropane	EPA 504.1
1,2-Dibromoethane	EPA 504.1
Miscellaneous	
Methyl iodide	EPA 524.2
Odor	SM 18-22 2150B (-97)

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All approved analytes are listed below:

Miscellaneous	
Organic Carbon, Dissolved	SM 21-22 5310B (-00)
Organic Carbon, Total	SM 21-22 5310B (-00)
Perchlorate	EPA 314.0
Surfactant (MBAS)	SM 18-22 5540C (-00)
Turbidity	EPA 180.1 Rev. 2.0
Non-Metals	
Alkalinity	SM 18-22 2320B (-97)
Calcium Hardness	EPA 200.7 Rev. 4.4
Chloride	EPA 300.0 Rev. 2.1
Color	SM 18-22 2120B (-01)
Cyanide	EPA 335.4 Rev. 1.0
Fluoride, Total	EPA 300.0 Rev. 2.1
Nitrate (as N)	EPA 353.2 Rev. 2.0
Nitrite (as N)	SM 18-22 4500-NO2 B (-00)
Orthophosphate (as P)	SM 18-22 4500-P E (-99)
Silica, Dissolved	EPA 200.7 Rev. 4.4
	SM 18-19 4500-Si D
Solids, Total Dissolved	SM 18-22 2540C (-97)
Specific Conductance	SM 18-22 2510B (-97)
Sulfate (as SO4)	EPA 300.0 Rev. 2.1
Trihalomethanes	
Bromodichloromethane	EPA 524.2
Bromoform	EPA 524.2
Chloroform	EPA 524.2
Dibromochloromethane	EPA 524.2
Trihalomethanes	
Total Trihalomethanes	EPA 524.2
Volatile Aromatics	
1,2,3-Trichlorobenzene	EPA 524.2
1,2,4-Trichlorobenzene	EPA 524.2
1,2,4-Trimethylbenzene	EPA 524.2
1,2-Dichlorobenzene	EPA 524.2
1,3,5-Trimethylbenzene	EPA 524.2
1,3-Dichlorobenzene	EPA 524.2
1,4-Dichlorobenzene	EPA 524.2
2-Chlorotoluene	EPA 524.2
4-Chlorotoluene	EPA 524.2
Benzene	EPA 524.2
Bromobenzene	EPA 524.2
Chlorobenzene	EPA 524.2
Ethyl benzene	EPA 524.2
Hexachlorobutadiene	EPA 524.2
Isopropylbenzene	EPA 524.2
n-Butylbenzene	EPA 524.2
n-Propylbenzene	EPA 524.2
p-Isopropyltoluene (P-Cymene)	EPA 524.2
sec-Butylbenzene	EPA 524.2
Styrene	EPA 524.2
tert-Butylbenzene	EPA 524.2
Toluene	EPA 524.2
Total Xylenes	EPA 524.2

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NELAP RECOGNIZED TNI ACCREDITATION BODY

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All approved analytes are listed below:

Volatile Halocarbons	
1,1,1,2-Tetrachloroethane	EPA 524.2
1,1,1-Trichloroethane	EPA 524.2
1,1,2,2-Tetrachloroethane	EPA 524.2
1,1,2-Trichloroethane	EPA 524.2
1,1-Dichloroethane	EPA 524.2
1,1-Dichloroethene	EPA 524.2
1,1-Dichloropropene	EPA 524.2
1,2,3-Trichloropropane	EPA 524.2
1,2-Dichloroethane	EPA 524.2
1,2-Dichloropropane	EPA 524.2
1,3-Dichloropropane	EPA 524.2
2,2-Dichloropropane	EPA 524.2
Bromochloromethane	EPA 524.2
Bromomethane	EPA 524.2
Carbon tetrachloride	EPA 524.2
Chloroethane	EPA 524.2
Chloromethane	EPA 524.2
cis-1,2-Dichloroethene	EPA 524.2
cis-1,3-Dichloropropene	EPA 524.2
Dibromomethane	EPA 524.2
Dichlorodifluoromethane	EPA 524.2
Methylene chloride	EPA 524.2
Tetrachloroethene	EPA 524.2
trans-1,2-Dichloroethene	EPA 524.2
trans-1,3-Dichloropropene	EPA 524.2
Trichloroethene	EPA 524.2

Volatile Halocarbons	
Trichlorofluoromethane	EPA 524.2
Vinyl chloride	EPA 524.2

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All approved analytes are listed below:

Acrylates	
Acetonitrile	EPA TO-15
Acrylonitrile	EPA TO-15
Ethyl acrylate	EPA TO-15
Methyl methacrylate	EPA TO-15
Chlorinated Hydrocarbons	
1,2,4-Trichlorobenzene	EPA TO-15
Hexachlorobutadiene	EPA TO-15
Hexachloroethane	EPA TO-15
Polynuclear Aromatics	
Naphthalene	EPA TO-15
Priority Pollutant Phenols	
Phenol	EPA TO-15
Purgeable Aromatics	
1,2,4-Trimethylbenzene	EPA TO-15
1,2-Dichlorobenzene	EPA TO-15
1,3,5-Trimethylbenzene	EPA TO-15
1,3-Dichlorobenzene	EPA TO-15
1,4-Dichlorobenzene	EPA TO-15
2-Chlorotoluene	EPA TO-15
Benzene	EPA TO-15
	EPA TO-3
Chlorobenzene	EPA TO-15
Ethyl benzene	EPA TO-15
Isopropylbenzene	EPA TO-15

Purgeable Aromatics	
m/p-Xylenes	EPA TO-15
o-Xylene	EPA TO-15
Styrene	EPA TO-15
Toluene	EPA TO-15
Total Xylenes	EPA TO-15
Purgeable Halocarbons	
1,1,1-Trichloroethane	EPA TO-15
1,1,2,2-Tetrachloroethane	EPA TO-15
1,1,2-Trichloro-1,2,2-Trifluoroethane	EPA TO-15
1,1,2-Trichloroethane	EPA TO-15
1,1-Dichloroethane	EPA TO-15
1,1-Dichloroethene	EPA TO-15
1,2-Dibromo-3-chloropropane	EPA TO-15
1,2-Dibromoethane	EPA TO-15
1,2-Dichloroethane	EPA TO-15
1,2-Dichloropropane	EPA TO-15
3-Chloropropene (Allyl chloride)	EPA TO-15
Bromodichloromethane	EPA TO-15
Bromoform	EPA TO-15
Bromomethane	EPA TO-15
Carbon tetrachloride	EPA TO-15
Chloroethane	EPA TO-15
Chloroform	EPA TO-15
Chloromethane	EPA TO-15
cis-1,2-Dichloroethene	EPA TO-15

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NY Lab Id No: 10983

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All approved analytes are listed below:

Acrylates	
Acrolein (Propenal)	EPA 8260C
Acrylonitrile	EPA 8260C
Ethyl methacrylate	EPA 8260C
Methyl acrylonitrile	EPA 8260C
Methyl methacrylate	EPA 8260C
Amines	
1,2-Diphenylhydrazine	EPA 8270D
1,4-Phenylenediamine	EPA 8270D
1-Naphthylamine	EPA 8270D
2-Naphthylamine	EPA 8270D
2-Nitroaniline	EPA 8270D
3-Nitroaniline	EPA 8270D
4-Chloroaniline	EPA 8270D
4-Nitroaniline	EPA 8270D
5-Nitro-o-toluidine	EPA 8270D
a,a-Dimethylphenethylamine	EPA 8270D
Aniline	EPA 8270D
Carbazole	EPA 8270D
Diphenylamine	EPA 8270D
Methapyrilene	EPA 8270D
Pronamide	EPA 8270D
Benzidines	
3,3'-Dichlorobenzidine	EPA 8270D
Benzidine	EPA 8270D

Characteristic Testing	
Corrosivity	EPA 9040C
	EPA 9045D
Free Liquids	EPA 9095B
Ignitability	EPA 1010A
Synthetic Precipitation Leaching Proc.	EPA 1312
TCLP	EPA 1311
Chlorinated Hydrocarbon Pesticides	
4,4'-DDD	EPA 8081B
4,4'-DDE	EPA 8081B
4,4'-DDT	EPA 8081B
Aldrin	EPA 8081B
alpha-BHC	EPA 8081B
alpha-Chlordane	EPA 8081B
Atrazine	EPA 8270D
beta-BHC	EPA 8081B
Chlordane Total	EPA 8081B
Chlorobenzilate	EPA 8270D
delta-BHC	EPA 8081B
Diallate	EPA 8270D
Dieldrin	EPA 8081B
Endosulfan I	EPA 8081B
Endosulfan II	EPA 8081B
Endosulfan sulfate	EPA 8081B
Endrin	EPA 8081B
Endrin aldehyde	EPA 8081B

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Chlorinated Hydrocarbon Pesticides

Endrin Ketone	EPA 8081B
gamma-Chlordane	EPA 8081B
Heptachlor	EPA 8081B
Heptachlor epoxide	EPA 8081B
Isodrin	EPA 8270D
Kepone	EPA 8270D
Lindane	EPA 8081B
Methoxychlor	EPA 8081B
Mirex	EPA 8081B
Pentachloronitrobenzene	EPA 8270D
Toxaphene	EPA 8081B

Chlorinated Hydrocarbons

1,2,3-Trichlorobenzene	EPA 8260C
1,2,4,5-Tetrachlorobenzene	EPA 8270D
1,2,4-Trichlorobenzene	EPA 8270D
2-Chloronaphthalene	EPA 8270D
Hexachlorobenzene	EPA 8270D
Hexachlorobutadiene	EPA 8270D
Hexachlorocyclopentadiene	EPA 8270D
Hexachloroethane	EPA 8260C
	EPA 8270D
Hexachloropropene	EPA 8270D
Pentachlorobenzene	EPA 8270D

Chlorophenoxy Acid Pesticides

2,4,5-T	EPA 8151A

Chlorophenoxy Acid Pesticides

2,4,5-TP (Silvex)	EPA 8151A
2,4-D	EPA 8151A
2,4-DB	EPA 8151A
Dalapon	EPA 8151A
Dicamba	EPA 8151A
Dichloroprop	EPA 8151A
Dinoseb	EPA 8151A
	EPA 8270D
MCPA	EPA 8151A
MCPP	EPA 8151A
Pentachlorophenol	EPA 8151A

Haloethers

2,2'-Oxybis(1-chloropropane)	EPA 8270D
4-Bromophenylphenyl ether	EPA 8270D
4-Chlorophenylphenyl ether	EPA 8270D
Bis(2-chloroethoxy)methane	EPA 8270D
Bis(2-chloroethyl)ether	EPA 8270D

Low Level Polynuclear Aromatic Hydrocarbons

Acenaphthene Low Level	EPA 8270D SIM
Acenaphthylene Low Level	EPA 8270D SIM
Anthracene Low Level	EPA 8270D SIM
Benzo(a)anthracene Low Level	EPA 8270D SIM
Benzo(a)pyrene Low Level	EPA 8270D SIM
Benzo(b)fluoranthene Low Level	EPA 8270D SIM
Benzo(g,h,i)perylene Low Level	EPA 8270D SIM

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All approved analytes are listed below:

Low Level Polynuclear Aromatic Hydrocarbons

Benzo(k)fluoranthene Low Level	EPA 8270D SIM
Chrysene Low Level	EPA 8270D SIM
Dibenzo(a,h)anthracene Low Level	EPA 8270D SIM
Fluoranthene Low Level	EPA 8270D SIM
Fluorene Low Level	EPA 8270D SIM
Indeno(1,2,3-cd)pyrene Low Level	EPA 8270D SIM
Naphthalene Low Level	EPA 8270D SIM
Phenanthrene Low Level	EPA 8270D SIM
Pyrene Low Level	EPA 8270D SIM

Metals I

Barium, Total	EPA 6010C
	EPA 6010D
	EPA 6020A
	EPA 6020B
Cadmium, Total	EPA 6010C
	EPA 6010D
	EPA 6020A
	EPA 6020B
Calcium, Total	EPA 6010C
	EPA 6010D
	EPA 6020A
	EPA 6020B
Chromium, Total	EPA 6010C
	EPA 6010D
	EPA 6020A

Metals I

Chromium, Total	EPA 6020B
Copper, Total	EPA 6010C
	EPA 6010D
	EPA 6020A
	EPA 6020B
Iron, Total	EPA 6010C
	EPA 6010D
	EPA 6020A
	EPA 6020B
Lead, Total	EPA 6010C
	EPA 6010D
	EPA 6020A
	EPA 6020B
Magnesium, Total	EPA 6010C
	EPA 6010D
	EPA 6020A
	EPA 6020B
Manganese, Total	EPA 6010C
	EPA 6010D
	EPA 6020A
	EPA 6020B
Nickel, Total	EPA 6010C
	EPA 6010D
	EPA 6020A
	EPA 6020B
Potassium, Total	EPA 6010C

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Metals I

Potassium, Total	EPA 6010D
	EPA 6020A
	EPA 6020B
Silver, Total	EPA 6010C
	EPA 6010D
	EPA 6020A
	EPA 6020B
Sodium, Total	EPA 6010C
	EPA 6010D
	EPA 6020A
	EPA 6020B
Strontium, Total	EPA 6010C
	EPA 6010D
	EPA 6020A
	EPA 6020B

Metals II

Aluminum, Total	EPA 6010C
	EPA 6010D
	EPA 6020A
	EPA 6020B
Antimony, Total	EPA 6010C
	EPA 6010D
	EPA 6020A
	EPA 6020B
Arsenic, Total	EPA 6010C

Metals II

Arsenic, Total	EPA 6010D
	EPA 6020A
	EPA 6020B
Beryllium, Total	EPA 6010C
	EPA 6010D
	EPA 6020A
	EPA 6020B
Chromium VI	EPA 7196A
	EPA 7199
Lithium, Total	EPA 6010C
Mercury, Total	EPA 7471B
Selenium, Total	EPA 6010C
	EPA 6010D
	EPA 6020A
	EPA 6020B
Vanadium, Total	EPA 6010C
	EPA 6010D
	EPA 6020A
	EPA 6020B
Zinc, Total	EPA 6010C
	EPA 6010D
	EPA 6020A
	EPA 6020B

Metals III

Cobalt, Total	EPA 6010C

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Metals III	
Cobalt, Total	EPA 6010D
	EPA 6020A
	EPA 6020B
Molybdenum, Total	EPA 6010C
	EPA 6010D
	EPA 6020A
	EPA 6020B
Thallium, Total	EPA 6010C
	EPA 6010D
	EPA 6020A
	EPA 6020B
Tin, Total	EPA 6010C
	EPA 6010D
	EPA 6020A
	EPA 6020B
Titanium, Total	EPA 6010C
	EPA 6010D
	EPA 6020A
	EPA 6020B
Minerals	
Bromide	EPA 9056A
Chloride	EPA 9056A
Fluoride, Total	EPA 9056A
Sulfate (as SO4)	EPA 9056A

Miscellaneous	
Boron, Total	EPA 6010C
	EPA 6020A
Cyanide, Total	EPA 9012B
Extractable Organic Halides	EPA 9023
Organic Carbon, Total	Lloyd Kahn Method
	EPA 9060A
Phenols	EPA 9065
Sulfide (as S)	EPA 9034
Nitroaromatics and Isophorone	
1,3,5-Trinitrobenzene	EPA 8270D
1,3-Dinitrobenzene	EPA 8270D
1,4-Naphthoquinone	EPA 8270D
2,4-Dinitrotoluene	EPA 8270D
2,6-Dinitrotoluene	EPA 8270D
4-Dimethylaminoazobenzene	EPA 8270D
4-Nitroquinoline-1-oxide	EPA 8270D
Hydroquinone	EPA 8270D
Isophorone	EPA 8270D
Nitrobenzene	EPA 8270D
Pyridine	EPA 8270D
Nitrosoamines	
N-Nitrosodiethylamine	EPA 8270D
N-Nitrosodimethylamine	EPA 8270D
N-Nitrosodi-n-butylamine	EPA 8270D
N-Nitrosodi-n-propylamine	EPA 8270D

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CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

MR. PAUL IOANNIDIS
SGS NORTH AMERICA INC. - DAYTON
2235 ROUTE 130
DAYTON, NJ 08810

NY Lab Id No: 10983

is hereby APPROVED as an Environmental Laboratory in conformance with the National Environmental Laboratory Accreditation Conference Standards (2003) for the category ENVIRONMENTAL ANALYSES SOLID AND HAZARDOUS WASTE
All approved analytes are listed below:

Nitrosoamines	
N-Nitrosodiphenylamine	EPA 8270D
N-nitrosomethylethylamine	EPA 8270D
N-nitrosomorpholine	EPA 8270D
N-nitrosopiperidine	EPA 8270D
N-Nitrosopyrrolidine	EPA 8270D
Organophosphate Pesticides	
Dimethoate	EPA 8270D
Disulfoton	EPA 8270D
Famphur	EPA 8270D
Parathion ethyl	EPA 8270D
Parathion methyl	EPA 8270D
Phorate	EPA 8270D
Thionazin	EPA 8270D
Petroleum Hydrocarbons	
Diesel Range Organics	EPA 8015C
Gasoline Range Organics	EPA 8015C
Oil and Grease Total Recoverable (HEM)	EPA 9071B (Solvent:Hexane)
Phthalate Esters	
Benzyl butyl phthalate	EPA 8270D
Bis(2-ethylhexyl) phthalate	EPA 8270D
Diethyl phthalate	EPA 8270D
Dimethyl phthalate	EPA 8270D
Di-n-butyl phthalate	EPA 8270D
Di-n-octyl phthalate	EPA 8270D

Polychlorinated Biphenyls	
PCB-1016	EPA 8082A
PCB-1221	EPA 8082A
PCB-1232	EPA 8082A
PCB-1242	EPA 8082A
PCB-1248	EPA 8082A
PCB-1254	EPA 8082A
PCB-1260	EPA 8082A
PCB-1262	EPA 8082A
PCB-1268	EPA 8082A
Polynuclear Aromatic Hydrocarbons	
2-Acetylaminofluorene	EPA 8270D
3-Methylcholanthrene	EPA 8270D
7,12-Dimethylbenzyl (a) anthracene	EPA 8270D
Acenaphthene	EPA 8270D
Acenaphthylene	EPA 8270D
Anthracene	EPA 8270D
Benzo(a)anthracene	EPA 8270D
Benzo(a)pyrene	EPA 8270D
Benzo(b)fluoranthene	EPA 8270D
Benzo(ghi)perylene	EPA 8270D
Benzo(k)fluoranthene	EPA 8270D
Chrysene	EPA 8270D
Dibenzo(a,h)anthracene	EPA 8270D
Fluoranthene	EPA 8270D
Fluorene	EPA 8270D

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Polynuclear Aromatic Hydrocarbons	
Indeno(1,2,3-cd)pyrene	EPA 8270D
Naphthalene	EPA 8270D
Phenanthrene	EPA 8270D
Pyrene	EPA 8270D
Priority Pollutant Phenols	
2,3,4,6 Tetrachlorophenol	EPA 8270D
2,4,5-Trichlorophenol	EPA 8270D
2,4,6-Trichlorophenol	EPA 8270D
2,4-Dichlorophenol	EPA 8270D
2,4-Dimethylphenol	EPA 8270D
2,4-Dinitrophenol	EPA 8270D
2,6-Dichlorophenol	EPA 8270D
2-Chlorophenol	EPA 8270D
2-Methyl-4,6-dinitrophenol	EPA 8270D
2-Methylphenol	EPA 8270D
2-Nitrophenol	EPA 8270D
3-Methylphenol	EPA 8270D
4-Chloro-3-methylphenol	EPA 8270D
4-Methylphenol	EPA 8270D
4-Nitrophenol	EPA 8270D
Pentachlorophenol	EPA 8270D
Phenol	EPA 8270D
Semi-Volatile Organics	
1,1'-Biphenyl	EPA 8270D
1,2-Dichlorobenzene, Semi-volatile	EPA 8270D
Semi-Volatile Organics	
1,3-Dichlorobenzene, Semi-volatile	EPA 8270D
1,4-Dichlorobenzene, Semi-volatile	EPA 8270D
2-Methylnaphthalene	EPA 8270D
2-Picoline	EPA 8270D
4-Amino biphenyl	EPA 8270D
Acetophenone	EPA 8270D
Aramite	EPA 8270D
Benzaldehyde	EPA 8270D
Benzoic Acid	EPA 8270D
Benzyl alcohol	EPA 8270D
Caprolactam	EPA 8270D
Dibenzofuran	EPA 8270D
Ethyl methanesulfonate	EPA 8270D
Isosafrole	EPA 8270D
Methyl methanesulfonate	EPA 8270D
O,O,O-Triethyl phosphorothioate	EPA 8270D
Phenacetin	EPA 8270D
Safrole	EPA 8270D
Volatile Aromatics	
1,2,4-Trichlorobenzene, Volatile	EPA 8260C
1,2,4-Trimethylbenzene	EPA 8260C
1,2-Dichlorobenzene	EPA 8260C
1,3,5-Trimethylbenzene	EPA 8260C
1,3-Dichlorobenzene	EPA 8260C
1,4-Dichlorobenzene	EPA 8260C

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Volatile Aromatics	
2-Chlorotoluene	EPA 8260C
4-Chlorotoluene	EPA 8260C
Benzene	EPA 8260C
Bromobenzene	EPA 8260C
Chlorobenzene	EPA 8260C
Ethyl benzene	EPA 8260C
Isopropylbenzene	EPA 8260C
m/p-Xylenes	EPA 8260C
Naphthalene, Volatile	EPA 8260C
n-Butylbenzene	EPA 8260C
n-Propylbenzene	EPA 8260C
o-Xylene	EPA 8260C
p-Isopropyltoluene (P-Cymene)	EPA 8260C
sec-Butylbenzene	EPA 8260C
Styrene	EPA 8260C
tert-Butylbenzene	EPA 8260C
Toluene	EPA 8260C
Total Xylenes	EPA 8260C
Volatile Chlorinated Organics	
Benzyl chloride	EPA 8260C
Volatile Halocarbons	
1,1,1,2-Tetrachloroethane	EPA 8260C
1,1,1-Trichloroethane	EPA 8260C
1,1,2,2-Tetrachloroethane	EPA 8260C
1,1,2-Trichloro-1,2,2-Trifluoroethane	EPA 8260C

Volatile Halocarbons	
1,1,2-Trichloroethane	EPA 8260C
1,1-Dichloroethane	EPA 8260C
1,1-Dichloroethene	EPA 8260C
1,1-Dichloropropene	EPA 8260C
1,2,3-Trichloropropane	EPA 8260C
1,2-Dibromo-3-chloropropane	EPA 8260C
1,2-Dibromoethane	EPA 8260C
1,2-Dichloroethane	EPA 8260C
1,2-Dichloropropane	EPA 8260C
1,3-Dichloropropane	EPA 8260C
2,2-Dichloropropane	EPA 8260C
2-Chloro-1,3-butadiene (Chloroprene)	EPA 8260C
2-Chloroethylvinyl ether	EPA 8260C
3-Chloropropene (Allyl chloride)	EPA 8260C
Bromochloromethane	EPA 8260C
Bromodichloromethane	EPA 8260C
Bromoform	EPA 8260C
Bromomethane	EPA 8260C
Carbon tetrachloride	EPA 8260C
Chloroethane	EPA 8260C
Chloroform	EPA 8260C
Chloromethane	EPA 8260C
cis-1,2-Dichloroethene	EPA 8260C
cis-1,3-Dichloropropene	EPA 8260C
Dibromochloromethane	EPA 8260C
Dibromomethane	EPA 8260C

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Volatile Halocarbons	
Dichlorodifluoromethane	EPA 8260C
Hexachlorobutadiene, Volatile	EPA 8260C
Methyl iodide	EPA 8260C
Methylene chloride	EPA 8260C
Tetrachloroethene	EPA 8260C
trans-1,2-Dichloroethene	EPA 8260C
trans-1,3-Dichloropropene	EPA 8260C
trans-1,4-Dichloro-2-butene	EPA 8260C
Trichloroethene	EPA 8260C
Trichlorofluoromethane	EPA 8260C
Vinyl chloride	EPA 8260C

Volatile Organics	
1,4-Dioxane	EPA 8260C
	EPA 8270D
2-Butanone (Methylethyl ketone)	EPA 8260C
2-Hexanone	EPA 8260C
2-Nitropropane	EPA 8260C
4-Methyl-2-Pentanone	EPA 8260C
Acetone	EPA 8260C
Acetonitrile	EPA 8260C
Carbon Disulfide	EPA 8260C
Cyclohexane	EPA 8260C
Di-ethyl ether	EPA 8260C
Ethyl Acetate	EPA 8260C
Ethylene Glycol	EPA 8015C

Volatile Organics	
Isobutyl alcohol	EPA 8260C
	EPA 8015C
Methyl acetate	EPA 8260C
Methyl cyclohexane	EPA 8260C
Methyl tert-butyl ether	EPA 8260C
n-Butanol	EPA 8260C
o-Toluidine	EPA 8270D
Propionitrile	EPA 8260C
tert-butyl alcohol	EPA 8260C
	EPA 8015C
Vinyl acetate	EPA 8260C

Sample Preparation Methods	
	EPA 5035A-L
	EPA 5035A-H
	EPA 3580A
	EPA 3010A
	EPA 3005A
	EPA 3050B
	EPA 3550C
	EPA 3540C
	EPA 3546
	EPA 3060A

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All approved analytes are listed below:

Purgeable Halocarbons

cis-1,3-Dichloropropene	EPA TO-15
Dibromochloromethane	EPA TO-15
Dichlorodifluoromethane	EPA TO-15
Methylene chloride	EPA TO-15
Tetrachloroethene	EPA TO-15
trans-1,2-Dichloroethene	EPA TO-15
trans-1,3-Dichloropropene	EPA TO-15
Trichloroethene	EPA TO-15
Trichlorofluoromethane	EPA TO-15
Vinyl bromide	EPA TO-15
Vinyl chloride	EPA TO-15

Volatile Chlorinated Organics

Benzyl chloride	EPA TO-15
Epichlorohydrin	EPA TO-15

Volatile Organics

1,2-Dichlorotetrafluoroethane	EPA TO-15
1,3-Butadiene	EPA TO-15
1,4-Dioxane	EPA TO-15
2,2,4-Trimethylpentane	EPA TO-15
2-Butanone (Methylethyl ketone)	EPA TO-15
4-Methyl-2-Pentanone	EPA TO-15
Acetaldehyde	EPA TO-15
Acetone	EPA TO-15
Acrolein (Propenal)	EPA TO-15
Carbon Disulfide	EPA TO-15

Volatile Organics

Cyclohexane	EPA TO-15
Hexane	EPA TO-15
Isopropanol	EPA TO-15
Methyl iodide	EPA TO-15
Methyl tert-butyl ether	EPA TO-15
n-Heptane	EPA TO-15
Nitrobenzene	EPA TO-15
Propionaldehyde	EPA TO-15
tert-butyl alcohol	EPA TO-15
Vinyl acetate	EPA TO-15

Serial No.: 58535

LAB MANAGER: _____

QA MANAGER: Olga Agaiova

EFFECTIVE DATE: 4-18-2017

TITLE: METHOD 8260C, VOLATILE ORGANIC COMPOUNDS BY GAS CHROMATOGRAPHY/ MASS SPECTROMETRY (GC/MS)
REFERENCES: SW846 8260C (Revision 3, August 2006)
REVISED SECTIONS: 11.6.2, 11.7.11, Table 2

1.0 SCOPE AND APPLICATION

1.1 This SOP describes the analytical procedures, which are utilized by Accutest to acquire samples for analysis of volatile organic compounds by gas chromatographic/mass spectrometric (GC/MS) following purge and trap utilizing the internal standard technique. The compounds in Table 1 may be determined by this method. An option has been included for the analysis of 1,4-Dioxane by selected ion monitoring GC/MS (GC/SIM-SIM).

1.2 This analytical method is designed for nearly all types of samples, regardless of water content, including ground water, aqueous sludges, liquors, waste solvents, oily wastes, tars, filter cakes, sediments and soils.

1.3 The applicable concentration range of this method is compound, matrix, and instrument dependent. Volatile water-soluble compounds can be included in this analytical technique. However, for some low-molecular weight halogenated hydrocarbons, aromatics, ketones, nitriles, acetates, acrylates, ethers, and sulfides, quantitation limits are approximately ten times higher because of poor purging efficiency. Determination of some structural isomers (i.e. xylenes) may also be hampered by coelution.

2.0 SUMMARY OF METHOD

2.1 Volatile compounds are introduced into the gas chromatograph by purge-and-trap (Method 5030/5035). Method 5030 may be used directly on ground water samples. Method 5035 is used for low-concentration and medium-concentration soils, sediments, and wastes. Medium concentration samples are preserved and stored in methanol prior to purge-and-trap analysis.

2.2 An inert gas is bubbled through a 5 ml sample contained in a specifically designed purging chamber at ambient temperature. The purgeables are efficiently transferred from the aqueous phase to the vapor phase. The vapor is swept through a sorbent column where the purgeables are trapped. After purging is completed, the sorbent column is heated and backflushed with the inert gas to desorb the purgeables onto a gas chromatographic (GC) column.

2.3 The volatile compounds are separated by the temperature programmed GC column and detected using a mass spectrometer, which is used to provide both qualitative and quantitative information.

2.4 The peaks detected are qualitated by comparison to characteristic ions and retention times specific to the known target list of compounds.

2.5 Once identified the compound is quantitated by comparing the response of major (quantitation) ion relative to an internal standard technique with an average response factor generated from a calibration curve.

2.6 Additional unknown peaks with a response > 10 % of the closest internal standard may be processed through a library search with comparison to a database of approximately 75,000 spectra. An estimated concentration is quantitated by assuming a response factor of 1.

2.7 Water soluble volatile organic and other poor purging compounds maybe analyzed using this methodology, however this method is not the method of choice for these compounds and the laboratory's ability to achieve all calibration and quality control criteria for this method cannot be guaranteed. These compounds are noted as (pp) in Table 7.

2.8 The method includes an analytical option for the analysis of 1,4-Dioxane by GC/MS-SIM. The selected ions that are characteristic of the analytes of interest are analyzed using lower concentrations of calibration standards under the same MS conditions. SIM analysis is performed upon client request and is documented in the report.

3.0 REPORTING LIMIT AND METHOD DETECTION LIMIT

3.1 Reporting Limit. The reporting limit for this method is established at the lowest concentration standard in the calibration curve and may vary depending on matrix interferences, sample volume or weight and percent moisture. Detected concentrations below this concentration cannot be reported without qualification. See Table 10.

3.1.1 Compounds detected at concentrations between the reporting limit and MDL are quantitated and qualified as "J", estimated value. Program or project specifications may dictate that "J" qualified compounds are not to be reported.

3.2 Method Detection Limit. Experimentally determine MDLs using the procedure specified in 40 CFR, Part 136, Appendix B, revision 2. This value represents the lowest reportable concentration of an individual compound that meets the method qualitative identification criteria.

3.2.1 Experimental MDLs must be determined annually for this method.

3.2.2 Process all raw data for the replicate analysis in each MDL study. Forward the processed data to the QA group for archiving.

3.2.3 Calculated MDLs may not be feasible in the analysis of samples, particularly in regards to compounds in table 11 and common laboratory solvents (methylene chloride and acetone). In these cases the MDLs may be raised from the calculated value to a maximum of half the LOQ to avoid false positives being reported.

4.0 DEFINITIONS

BLANK - an analytical sample designed to assess specific sources of laboratory contamination. See individual types of Blanks: Method Blank, Instrument Blank, Storage Blank, Cleanup Blank and Sulfur Blank.

4-BROMOFLUOROBENZENE (BFB) - the compound chosen to establish mass spectral instrument performance for volatile (VOA) analyses.

CALIBRATION FACTOR (CF) - a measure of the gas chromatographic response of a target analyte to the mass injected. The calibration factor is analogous to the Relative Response Factor (RRF) used in the Volatile and Semivolatile fractions.

CONTINUING CALIBRATION - analytical standard run every 12 hours to verify the initial calibration of the system.

CONTINUOUS LIQUID-LIQUID EXTRACTION - used herein synonymously with the terms continuous extraction, continuous liquid extraction, and liquid extraction. This extraction technique involves boiling the extraction solvent in a flask and condensing the solvent above the aqueous sample. The condensed solvent drips through the sample, extracting the compounds of interest from the aqueous phase.

EXTRACTED ION CURRENT PROFILE (EICP) - a plot of ion abundance versus time (or scan number) for ion(s) of specified mass (Es).

INITIAL CALIBRATION - analysis of analytical standards for a series of different specified concentrations; used to define the linearity and dynamic range of the response of the mass spectrometer to the target compounds.

INTERNAL STANDARDS - compounds added to every standard, blank, matrix spike, matrix spike duplicate, sample (for volatiles), and sample extract (for semivolatiles) at a known concentration, prior to analysis. Internal standards are used as the basis for quantitation of the target compounds.

MATRIX - the predominant material of which the sample to be analyzed is composed. For the purpose of this SOP, a sample matrix is either water or soil/sediment. Matrix is not synonymous with phase (liquid or solid).

MATRIX SPIKE - aliquot of a matrix (water or soil) fortified (spiked) with known quantities of specific compounds and subjected to the entire analytical procedure in order to indicate the appropriateness of the method for the matrix by measuring recovery.

MATRIX SPIKE DUPLICATE - a second aliquot of the same matrix as the matrix spike (above) that is spiked in order to determine the precision of the method.

METHOD BLANK - an analytical control consisting of all reagents, internal standards and surrogate standards that is carried throughout the entire analytical procedure. The method blank is used to define the level of laboratory, background and reagent contamination.

METHOD DETECTION LIMITS (MDLs) - The minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero and is determined from analysis of a sample in a given matrix containing the analyte. MDLs must be determined approximately once per year for frequently analyzed parameters.

PERCENT DIFFERENCE (%D) - As used in this SOP and elsewhere to compare two values, the percent difference indicates both the direction and the magnitude of the comparison, i.e., the percent difference may be either negative, positive, or zero. (In contrast, see relative percent difference.)

PERCENT MOISTURE - an approximation of the amount of water in a soil/sediment sample made by drying an aliquot of the sample at 105^{o}C. The percent moisture determined in this manner also includes contributions from all compounds that may volatilize at or below 105 ^{o}C, including water. Percent moisture may be determined from decanted samples and from samples that are not decanted.

PRIMARY QUANTITATION ION - a contract specified ion used to quantitate a target analyte.

REAGENT WATER - water in which an interferant is not observed at or above the minimum detection limit of the parameters of interest.

RECONSTRUCTED ION CHROMATOGRAM (RIC) - a mass spectral graphical representation of the separation achieved by a gas chromatograph: a plot of total ion current versus retention time.

RELATIVE PERCENT DIFFERENCE (RPD) - As used in this SOP and elsewhere to compare two values, the relative percent difference is based on the mean of the two values, and is reported as an absolute value, i.e., always expressed as a positive number or zero. (In contrast, see percent difference.)

RELATIVE RESPONSE FACTOR (RRF) - a measure of the relative mass spectral response of an analyte compared to its internal standard. Relative Response Factors are determined by analysis of standards and are used in the calculation of concentrations of analytes in samples.

RELATIVE RETENTION TIME (RRT) - the ratio of the retention time of a compound to that of a standard (such as an internal standard).

INSTRUMENT BLANK – a system evaluation sample containing lab reagent grade water with internal standards and surrogate standards added. An instrument blank is used to remove and/or evaluate residual carryover from high level standards, spike samples and field samples.

5.0 HEALTH & SAFETY

5.1 The analyst must follow normal safety procedures as outlined in the Accutest Health and Safety Plan and Personal Protection Policy, which include the use of safety glasses and lab coats. In addition, all acids are corrosive and must be handled with care. Flush spills with plenty of water. If acids contact any part of the body, flush with water and contact the supervisor.

5.2 The toxicity or carcinogenicity of each reagent used in this method has not been precisely determined; however, each chemical must be treated as a potential health hazard. Exposure to these reagents must be reduced to the lowest possible level. The laboratory is responsible for maintaining a current awareness file of OSHA regulations regarding the safe handling of the chemicals specified in this method. A reference file of data handling sheets must be made available to all personnel involved in these analyses.

5.3 The following analytes covered by this method have been tentatively classified as known or suspected, human or mammalian carcinogens: benzene, carbon tetrachloride, 1,4-dichlorobenzene, 1,2-dichlorethane, hexachlorobutadiene, 1,1,2,2-tetrachloroethane, 1,1,2-trichloroethane, chloroform, 1,2-dibromoethane, tetrachloroethene, trichloroethene, and vinyl chloride. Primary standards of these toxic compounds must be prepared in a hood. A NIOSH/Mass approved toxic gas respirator must be worn when the analyst handles high concentrations of these toxic compounds.

6.0 INTERFERENCES

6.1 The data from all blanks, samples, and spikes must be evaluated for interferences.

6.2 Impurities in the purge gas, organic compounds out-gassing from the plumbing ahead of the trap, and solvent vapors in the laboratory account for the majority of contamination problems. The analytical system must be demonstrated to be free from contamination under the conditions of the analysis by running laboratory reagent blanks. The use of non-TFE tubing, non-TFE thread sealants, or flow controllers with rubber components in the purging device must be avoided.

6.3 Samples can be contaminated by diffusion of volatile organics (particularly methylene chloride and fluorocarbons) through the septum seal into the sample during shipment and storage. A trip blank prepared from reagent water and carried through the sampling and handling protocol can serve as a check on such contamination.

6.4 Contamination by carry-over can occur whenever high level and low-level samples are sequentially analyzed.

6.4.1 Whenever an unusually concentrated sample is encountered, it must be followed by an analysis of an instrument blank to check for cross contamination. Refer to Table 11 for compounds that may cause carryover for this method.

6.4.2 It may be necessary to wash the purging device with methanol, rinse it with organic-free water, and then dry the purging device in an oven at 105^0 C. Follow the instrument manual for instructions on cleaning. Document the occurrence in the maintenance log and notify the manager/supervisor.

6.4.2.1 Clean and bake purging tube.

6.4.2.2 Clean or replace purge needle.

6.4.2.3 Clean and bake sample filter or sparge filter.

6.4.2.4 Clean and bake sample loop.

6.4.2.5 Replace trap if necessary.

6.4.2.6 Replace water management module if necessary.

6.4.2.7 Rinse transfer line with methanol. Caution: disconnect the trap before rinsing.

6.4.3 In extreme situations, the entire purge-and trap device may require dismantling and cleaning. Follow the instrument's manual for instructions on disassembly. Document the occurrence in the maintenance log and notify the manager/supervisor. Screening of the samples prior to purge-and-trap GC/MS analysis is highly recommended to prevent contamination of the system. This is especially true for soil and waste samples.

6.4.4 If the contamination has been transferred to gas chromatograph, any of the following approaches may be used to cleanup the instrument.

6.4.4.1 Baking out the column between analyses.

6.4.4.2 Change the injector liner to reduce the potential for cross-contamination.

6.4.4.3 Remove a portion of the analytical column in the case of extreme contamination.

6.4.5 The oven temperature program must include a post-analysis bake out period to ensure that semivolatile hydrocarbons are stripped from the chromatographic column.

6.5 Special precautions must be taken during the analysis to avoid contamination from methylene chloride and other common laboratory solvents.

6.5.1 The sample storage and analytical area must be isolated from all atmospheric sources of methylene chloride or other common solvents.

6.5.2 Laboratory clothing worn by the analyst must be clean and used in designated areas only. Clothing previously exposed to solvent vapors in the organics sample preparation laboratory can contribute to sample contamination.

6.6 Samples with suspected or known permanganate levels should be preserved with ascorbic acid at collection. The purpose of the ascorbic acid is to remove the permanganate which is an oxidizer. There is potential that the analytes of concern will undergo an oxidative transformation which would no longer be representative of the concentrations as the site.

7.0 SAMPLE HANDLING AND PRESERVATION AND HOLDING TIME

7.1 HANDLING and PRESERVATION

7.1.1 Water samples

7.1.1.1 Container - 40 ml glass screw-cap VOA vial with Teflon-faced silicone septum. The 40-ml glass VOA vials are pre-cleaned and certified.

7.1.1.2 Acrolein & Acrylonitrile

7.1.1.2.1 If acrolein and acrylonitrile are to be analyzed, collect 3, 40 mL VO vials of sample unpreserved. Samples for acrolein and acrylonitrile analysis receiving no pH adjustment must be analyzed within 7 days of sampling. All samples must be footnoted stating samples were unpreserved and analyzed within 7 days.

7.1.1.3 Collect all samples in triplicate. Test all samples for residual chlorine using test paper for free and total chlorine. If samples contain residual chlorine, three milligrams of sodium thiosulfate must be added for each 40 ml of water sample.

7.1.1.4 Fill sample bottles to overflowing, but do not flush out the dechlorinating agent. Sample must be taken with care so as to prevent any air or bubbles entering vials creating headspace.

7.1.1.5 Adjust the pH of all samples to ≤ 2 at the time of collection, but after dechlorination, by carefully adding two drops of 1:1 HCl for each 40 ml of sample. Seal the sample bottles, Teflon face down, and mix for one minute. Or VOA vials containing the preservative (HCL) may be used.

Note: Do not mix the sodium thiosulfate with the HCl in the sample bottle prior to sampling.

7.1.1.6 The samples must be protected from light and refrigerated at 0 - ≤ 6 °C from the time of receipt until analysis.

7.1.1.7 An alternate preservative that may be used when suspected or known levels of permanganate exist in a sample is 25 mg of ascorbic acid per 40 ml vial.

7.1.1.7.1 Ascorbic acid is added to remove the permanganate which is an oxidizer.

7.1.1.7.2 Fill the sample bottles to overflowing, but do not flush out the ascorbic acid.

7.1.1.7.3 The samples must be protected from light and refrigerated at 0 - ≤ 6 °C from the time of receipt until analysis.

7.1.2 Soil Samples

7.1.2.1 Refer to the SOP for SW846 Method 5035 for preservation requirement of non-aqueous solids.

7.2 HOLDING TIME

7.2.1 Water Samples.

7.2.1.1 All samples are to be analyzed within 14 days of sampling (HCl preserved for aqueous sample) unless otherwise specified by the contract. The sample preservation deficiency is noted in the analytical run logbook when the analyst checks the pH at the bench. If the pH is not <2, the analyst notifies the supervisor, who then notifies Client Service Dept. A comment is added to the result page and Non-Conformance Summary.

7.2.1.2 Acrolein & Acrylonitrile

7.2.1.2.1 Samples for acrolein and acrylonitrile analysis receiving no pH adjustment must be analyzed within 7 days of sampling.

7.2.2 Soil Samples

7.2.2.1 Refer to the SOP for SW846 Method 5035 for holding time requirement of non-aqueous solids.

7.2.2.2 All samples are analyzed within 14 days of sampling unless otherwise specified.

8.0 APPARATUS AND MATERIALS

8.1 SYRINGE

8.1.1 10, 25, 50, 100, 500 and 5000 µl graduated syringes, manually held (Hamilton/equiv.).

8.1.2 5 ml and 50 ml glass gas tight syringes with Luerlok end, if appropriate for the purging device.

8.2 BALANCE

8.2.1 Analytical balance capable of weighing 0.0001 gram.

8.2.2 Top loading balance capable of weighing 0.1 gram.

8.3 PURGE AND TRAP DEVICES

8.3.1 The autosampler models are used for purging, trapping and desorbing the sample into GC column.

- O.I. Model 4560 sample concentrator with 4551 vial multi-sampler
- O.I. Model 4560 sample concentrator with 4552 Water/Soil multi-sampler

8.3.2 The sample purge vial must be designed to accept 5 ml of sample with a water column at least 3 cm deep.

8.3.3 The auto-sampler is equipped with a heater capable of maintaining the purge chamber at 40 °C to improve purging efficiency. The heater is to be used for low level soil/sediment analysis, but not for water or medium level soil/sediment analysis.

8.3.4 The OI #10 trap is 42 cm with an inside diameter of 0.105 inches. The trap must be packed to contain the following absorbents (3-ring) and must be conditioned at 180 °C for 30 minutes by backflushing with a Helium gas flow at least 20 ml/min before initial use.

- Tenax (2,6-Diphenylene oxide polymer).
- Silica gel.
- Carbon Molecule Sieve (CMS).

8.3.5 The desorber must be capable of rapidly heating the trap to 190^0 C for desorption. Do not exceed $210\ ^0$C during bake-out mode. Alternatively, follow manufacturer's instructions.

8.4 GAS CHROMATOGRAPH/MASS SPECTROMETER SYSTEM

8.4.1 Gas Chromatograph.

8.4.1.1 An analytical system complete with a temperature programmable gas chromatograph and all required accessories including syringes, analytical columns, and gases.

8.4.1.2 The injection port must be suitable for split or splitless with appropriate interface.

8.4.1.3 The narrow bore capillary column is directly coupled to the source for HP-6890 or Agilent 6890 model.

8.4.1.4 The wide bore capillary column is interfaced through a jet separator to the source for HP-5890 model.

8.4.2 Column.

- 75 m x 0.53mm ID x 3 μm film thickness capillary column coated with DB-624 (J&W Scientific), or equivalent. Condition as per manufactures directions.

- 105 m x 0.53mm ID x 3 μm film thickness capillary column coated with HP-VOA, or equivalent. Condition as per manufactures directions.

- 60 m x 0.25mm ID x 1.4 μm film thickness capillary column coated with DB-624 (J&W Scientific), or equivalent. Condition as per manufactures directions.

- 60 m x 0.45mm ID x 1.7 μm film thickness capillary column coated with DB-VRX (J&W Scientific), or equivalent. Condition as per manufactures directions.

8.4.3 Mass Spectrometer.

8.4.3.1 HP5973, HP5970 Agilent 5973, or Agilent 5975 is capable of scanning from 35 to 300 amu every 2 seconds or less, utilizing 70 volt (nominal) electron energy in the electron impact ionization mode.

8.4.3.2 The mass spectrometer must be capable of producing a mass spectrum which meets all the criteria in Table 3 when injecting or purging 50 ng of the GC/MS tuning standard - Bromofluorobenzene (BFB).

8.4.3.3 SIM Mode – Capable of selective ion grouping at specified retention times for increased compound sensitivity (Table 2a).

8.5 DATA SYSTEM

8.5.1 Data Acquisition and Instrument Control (HP Chemstation) **-** A computer system is interfaced to the mass spectrometer, which allows the continuous acquisition and storage on a machine-readable media (disc) of all mass spectra obtained throughout the duration of the chromatographic program.

8.5.2 Data Processing (HP Enviroquant) - The software accommodates searching of GC/MS data file for target analytes which display specific fragmentation patterns. The software also allows integrating the abundance of an EICP between specified time or scan number limits. The data system includes the recent version of the EPA/NBS or NIST98 mass spectral library for qualitative searches of non-target compounds present in the chromatogram. The data system flags all data files that have been edited manually by laboratory personnel.

8.5.3 Off line Magnetic Tape Storage Device (Lagato Networker) - The magnetic tape storage device copies data for long-term, off-line storage.

9.0 REAGENTS AND STANDARDS

9.1 Solvent

9.1.1 Methanol: purge-and-trap grade quality or equivalent. Store separately, away from the other solvents.

9.2 Reagent Water

9.2.1 Reagent water is defined as water in which an interferant is not observed at the method detection limit of the parameters of interest.

9.2.2 Reagent water is generated by either passing tap water through a bed of approximately one pound of activated carbon or by using the water purification system at Accutest that is a series of deionizers and carbon cartridges.

9.3 Stock Standard Solutions

9.3.1 Commercially prepared standards used.

9.3.1.1 EPA Method 524.2 Volatiles (78 components): Absolute (or equivalent) at 200 μg/ml or 2,000 μg/ml concentration.

9.3.1.2 Custom Volatiles Mix A: Restek (or equivalent) at 2,000 μg/ml concentration.

9.3.1.3 Custom Volatiles Mix B: Restek (or equivalent) at 2,000 - 100,000 μg/ml concentration.

9.3.1.4 VOC Gas Mixture: Ultra (or equivalent) contains 200 μg/ml or 2,000 μg/ml of the following compounds in methanol.

- Bromomethane
- Chloroethane
- Chloromethane
- Dichlorodifluoromethane
- Trichlorofluoromethane
- Vinyl Chloride

9.3.1.5 Multiple neat compounds.

9.3.1.6 Surrogate standard mixture: Ultra (or equivalent) at a concentration of 2,500 μg/ml each surrogate compound.

- 1,2-Dichloroethane-d_4
- Dibromofluoromethane
- Toluene-d_8
- 4-Bromofluorobenzene

9.3.1.7 Internal standard mixture: Ultra (or equivalent) at a concentration of 2,000 μg/ml for all the compounds except Tert Butyl Alcohol-d_9, which is from Absolute (or equivalent) at a concentration of 50,000 μg/ml. The following five internal standards are used that exhibit similar analytical behavior to the compounds of interest.

- 1,4-Dichlorobenzene-d_4
- 1,4-Difluorobenzene
- Chlorobenzene-d_5
- Pentafluorobenzene
- Tert Butyl Alcohol-d_9

9.3.1.8 1,4-Dioxane Solution for SIM : Ultra (or equivalent) at 100 μg/ml in methanol.

9.3.1.9 Ketones mixture: Acros (or equivalent) neat standards for Acetone, 2-Butanone, 4-methyl-2-pentanone (MIBK), and 2-hexanone prepared at concentrations 300 ug/ml for soil matrix and 400 ug/ml for aqueous matrix.

9.3.2 Unopened stock standard (ampoules) must be stored according to manufacturer's documented holding time and storage temperature recommendations (usually placed on the ampoule).

9.3.3 After opened, stock standards, internal standards, and surrogate solutions must be replaced after 6 months (one month for purgeable gases standard) or sooner if

manufacture expiration date come first or comparison with quality control check samples indicates degradation.

9.3.4 Store all stock standards in vials with minimal headspace and Teflon lid liners after open, protect from light, and refrigerate to –10°C or colder or as recommended by the standard manufacturer.

9.3.5 Return the standards to the freezer as soon as the analyst has completed mixing or diluting the standards to prevent the evaporation of volatile target compounds.

9.4 Internal Standard and Surrogate Solution

9.4.1 Five internal standard and surrogate spiking solutions are prepared in methanol per Table 8.A.

9.4.1.1 25 μg /ml internal standard and surrogate mixture.

9.4.1.2 250 μg /ml internal standard and surrogate mixture.

9.4.1.3 100 μg/ml surrogate mixture.

9.4.1.4 25 μg /ml internal standard mixture.

9.4.1.5 250 μg /ml internal standard mixture.

9.4.2 A calibration range must be constructed for the surrogate compounds. Accordingly, appropriate amounts of surrogates are mixed with each calibration solution to define a range similar to the target compounds.

9.4.3 Each 5 ml sample, QC sample, and blank undergoing analysis must be spiked with any one of the above spiking solutions (depending upon the type of standards addition modules used), resulting in a concentration of 50 μg/l of each compound.

9.4.4 Prepare fresh internal standard and surrogate spiking solutions every six months, or sooner, if manufacturer's expiration dates come first or if the solution has degraded or evaporated.

9.5 Secondary Dilution Standards

9.5.1 Using stock standard solutions prepare secondary dilution standards in methanol containing the compounds of interest, either singly or mixed together.

9.5.1.1 100 μg /ml V8260 mixture: prepared from 2,000 μg /ml stock solution. (see Table 8-C)

9.5.1.2 100 μg /ml V8260 custom mixture: prepared from 2,000 μg /ml stock solution. (see Table 8-C)

9.5.1.3 100 μg /ml Gas mixture: prepared from 2,000 μg /ml stock solution. (see Table 8-C)

9.5.2 Replace after one month for non-gas mixtures (one week for gas mixtures) or sooner if manufacture expiration date come first or comparison with quality control check samples indicates degradation.

9.5.3 Store all secondary dilution standards in vials with no headspace and Teflon lid liners, protect from light, and refrigerate to – 10°C or colder or according to manufacturer's storage temperature recommendation.

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9.5.4 Return the standards to the freezer as soon as preparation is finished to prevent the evaporation of volatile compounds.

9.6 Aqueous Calibration Standard Solutions

9.6.1 Initial Calibration Standards

9.6.1.1 Prepare a minimum of five aqueous calibration standard solutions containing the surrogate compounds as Table 8-D.1 or 8-D.2.

9.6.1.2 To prepare a calibration standard, add a measured volume of secondary dilution standard solutions and the surrogate spiking solution to an aliquot of reagent water in the flask. Use a micro-syringe and rapidly inject the methanol standard into the expanded area of the filled volumetric flask. Remove the needle as quickly as possible after injection. Bring to volume. Mix by inverting the flask three times only. Discard the contents contained in the neck of the flask.

9.6.1.2.1 1,4-Dioxane for SIM analysis is prepared from primary stock standard (100ppm).

9.6.2 Continuing Calibration Standard

9.6.2.1 A continuing calibration standard at a concentration of 50 μg/l is prepared as the scheme outlined in Table 8-E.

9.6.3 Aqueous standards are not stable and may be stored up to 24 hours if held in Teflon sealed screw-cap vials with zero headspace at 4^0C (± 2^0C). Protect the standards from light. If not so stored, they must be discarded after use, unless they are set up to be purged by an autosampler.

9.6.4 When using an autosampler, standards may be retained up to 12 hours if they are in purge tubes connected via the autosampler to the purge and trap device.

9.7 Second Source Calibration Check Standard (ICV)

9.7.1 Prepare the second source calibration check standards from separate sources of stock standards from the calibration curve following the procedures in Section 9.6. At a minimum, an ICV must be analyzed with every initial calibration.

9.7.2 For 1,4-Dioxane via SIM: Prepare the second source calibration check standard using 5 µl of a 100ppm (Absolute or equivalent) to 10 mL of reagent water which yields a 50 ppb standard.

9.8 4-Bromofluorobenzene (BFB) Standard

9.8.1 Two BFB solutions are prepared in methanol per Table 8-B.

9.8.1.1 25 µg /ml solution for direct injection.

9.8.1.2 250 µg /ml solution for purging.

9.8.2 The solution must be replaced after 6 months or sooner if mass spectrum indicates degradation or if manufacture expiration date comes first.

9.9 Ascorbic Acid

10.0 CALIBRATION

10.1 Daily Maintenance. Routine Daily maintenance must be performed before any tuning, calibration or sample analysis activities are initiated. These include checks of the following items:

Purge and Trap Device:

Clean & bake purge tube
Bake trap and transfer lines
Check or refill internal/surrogate spike solution on SIM/SAM vials
Clean/replace syringe (if necessary)
Change and refill rinse bottle
Empty and rinse waste bottle

GC Oven: (if necessary)

Change septum
Change liner
Clip column, indicated by carbon build-up

10.2 Initial Calibration

10.2.1 The calibration range covered for routine analysis under RCRA, and SIM, employs standards of 0.2, 0.5, 1(specified compounds only), (2)*, 5, 10, 20, 50, 100, 200,(300 or 400)* µg/l. (*instrument dependent). Optionally 4 and 8 ug/l standards may replace the 5 and 10 ug/l standards. A minimum of five standards must be run sequentially. The low calibration standard defines the reporting limit. Lower concentration standards (0.2, 0.5, 1.0 or 2.0 µg/l) may be needed to meet the reporting limit requirements of state specific

regulatory programs. Refer to Table 8-D-1 and 8-D-2 for calibration standard preparation.

10.2.2 The surrogates are introduced to the calibration standards automatically by the autosampler. For this calibration option the surrogate linear response is less important, since multiple concentrations of surrogates are not being measured. Instead, the surrogate concentration remains constant throughout and the recovery of this known concentration can easily be attained without demonstrating if the response is linear.

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10.2.2.1 Optional: The surrogates can be added manually. In order to compensate for the difference between the automatic and manual surrogate additions a correction factor must be applied to the amount of surrogate added in Table 8-D. To determine the correction factor divide the surrogate concentration from an automatic injection by the surrogate concentration from a manual injection for each of the surrogates. Average the result for each of the surrogates to determine the correction factor. Finally multiply the correction factor by the appropriate amount of surrogate from Table 8-D and add this amount to the standard.

10.2.3 For water and medium-level soil calibration: Transfer and fill up (no air space) each standard to labeled 40 ml vial and cap with Teflon septum, then place the vial into O.I. sample tray.

10.2.4 For low-level soil calibration: Transfer 5 ml of each standard to labeled 40 ml vial and cap with Teflon septum, then place the vial into O.I. sample tray.

10.2.4.1 When calibrating for Method 5035 low-level samples, if the sodium bisulfate option was used, add 1g of sodium bisulfate to the 40-ml vial before aliquot 5 ml of each standard into vial otherwise do not add sodium bisulfate. This is equivalent to the amount of sodium bisulfate added to the samples and will maintain a consistent purging efficiency of the compounds. Cap the vial with Teflon septum and place it into O.I sample tray.

10.2.5 The linear range covered by this calibration is the highest concentration standard.

10.2.6 Program the autosampler to add internal standard mixture (and optionally surrogate) to each standard. This results in a concentration of 50 μg/l for each internal standard (and surrogate).

10.2.6.1 For O.I. SIM spiker: Automatically adds 10 μl of 25 μg/ml internal standard solution **(**Section 9.4.1.4) or Internal Standard/Surrogate solution (Section 9.4.1.1) to each standard.

10.2.6.2 For O.I. SAM spiker: Automatically adds 1 μl of 250 μg/ml internal standard solution (Section 9.4.1.5) or Internal Standard/Surrogate solution Section 9.4.1.2) to each standard.

10.2.7 Analyze the standard solutions using the conditions established in Section 11.0. Whenever the highest concentration standard is analyzed, it is usually followed by the analyses of two reagent water blanks. Further analysis may not proceed until the blank analysis is demonstrated to be free of interferences.

10.2.8 Each analyte is quantitatively determined by internal standard technique using the closest eluting internal standard and the corresponding area of the major ion. See Table 7.

10.2.9 The Response Factor (RF) is defined in Section 13.1. Calculate the mean RF for each target analyte using minimum of five RF values calculated from the initial calibration curve.

10.2.10 For the initial calibration to be valid, the following criteria must be met.

10.2.10.1 The percent relative standard deviation (% RSD) (see Section 13.2) of all target analytes must be less than or equal to 20%.

10.2.10.2 If the average response factor criteria cannot be achieved, and if the problem is associated with one or more of the standards, reanalyze the standards and recalculate the RSD. The instrument logbook must have clear documentation as to what the suspected problem was.

10.2.10.2.1 A calibration standard is allowed to be repeated only once; if the second trial fails, a new initial calibration must be performed. Notify the team leader/manager. Document this occurrence in the instrument log.

10.2.10.3 Alternately, if the average response factor criteria cannot be achieved, the calibration range can be narrowed by dropping the low or high point of the curve.

10.2.10.3.1 The changes to the upper end of the calibration range will affect the need to dilute samples above the range, while changes to the lower end will affect the overall sensitivity of the method. Consider the regulatory limits or action levels associated with the target analytes when adjusting the lower end.

10.2.10.4 If the average response factor criteria still cannot be achieved, employ an alternative calibration linearity model. Specifically, linear regression using a least squares approach may be employed.

10.2.10.4.1 If linear regression is employed select the linear regression calibration option of the mass spectrometer data system. Do not force the regression line through the origin and do not employ 0,0 as a sixth calibration standard.

10.2.10.4.2 The correlation coefficient (r value) must be ≥ 0.99 for each compound to be acceptable.

10.2.10.4.2.1 When calculating the calibration curves using the linear regression model, a minimum quantitation check on the viability of the lowest calibration point must be performed by re-fitting the response from the low concentration calibration standard back into the curve.

10.2.10.4.2.2 The recalculated concentration of the low calibration point must be within ± 30% of the standard's true concentration

10.2.10.5 The initial calibration criteria for this method apply to all additional compounds of concern specified by the client.

10.2.10.6 If more than 10% of the compounds included with the initial calibration exceed the 20% RSD limit and do not meet the minimum correlation coefficient for the linear calibration option, then the chromatographic system is considered too reactive for the analysis to begin. Perform corrective action and recalibrate if the calibration criteria cannot be achieved.

10.2.10.7 A quadratic calibration model is allowed if the linear regression fails.

10.2.10.7.1 This may only be used for historically poor performing compounds (e.g. ketones).

10.2.10.7.2 A minimum of six calibration points are required. Do not employ 0,0 as a calibration point.

10.2.10.7.3 Quadratic calibration models cannot be used to extend the calibration range.

10.2.10.8 It is recommended that the minimum response factor for the most common target analytes in table 12 must be demonstrated for each individual calibration level as a means to ensure that these compounds are behaving as expected. In addition, meeting the minimum response factor criteria for the lowest calibration standard is critical in establishing and demonstrating the desired sensitivity.

10.2.10.9 The relative retention times of each target analyte in each calibration standard must agree within 0.06 relative retention time units.

10.3 Initial Calibration Verification (ICV) - Second Source Calibration Check Standard

10.3.1 The calibration is verified with a calibration check standard at 50 µg/l from an external source (Section 9.7). It must be analyzed immediately following the initial calibration.

10.3.2 The percent difference (% D) (Section 13.3) for this standard must meet the criteria of 30% for all the target compounds.

10.3.2.1 If % D is greater than 30%, reanalyze the second source check. If the criteria cannot be met upon re-injection, re-prepare the second source solution using a fresh ampoule and repeat the process.

10.3.2.2 If the %D criteria cannot be achieved after re-preparation of the second source, prepare a third source and repeat the process. Make fresh calibration standards using one of the two standard sources that match each other and repeat the initial calibration.

10.4 Continuing Calibration Verification Standard(CCV)

10.4.1 A continuing calibration verification standard at a concentration near mid-level of the initial calibration range (50 μg/l) must be acquired every 12 hrs or at the beginning of each analytical batch.

10.4.1.1 For water and medium level soil analysis: Transfer and fill up (no air space) the calibration verification standard to labeled 40 ml vial and cap with Teflon septum, then place the vial into O.I. sample tray. Analyze as per Section 11.7.

10.4.1.1.1 Vary the concentration of the continuing calibration verification standard on alternate verifications (i.e. every other calibration verification) using an alternative concentration standard. The standard selected must be lower than the midpoint calibration standard.

10.4.1.2 For low-level soil analysis: Transfer 5 ml of the calibration verification standard to labeled 40 ml vial and cap with Teflon septum, then place the vial into O.I. sample tray. Analyze as per Section 11.7.

10.4.1.2.1 When calibrating for Method 5035 low-level samples, if the sodium bisulfate option was used add 1g of sodium bisulfate to the 40-ml vial before aliquot 5 ml of the calibration verification standard into vial, otherwise do not use sodium bisulfate. This is equivalent to the amount of sodium bisulfate added to the samples and will maintain a consistent purging efficiency of the compounds. Analyze as per Section 11.7.

10.4.1.3 A continuing calibration standard is analyzed whenever the analyst suspects that the analytical system is out of calibration. If the calibration cannot be verified, corrective action is performed to bring the system into control. Analysis may not continue until the system is under control.

10.4.2 For the continuing calibration to be valid, all of the following specified criteria must be met.

10.4.2.1 Each of the most common target analytes in the calibration verification standard must meet the minimum response factors as noted in Table 12. This criterion is particularly important when the common target analytes are also critical project-required compounds. This is the same check that is applied during the initial calibration.

10.4.2.1.1 If the minimum response factors are not met, the system must be evaluated, and corrective action must be taken before sample analysis begins.

10.4.2.2 All target compounds of interest must be evaluated using a 20%variability criterion. Use percent difference when performing the average response factor model calibration. Use percent drift when calibrating using a regression fit model. If the percent difference or percent drift for a compound is less than or equal to 20%, then the initial calibration for that compound is assumed to be valid.

10.4.2.3 Due to the large numbers of compounds that may be analyzed by this method, some compounds will fail to meet the criteria. If the criterion is not met (i.e., greater than 20% difference or drift) for more than 20% of the compounds included in the initial calibration, then corrective action must be taken prior to the analysis of samples.

10.4.2.4 In cases where compounds fail, they may still be reported as non-detects if it can demonstrated that there was adequate sensitivity to detect the compound at the applicable quantitation limit. For situations when the failed compound is present, the concentrations must be reported as estimated values.

10.4.2.4.1 Compounds with response factors that exceed the 20% D in the CCV compared to the initial calibration with high bias may only be reported as an estimated value.

10.4.2.4.2 Compounds that do not meet the 20% D in the CCV compared to the initial calibration due to low response factors can only be reported if the low sensitivity of the instrument is still achieved. This sensitivity must be verified by running a low level standard check at the RL. If a positive result for the compound is found then adequate sensitivity has been demonstrated and the run can proceed. Non-detect results for samples may be reported, positive results, if reported, must be done as an estimated value.

10.4.3 If the first continuing calibration verification (CCV) does not meet criteria, a second standard can be analyzed immediately or after the corrective action was performed. If the second CCV fails to meet criteria then corrective actions must be performed. Such as: auto-tuning, routine system cleaning and routine system maintenance. Notify the team leader/manager.

10.4.3.1 If the second CCV trial fails, the lab must demonstrate acceptable performance <u>after</u> corrective action with two consecutive passing calibration verifications (CCVs) OR a new initial calibration. The Instrument Logbook and Maintenance Logbook must have clear documented notations as to what the problem was and what corrective action was implemented.

10.4.3.1.1 If the lab has not verified calibration, samples cannot be analyzed.

10.4.3.1.2 However, in the case where samples are analyzed on the system where the CCV does not meet the criteria the data must be flagged.

10.4.3.1.2.1 The data may be usable if the response for the verification exceed high (high bias) and the associated samples are non-detects.

10.4.3.1.2.2 If the criteria for the CCV is low (low bias), those sample results may be reported only if they exceed a maximum regulatory limit/decision level.

10.4.3.2 If the calibration verification is being performed using an auto sampler for night batch, two (2) vials of standard solution are placed in the device for analysis. The second standard must meet continuing calibration criteria and is used for calibration verification. The second check may be discarded only if there is a purge failure or incorrect spike concentration provided the first calibration standard meets the requirement. In this case, the first calibration standard is used as calibration verification following team leader/manager approval. Document this occurrence on instrument log.

10.4.3.2.1 Both CCVs must be evaluated. If vial 1 fails and vial 2 passes this meets the criteria of 10.4.3 of consecutive and immediate passing CCV.

10.4.3.2.2 If CCV number 2 fails, the analysis cannot continue unless it was determined that there was an isolated mechanical failure.

10.4.4 If any of the internal standard areas change by a factor of two (- 50% to + 100%) or the retention time changes by more than 30 seconds from the midpoint standard of the last initial calibration, the mass spectrometer must be inspected for malfunctions and corrections must be made, as appropriate.

10.4.4.1 Reanalyze the continuing calibration standard. New initial calibration is required if reanalyzed standard continues to fail the internal standard requirements.

10.4.4.2 All samples analyzed while the system was out of control must be reanalyzed following corrective action.

10.5 Corrective Action Maintenance For Failed Tuning and Calibration Procedures

10.5.1 Inability to achieve criteria for instrument tuning or calibration may indicate the need for instrument maintenance. Maintenance may include routine system cleaning and replacement of worn expendables or the need for outside service if the scope of the repair exceeds the capability of the staff.

10.5.2 If maintenance is performed on an instrument, return to control must be demonstrated before analysis can continue. Return to control is demonstrated as follows:

10.5.2.1 Successful instrument tune using PFTBA.

10.5.2.2 Successful tune verification by the analysis of 4-bromofluorobenzene.

10.5.2.3 Successful initial calibration or continuing calibration.

11.0 PROCEDURE

11.1 Instrument conditions.

11.1.1 Recommended instrument conditions are listed in Table 2 and 2a (SIM only). Modifications of parameters specified with an asterisk are allowed as long as criteria of calibration are met. Any modification must be approved by team leader/manger.

11.1.2 Optimize GC conditions for analyte separation and sensitivity. Once optimized, use the same GC conditions for the analysis of all standards, blanks, samples, and QC samples.

11.2 Purge and Trap Device conditions.

11.2.1 See Table 2.

11.2.2 Daily Maintenance. Routine Daily maintenance must be performed before any tuning, calibration or sample analysis activities are initiated. These include checks of the following items:

Purge and Trap Device:

- Clean & bake purge tube.
- Bake trap and transfer lines.
- Check or refill internal/surrogate spike solution on SIM/SAM vials.
- Clean/replace syringe (if necessary).
- Change and refill rinse bottle.
- Empty and rinse waste bottle.

11.3 Step 1: Daily GC/MS performance check.

11.3.1 Every 12 hours, either

- Inject 2 μl (50 ng) of BFB solution directly on column or
- Purge 10 μg/l of 5ml (50ng) to GC column.

11.3.2 The GC/MS system must be checked to verify acceptable performance criteria are achieved (see Table 3).

11.3.3 This performance test must be passed before any samples, blanks or standards are analyzed. Evaluate the tune spectrum using three mass scans from the chromatographic peak and a subtraction of instrument background.

11.3.3.1 Select the scans at the peak apex and one to each side of the apex.

11.3.3.2 Calculate an average of the mass abundances from the three scans.

11.3.3.3 Background subtraction is required. Select a single scan in the chromatogram that is absent of any interfering compound peaks and no more than 20 scans prior to the elution of BFB. The background subtraction must be designed only to eliminate column bleed or instrument background ions. Do not subtract part of the tuning compound peak.

11.3.4 If all the criteria are not achieved, the analyst must retune the mass spectrometer with team leader/manager and repeat the test until all criteria are met.

11.3.4.1 Alternatively, an additional scan on each side of the peak apex may be selected and included in the averaging of the mass scans. This will provide a mass spectrum of five averaged scans centered on the peak apex. NOTE: The selection of additional mass scans for tuning may only be performed with supervisory approval on a case by case basis.

11.3.4.2 Note: All subsequent standards, samples, MS/MSDs, BS, and blanks associated with a BFB analysis must use identical mass spectrometer conditions.

11.3.4.3 The injection time of the acceptable tune analysis is considered the start of the 12-hour clock.

11.3.5 The BFB must meet the criteria before sample analysis begins. The BFB and calibration verification standard may be combined into a single standard as long as both tuning and calibration verification acceptance criteria for the project can be met without interferences.

11.3 Step 2 : Daily calibration check

11.4.1 Initial calibration

11.4.1.1 Refer to Section 10.2.

11.4.1.2 An initial calibration must be established (or reestablished) on each instrument:

- Prior to any sample analyses;
- Whenever a new column is installed;
- Whenever instrument adjustments that affect sensitivity are made; and
- Whenever a continuing calibration standard fails to meet the specified acceptance criteria, on the second trial.

11.4.2 Initial Calibration Verification - Second Source Calibration Check Standard

11.4.2.1 This standard is only analyzed when initial calibration provided. Refer to Section 10.3.

11.4.3 Continuing Calibration verification standard

11.4.3.1 Refer to Section 10.4.

11.4.4 The method blank (step 3) cannot be analyzed until the continuing calibration verification meets the criteria.

11.5 Step 3 : Method blank

11.5.1 The acceptable method blank must be analyzed for every 12-hour time period or sooner.

11.5.1.1 Water and medium-level soil samples - Place a 40 ml vial, filled with DI water onto the autosampler.

11.5.1.2 Low-level soil samples without sodium bisulfate - Transfer 5 ml of DI water to a 40 ml vial and cap with Teflon septum, then place the vial into O.I. sample tray.

11.5.1.2.1 Low-level soil samples with sodium bisulfate (Method 5035) - Add 1g of sodium bisulfate into a 40 ml vial before adding 5 ml of DI water. Cap the vial with a Teflon septum, then place the vial onto the autosampler.

11.5.2 Program the autosampler to add internal standard and surrogate solution to the method blank for a concentration of 50 μg/l for each internal standard and surrogate.

11.5.2.1 For O.I. SIM spiker: Automatically adds 10 μl of 25 μg/ml internal standard and surrogate solution (Section 9.4.1.1) to the method blank.

11.5.2.2 For O.I. SAM spiker: Automatically adds 1 μl of 250 μg/ml internal standard and surrogate solution (Section 9.4.1.2) to the method blank.

11.5.3 No compound can be present above the laboratory's MDL. If common laboratory solvents (i.e. methylene chloride, acetone) are present in the sample at >1/2 RL, the analyst must determine if the contamination will negatively impact data quality. If the contamination impacts data quality, all affected samples must be re-analyzed.

11.5.4 Surrogates must meet recovery criteria specified in house limits.

11.5.5 If the method blank does not meet surrogate criteria or contains target analytes above the MDL, then

11.5.5.1 All samples analyzed following an out of control method blank must be reanalyzed.

11.5.5.2 Check for the potential of contamination interference from the following areas. Make sure all items are free contamination.

- the analytical system,
- dust and vapor in the air,
- glassware and
- Reagents.

11.5.5.3 Re-analyze the method blank following the system evaluation. In this situation, the instrument logbook must have clear documented notations as to what the problem was and what corrective action was implemented to enable the second blank to pass.

11.5.5.4 If re-analyzed method blank remains out of control, notify team leader or manager.

11.5.6 If two consecutive method blanks are analyzed during unattended operations, the second analysis must meet criteria for the subsequent sample analysis to be valid. Always report the second method blank. The second analysis can only be discarded because of a purge failure provided that the first blank meets the requirement. In this case, the first blank is reported following team leader/manager approval. Document this occurrence on the instrument log.

11.5.7 The blank spike (BS) (step 4) cannot be analyzed until the method blank meets criteria.

11.6 Step 4: Blank spike (BS)

11.6.1 An acceptable blank spike must be analyzed with every analytical batch. The maximum number of samples per analytical batch is twenty.

11.6.2 Spike 50 ml of reagent water with appropriate amount of the standards to prepare a blank spike containing 50 μg/L of each analyte. In situations where lower detection limits are required, a blank spike at 20 μg/L may be prepared. The stock solution for the BS must be from the same source as the initial calibration solution. Refer to Table 8-F for the preparations of the blank spikes.

11.6.2.1 Water and medium-level soil samples - Place a 40 ml vial, filled with DI water onto the autosampler.

11.6.2.2 Low-level soil samples without sodium bisulfate - Aliquot 5 ml of the blank spike into vial and cap with Teflon septum, then place the vial into O.I. sample tray.

11.6.2.2.1 Low-level soil samples with sodium bisulfate for Method 5035 - Add 1g of sodium bisulfate to labeled 40 ml vial before aliquot 5 ml of the blank spike into vial and cap with Teflon septum, then place the vial into O.I. sample tray.

11.6.3 Initiate auto addition of internal standard and surrogate into the syringe per 11.5.2.

11.6.4 Compare the percent recoveries (% R) (see Section 13.5) to the in house limits acceptance criteria. If a blank spike is out of control, all the associated samples must be reanalyzed. The exception is if the blank spike recovery is high and no hits reported in associated samples and QC batch. In that case, the sample results can be reported with footnote (remark) and no further action is required. Or if the blank spike recovery is low and the hits in the samples are above regulatory levels.

11.6.5 Do not analyze samples and MS/MSD (step 5) unless the BS meets acceptance criteria.

11.6.6 The blank spike and matrix spike must be the same source and concentration.

11.7 Step 5: Samples /MS/MSD analysis

11.7.1 All samples and standard solutions must be allowed to warm to ambient temperature before analysis.

11.7.2 Select the sample dilution factor to assure the highest concentration analyte is above the calibration range midpoint, but below the upper limit of the range depend on project requirements. See Table 9 for dilution guideline.

- Utilize FID screen data.
- Utilize acquired sample data.
- Utilize the history program.
- Sample characteristics (appearance, odor).

11.7.3 Water samples.

11.7.3.1 Using O.I.Model 4560 sample concentrator with 4551 or 4552 vial multisampler,

- Place the 40 ml vial in the tray, or
- Load 5ml sample into purge tube if sample volume limited.

11.7.3.2 A matrix spike and matrix spike duplicate are performed by spiking 20ul of the appropriate standards into the 40ml sample vial. If there are not enough vials for this procedure, a matrix spike and a sample duplicate are performed in place of an MS/MSD.

11.7.4 Sediment/ soil sample

11.7.4.1 Low-level soil method

11.7.4.1.1 Collect the sample using the procedures detailed in the SOP for SW846 Method 5035 low - level soil samples.

11.7.4.1.2 Weigh out 5 g of each sample into a labeled, tared vial filled with 5 ml DI water. Add the matrix spike by manually puncturing the septum with a small-gauge needle. Transfer the 40ml vial to the autosampler tray. Stir and heat the sample at the time of analysis.

11.7.4.2 Medium-level soil method

11.7.4.2.1 Collect the sample using the procedures detailed in the SOP for SW846 Method 5035 medium - level soil samples.

11.7.4.2.2 Select a methanol aliquot of appropriate volume (see Table 9) determined via screening and transfer to 40 ml of reagent water.

11.7.8 Program the autosampler to inject the internal standard and surrogate solution into the robotic syringe used to withdraw sample from the 40 ml vial. This addition to 5 ml of sample is equivalent to a concentration of 50 μg/L of each internal standard and surrogate.

11.7.8.1 For O.I. SIM spiker: Automatically adds 10 μl of 25 μg/ml internal standard and surrogate solution (Section 9.4.1.1) to each sample.

11.7.8.2 For O.I. SAM spiker: Automatically adds 1 μl of 250 μg/ml internal standard and surrogate solution (Section 9.4.1.2) to each sample.

11.7.9 Purge the sample for 9 minutes with Helium.

11.7.9.1 Low-level soil sample must be performed at 40 °C while the sample is being agitated with the magnetic stirring bar or other mechanical means.

11.7.9.2 To improve the purging efficiency of water-soluble compounds, aqueous samples may also be purged at 40 °C as long as all calibration standards (for 1,4-Dioxane SIM option, purge temperature is 80°C), samples and QC samples are purged at the same temperature and acceptable method performance is demonstrated.

11.7.10 One sample is randomly selected from each analytical batch of similar matrix types and spiked in duplicate to determine whether the sample matrix contributes bias to the analytical results. A matrix spike and matrix spike duplicate are performed by spiking the sample for a concentration of 50 μg/l or 50 μg/kg based on 5 g dry weight. In situations where lower detection limits are required, a blank spike at lower concentration may be prepared.

11.7.11 Desorb the sample for a maximum of 4 minutes by rapidly heating the trap to 190 °C while backflushing with Helium. Desorb time may require performance optimization between 0.5 and 4.0 minutes as dictated by trap manufacturers specifications or instrument characteristics.

11.7.12 Program the purge and trap system to automatically rinse purge tube at least twice with heated organic-free water (reagent water) between analyses to avoid carryover of target compounds. For samples containing large amounts of water-soluble materials, suspended solids, high-boiling compounds, or high purgeable levels, it may be necessary to wash out the purging device with methanol solution between analyses, rinse it with distilled water.

11.7.13 Bake the trap at least 10 minutes at 210 °C to remove any residual purgeable compounds.

11.7.14 If the initial analysis of the sample or a dilution of the sample has a response for any ion of interest that exceeds the working range of the GC/MS system, the sample must be reanalyzed at a higher dilution.

11.7.14.1 When ions from a compound in the sample saturate the detector, this analysis must be followed by the analysis of reagent water blank. If the blank analysis is not free of interferences, then the system must be decontaminated. Sample analysis may not resume until the blank analysis is demonstrated to be free of interferences.

11.8 Sample dilutions

11.8.1 Using Screening Data to Determine Dilution Factors

11.8.1.1 Dilution for High Concentration Analytes Exceeding The Calibration Range

11.8.1.1.1 The highest concentration target compound detected in the screen data is compared to the highest concentration calibration standard used for determinative volatile organics analysis.

11.8.1.1.1.1 Divide the calibration concentration of the screen concentration by the highest concentration calibration standard.

11.8.1.1.1.2 If the result is >1, sample dilution is considered.

11.8.1.1.2 The result from step 11.8.1.1.1 determines the dilution factor. The dilution factor is targeted to assure that the highest concentration diluted analyte is at the mid-range concentration of the calibration curve for the determinative analysis.

11.8.1.1.3 In all cases a conservative approach to dilution is applied to minimize the increase of detection and reporting limits

11.8.1.2 Dilution for High Concentration Matrix Interferences

11.8.1.2.1 The peak height of the background is compared to the peak height of the later eluting calibration standards from the screening analysis.

11.8.1.2.1.1 A rough estimate of background concentration is calculated by dividing the background peak height by the peak height of the selected screening standard and multiplying by its concentration.

11.8.1.2.2 If the result is >1, sample dilution is considered.

11.8.1.2.3 The result from step 11.8.1.2.1 determines the dilution factor. The dilution factor is targeted to avoid Carry-over contamination between samples and facilitate qualitative and quantitative analysis of target compounds present in the sample.

11.8.1.2.4 In all cases a conservative approach to dilution is applied to minimize the increase of detection and reporting limits

11.8.2 If the concentration of any target compound in any sample exceeds the initial calibration range, a new aliquot of that sample must be diluted and re-analyzed. Until the diluted sample is in a sealed sample vial, all steps in the dilution procedure must be performed without delay.

11.8.3 Water Samples.

11.8.3.1 Prepare all dilutions of water samples in volumetric flasks or Class A graduated cylinder. Intermediate dilutions may be necessary for extremely large dilutions.

11.8.3.2 Calculate the approximate volume of reagent water, which will be added to the volumetric flask or graduated cylinder, and add slightly less than this quantity to the flask. Refer to Table 9 for dilution guideline.

11.8.3.3 Inject the proper sample aliquot from a syringe into the volumetric flask or graduated cylinder. It is also permissible to pour the sample directly into a graduated cylinder for some dilutions. Dilute the flask to the volume mark with reagent water. Cap the flask and invert the flask three times.

11.8.3.4 Fill a 40 ml sample vial and seal with a Teflon baked silicon septa, load the diluted sample into the autosampler and analyze according to Section 11.7.

11.8.4 Low-level Soil Samples.

11.8.3.1 Screen data is used to determine the appropriate sample preparation procedure for a particular sample, the low-level soil method or the medium-level soil method.

11.8.3.2 If any target compound exceeds the initial calibration range from the analysis of 5 g sample, a smaller sample size must be analyzed. However, the smallest sample size permitted is 0.5 g. If smaller than 0.5 g sample size is needed to prevent any target compounds from exceeding the initial calibration range, the medium level method must be used.

11.9 Data interpretation

11.9.1 Qualitative identification.

11.9.1.1 The targeted compounds shall be identified by analyst with competent knowledge in the interpretation of mass spectra by comparison of the sample mass spectrum to the mass spectrum of a standard of the suspected compound.

11.9.1.2 The characteristic ions for target compounds that can be determined are listed in Table 7. Table 4 and Table 5 list the characteristic ions for internal standards and surrogate compounds respectively.

11.9.1.3 The criteria required for a positive identification are listed below.

11.9.1.3.1 The sample component must elute at the same relative retention time (RRT) as the daily standard. Criteria are the RRT of sample component must be within ± 0.06 RRT units of the standard component.

11.9.1.3.2 The relative intensities of these ions must agree within ± 30 % between the daily standard and sample spectra. (Example: For an ion with an abundance of 50 % in the standard spectra, the corresponding sample abundance must be between 20 and 80 %.)

11.9.1.3.2.1 Compounds can have secondary ions outside criteria from co-eluting compounds and/or matrix effect that can contribute to ion abundances. The interference on ion ratios can't always be subtracted out by software programs resulting in qualified compound identification.

11.9.1.3.2.2 Quantitation reports display compounds that have secondary ions outside the ratio criteria with a "#" flag.

11.9.1.3.3 Structural isomers that produce very similar mass spectra must be identified as individual isomers if they have sufficiently different GC retention times. Sufficient GC resolution is achieved if the height of the valley between two isomer peaks is less than 50 % of sum of the two peak heights. Otherwise, structural isomers are identified as isomeric pairs.

11.9.2 Quantitative analysis

11.9.2.1 Once a target compound has been identified, its concentration (Section 13.4) will be based on the integrated area of the quantitation ion, normally the base peak (Table 7). The compound is quantitated by internal standard technique with an average response factor generated from the initial calibration curve.

11.9.2.2 If the sample produces interference for the primary ion, use a secondary ion to quantitate (see Table 7). This is characterized by an excessive background signal of the same ion, which distorts the peak shape beyond a definitive integration. Also interference could severely inhibit the response of the internal standard ion. This secondary ion must also be used to generate new calibration response factors.

11.10 Library search for tentatively identified compounds.

11.10.1 If a library search is requested, the analyst must perform a forward library search of NBS or NIST98 mass spectral library to tentatively identify 15 non-reported compounds.

11.10.2 Guidelines for making tentative identification are listed below.

11.10.2.1 These compounds must have a response greater than 10 % of the nearest internal standard. The response is obtained from the integration for peak area of the Total Ion Chromatogram (TIC).

11.10.2.2 The search is to include a spectral printout of the 3 best library matches for a particular substance. The results are to be interpreted by analyst.

11.10.2.3 Molecular ions present in the reference spectrum must be present in the sample spectrum.

11.10.2.4 Relative intensities of major ions in the reference spectrum (ions > 10 % of the most abundant ion) must be present in the sample spectrum.

11.10.2.5 The relative intensities of the major ions must agree within ± 20 %. (Example: For an ion with an abundance of 50% in the standard spectrum, the corresponding sample ion abundance must between 30 and 70%).

11.10.2.6 Ions present in the sample spectrum but not in the reference spectrum must be reviewed for possible background contamination or presence of coeluting compounds.

11.10.2.7 Ions present in the reference spectrum but not in the sample spectrum must be verified by performing further manual background subtraction to eliminate the interference created by coeluting peaks and/or matrix interference.

11.10.2.8 Quantitation of the tentatively identified compounds is obtained from the total ion chromatogram based on a response factor of 1 and is to be tabulated on the library search summary data sheet.

11.10.2.9 The resulting concentration must be reported indicating: (1) that the value is estimate, and (2) which internal standard was used to determine concentration. Quantitation is performed on the nearest internal standard.

11.11 An instrument blank is a system evaluation sample containing lab reagent grade water with internal standards and surrogates. An instrument blank is used to remove and or evaluate residual carryover from high level standards, spike samples and field samples. Since target compound lists have expanded to overlap some volatile and semi-volatile compounds, instrument blanks are necessary to remove carryover contamination.

11.11.1 The compounds that may exhibit carryover for this method are listed in Table 11.

11.11.2 If instrument blanks following a standard or spike sample exhibits carry-over effect, then any samples that show the same carryover profile, after a comparable concentration must be considered suspect and rerun for confirmation. For example, if an instrument blank has 1ppb detected after a 200ppb standard, then any sample following a sample containing 200ppb or above of the same compound must be confirmed for possible carryover.

11.11.3 If an Instrument Blank(s) was run following suspect high concentration samples and it exhibits the same carryover profile after a comparable concentration must be considered suspect and rerun for confirmation.

11.11.4 In some cases, several instrument blanks may have to be run to eliminate contamination from over loaded samples.

11.11.5 The analytical system is considered free of carryover, when no target analytes can be detected above the MDL.

11.12 Selected Ion Monitoring (SIM) Option

11.12.1 Instrument Set-Up: Modify the method for SIM analysis and define ion groups with retention times, ions and dwell times to include base peak ion for the target compounds of interest, surrogates, and internal standards (Table 2a.) Select a mass dwell time of 50 milliseconds for all compounds.

11.12.2 Calibration: Calibrate the mass spectrometer in the selected ion monitoring mode using 9 calibration standards of 0.2, 0.3, 0.4, 1, 2, 5, 10, 20, and 50 ug/l. Spike each standard with the SIM specific internal standard solution at 4ug/ml. Calculate individual response factors and response factor RSDs. The initial calibration must meet the criteria in section 10.2.10.

11.12.3 Initial Calibration Verification. Verify the initial calibration after its completion using a 50 ug/l calibration standard purchased or prepared from a second standards reference materials source. The initial calibration verification must meet the criteria of Section 10.3.

11.12.4 Continuing Calibration Verification. Verify the initial calibration every 12 hours using a 50 ug/l calibration. The continuing calibration verification must meet the criteria of Section 10.4.

11.12.5 Surrogate Standard Calculation. Report surrogate spike accuracy for the surrogates spiked for the full scan GC/MS analysis.

12.0 QUALITY CONTROL

12.1 QC Requirements Summary

BFB	Beginning of the analytical shift and every 12 hours
ICV - Second Source Calibration Check Standard	Following initial calibration
Calibration Verification Standard	Every 12 hours
Method Blank	Every 12 hours
Blank Spike	One per analytical batch*
Matrix Spike	One per analytical batch*
Matrix Spike Duplicate	One per analytical batch*
Surrogate	Every sample and standard
Internal Standard	Every sample and standard

*The maximum number of samples per analytical batch is twenty.

12.2 Daily GC/MS Performance Check - BFB

12.2.1 Refer to Section 11.3.

12.3 Second Source Calibration Check Standard

12.3.1 Refer to Section 10.3.

12.3.2 Calibration Verification Standard

12.3.3 Refer to Section 10.4.

12.4 Method Blank

12.4.1 Refer to Section 11.5

12.5 Blank Spike

12.5.1 Refer to Section 11.6

12.6 Matrix Spike (MS)/Matrix Spike Duplicate (MSD)

12.6.1 One sample is selected at random from each analytical batch of similar matrix types and spiked in duplicate to check precision and accuracy.

12.6.2 Assess the matrix spike recoveries (Section 13.5) and relative percent difference (RPD) (Section 13.6) against the control limits.

12.6.3 If the matrix spike recoveries do not meet the criteria, check the blank spike recovery to verify that the method is in control. If the blank spike did not meet criteria, the method is out of control for the parameter in question and must be reanalyzed or qualified with an estimate of potential bias. Otherwise, matrix interference is assumed and the data is reportable. No further corrective action is required.

12.7 Surrogates

12.7.1 All standards, blanks, samples, and matrix spikes contain surrogate compounds, which are used to monitor method performance. If the recovery of any surrogate compound does not meet the control limits, the result must be flagged and:

12.7.1.1 The calculation must be checked.

12.7.1.2 The sample must be reanalyzed if the recovery of any one surrogate is out of control limit.

12.7.2 If the sample exhibits matrix interference, defined as excessive signal levels from target or non-target interfering peaks. In this case, reanalysis may not be required following team leader/manager approval.

12.7.3 If surrogate recoveries are acceptable upon reanalysis, the data from the reanalysis is reported. If the reanalysis date did not meet the hold time, then both sets of data must be submitted with the reanalysis reported.

12.7.4 If surrogates are still outside control limits upon reanalysis, then both sets of data must be submitted with the first analysis reported.

12.8 Internal Standard

12.8.1 Retention time for all internal standards must be within ± 30 seconds of the corresponding internal standard in the latest continuing calibration or 50 μg/l standard of initial calibration

12.8.2 The area (Extracted Ion Current Profile) of the internal standard in all analyses must be within 50 to 200 % of the corresponding area in the latest calibration standard (12 hr. time period).

12.8.3 If area of internal standard does not meet control limits, the calculations must be checked. If a problem is not discovered, the sample must be reanalyzed.

12.8.4 If areas are acceptable upon reanalysis, the reanalysis data is reported.

12.8.5 If areas are unacceptable upon reanalysis, then both sets of data are submitted with the original analysis reported.

13.0 CALCULATION

13.1 Response Factor (RF)

$$RF = \frac{As \times Cis}{Ais \times Cs}$$

where:
As = Area of the characteristic ion for the compound being measured.
Ais = Area of the characteristic ion for the specific internal standard.
Cs = Concentration of the compound being measured (ug/l).
Cis = Concentration of the specific internal standard (ug/l).

13.2 Percent Relative Standard Deviation (% RSD)

$$\%RSD = \frac{SD}{RFav} \times 100$$

where:
SD = Standard Deviation
RFav = Average response factor from initial calibration.

13.3 Percent Difference (%D)

$$\%D = \frac{(RFav - RFcv)}{RFav} \times 100$$

where:
RFcv = Response factor from Calibration Verification standard.
RFav = Average response factor from initial calibration.

13.4 Concentration (Conc.)

For water:

$$\text{Conc. } (\mu g/l) = \frac{Ac \times Cis \times Vp}{Ais \times RF \times Vi}$$

For soil/sediment low level (on a dry weight basis):

$$\text{Conc. } (\mu g/kg) = \frac{Ac \times Cis \times Vp}{Ais \times RF \times Ws \times M}$$

For soil/ sediment medium level (on a dry weight basis)

$$\text{Conc. } (\mu g/kg) = \frac{Ac \times Cis \times Vp \times Vt}{Ais \times RF \times Vme \times Ws \times M}$$

Where:
Ac = Area of characteristic ion for compound being measured.
Ais = Area of characteristic ion for internal standard.
Cis = Concentration of internal standard
RF = Response factor of compound being measured(from initial calibration)
Vi = Initial volume of water purged (ml)
Vp = 5 ml (Total Purge Volume)
Vme = Volume of Methanol aliquot
Vt = Ml Solvent + ((100-% solid)/100 x Ws)
Ws = Weight of sample extracted (g).
M = (100 - % moisture in sample) / 100 or % solids / 100

13.5 Percent Recovery (% R)

$$\%\ R = \frac{\text{Concentration found}}{\text{Concentration spiked}} \times 100$$

13.6 Relative Percent Difference (RPD)

$$RPD = \frac{|MSC - MSDC|}{(1/2)(MSC+MSDC)} \times 100$$

Where:
MSC = Matrix Spike Concentration
MSDC = Matrix Spike Duplicate Concentration

13.7 Linear regression by the internal standard technique.

$$C_s = \left(\frac{\frac{A_s}{A_{is}} - b}{a} \right) \times C_{is}$$

Where:
Cs = concentration of target analyte
As = Area of target analyte
Cis = concentration of the internal standard
b = Intercept
a = slope of the line

$$a = \frac{N \Sigma xy - \Sigma x \Sigma y}{N \Sigma x^2 - (\Sigma x)^2}$$

$$b = \frac{\Sigma y - a \Sigma x}{N}$$

N = number of points
x = amount of analyte
y = response of instrument

13.8 Correlation Coefficient

$$r = \frac{\Sigma(x - \bar{x})(y - \bar{y})}{\sqrt{\Sigma(x - \bar{x})^2 \Sigma(y - \bar{y})^2}}$$

Where r = correlation coefficient
x = amount of analyte
y = response of instrument

$\bar{x}$ = average of x values

$\bar{y}$ = average of y values

13.9 Quadratic curve with internal standard technique

$$Cs = \frac{-b \pm \sqrt{b^2 - 4a\left(c - \frac{A_s \times C_{is}}{A_{is}}\right)}}{2a}$$

Where:
Cs = concentration of target analyte

As = Area of target analyte
Cis = concentration of the internal standard
b = Intercept
a = slope of the line

14.0 DOCUMENTATION

14.1 The Analytical Logbook. The logbook must be completed by the analyst daily. Each instrument will have a separate logbook. The daily sequence must be recorded in the logbook by giving a file number to every instrument standard, QC, and samples in appropriate spaces. The files must be never overwritten or skipped intentionally. In case where the file is skipped or overwritten, a thorough explanation must be documented in the notes section. Upon completion, every analytical batch must be reviewed and signed by a supervisor/team lead. Supervisor signature indicates all documentation was performed correctly.

14.1.1 If samples or blank spike require reanalysis, a brief explanation of the reason and corrective action must be documented in the Comments section.
14.1.2 If maintenance was done on the instrument in order to pass the CCV or any other reason, the analyst must document it in the logbook.

14.2 Standards Preparation Logbook must be completed for all standard preparations. All information must be completed; the page must be signed and dated by the appropriate person.

14.2.1 The Accutest lot number must be cross-referenced on the standard vial.

14.3 Instrument Maintenance Logbook must be completed when any type of maintenance is performed on the instrument. Each instrument has a separate log.

14.4 Any corrections to laboratory data must be done using a single line through the error. The initials of the person and date of correction must appear next to the correction.

14.5 Supervisory personnel must review and sign all laboratory logbooks monthly to ensure that information was recorded properly. Additionally, the instrument maintenance logbooks and the accuracy of the recorded information must also be verified and signed off on the first page of the logbook quarterly by a supervisor/team lead.

14.6 Acrolein and Acrylonitrile data reported from a preserved sample must be footnoted: “Results reported from the HCl preserved sample. This reported result can only be used for screening purposes for Acrolein and Acrylonitrile.” Any samples analyzed form an unpreserved vial must be footnoted stating samples were unpreserved and analyzed within 7 days.

15.0 POLLUTION PREVENTION & WASTE MANAGEMENT

15.1 Users of this method must perform all procedural steps in a manner that controls the creation and/or escape of wastes or hazardous materials to the environment. The amounts of standards, reagents, and solvents must be limited to the amounts specified in this SOP. All safety practices designed to limit the escape of vapors, liquids or solids to the environment

must be followed. All method users must be familiar with the waste management practices described in section 15.2.

15.2 Waste Management. Individuals performing this method must follow established waste management procedures as described in the waste management SOP, EHS004. This document describes the proper disposal of all waste materials generated during the testing of samples as follows:

15.2.1 Non hazardous aqueous wastes

15.2.2 Hazardous aqueous wastes

15.2.3 Chlorinated organic solvents

15.2.4 Non-chlorinated organic solvents

15.2.5 Hazardous solid wastes

15.2.6 Non-hazardous solid wastes

Table 1 TARGET COMPOUNDS		
Acetone	1,4-Dichlorobenzene	Methylene Bromide
Acetonitrile	Dichlorodifluoromethane	Methylene Chloride
Acrolein	1,1-Dichloroethane	1-Methylnaphthalene
Acrylonitrile	1,2-Dichloroethane	2-Methylnaphthalene
Allyl Chloride	1,1-Dichloroethene	Naphthalene
Benzene	cis-1,2-Dichloroethene	2-Nitropropane
Benzyl chloride	trans-1,2-Dichloroethene	Pentachloroethane
Bromobenzene	1,2-Dichloropropane	Propionitrile
Bromochloromethane	1,3-Dichloropropane	Propyl Acetate
Bromodichloromethane	2,2-Dichloropropane	n-Propylbenzene
Bromoform	1,1-Dichloropropene	Styrene
Bromomethane	cis-1,3-Dichloropropene	Tert Butyl Alcohol
2-Butanone (MEK)	trans-1,3-Dichloropropene	tert-Amyl Methyl Ether
Butyl Acetate	1,4-Dioxane	tert-Butyl Ethyl Ether
n-Butyl Alcohol	Epichlorohydrin	1,1,1,2-Tetrachloroethane
n-Butylbenzene	Ethyl Acetate	1,1,2,2-Tetrachloroethane
sec-Butylbenzene	Ethyl Ether	Tetrachloroethene
tert-Butylbenzene	Ethyl Methacrylate	Tetrahydrofuran
Carbon Disulfide	Ethylbenzene	Toluene
Carbon Tetrachloride	p-Ethyltoluene	trans-1,4-Dichloro-2-Butene
Chlorobenzene	Freon 113	1,2,3-Trichlorobenzene
Chlorodifluoromethane	Heptane	1,2,4-Trichlorobenzene
Chloroethane	Hexachlorobutadine	1,1,1-Trichloroethane
2-Chloroethyl Vinyl Ether	Hexachloroethane	1,1,2-Trichloroethane
Chloroform	Hexane	Trichloroethene
Chloromethane	2-Hexanone	Trichlorofluoromethane
Chloroprene (2-chloro-1,3-butadiene)	Iodomethane (Methy iodide)	1,2,3-Trichloropropane
o-Chlorotoluene	IsoAmyl Alcohol	1,2,4-Trimethlylbenzene
p-Chlorotoluene	Isobutyl Alcohol	1,3,5-Trimethylbenzene
Cyclohexane	Isopropyl Acetate	2,2,4 Trimethylpentane
Cyclohexanone	Isopropylbenzene	Vinyl Acetate
di-Isobutylene	p-Isopropyltoluene	Vinyl Chloride
di-Isopropyl Ether	Methacrylonitrile	Vinyltoluene
1,2-Dibromo-3-Chloropropane	Methyl Acetate	m,p-Xylene
Dibromochloromethane	3 Methyl-1-Butanol	o-Xylene
1,2-Dibromoethane	Methyl Tert Butyl Ether	Ethanol
Dibromomethane	Methylcyclohexane	Methyl Acrylate
1,2-Dichlorobenzene	Methyl Methacrylate	1-chloro-1,1-difluoroethane
1,3-Dichlorobenzene	4-Methyl-2-pentanone (MIBK)	1,1,1-trifluoroethane
1,1-dichloro-1-fluroethane	2,2-Dichloropropane	1,3-Butadiene
3,3-Dimethyl-1-Butanol	Tert-Butyl Formate	Tert-amyl alcohol
2-methylnaphthalene		

Table 2 RECOMMENDED OPERATING CONDITION	
Gas Chromatograph/ Mass Spectrometer	
Carrier Gas (linear velocity)	Helium at *30 cm/sec
Mass range	35 – 300 amu
Electron Energy	70 volts (nominal)
Scan time	not to exceed 2 sec. per scan
Injection port temperature	200 - 225 °C
Source temperature	200 - 250 °C
Transfer line temperature	220 - 280 °C
Analyzer temperature	220 - 250 °C
Gas Chromatograph temperature program*	
Initial temperature	*40 °C
Time 1	*3 minutes
Column temperature rate	*8 degrees/min.
Final temperature	*220 °C.- 240 °C
Total run time	*25 – 50 mins
Purge and Trap Device	
Purge time	9 min. (at 40 °C for low-level soil) SIM – 6 min @ 80 °C
Desorb**	1 min. at 190 °C
Bake	>10 min. at 210 °C
Transfer line	100 - 130 °C
Valve temperature	approx. transfer line temperature

* Parameter modification allowed for performance optimization provided operational and QC criteria is achieved.(must be approved by team leader/manager)

** Desorb time may require performance optimum between 0.5 and 4.0 minutes as dictated by trap manufacturers specifications or instrument characteristics

Table 2a SIM Group Parameters		
Group No.	**Retention Time (minutes)**	**Ions**
1	0 – 10.8	58, 65, 66, 88
2	10.8 – 16.0	95, 174, 176, 96,64

Table 3 BFB KEY IONS AND ION ABUNDANCE CRITERIA	
Mass	**Ion Abundance Criteria**
50	15-40% of mass 95
75	30-60% of mass 95
95	Base peak, 100% relative abundance
96	5-9% of mass 95
173	< 2% of mass 174
174	> 50% of mass 95
175	5-9% of mass 174
176	>95% and <101% of mass 174
177	5-9% of mass 176

Table 4 INTERNAL STANDARD QUANTITION IONS	
Internal Standard	**Primary/Secondary Ions**
1,4-Difluorobenzene	114 / 63,88
Chlorobenzene-d5	117 / 82, 119
Pentafluorobenzene	168
1,4-Dichlorobenzene-d4	152 / 115, 150
Tert Butyl Alcohol-d9	65/66
Internal Standard (SIM)	
4-BFB	95/174,176

Table 5 SURROGATE QUANTITION IONS	
Surrogate Compound	**Primary/Secondary Ions**
1,2 Dichloroethane – d_4	102
Dibromofluoromethane	113
Toluene-d8	98
4-Bromofluorobenzene	95 / 174, 176
1,4-dioxane-d8	96, 64

Table 6 - Intentionally removed.

Table 7 Volatile Internal Standards with Corresponding Analytes Assigned for Quantitation					
Analyte	**Primary Characteristic Ion**	**Secondary Characteristic Ion (s)**	**Analyte**	**Primary Characteristic Ion**	**Secondary Characteristic Ion (s)**
Tert Butyl Alcohol-d9	65		Dibromomethane	93	95, 174
Tert Butyl alcohol	59	57	Di-isobutylene	57	
Ethanol	45	46	Epichlorohydrin (pp)	57	57, 49, 62, 51
1,4-Dioxane (pp)	88	58,43,57	Heptane	57	
Pentafluorobenzene	168		Methyl cyclohexane	83	
1,1,1-Trichloroethane	97	99, 61	Methyl methacrylate	100	69, 41, 39
1,1-Dichlorethane	63	65, 83	n-Butanol (pp)	56	41
1,1-Dichloroethene	96	61, 63	Propyl Acetate	43	
2,2-Dichloropropane	77	97	tert Amyl Methyl Ether	73	
2-Butanone (pp)	72	43, 72	Trichloroethene	95	97, 130, 132
Acetone (pp)	58	43	**Chlorobenzene-d5**	117	82,119
Acetonitrile (pp)	41	41, 40, 39	1,1,1,2-Tetrachloroethane	131	133, 119
Acrolein (pp)	56	55,58	1,3-Dichloropropane	76	78
Acrylonitrile (pp)	53	52, 51	Bromoform	173	175, 254
Allyl Chloride	76	41	Butyl Acetate	56	
Bromochloromethane	128	49, 130	Chlorobenzene	112	77, 114
Bromomethane	94	96	Dibromochloromethane	129	127
Carbon disulfide	76	78	Ethylbenzene	91	106
Carbon tetrachloride	117	119	m-Xylene	106	91
Chlorodifluouromethane	51	86	o-Xylene	91	106
Chloroethane	64	66	3,3-Dimethyl-1-Butanol	57	69
Chloroform	83	85	p-Xylene	106	91
Chloromethane	50	52	Styrene	104	78
Chloroprene	53	53, 88, 90, 51	Ethyl methacrylate	69	69, 41, 99, 86, 114
cis-1,2-Dichloroethene	96	61, 98	Toluene	92	91
Cyclohexane	84		**Toluene-d_8 (S)**	98	
Dibromofluoromethane (S)	113		Tetrachloroethene	164	129,131,166
Dichlorodifluoromethane	85	87	Cyclohexanone	55	
1,1-Dichloropropene	75	110, 77	2-Hexanone (pp)	58	43, 57, 100
Diethyl ether	74	45, 59	trans-1,3-Dichloropropene	75	77, 39
1,3-Butadiene	54		**1,4 Dichlorobenzene-d4**	152	115,150
Diisopropyl ether	45	102	1,1,2,2-Tetrachloroethane	83	131, 85
Ethyl acetate (pp)	45	43, 88, 61	1,2,3-Trichlorobenzene	180	182, 145

Table 7 Volatile Internal Standards with Corresponding Analytes Assigned for Quantitation

Analyte	Primary Characteristic Ion	Secondary Characteristic Ion (s)	Analyte	Primary Characteristic Ion	Secondary Characteristic Ion (s)
Ethyl tert Butyl Ether	59		1,2,3-Trichloropropane	110	77,75
Hexane	56		1,2,4-Trichlorobenzene	180	182, 145
Isopropyl acetate	87	43	1,2,4-Trimethylbenzene	105	120
Tert-Amyl alcohol	59	73,55	1,2-Dibromo-3-chloropropane(pp)	157	155, 75
Freon 113	151		1,2-Dichlorobenzene	146	111,148
Iodomethane	142	127, 141	1,3,5-Trimethylbenzene	105	120
Isobutyl alcohol (pp)	43	43, 41, 42, 74	1,3-Dichlorobenzene	146	111, 148
Methacrylonitrile (pp)	67	41, 39, 52, 66	1,4-Dichlorobenzene	146	111, 148
Methyl Acetate	43	74	2-Chlorotoluene	126	91
Methylene chloride	84	86, 49	**4-Bromofluorobenzene (S)**	95	174, 176
Methyl-t-butyl ether	73	57	2-methylnaphthalene	142	141,115,143
Propionitrile (ethyl cyanide)(pp)	54	54, 52, 55, 40	Dibromofluoromethane		
Tetrahydrofuran	71	42	4-Chlorotoluene	91	126
trans-1,2-Dichloroethene	96	61, 98	Benzyl chloride	91	91, 126, 65, 128
Trichlorofluoromethane	101	151, 153	Bromobenzene	156	77, 158
Vinyl acetate	86	43	Hexachlorobutadiene	225	223, 227
Vinyl chloride	62	64	Hexachloroethane (pp)	201	166, 199, 203
Methyl Acrylate	85	55	Isopropylbenzene	105	120
Tert-Butyl Formate	59	57, 41	Naphthalene	128	-
1-chloro-1, 1-difluoroethane	65	45,85	n-Butylbenzene	92	91, 134
1,1,1-trifluoroethane	69	69,45	n-Propylbenzene	91	120
1,1-dichloro-1-fluroethane	81	45,61	Pentachloroethane (pp)	167	167,130,132,165,169
2,2-Dichloropropane	77	97,79	p-isopropyltoluene	119	134,91
1,4 Difluorobenzene	114	63, 88	sec-Butylbenzene	105	134
1,1,2-Trichloroethane	83	97, 85	tert-Buytlbenzene	119	91, 134
1,2-Dibromoethane	107	109, 188	trans-1,4-Dichloro-2-butene (pp)	53	88, 75
1,2 Dichloroethane	62	98			
1,2 Dichloropropane	63	112	**(pp) = Poor Purging Efficiency**		
2,2,4 Trimethylpentane	57		(S)=Surrogate		
2-Chloroethyl-vinylether (pp)	63	65, 106			
Dichloroethane-d_4 (S)	65	102			
2-Nitropropane	46	-			
3 Methyl –1 butanol	70	55			
4-Methyl-2-pentanone (pp)	58	43, 85, 100			
Benzene	78	-			
Bromodichloromethane	83	85, 127			
cis-1,3-Dichloropropene	75	77, 39			
Methylcyclohexane	83				

Table 7-1 SIM - Volatile Internal Standards with Corresponding Analytes Assigned for Quantitation

Analyte	Primary Characteristic Ion	Secondary Characteristic Ion (s)
4-BFB	95	174, 176
1,4-Dioxane	88	58
1,4-dioxane-d8	96	64

Table 8 STANDARDS PREPARATION

A) Internal standard and Surrogate mixtures:

	a) 25/250 μg/ml	b) 250/2,500 μg/ml
Internal Standard Mixture (2,000 μg/ml)	1.25 ml	1 .25 ml
Tert Butyl Alcohol-d_9 (50,000 μg/ml)	0.5 ml	0.5 ml
Surrogate Mixture (2,500 μg/ml)	1 ml	1 ml
Methanol	97.25 ml	7.25 ml
Total	100 ml	10 ml

- 25/250 μg /ml internal standard and surrogate mixture: The mixture is prepared by measuring 1.25ml of 2,000 μg /ml Internal Standard Mixture (Ultra or equivalent), 0.5 ml of 50,000 μg/ml TBA-d_9 (Absolute or equivalent), 1 ml of 2,500 μg /ml Method 8260A Surrogate Standard Mixture (Ultra or equivalent) and bringing to 100 ml with methanol.

- 250/2,500 μg /ml internal standard and surrogate mixture: The mixture is prepared by measuring 1.25 ml of 2,000 μg /ml Internal Standard Mixture (Ultra or equivalent), 0.5 ml of 50,000 μg/ml TBA-d_9 (Absolute or equivalent), 1 ml of 2,500 μg /ml Method 8260A Surrogate Standard Mixture (Ultra or equivalent) and bringing to 10 ml with methanol.

- 100 μg/ml surrogate mixture: The solution is prepared at 100 μg/ml by measuring 0.4 ml of 2,500 μg/ml Method 8260A Surrogate Standard Mixture (Ultra or equivalent) and bringing to 10 ml with methanol.

- 25/250 μg /ml internal standard mixture: The solution is prepared by measuring 1.25 ml of 2,000 μg /ml Internal Standard Mixture (Ultra or equivalent), 0.5 ml of 50,000 μg/ml TBA-d_9 (Absolute or equivalent), and bringing to 100 ml with methanol.

- 250/2,500 μg /ml internal standard mixture: The solution is prepared by measuring 1.25 ml of 2,000 μg /ml Internal Standard Mixture (Ultra or equivalent), 0.5 ml of 50,000 μg/ml TBA-d_9 (Absolute or equivalent), and bringing to 10 ml with methanol.

B) Bromofluorobenzene (BFB):

	a) 25 μg/ml	b)) 250 μg/ml
BFB (25,000 μg/ml)	0.1 ml	0.1 ml
Methanol	99.9 ml	9.9 ml
Total	100 ml	10 ml

- 25 μg /ml solution for direct injection: The BFB is prepared at 25 μg /ml by measuring 0.1 ml of 25,000 μg /ml (Absolute Stock or equivalent) and diluting to 100 ml with methanol.

- 250 μg /ml solution for purging: The BFB is prepared at 250 μg /ml by measuring 0.1 ml of 25,000 μg /ml (Absolute Stock or equivalent) and diluting to 10 ml with methanol.

Table 8 STANDARD PREPARATION (Continued)
C) Secondary dilution standards:

2nd Dilution Standards	Stock Solution	Concentration (µg/ml)	Volume Added (µl)	Final Volume in Methanol (ml)	Final Concentration (µg/ml)
V8260 Mixture	EPA Method 524.2 Volatiles	2,000	2,500	50	100
	Acrolein	Neat (90%)	66.2		1,000
	Acrylonitrile*	Neat	25		500+
	Propionitrile**	Neat	58.9		1,000++
	Di-iso Butylene	Neat	7.1		100
	Cyclohexane	Neat	6.5		100
	Cyclohexanone	Neat	52.9		1,000
V8260 Custom Mixture	Custom Volatiles Mix A	2,000	2,500	50	100
	Custom Volatiles Mix B	2,000 -100,000	2,500		100 - 5,000
	Epichlorohydrin	Neat	21.4		500
	Iso-Amyl alcohol	Neat	125		2,000
	2-Chloroethyl vinyl ether	Neat	20.1		500
	Ethyl tert-butyl ether	Neat	6.8		100
	Tert-Amyl methyl ether	Neat	6.56		100
	Benzyl chloride	Neat	4.6		100
Gas Mixture	VOC Gas Mixture	2,000	1,000	20	100
Ketones Mixture (water samples)	Acetone, 2-Butanone, MIBK, 2-Hexanone	Neat	23.5 ml	50	400
Ketones Mixture (soil samples)	Acetone, 2-Butanone, MIBK, 2-Hexanone	Neat	7.6 ml	20	300

- 100 µg /ml V8260 mixture: The mixture is prepared at 100 µg /ml by measuring 2 ml of 2,000 µg /ml EPA Method 524.2 Volatiles stock standard, appropriate amount of some neat compounds, and bringing to 50 ml with methanol.
  * Acrylonitrile = 400 µg /ml (Neat) + 100 µg /ml (EPA Method 524.2 Volatiles)
  ** Propionitrile = 900 µg /ml (Neat) + 100 µg /ml (EPA Method 524.2 Volatiles)

- 100 µg /ml V8260 custom mixture: The mixture is prepared at 100 - 5,000 µg /ml by measuring 2.5ml of 2,000 µg /ml Custom Volatiles Mix A, 2.5 ml of 2,000 - 100,000 µg/ml Custom Volatiles Mix B, appropriate amount of some neat compounds, and bringing to 50 ml with methanol.

- 100 µg /ml gas mixture ***: The mixture is prepared at 100 µg /ml by measuring 1 ml of 2,000 µg /ml stock standard and bring to 20 ml with methanol.
  ******* Gas mixture must be prepared weekly.

Table 8 STANDARD PREPARATION (Continued)

D).1 Initial Calibration Standards: using DI water bring to 50 ml final volume for the 1 -400 ppb standards and 500 ml for the 0.2 and 0.5 ppb standards: All mixtures used must be **secondary dilution** standards at **100 ppm**. Note: Larger volumes may be prepared if needed i.e. if 100 ml final volume is used the volume of the standard added would be doubled.

Standard and Surrogate Concentration	V8260 Mix (100 ppm)	V8260 Custom Mix (100 ppm)	Gas compound Mix (100 ppm)	Surrogate Mix when added manually (100ppm)	Ketones Mix for soil matrix (300 ppm)	Ketones Mix for water matrix (400 ppm)
0.2 ppb	1.0 µl	1.0 µl	1.0 µl	1.0 µl#	1.0 µl	1.0 µl
0. 5 ppb	2.5 µl	2.5 µl	2.5 µl	2.5 µl#	2.5 µl	2.5 µl
1 ppb	0.5 µl	0.5 µl	0.5 µl	0.5 µl#	0.5 µl	0.5 µl
2 ppb *	1.0 µl	1.0 µl	1.0 µl	1.0 µl#	1.0 µl	1.0 µl
4 ppb *	2.0 µl	2.0 µl	2.0 µl	2.0 µl#	2.0 µl	2.0 µl
5 ppb	2.5 µl	2.5 µl	2.5 µl	2.5 µl#	2.5 µl	2.5 µl
8 ppb *	4.0 µl	4.0 µl	4.0 µl	4.0 µl#	4.0 µl	4.0 µl
10 ppb *	5 µl	5 µl	5 µl	5 µl#	5 µl	5 µl
20 ppb	10 µl	10 µl	10 µl	10 µl#	10 µl	10 µl
50 ppb	25 µl	25 µl	25 µl	25 µl#	25 µl	25 µl
100 ppb	50 µl	50 µl	50 µl	50 µl#	50 µl	50 µl
200 ppb	100 µl	100 µl	100 µl	100 µl#	100 µl	100 µl
300 ppb *	150 µl	150 µl	150 µl	150 µl#	150 µl	150 µl
400 ppb *	200 µl	200 µl	200 µl	200 µl#	200 µl	200 µl

* depending upon the instrument.
\# See Section 10.2.2.1 for correction factor.

- When calibrating for Method 5035 low-level soil samples, add 1g of sodium bisulfate to the 40-ml vial before aliquot 5 ml of each standard into vial if applicable. This is equivalent to the amount of sodium bisulfate added to the samples and will maintain a consistent purging efficiency of the compounds.

D).2 Initial Calibration Standards for 1,4-Dioxane using SIM

Standard / Surrogate Concentration (ppb)	1,4-Dioxane Solution (100ppm)	DI Water – Final Volume (ml)
0.4	0.4 µl	100
2	2 µl	100
5	5 µl	100
25	25 µl	100
50	25 µl	50
100	50 µl	50
200	100 µl	50
400	200 µl	50

Table 8 STANDARD PREPARATION (Continued)

E) Continuing Calibration Standard: using DI water bring to 50 ml final volume: All mixtures used are secondary dilution standards at 100 ppm.

Concentration	V8260 Mix (100 ppm)	V8260 Custom Mix (100 ppm)	Gas compound Mix (100 ppm)	Ketones Mix for water matrix(400 ppm)	Ketones Mix for soil matrix (300 ppm)
50 ppb	25 µl	25 µl	25 µl	25 µl	25 µl

- When calibrating for Method 5035 low-level soil samples, add 1g of sodium bisulfate to the 40-ml vial before aliquot 5 ml of the continuing calibration standard into vial if applicable. This is equivalent to the amount of sodium bisulfate added to the samples and will maintain a consistent purging efficiency of the compounds.

F) Blank Spike (BS): using DI water bring to 50 ml final volume: All mixtures used are 100 ppm secondary dilution standards.

Concentration	V8260 Mix (100 ppm)	V8260 Custom Mix (100 ppm)	Gas compound Mix (100 ppm)	Ketones Mix for water matrix(400 ppm	Ketones Mix for soil matrix (300 ppm)
50 ppb	25 ul	25 ul	25 ul	25 µl	25 µl

For lower detection level required (test code: V8260LL)

Concentration	V8260 Mix (100 ppm)	V8260 Custom Mix (100 ppm)	Gas compound Mix (100 ppm)	Ketones Mix for water matrix(400 ppm	Ketones Mix for soil matrix (300 ppm)
20 ppb	10 ul	10 ul	10 ul	10 µl	10 µl

- When calibrating for Method 5035 low-level soil samples, add 1g of sodium bisulfate to the 40-ml vial before aliquot 5 ml of the blank spike into vial if applicable. This is equivalent to the amount of sodium bisulfate added to the samples and will maintain a consistent purging efficiency of the compounds.

Table 9 GUIDELINE FOR DILUTION PREPARATION
Water Sample

Dilution	Sample amount taken	Final volume A (volumetric)	Take from final volume A	Final volume B (volumetric)
1:2	25 ml	50 ml		
1:5	10 ml	50 ml		
1:10	5 ml	50 ml		
1:20	2.5 ml	50 ml		
1: 25	2 ml	50 ml		
1:50	1 ml	50 ml		
1:100	0.5 ml	50 ml		
1:200	250 µl	50 ml		
1:250	200 µl	50 ml		
1:500	100 µl	50 ml		
1:1000	50 µl	50 ml		
1:2000	25 µl	50 ml		
1:2500	20 µl	50 ml		
1:5000	10 µl	50 ml		
1:10000	0.5 ml	50 ml	0.5 ml	50 ml
1:20000	0.5 ml	50 ml	250 µl	50 ml
1:25000	0.5 ml	50 ml	200 µl	50 ml
1:50000	0.5 ml	50 ml	100 µl	50 ml
1:100000	0.5 ml	50 ml	50 µl	50 ml

Soil-Low level (Non-Encore sample)

Dilution	Sample amount taken	Final volume
1:2	2.5 gram	5 ml
1:5	1 gram	5 ml
1:10	0.5 gram	5 ml

Soil-medium level

Additional Dilution	Sample in Methanol amount taken	Final volume (volumetric)
1:1	1 ml	50 ml
1:2	0.5 ml	50 ml
1:5	200 µl	50 ml
1:10	100 µl	50 ml
1:20	50 µl	50 ml
1: 25	40 µl	50 ml
1:50	20 µl	50 ml
1:100	10 µl	50 ml
1:200	5 µl	50 ml
1:250	4 µl	50 ml
1:500	2 µl	50 ml

Table 10 REPORTING LIMITS

Compound	Water	Soil	Compound	Water	Soil
	µg/l	µg/kg		µg/l	µg/kg
Chlorodifluoromethane	5	5	Chloroform	1	5
Dichlorodifluoromethane	5	5	Freon 113	5	5
Chloromethane	1	5	Methacrylonitrile	10	10
Vinyl chloride	1	5	Butyl Acetate	5	5
Bromomethane	2	5	1,1,1-Trichloroethane	1	5
Chloroethane	1	5	Heptane	5	5
Trichlorofluoromethane	5	5	n-Propyl acetate	5	5
Ethyl ether	5	5	2-Nitropropane	10	10
Acrolein	50	50	Tetrahydrofuran	10	10
1,1-Dichloroethene	1	5	2-Chloroethyl Vinyl Ether	10	25
Tertiary butyl alcohol	25	25	n-Butyl alcohol	250	250
Acetone	10	10	Cyclohexane	5	5
Methyl acetate	5	5	Carbon Tetrachloride	1	5
Allyl chloride	5	5	1,1-Dichloropropene	5	5
Acetonitrile	100	100	Isopropyl Acetate	5	5
Iodomethane	2	5	Benzene	0.5	0.5
Iso-butyl alcohol	50	50	1,2-Dichloroethane	1	1
Carbon disulfide	2	5	Trichloroethene	1	5
Methylene chloride	2	5	Methyl methacrylate	10	10
Methyl tert butyl ether	1	1	1,2 Dichloropropane	1	5
Trans-1,2-Dichloroethene	1	5	Di-isobutylene	5	5
Di-isopropyl ether	5	5	Dibromomethane	5	5
2-Butanone	10	10	1,4 Dioxane	125	125
1,1-Dichloroethane	1	5	Bromodichloromethane	1	5
Hexane	5	5	cis-1,3-Dichloropropene	1	5
Chloroprene	5	5	4-Methyl-2-pentanone	5	5
Acrylonitrile	50	50	Toluene	1	1
Vinyl acetate	10	10	trans-1,3-Dichloropropene	1	5
Ethyl acetate	5	5	Ethyl methacrylate	10	10
2,2-Dichloropropane	5	5	1,1,2-Trichloroethane	1	5
Cis-1,2-Dichloroethene	1	5	2-Hexanone	5	5
Bromochloromethane	5	5	Cyclohexanone	50	200

Table 10 REPORTING LIMITS (Continued)

Compound	Water	Soil	Compound	Water	Soil
	µg/l	µg/kg		µg/l	µg/kg
Tetrachloroethene	1	5	4-Chlorotoluene	5	5
1,3-Dichloropropane	5	5	1,3,5-Trimethylbenzene	2	5
Dibromchloromethane	1	5	tert-Butylbenzene	5	5
1,2-Dibromoethane	1	1	1,2,4 Trimethylbenzene	2	5
Chlorobenzene	1	5	sec-Butylbenzene	5	5
1,1,1,2-Tetrachloroethane	5	5	1,3-Dichlorobenzene	1	5
Ethylbenzene	1	1	p-Isopropyltoluene	5	5
M,p-Xylene	1	1	1,4-Dichlorobenzene	1	5
o-Xylene	1	1	1,2-Dichlorobenzene	1	5
Styrene	5	5	n-Butylbenzene	5	5
Bromoform	4	4	1,2-Dibromo-3-choropropane	10	10
Isopropylbenzene	2	5	1,2,4-Trichlorobenzene	2	5
Bromobenzene	5	5	Hexachlorobutadiene	5	5
1,1,2,2-Tetrachloroethane	1	5	Naphthalene	5	5
Trans-1,4-Dichloro-2-butene	5	5	1,2,3-Trichlorobenzene	5	5
1,2,3-Trichloropropane	5	5	Epichlorohydrin	100	100
n-Proplybenzene	5	5	3-Methyl-1-butanol	5	5
2-Chlorotoluene	5	5	Hexachloroethane	5	5
Ethanol	100	200	Methyl Acrylate	5	--
Benzyl Chloride	5	5	Methylcyclohexane	5	5
2,2,4 Trimethylpentane	5	5	1,1,1 trifluoroethane Freon 143a	5	10
1-chloro-1,1-difluoroethane Freon 142b	5	10	1,1-dichloro-1-fluoroethane Freon 141b	5	5
1,3-Butadiene	5	5	3,3-Dimethyl-1-butanol	20	20
1.4-Dioxane (SIM)	2	5	2-methylnaphthalene	5	5
Tert-Butyl Formate	5	5	Tert-amyl alcohol	25	25

Table 11 COMPOUNDS THAT MAY EXHIBIT CARRYOVER

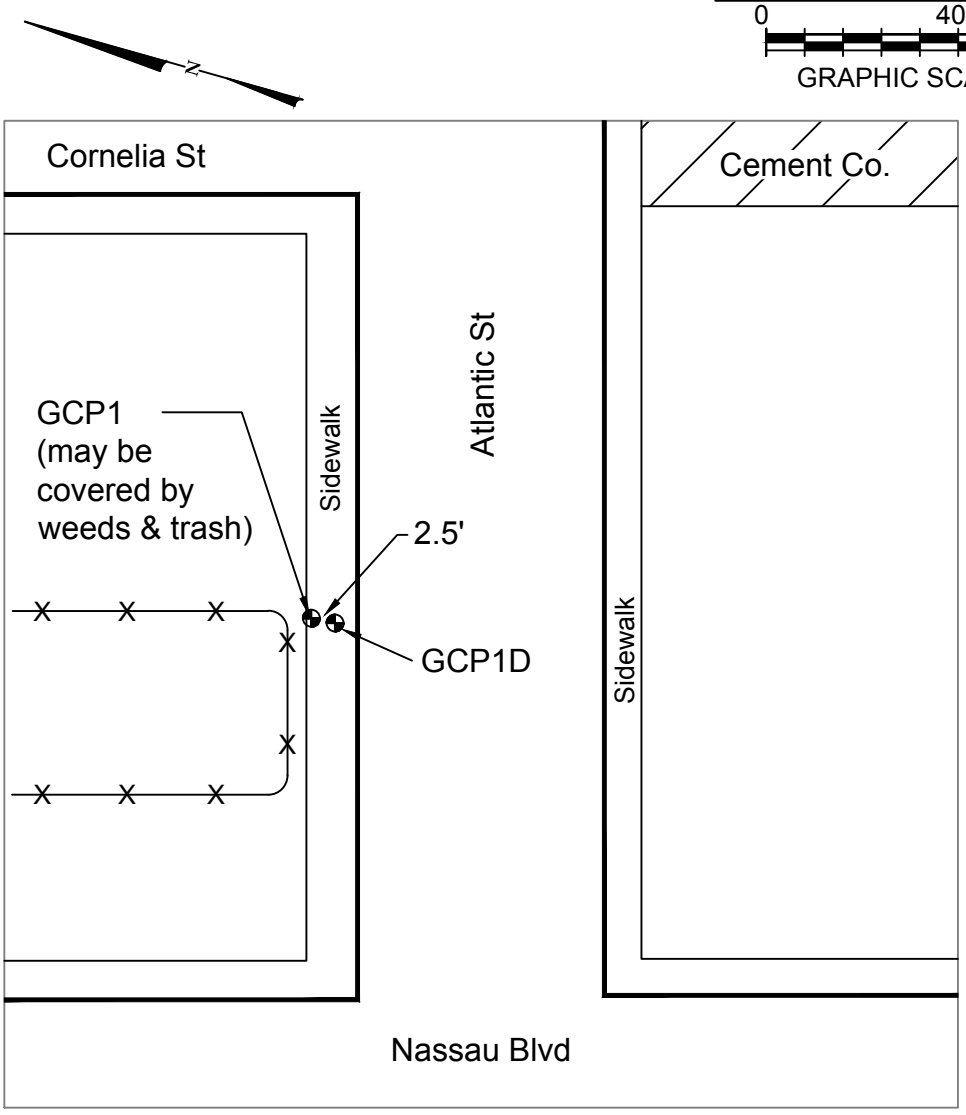
Compound
1,2,4-Trichlorobenzene
Hexachlorobutadiene
Naphthalene
1,2,3-Trichlorobenzene

Table 12 RECOMMENDED MINIMUM RELATIVE RESPONSE FACTOR CRITERIA FOR INITIAL AND CONTINUING CALIBRATION VERIFICATION

Compound	Minimum Response Factor	Typical Response Factor
Dichlorofluoromethane	0.100	0.327
Chloromethane	0.100	0.537
Vinyl chloride	0.100	0.451
Bromomethane	0.100	0.255
Chloroethane	0.100	0.254
Trichlorofuoromethane	0.100	0.426
1,1 Dichloroethene	0.100	0.313
Freon 113	0.100	0.302
Acetone	0.100	0.151
Carbon Disulfide	0.100	1.163
Methyl Acetate	0.100	0.302
Methylene chloride	0.100	0.380
trans-1,2 Dichloroethene	0.100	0.351
cis-1,2 Dichloroethene	0.100	0.376
Methyl tert-butyl Ether	0.100	0.847
1,1 Dichloroethane	0.200	0.655
2-Butanone	0.100	0.216
Chloroform	0.200	0.557
1,1,1 Trichloroethane	0.100	0.442
Cyclohexane	0.100	0.579
Carbon Tetrachloride	0.100	0.353
Benzene	.0.500	1.368
1,2 Dichloroethane	0.100	0.443
Trichloroethene	0.200	0.338
Methylcyclohexane	0.100	0.501
1,2-Dichloropropane	0.100	0.382
Bromodichloromethane	0.200	0.424
cis-1,3-Dichloropropene	0.200	0.537
trans-1,3 - Dichloropropene	0.100	0.515
4-Methyl-2-Pentanone	0.100	0.363
Toluene	0.400	1.577
1,1,2-Trichloroethane	0.100	0.518

Compound	Minimum Response Factor	Typical Response Factor
Tetrachloroethene	0.200	0.606
2-Hexanone	0.100	0.536
Dibromochloromethane	0.100	0.652
1,2 Dibromoethane	0.100	0.634
Chlorobenzene	0.500	1.733
Ethyl benzene	0.100	2.827
m,p-Xylene	0.100	1.080
o-Xylene	0.300	1.073
Styrene	0.300	1.916
Bromoform	0.100	0.413
Isopropylbenzene	0.100	2.271
1,1,2,2-Tetrachloroethane	0.300	0.782
1,3-Dichlorobenzene	0.600	1.408
1,4-Dichlorobenzene	0.500	1.427
1,2-Dichlorobenzene	0.400	1.332
1,2-Dibromom-3-chloropropane	0.050	0.129
1,2,4-Trichlorobenzene	0.200	0.806
1,3-Butadiene	0.100	0.250
3,3-Dimethyl-1-butanol	0.010	0.020
1,4-Dioxane (SIM)	0.010	0.286

ATTACHMENT D – Well Location Figures & Photos



Not To Scale

Wells GCP1 (N-10330) & GCP1D (no NYSDEC Well No.) are located North Side of Atlantic Ave in Garden City Park between Cornelia St and Nassau Blvd

TITLE

Groundwater Monitoring
Well Locations
GCP1 & GCP1D
Garden City Park, NY

PREPARED FOR

Genesco Inc.

Environmental Resources Management

FIGURE 1

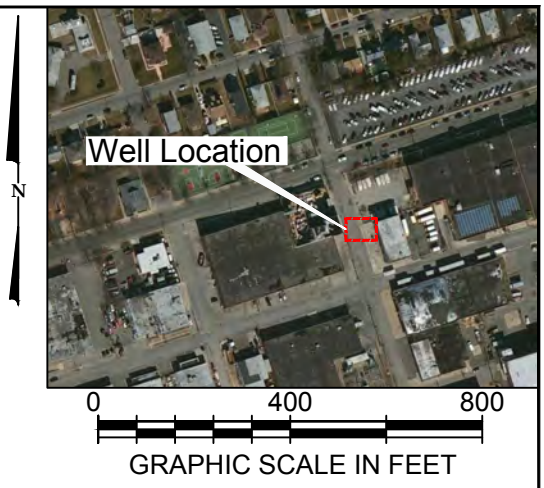
DRAWN BY	SCALE	DATE	JOB NO.
EMF	AS SHOWN	10/11/17	0097881.11

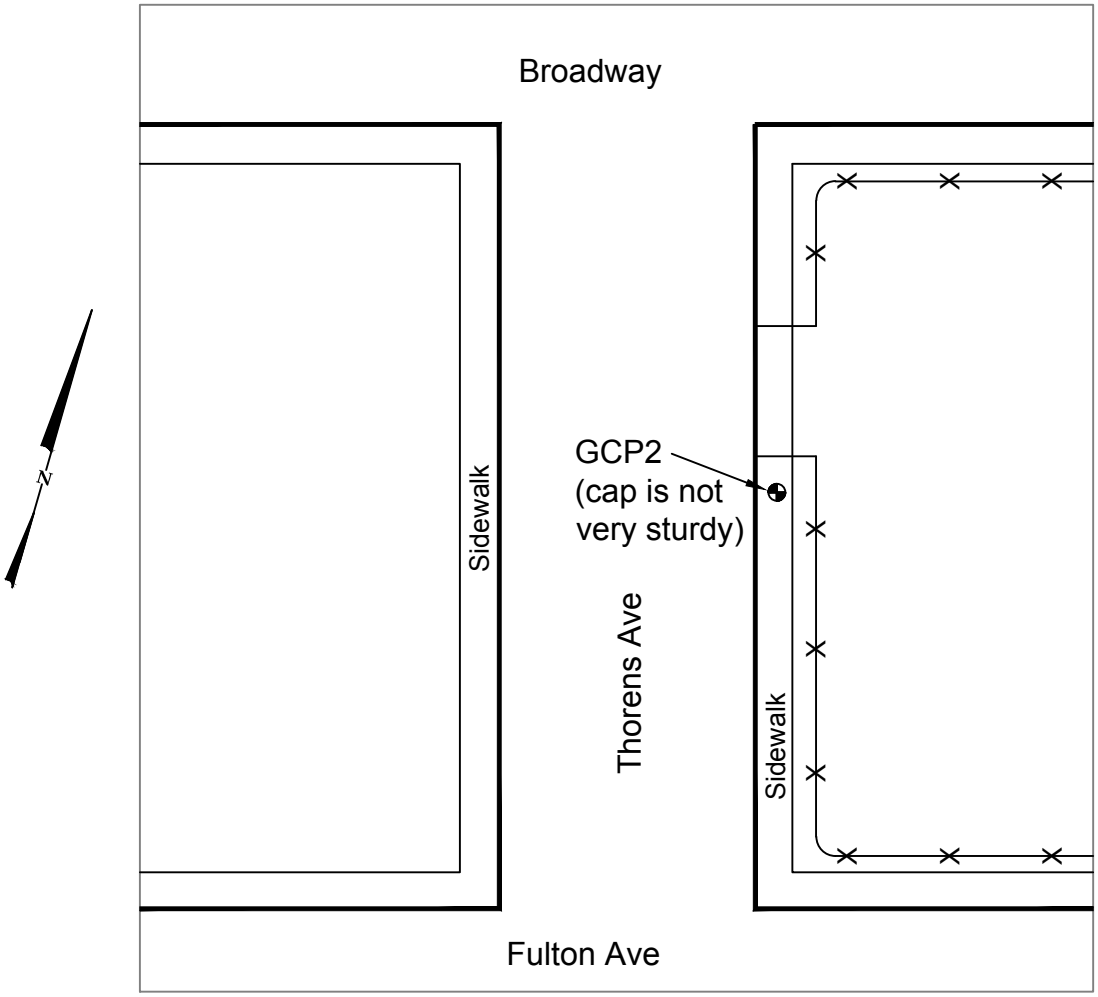
M:\Scout\Projects\GENESCO\150 Fulton Ave\NY\CAD\2017\2017-10 - Genesco - MW GCP1 (N-10330) & GCPD1D.dwg (12/11/2017 - 3:20pm Melville)

← North

GCP-1 (left) & GCP-1D (right)

Located on the north side of Atlantic Ave. between Cornelia and Nassau Blvd in Garden City Park.





Not To Scale

Well GCP2 (N-10331) is located at the East Side of Thorens Ave between Broadway and Fulton Ave in Garden City Park

TITLE

Groundwater Monitoring
Well Location
GCP2
Garden City Park, NY

PREPARED FOR

Genesco Inc.

Environmental Resources Management

FIGURE 2

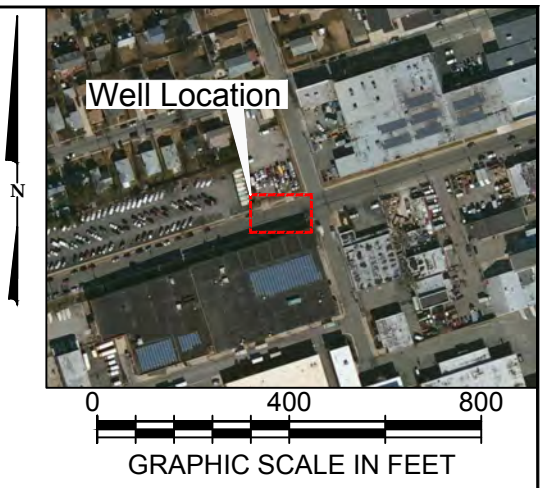
DRAWN BY	SCALE	DATE	JOB NO.
EMF	AS SHOWN	10/11/17	0097881.11

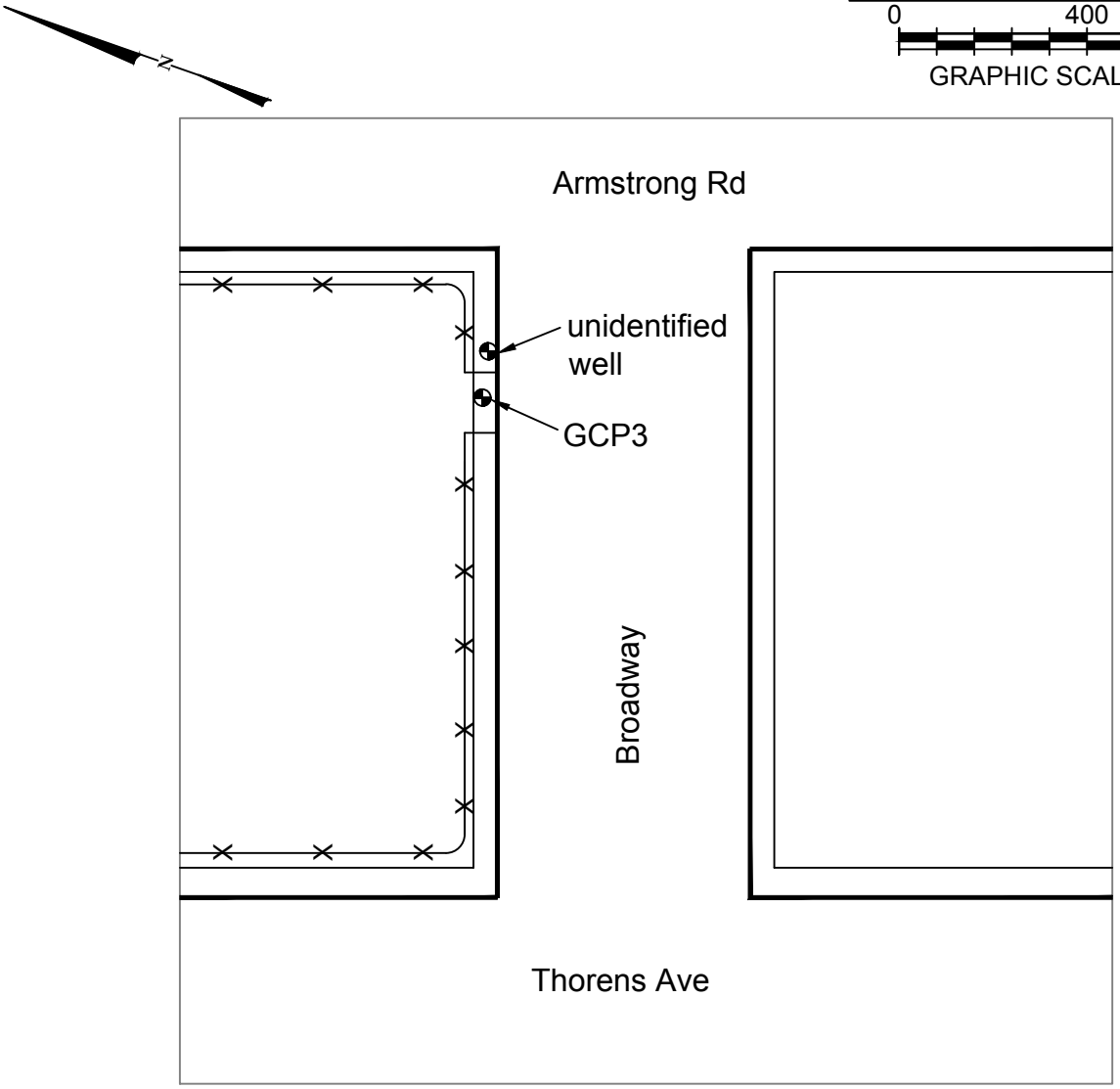
M:\Scout\Projects\GENESCO\150 Fulton Ave\NY\CAD\2017\2017-10 - Genesco - MW GCP2 (N-10331).dwg (10/17/2017 - 11:40am Melville)

← North

GCP-2

East Side of Thorens Ave. between Broadway and Fulton Ave. in Garden City Park.





Not To Scale

Well GCP3 (N-10481) is located close to the Northwest corner of Broadway and Armstrong Rd in Garden City Park

(there are two wells at this location, GCP3 is shallow. The other well has never been identified and is over 100 ft deep)

TITLE

Groundwater Monitoring
Well Location
GCP3
Garden City Park, NY

PREPARED FOR

Genesco Inc.

Environmental Resources Management

FIGURE 3

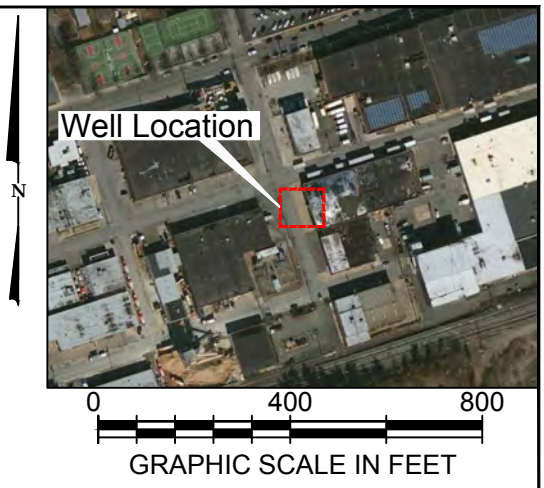
DRAWN BY	SCALE	DATE	JOB NO.
EMF	AS SHOWN	10/12/17	0097881.11

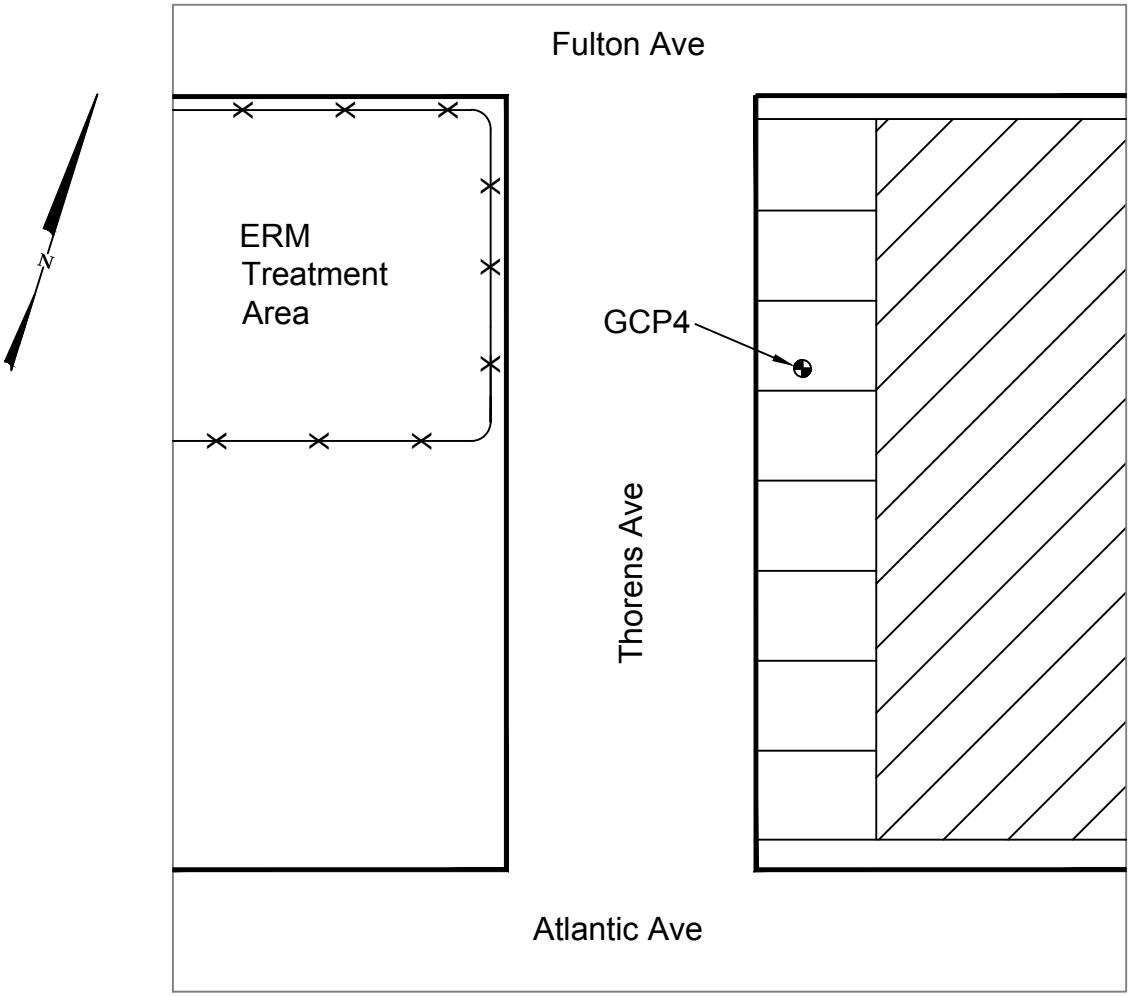
M:\Scout\Projects\GENESCO\150 Fulton Ave\NY\CAD\2017\2017-10 - Genesco - MW GCP3 (N-10481).dwg (10/17/2017 - 11:39am Melville)

← North

GCP-3

Close to the northwest corner of Broadway and Armstrong in Garden City Park.





Not To Scale

Well GCP4 (N-10482) is located on the East Side of Thorens Ave between Fulton Ave and Atlantic Ave in Garden City Park

TITLE

Groundwater Monitoring
Well Location
GCP4
Garden City Park, NY

PREPARED FOR

Genesco Inc.

Environmental Resources Management

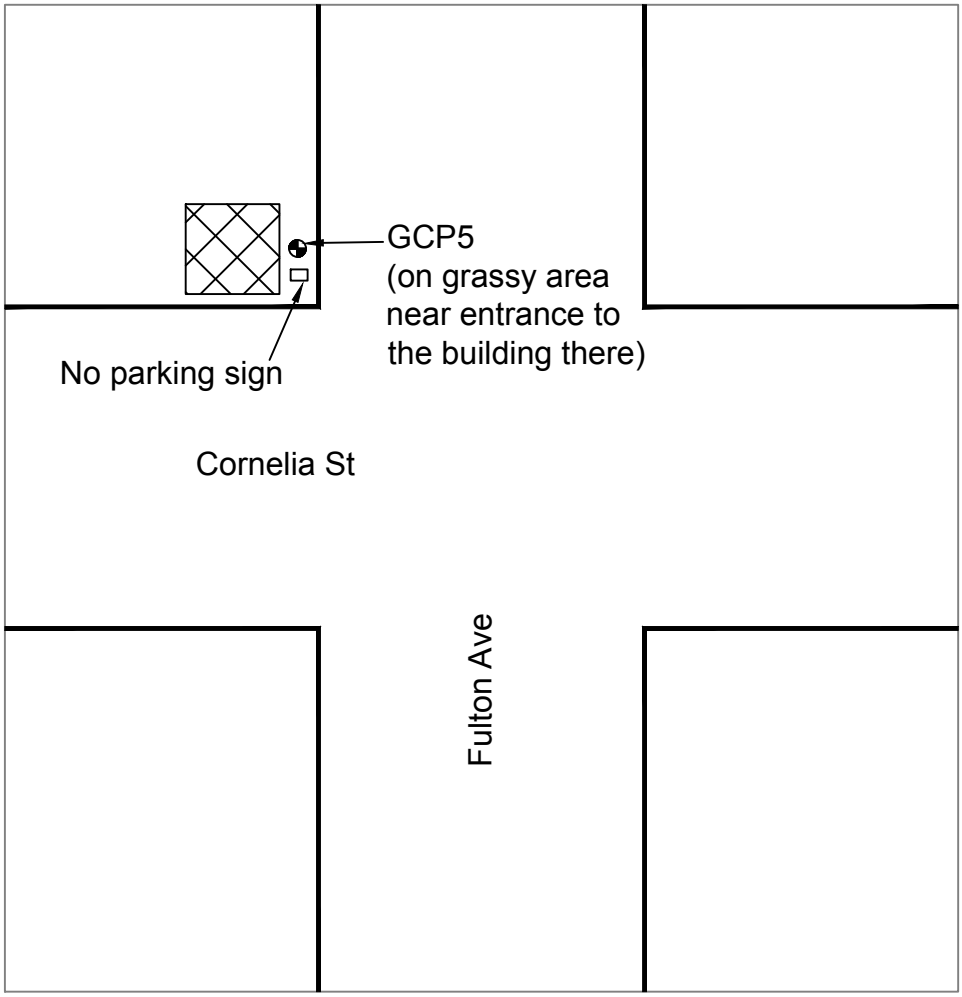
FIGURE 4

DRAWN BY	SCALE	DATE	JOB NO.
EMF	AS SHOWN	10/12/17	0097881.11

M:\Scout\Projects\GENESCO\150 Fulton Ave\NY\CAD\2017\2017-10 - Genesco - MW GCP4 (N-10482).dwg (10/17/2017 - 11:32am Melville)

← North

GCP-4
On the east side of Thorens Ave. between Fulton and Atlantic Ave. in Garden City Park.
(Approximately 1 foot to the right of the cone, under the car)



Not To Scale

Well GCP5 (N-10483) is located at the Southwest corner of Fulton Ave and Cornelia Ave in Garden City Park

TITLE

Groundwater Monitoring
Well Location
GCP5
Garden City Park, NY

PREPARED FOR

Genesco Inc.

Environmental Resources Management

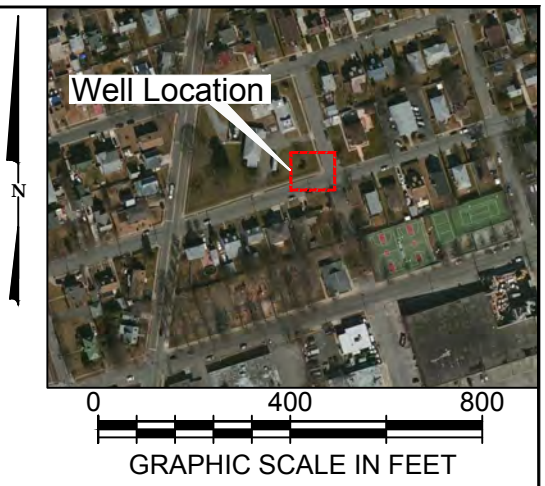
FIGURE 5

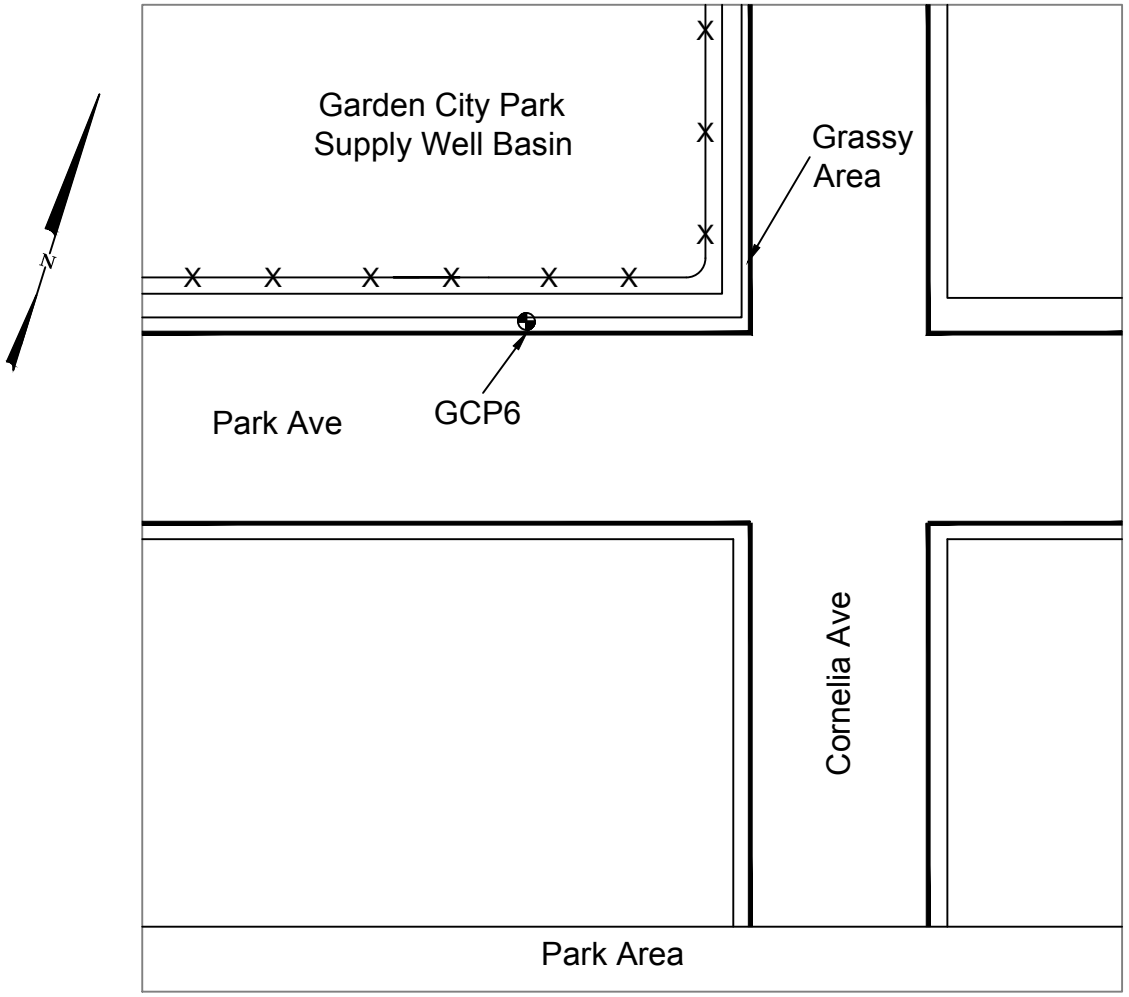
DRAWN BY	SCALE	DATE	JOB NO.
EMF	AS SHOWN	10/12/17	0097881.11

M:\Scout\Projects\GENESCO\150 Fulton Ave\NY\CAD\2017\2017-10 - Genesco - MW GCP5 (N-10483).dwg (10/17/2017 - 11:30am Melville)

N

GCP-5
Southwest corner of Fulton and Cornelia in Garden City Park.





Not To Scale

Well GCP6 (N-10484) is located at the Northwest corner of Park Ave and Cornelia Ave in Garden City Park

TITLE

Groundwater Monitoring
Well Location
GCP6
Garden City Park, NY

PREPARED FOR

Genesco Inc.

Environmental Resources Management

FIGURE 6

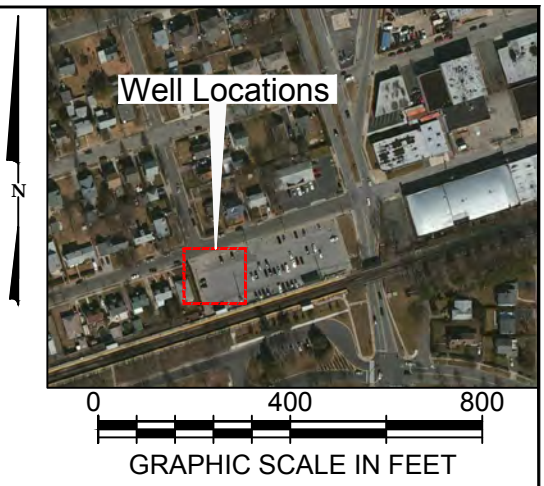
DRAWN BY	SCALE	DATE	JOB NO.
EMF	AS SHOWN	10/12/17	0097881.11

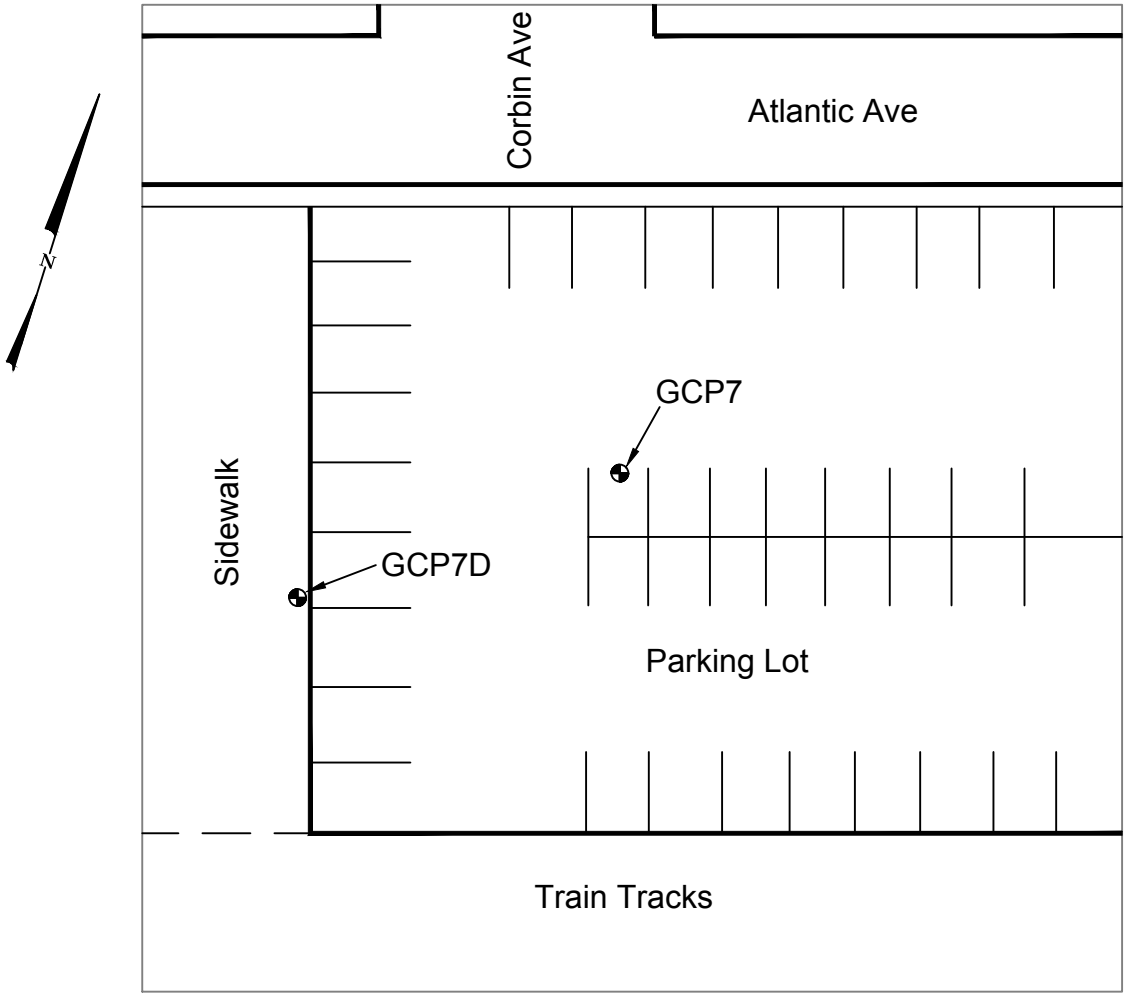
M:\Scout\Projects\GENESCO\150 Fulton Ave\NY\CAD\2017\2017-10 - Genesco - MW GCP6 (N-10484).dwg (10/17/2017 - 11:28am Melville)

← North

GCP-6

Northwest Corner of Park Ave. and Cornelia in Garden City Park.





Not To Scale

Well GCP7 (N-10485) and GCP7D (N-11733) are located in the Merillion Ave Train Station Parking Lot (west side of parking lot) in Garden City Park

TITLE

Groundwater Monitoring
Well Locations
GCP7 and GCP7D
Garden City Park, NY

PREPARED FOR

Genesco Inc.

Environmental Resources Management

FIGURE 7

DRAWN BY	SCALE	DATE	JOB NO.
EMF	AS SHOWN	10/12/17	0097881.11

M:\Scout\Projects\GENESCO\150 Fulton Ave\NY\CAD\2017\2017-10 - Genesco - MW GCP7 (N-10485) & 7D (N-11733).dwg (10/17/2017 - 11:26am Melville)

North

GCP-7

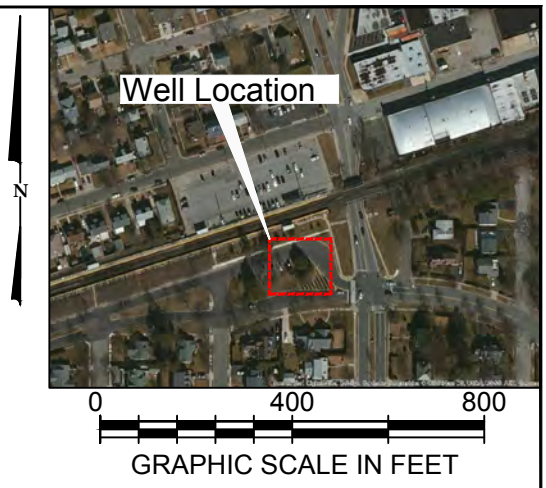
Located on the west side of the Merillion Ave. Train Station Parking Lot off of Atlantic Ave in Garden City Park.

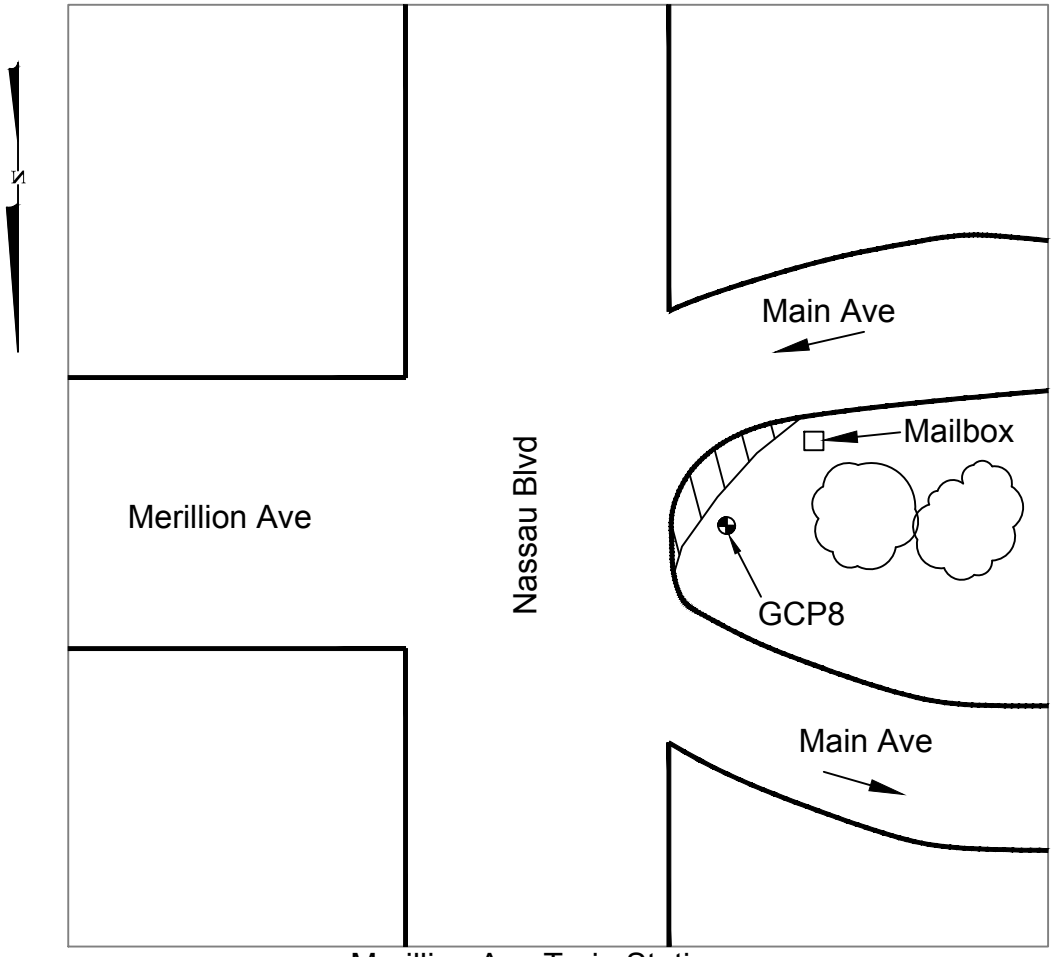
.

North

GCP-7 D

Located in the west side of the Merillion Ave. Train Station Parking Lot off of Atlantic Ave in Garden City Park





Merillion Ave Train Station

Not To Scale

Well GCP8 (N-10486) is located on the divide of Main Ave at the Main Ave and Nassau Blvd intersection

TITLE

Groundwater Monitoring
Well Location GCP8
Garden City Park, NY

PREPARED FOR

Genesco Inc.

Environmental Resources Management

FIGURE 8

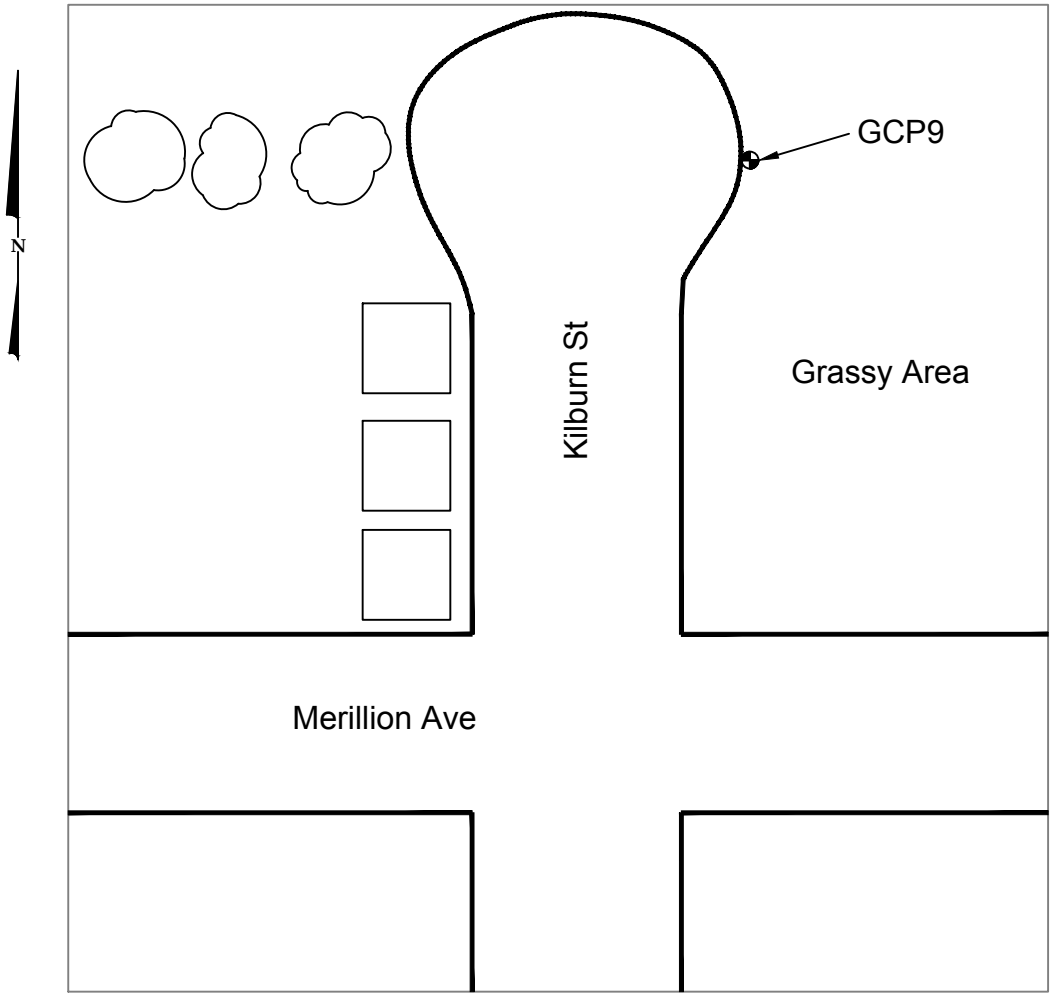
DRAWN BY	SCALE	DATE	JOB NO.
EMF	AS SHOWN	10/12/17	0097881.11

M:\Scout\Projects\GENESCO\150 Fulton Ave\NY\CAD\2017\2017-10 - Genesco - MW GCP8 (N-10486).dwg (12/11/2017 - 3:28pm Melville)

← North

GCP-8

Located on the divide of Main Ave. at the Main Ave. and Nassau Blvd. Intersection.



Not To Scale

Well GCP9 (N-10487) is located at the side of the Kilburn St dead end in Garden City

TITLE	Groundwater Monitoring Well Location GCP9 Garden City, NY
PREPARED FOR	Genesco Inc.
	Environmental Resources Management
FIGURE	9

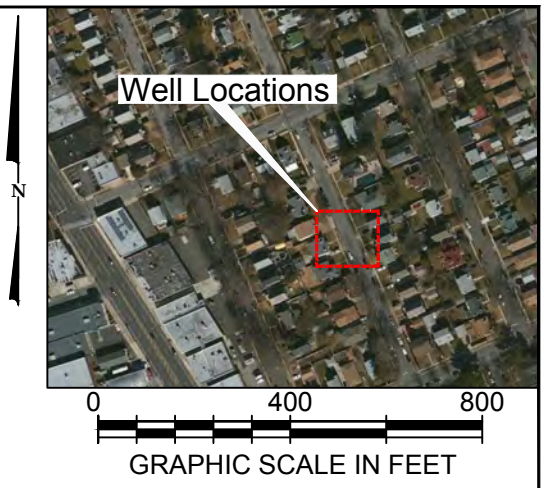
DRAWN BY	SCALE	DATE	JOB NO.
EMF	AS SHOWN	10/12/17	0097881.11

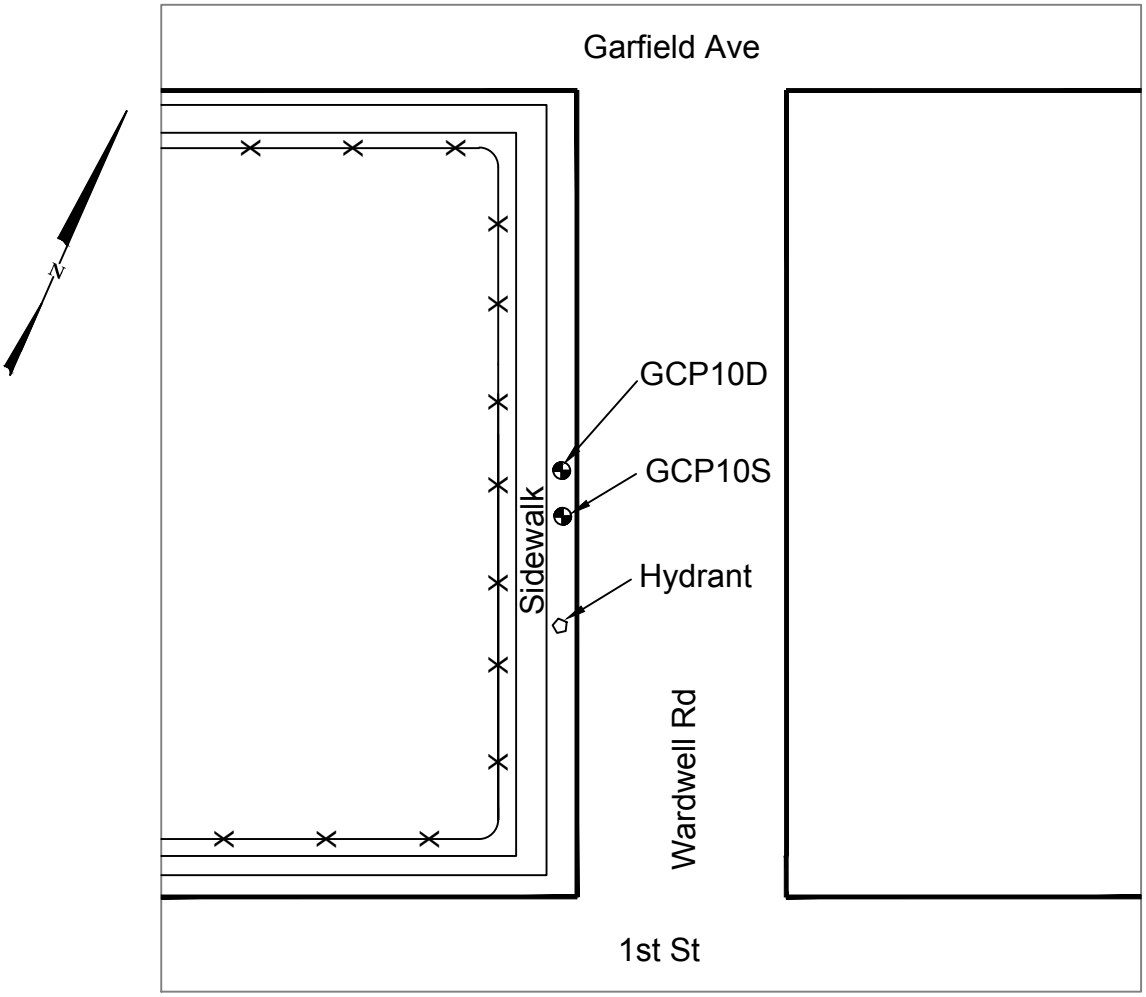
M:\Scout\Projects\GENESCO\150 Fulton Ave\NY\CAD\2017\2017-10 - Genesco - MW GCP9 (N-10487).dwg (10/17/2017 - 11:17am Melville)

North

GCP-9

Located on the east side of the Kilburne St. dead end in Garden City.





Not To Scale

Wells GCP10S (N-11737) and GCP10D (N-11729) are located on the North Side of Wardwell St between Garfield Ave and 1st Ave in Mineola

TITLE

Groundwater Monitoring
Well Locations GCP10S & GCP10D
Mineola, NY

PREPARED FOR

Genesco Inc.

Environmental Resources Management

FIGURE 10

DRAWN BY	SCALE	DATE	JOB NO.
EMF	AS SHOWN	10/12/17	0097881.11

M:\Scout\Projects\GENESCO\150 Fulton Ave\NY\CAD\2017\2017-10 - Genesco - MW GCP10S (N-11737) & GCP10D (N-11729).dwg (10/17/2017 - 11:14am Melville)

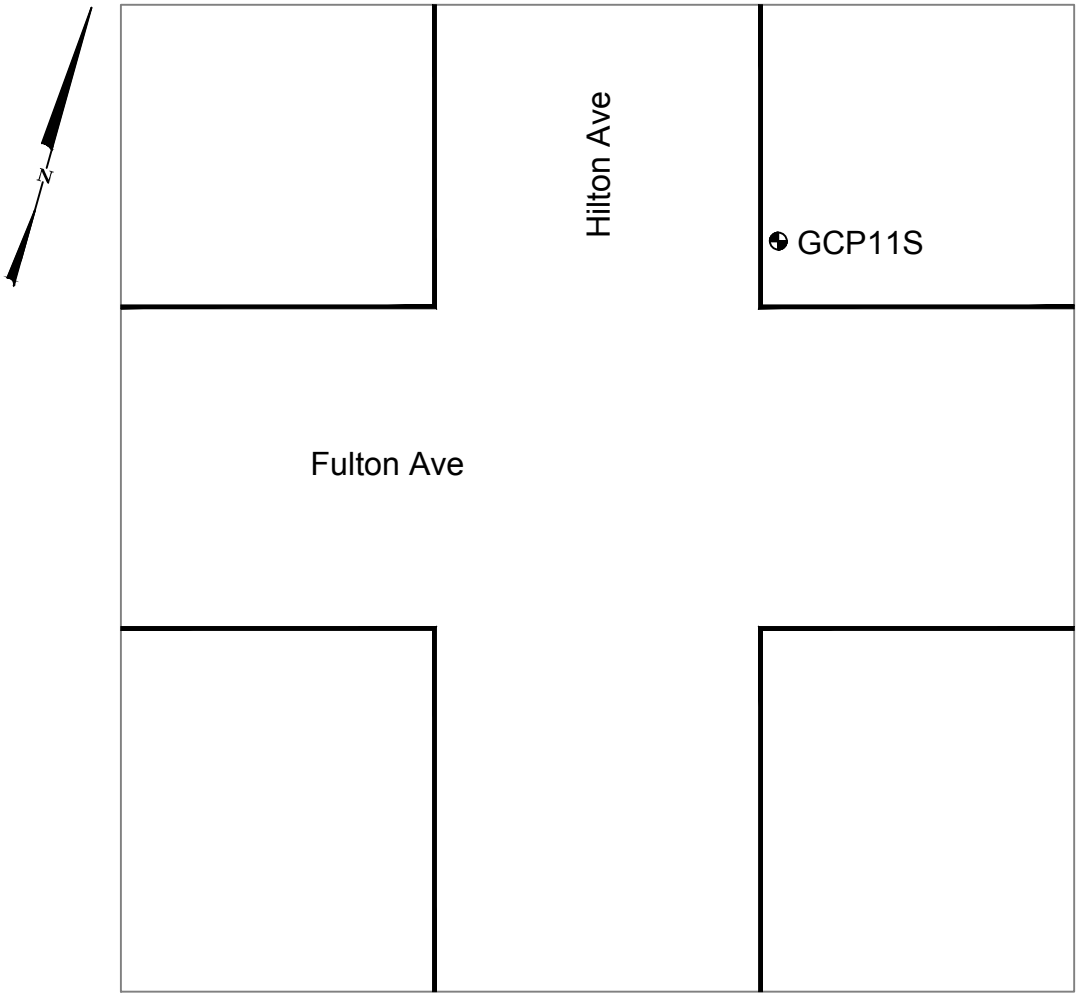
← North

GCP-10S and GCP-10D

Located on the north side of Wardwell St. between Garfield Ave and 1st Ave in Mineola.

0 400 800

GRAPHIC SCALE IN FEET



Not To Scale

Well GCP11S (N-11738) is located on the North East corner of Hilton Ave and Fulton Ave in Garden City Park

TITLE

Groundwater Monitoring
Well Location
GCP11S
Garden City Park, NY

PREPARED FOR

Genesco Inc.

Environmental Resources Management

FIGURE 11

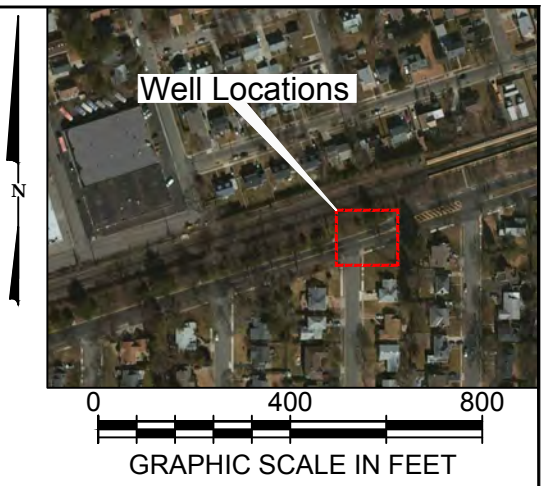
DRAWN BY	SCALE	DATE	JOB NO.
EMF	AS SHOWN	10/13/17	0097881.11

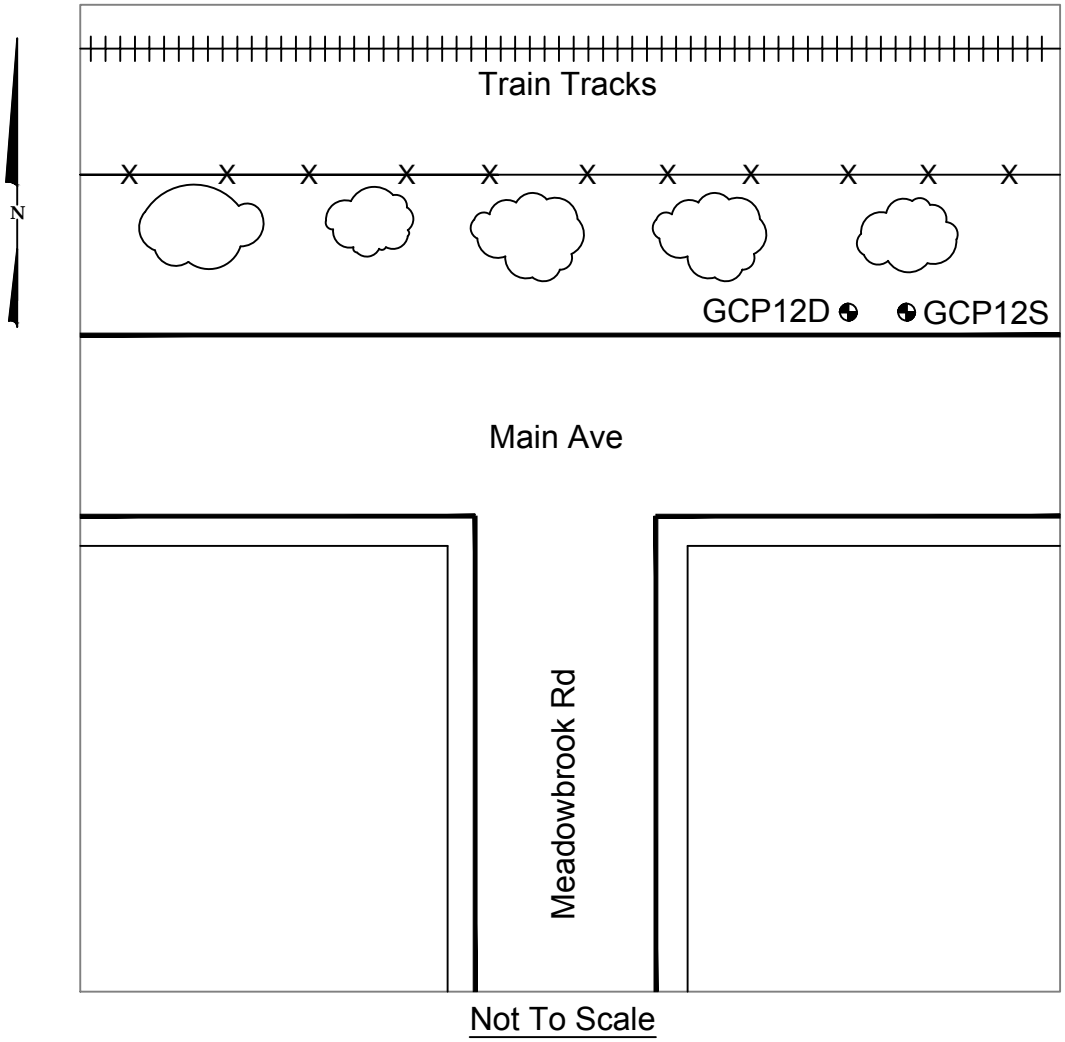
M:\Scout\Projects\GENESCO\150 Fulton Ave\NY\CAD\2017\2017-10 - Genesco - MW GCP11S (N-11738).dwg (10/17/2017 - 11:08am Melville)

North

GCP-11S

Located on the northeast corner of Hilton and Fulton Ave. in Garden City Park.





Not To Scale

Wells GCP12S (N-11739) and GCP12D (N-11734) are located on the North Side of Main Ave between Meadowbrook Rd and Roxbury St in Garden City

TITLE

Groundwater Monitoring
Well Locations GCP12S & GCP12D
Garden City, NY

PREPARED FOR

Genesco Inc.

Environmental Resources Management

FIGURE 12

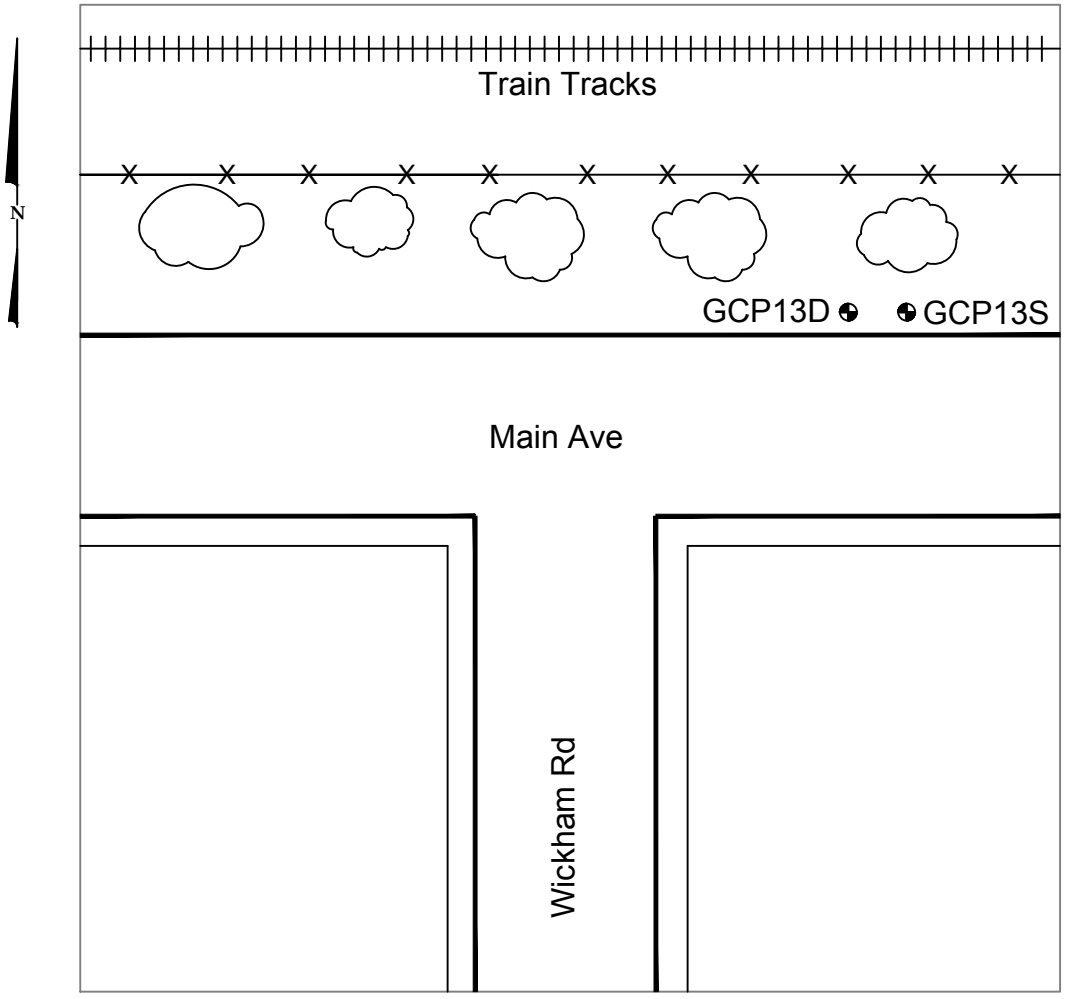
DRAWN BY	SCALE	DATE	JOB NO.
EMF	AS SHOWN	10/13/17	0097881.11

M:\Scout\Projects\GENESCO\150 Fulton Ave\NY\CAD\2017\2017-10 - Genesco - MW GCP12S (N-11739) & GCP12D (N-11734).dwg (10/17/2017 - 11:04am Melville)

North

GCP-12 S and GCP-12D

Located on the north side of Main Ave between Meadowbrook Rd. and Roxbury St. in Garden City.



Not To Scale

Wells GCP13S (N-11956) and GCP13D (N-11735) are located on the North Side of Main Ave between Wickham Rd and Tullamore Rd in Garden City

TITLE

Groundwater Monitoring
Well Locations GCP13S & GCP13D
Garden City, NY

PREPARED FOR

Genesco Inc.

Environmental Resources Management

FIGURE 13

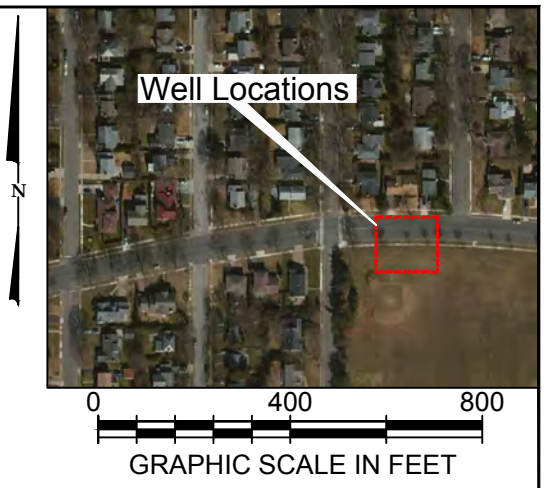
DRAWN BY	SCALE	DATE	JOB NO.
EMF	AS SHOWN	10/13/17	0097881.11

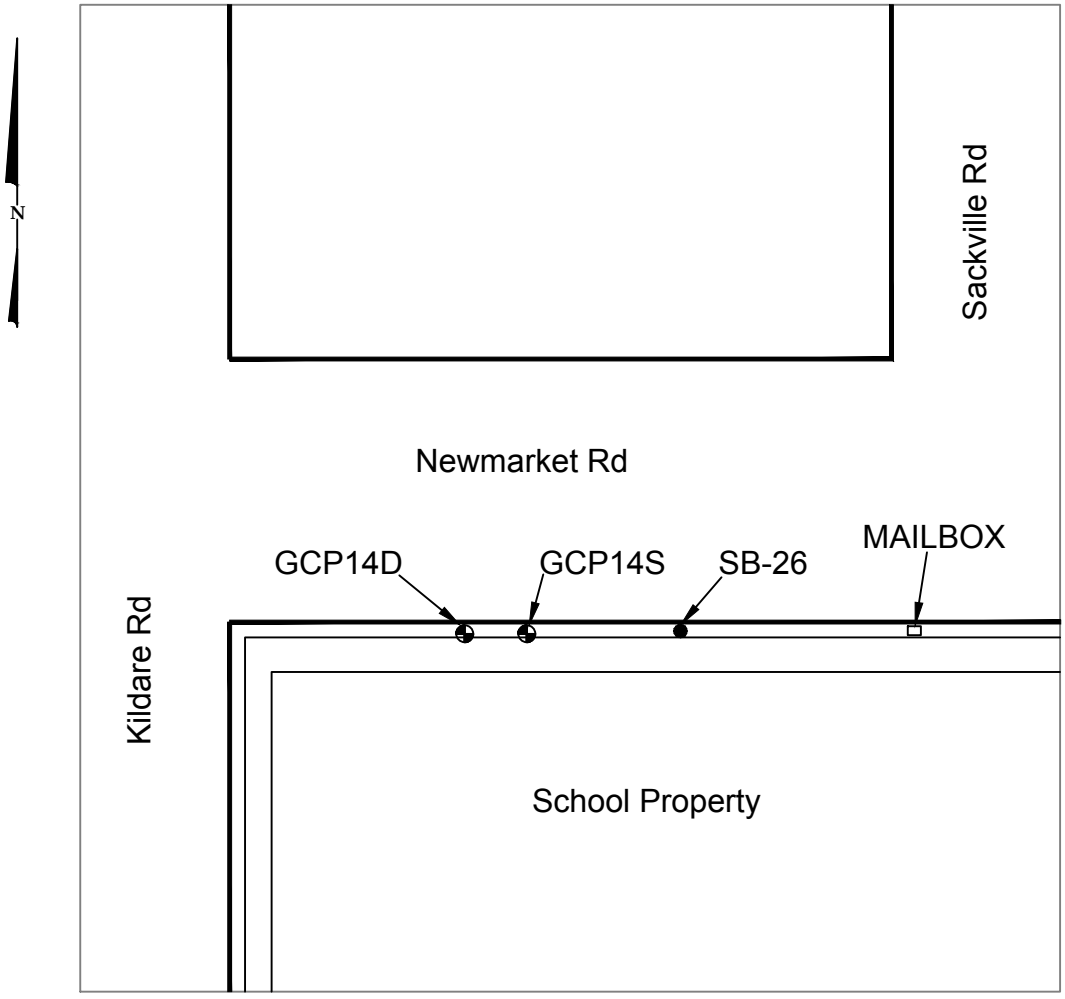
M:\Scout\Projects\GENESCO\150 Fulton Ave\NY\CAD\2017\2017-10 - Genesco - MW GCP13S (N-11956) & GCP13D (N-11735).dwg (10/17/2017 - 11:00am Melville)

North

GCP-13S (left) and GCP-13D (right)

Located on the north side of Main Ave. between Wickham Rd. and Tullamore Rd. in Garden City.





Not To Scale

Wells GCP14S (N-11957) and GCP14D (N-11736) are located on the South Side of Newmarket Rd between Kildare Rd and Sackville Rd in Garden City

TITLE

Groundwater Monitoring
Well Locations GCP14S & GCP14D
Garden City, NY

PREPARED FOR

Genesco Inc.

Environmental Resources Management

FIGURE 14

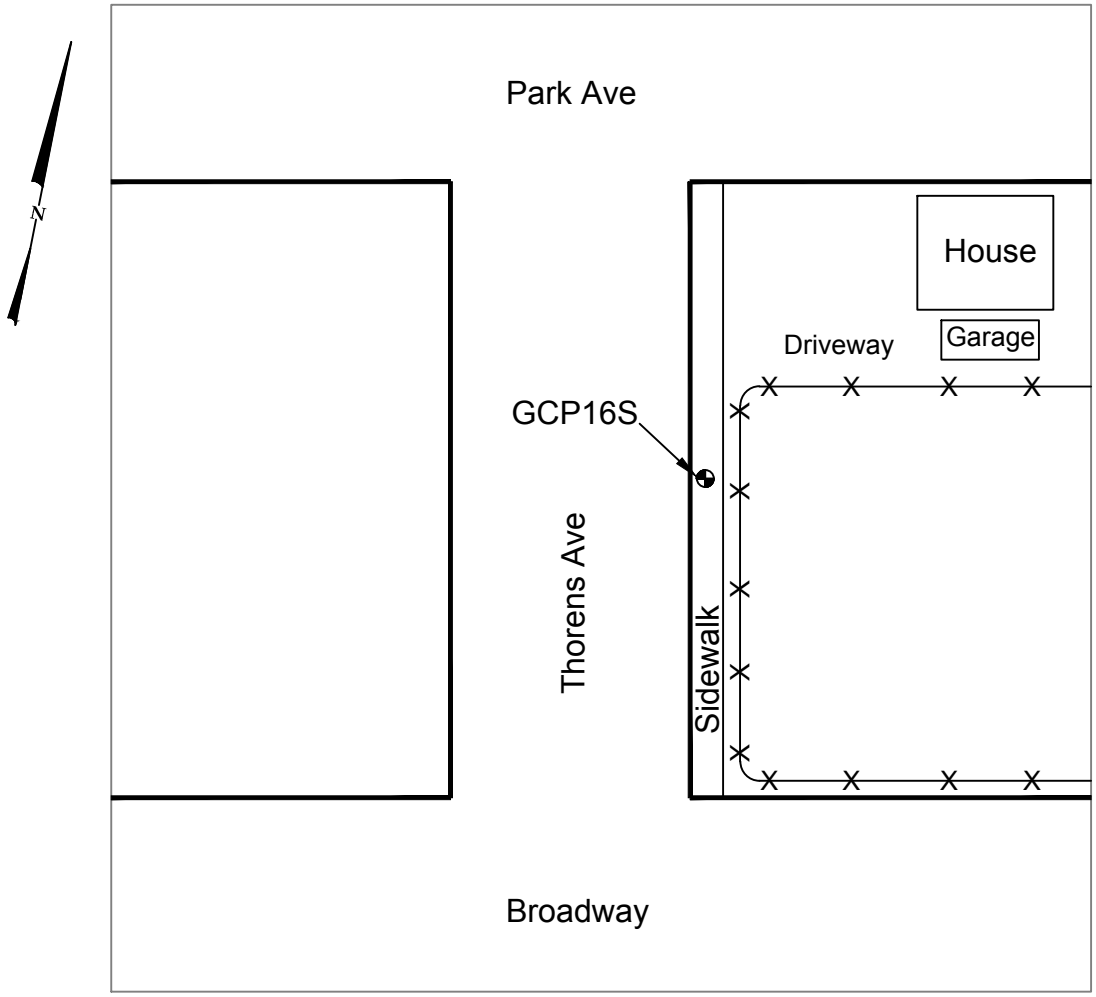
DRAWN BY	SCALE	DATE	JOB NO.
EMF	AS SHOWN	10/13/17	0097881.11

M:\Scout\Projects\GENESCO\150 Fulton Ave\NY\CAD\2017\2017-10 - Genesco - MW GCP14S (N-11957) & GCP14D (N-11736).dwg (10/17/2017 - 10:57am Melville)

North

GCP-14S and GCP-14D

Located on south side of Newmarket Rd. between Kildare and Sackville Rd. in Garden City.



Not To Scale

Well GCP-16S (N-12005) is located on the East Side of Thorens Ave between Park Ave and Broadway in Garden City Park

TITLE

Groundwater Monitoring
Well Location GCP16S
Garden City Park, NY

PREPARED FOR

Genesco Inc.

Environmental Resources Management

FIGURE 15

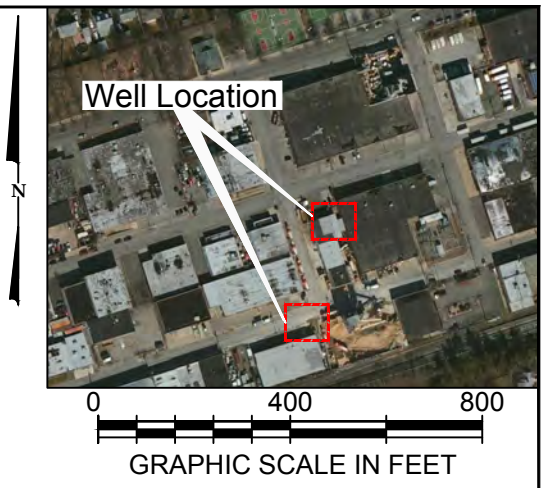
DRAWN BY	SCALE	DATE	JOB NO.
EMF	AS SHOWN	10/13/17	0097881.11

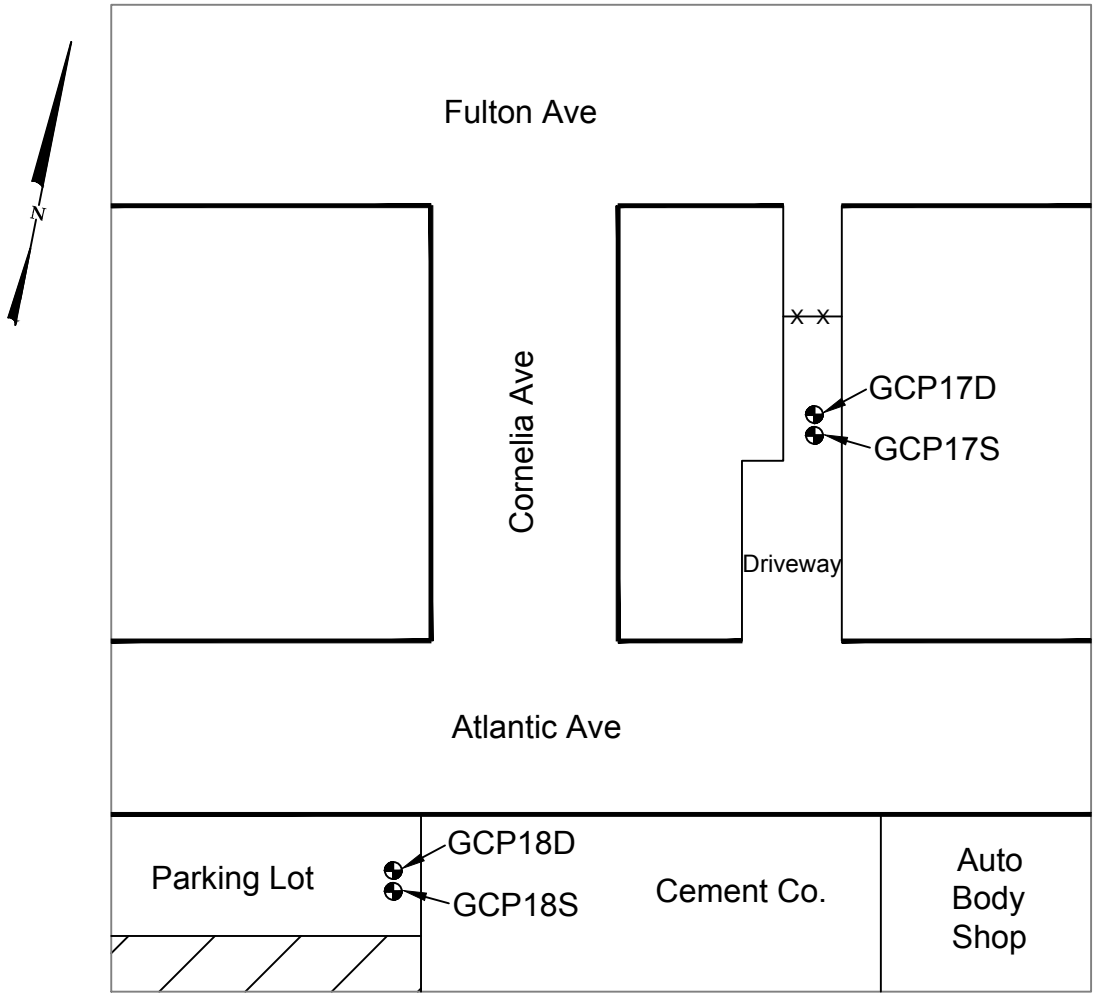
M:\Scout\Projects\GENESCO\150 Fulton Ave\NY\CAD\2017\2017-10 - Genesco - MW GCP16S (N-12005).dwg (10/17/2017 - 10:51am Melville)

North

GCP-16S

Located on the east side of Thorens Ave. between Park Ave. and Broadway in Garden City Park.





Not To Scale

Wells GCP17S and GCP17D (no NYSDEC Well Nos.) are located in the alley off of Atlantic Ave behind the cement company office building, large trucks often parked on the top of the wells.

Wells GCP18S and GCP18D (no NYSDEC Well Nos.) are located on the South Side of Atlantic Ave across from Cornelia Ave.

TITLE

Groundwater Monitoring
Well Locations GCP17S & 17D,
GCP18S & 18D
Garden City Park, NY

PREPARED FOR

Genesco Inc.

Environmental Resources Management

FIGURE 16

DRAWN BY	SCALE	DATE	JOB NO.
EMF	AS SHOWN	10/13/17	0097881.11

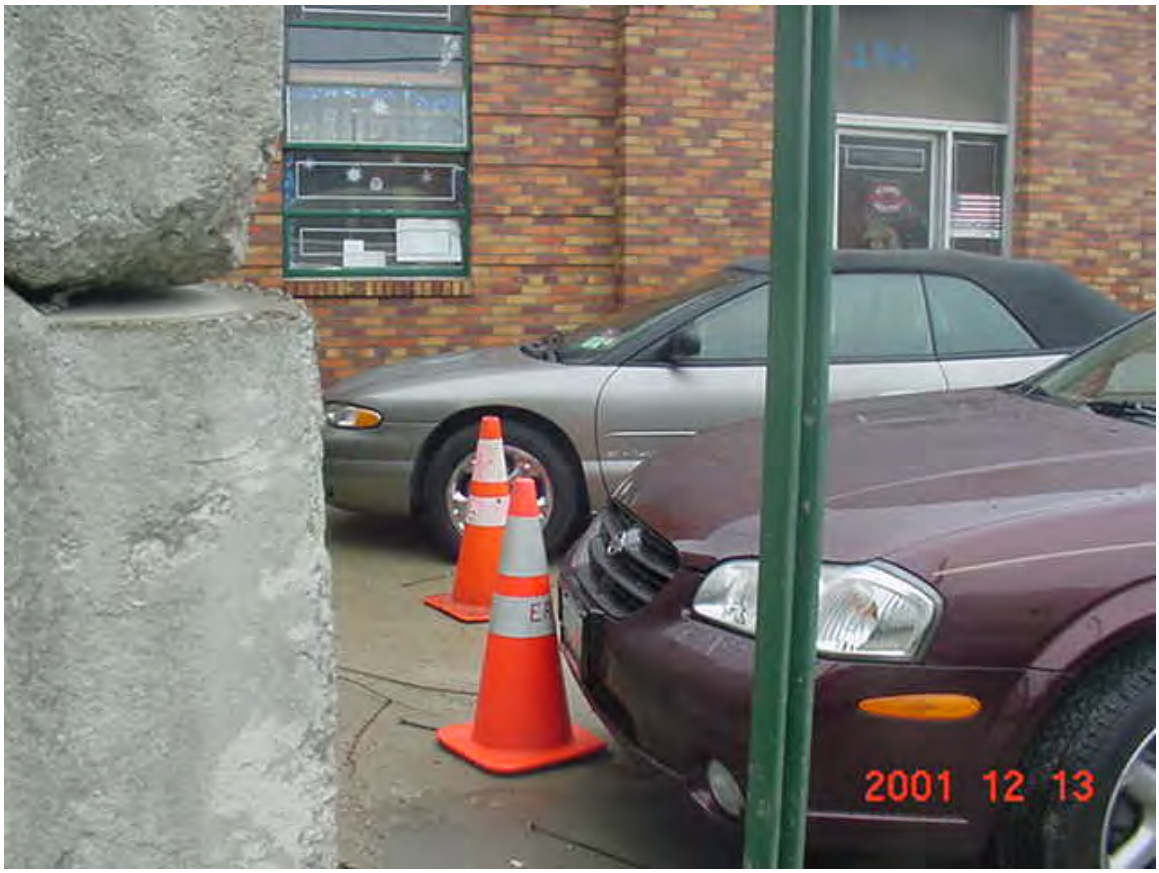
M:\Scout\Projects\GENESCO\150 Fulton Ave\NY\CAD\2017\2017-10 - Genesco - MW GCP17S & D - GCP18S & D.dwg (10/17/2017 - 10:46am Melville)

North

GCP-17S (bottom) and GCP-17D (top)

Located in the alley off of Atlantic Ave. behind the cement company office building large trucks often parked on top of the wells

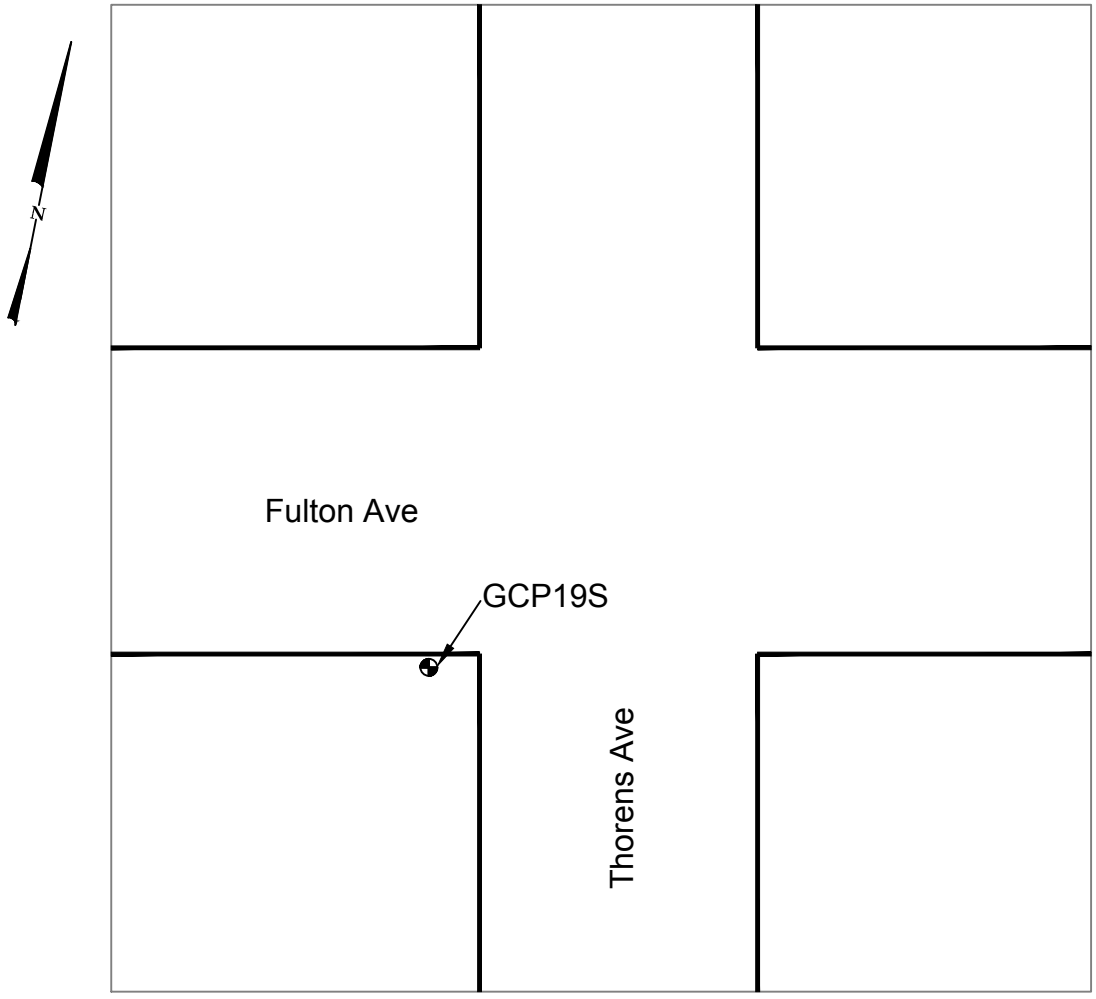
Cones pointing towards wells under large truck. They are located approximately 1 to 2 feet to the right of the cones.



North

GCP-18S (top) and GCP-18D (bottom)

Located on the south side of Atlantic Ave. across from Cornelia in Garden City Park.



Not To Scale

Well GCP19S (no NYSDEC Well No.) is located on the Southwest corner of Fulton Ave and Thorens Ave in Garden City Park

TITLE

Groundwater Monitoring
Well Location GCP19S
Garden City Park, NY

PREPARED FOR

Genesco Inc.

Environmental Resources Management

FIGURE 17

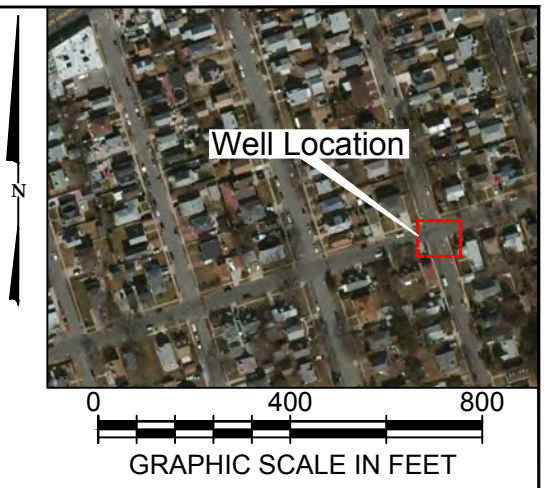
DRAWN BY	SCALE	DATE	JOB NO.
EMF	AS SHOWN	10/13/17	0097881.11

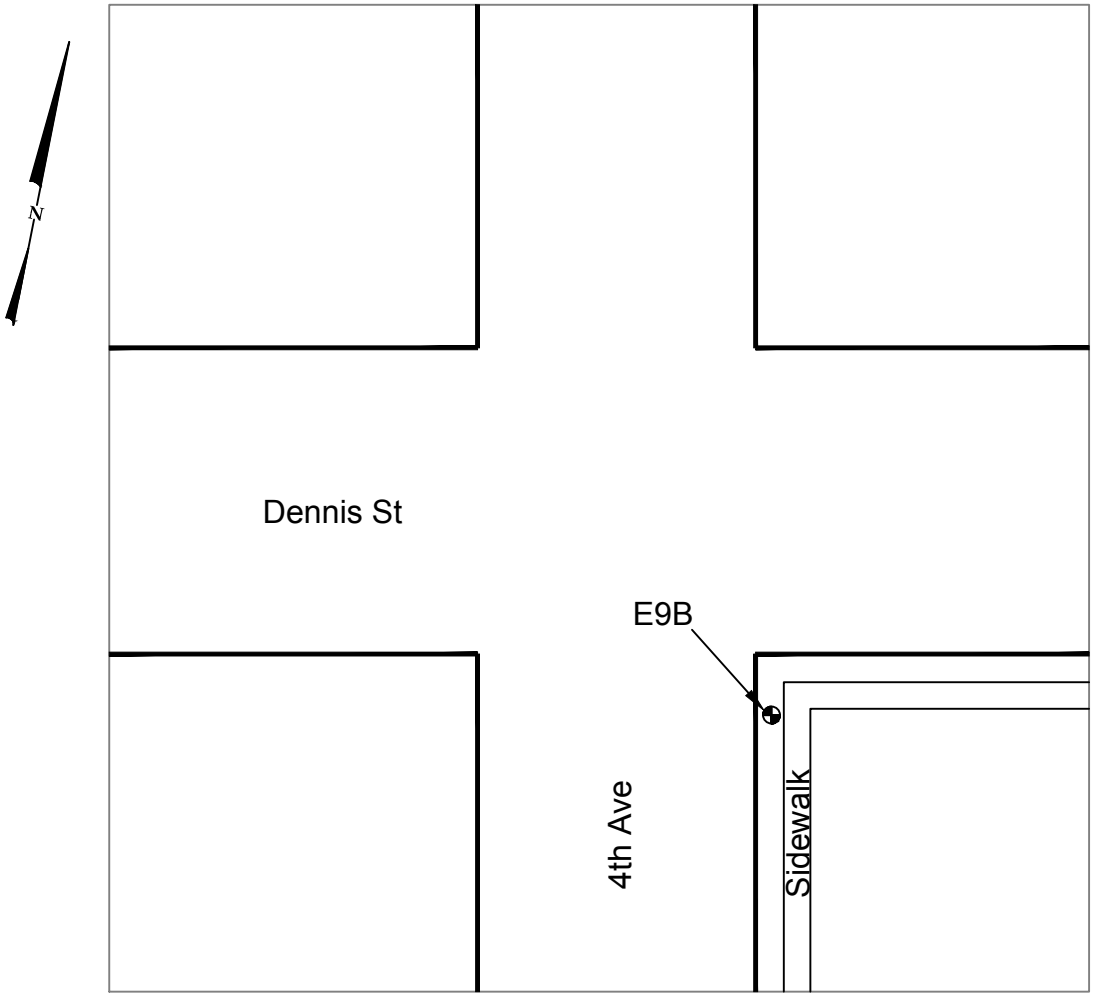
M:\Scout\Projects\GENESCO\150 Fulton Ave\NY\CAD\2017\2017-10 - Genesco - MW GCP19S.dwg (10/17/2017 - 10:43am Melville)

North

GCP-19S

Located on the southwest corner of Fulton Ave. and Thorens Ave. in Garden City Park.





Not To Scale

Well E9B (N-09944) is located on the Southeast corner of 4th Ave and Dennis St

TITLE

Groundwater Monitoring
Well Location E9B
Garden City Park, NY

PREPARED FOR

Genesco Inc.

Environmental Resources Management

FIGURE 18

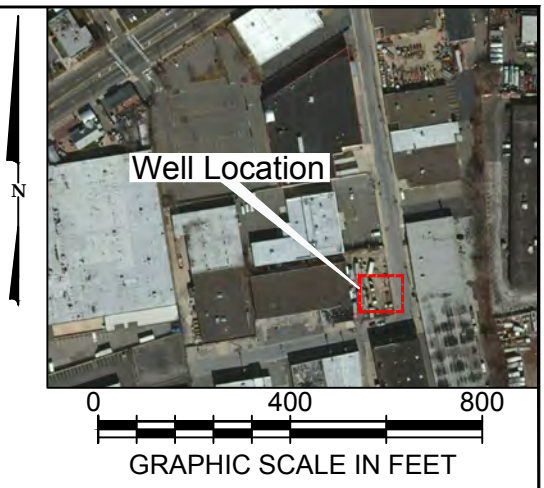
DRAWN BY	SCALE	DATE	JOB NO.
EMF	AS SHOWN	10/13/17	0097881.11

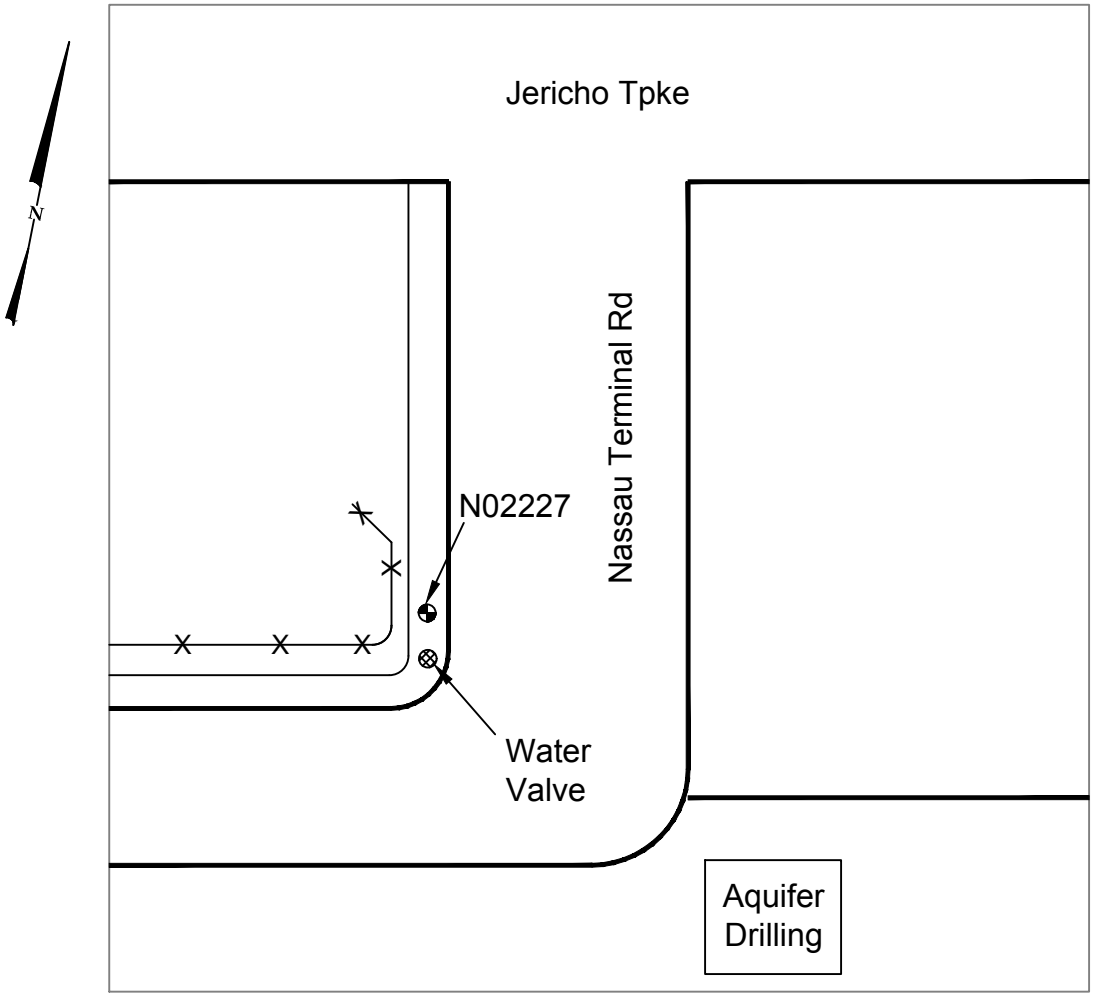
M:\Scout\Projects\GENESCO\150 Fulton Ave\NY\CAD\2017\2017-10 - Genesco - E9B (N-09944).dwg (10/17/2017 - 10:41am Melville)

North

E9B

Located on the southeat corner of southeast corner of 4th Ave. and Dennis St.





Not To Scale

Well N-02227 is located on the West Side of Nassau Terminal Rd right before the road bends

TITLE

Groundwater Monitoring
Well Location N-02227
Garden City Park, NY

PREPARED FOR

Genesco Inc.

Environmental Resources Management

FIGURE 19

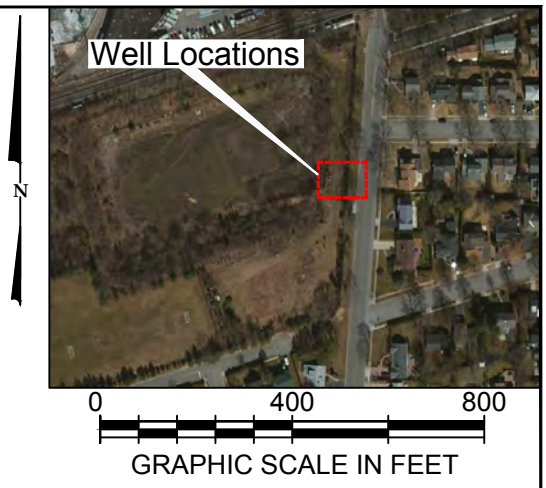
DRAWN BY	SCALE	DATE	JOB NO.
EMF	AS SHOWN	10/16/17	0097881.11

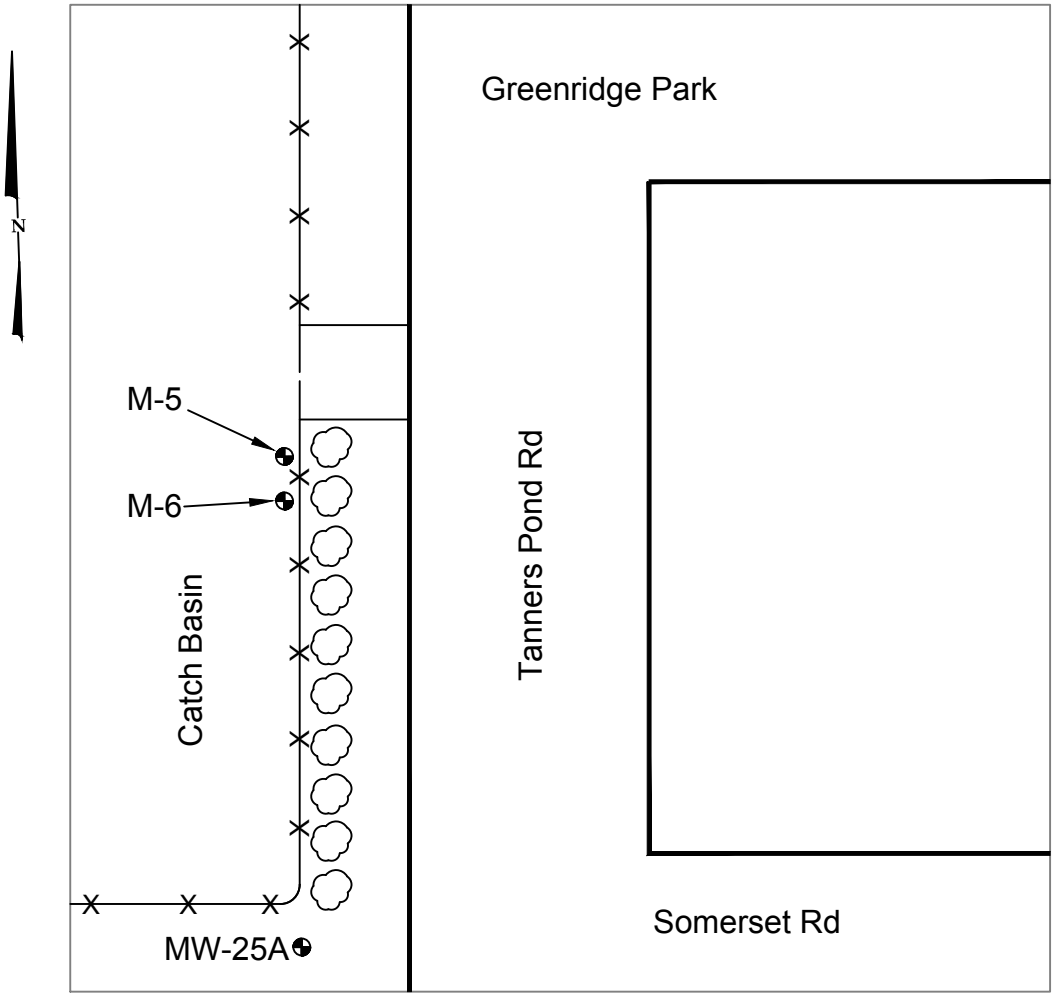
M:\Scout\Projects\GENESCO\150 Fulton Ave\NY\CAD\2017\2017-10 - Genesco - (N-02227).dwg (10/17/2017 - 10:38am Melville)

North

N-02227

Located on the west side of Nassau Terminal Rd. right before the road bends.





Not To Scale

Well M-5 (N-11172) and M-6 (N-11171) are located within the Catch Basin on Tanners Pond Rd between Greenridge Park and Somerset Rd in Garden City

TITLE

Groundwater Monitoring
Well Locations M-5 and M-6
Garden City, NY

PREPARED FOR

Genesco Inc.

Environmental Resources Management

FIGURE 20

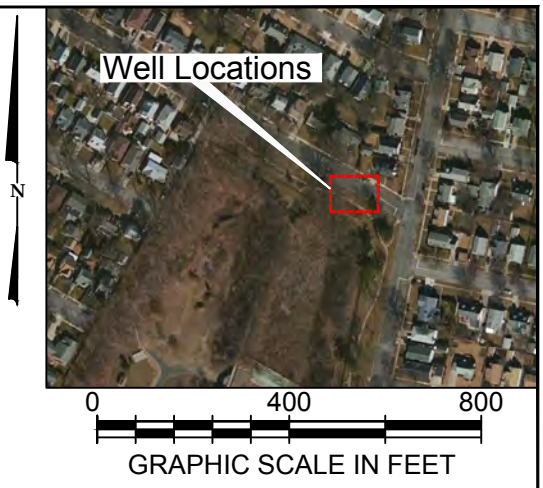
DRAWN BY	SCALE	DATE	JOB NO.
EMF	AS SHOWN	10/16/17	0097881.11

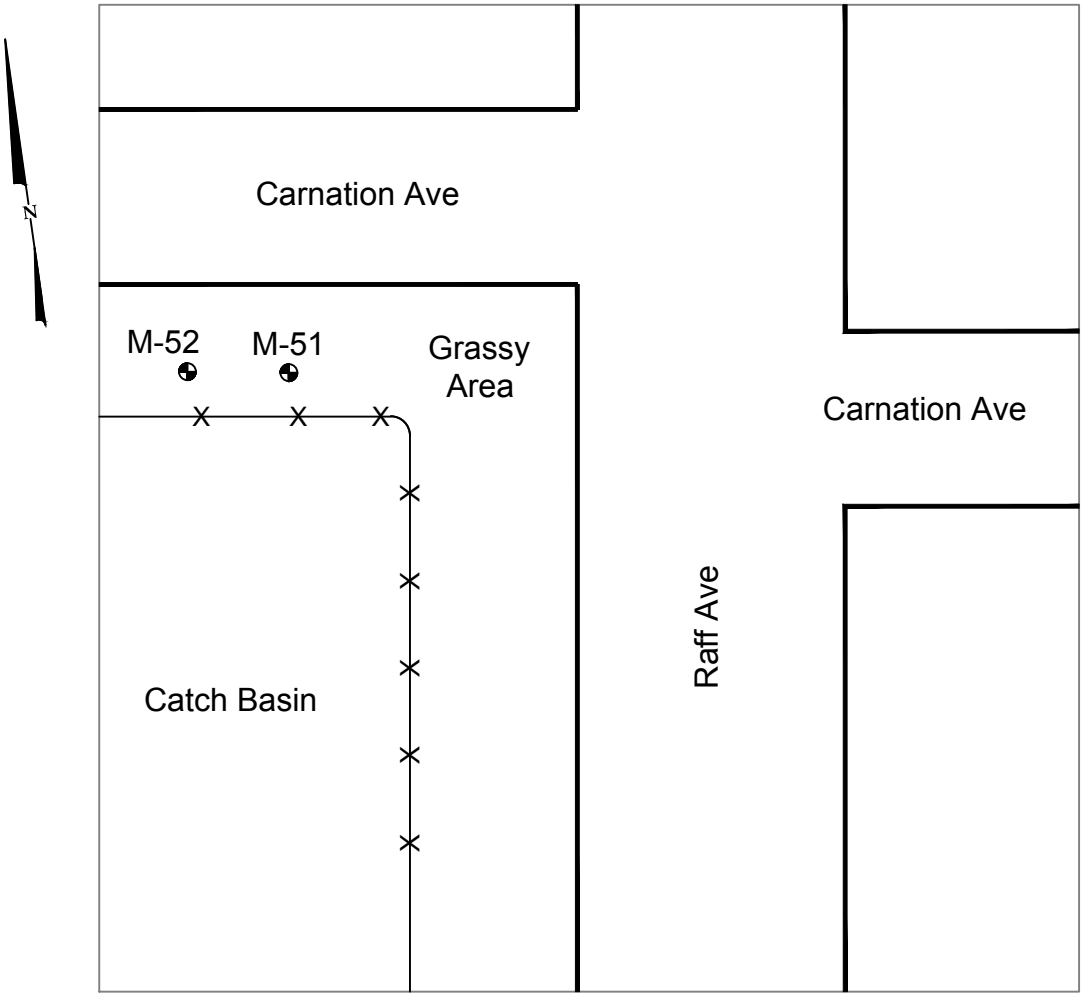
M:\Scout\Projects\GENESCO\150 Fulton Ave\NY\CAD\2017\2017-10 - Genesco - M5 (N-11172) & M6 (N11171).dwg (10/17/2017 - 10:37am Melville)

North

M-5 (left) and M-6 (right)

Located within the catch basin on Tanners Pond Rd. between Greenridge Park and Somerset Rd. in Garden City.





Not To Scale

Wells M-51 (N-12114) and M-52 (N-12113) are located on the Southwest corner of Carnation Ave and Raff Ave in Floral Park

TITLE

Groundwater Monitoring
Well Locations M-51 and M-52
Floral Park, NY

PREPARED FOR

Genesco Inc.

Environmental Resources Management

FIGURE 21

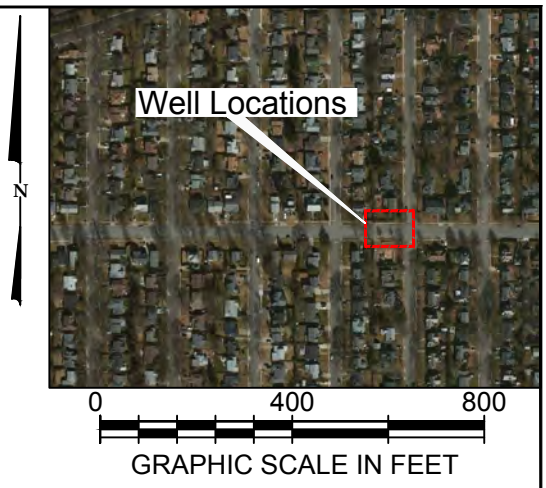
DRAWN BY	SCALE	DATE	JOB NO.
EMF	AS SHOWN	10/16/17	0097881.11

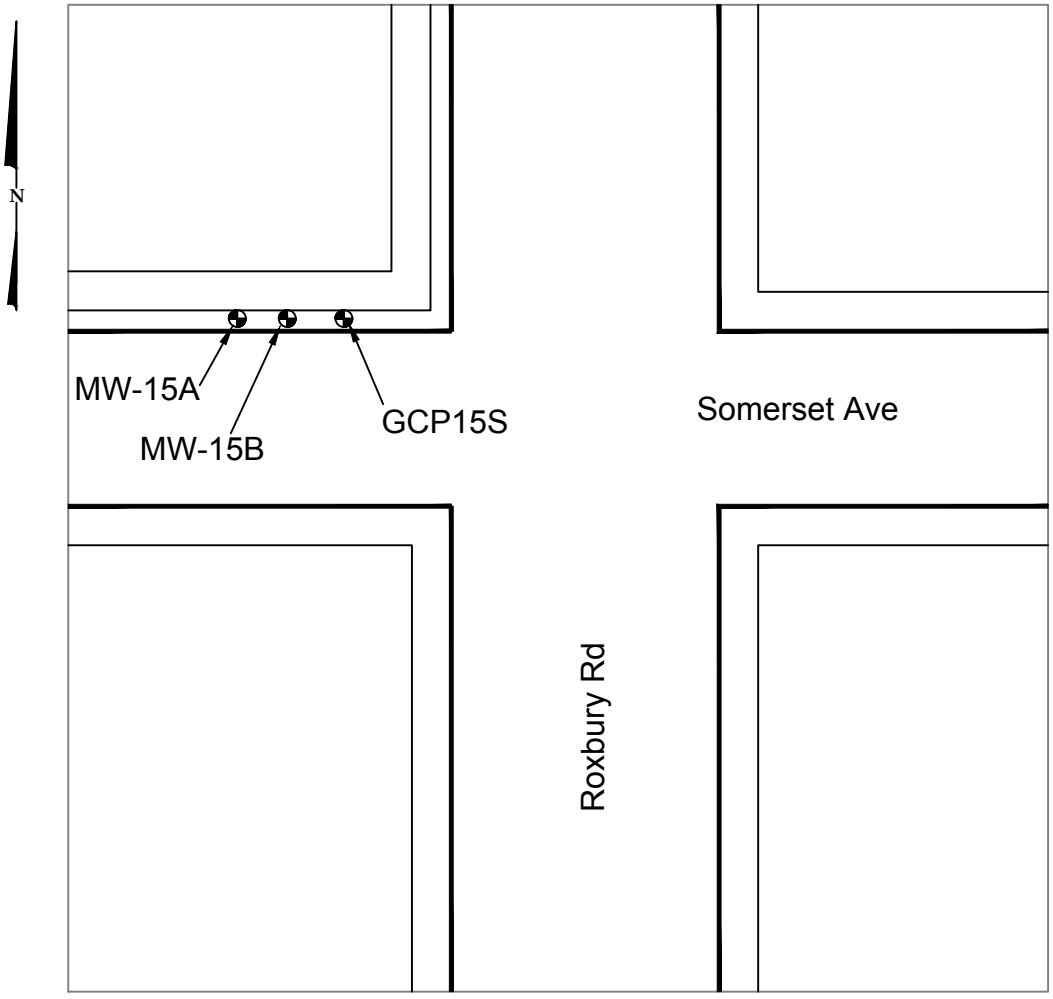
M:\Scout\Projects\GENESCO\150 Fulton Ave\NY\CAD\2017\2017-10 - Genesco - M51 (N-12114) & M52 (N2113).dwg (10/17/2017 - 10:34am Melville)

← North

M-51 and M-52 (not shown)

Located on the southwest corner of Carnation and Raff in Floral Park





Not To Scale

Wells GCP15S (N-11958), MW-15A (no NYSDEC Well No.) and MW-15B (no NYSDEC Well No.) are located at the Northwest corner Somerset Ave and Roxbury Rd in Garden City

TITLE

Groundwater Monitoring
Well Locations GCP15S and
MW-15S and MW-15B
Garden City, NY

PREPARED FOR

Genesco Inc.

Environmental Resources Management

FIGURE 22

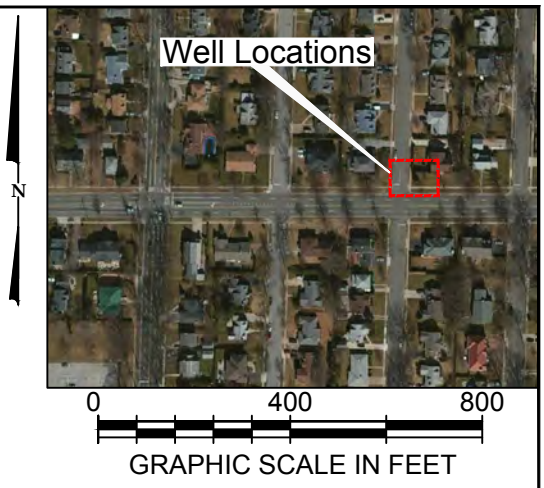
DRAWN BY	SCALE	DATE	JOB NO.
EMF	AS SHOWN	10/16/17	0097881.11

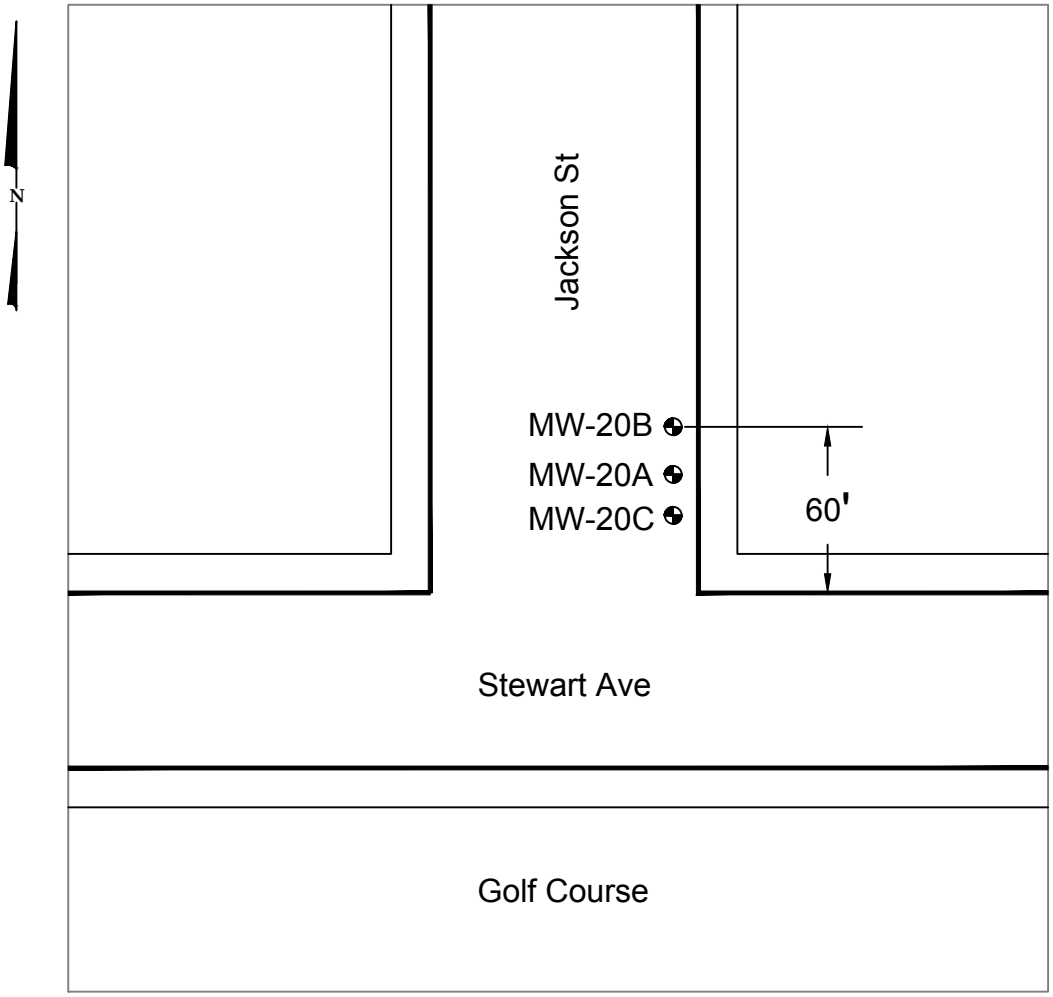
M:\Scout\Projects\GENESCO\150 Fulton Ave\NY\CAD\2017\2017-10 - Genesco - GCP15S (N-111958) & MW15A - MW-15B.dwg (10/17/2017 - 10:32am Melville)

North

MW-15A (left), MW-15B (right) and GCP-15S (not shown)

NW Corner of Somerset and Roxbury in Garden City.





Not To Scale

Wells MW-20A, B and C (no NYSDEC Well No.) are located at the Northeast corner of Jackson St and Stewart Ave in Garden City

(wells are 3 ft west of curb on Jackson St)

TITLE

Groundwater Monitoring
Well Locations MW-20A, B and C
Garden City, NY

PREPARED FOR

Genesco Inc.

Environmental Resources Management

FIGURE 23

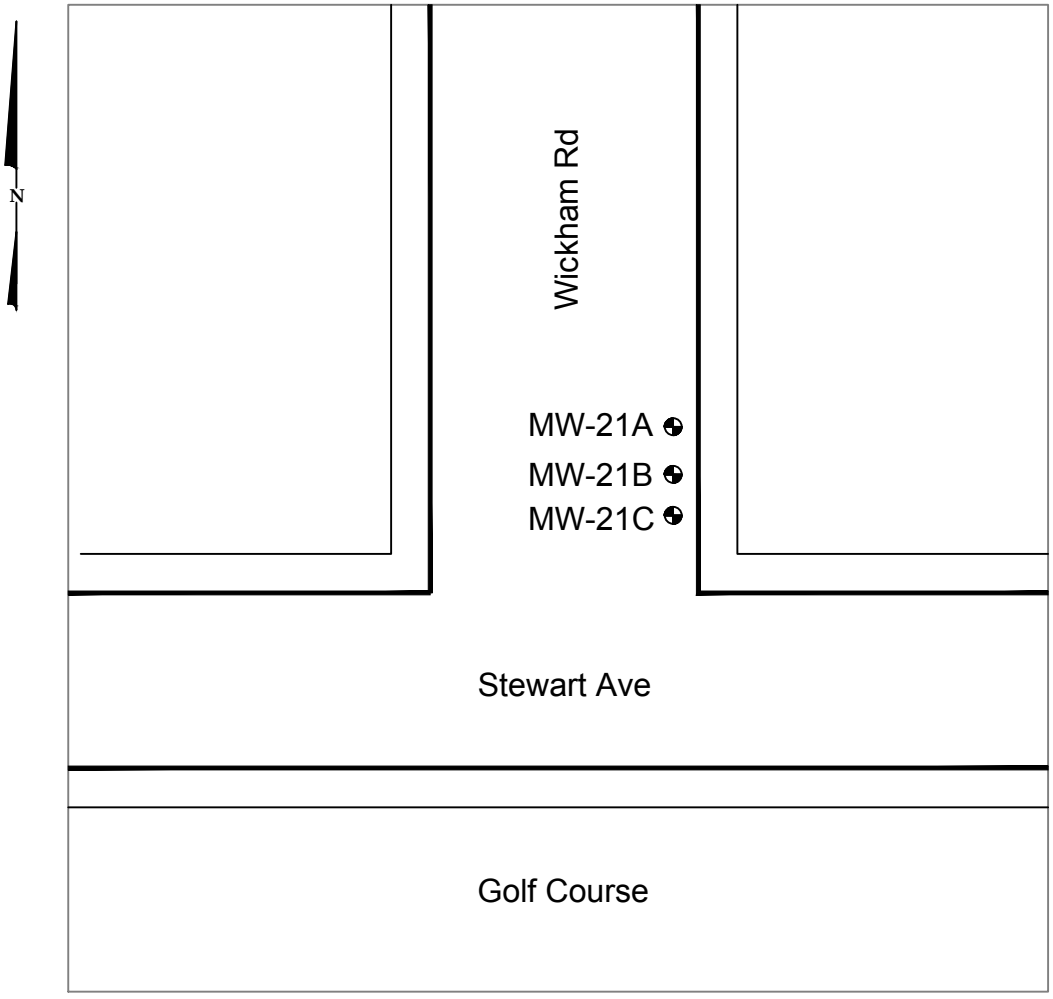
DRAWN BY	SCALE	DATE	JOB NO.
EMF	AS SHOWN	10/16/17	0097881.11

M:\Scout\Projects\GENESCO\150 Fulton Ave\NY\CAD\2017\2017-10 - Genesco - MW-20A, B & C.dwg (10/17/2017 - 10:30am Melville)

North

MW-20A (middle), MW-20B (left) and MW-20C (right)

Located on the northeast corner of Jackson St. and Stewart Ave in Garden City.



Not To Scale

Wells MW-21A, B and C (no NYSDEC Well No.) are located at the Northeast corner of Wickham Rd and Stewart Ave in Garden City

TITLE

Groundwater Monitoring
Well Locations MW-21A, B and C
Garden City, NY

PREPARED FOR

Genesco Inc.

Environmental Resources Management

FIGURE 24

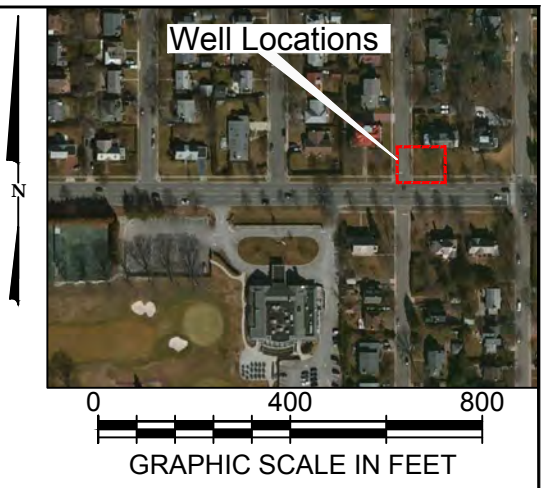
DRAWN BY	SCALE	DATE	JOB NO.
EMF	AS SHOWN	10/16/17	0097881.11

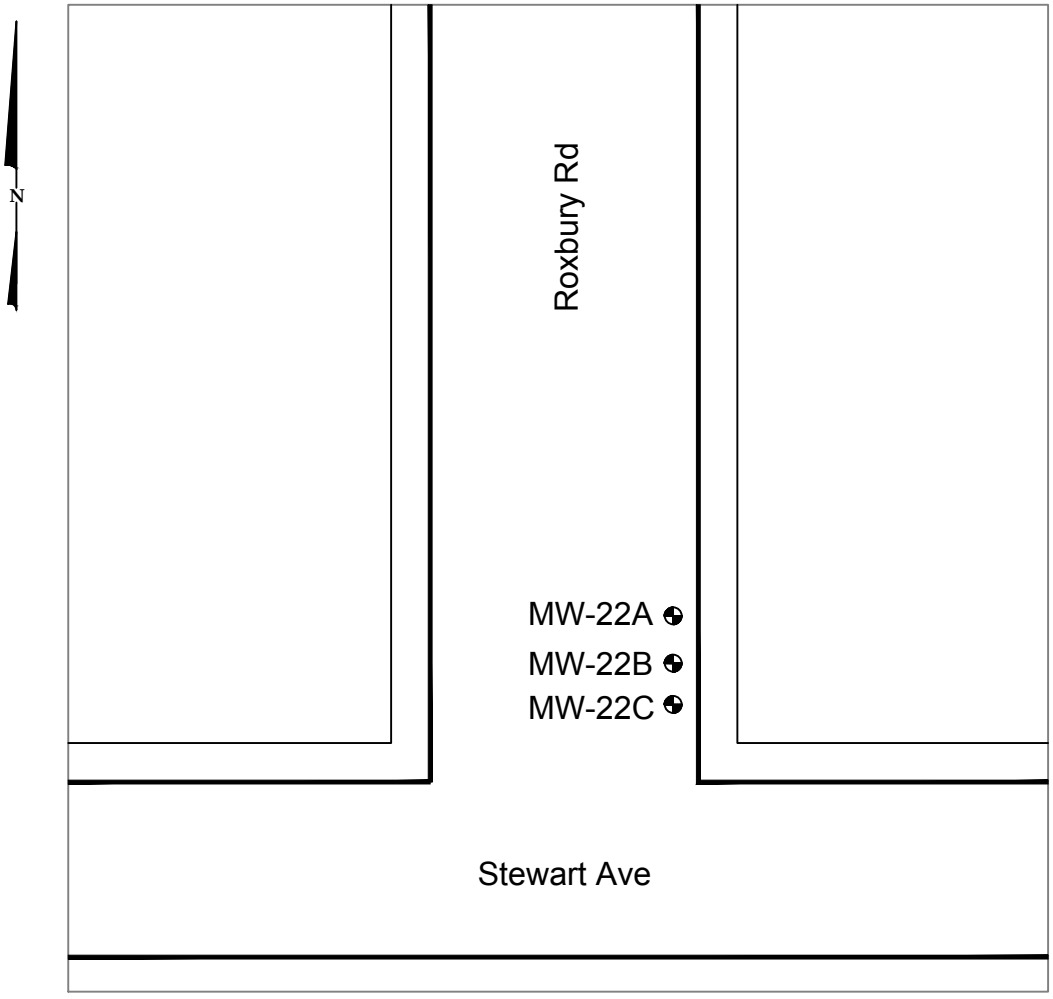
M:\Scout\Projects\GENESCO\150 Fulton Ave\NY\CAD\2017\2017-10 - Genesco - MW-21A, B & C.dwg (10/17/2017 - 10:30am Melville)

North

MW-21A (left) MW-21B (middle) and MW-21C (right)

Located on the northeast corner of Wickham Rd. and Stewart Ave. in Garden City.





Not To Scale

Wells MW-22A, B AND C (no NYSDEC Well No.) are located at the Northeast corner of Roxbury Rd and Stewart Ave in Garden City

TITLE

Groundwater Monitoring
Well Locations MW-22A, B and C
Garden City, NY

PREPARED FOR

Genesco Inc.

Environmental Resources Management

FIGURE 25

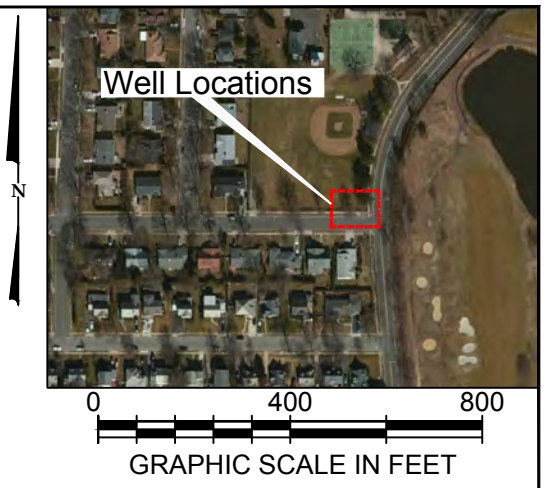
DRAWN BY	SCALE	DATE	JOB NO.
EMF	AS SHOWN	10/16/17	0097881.11

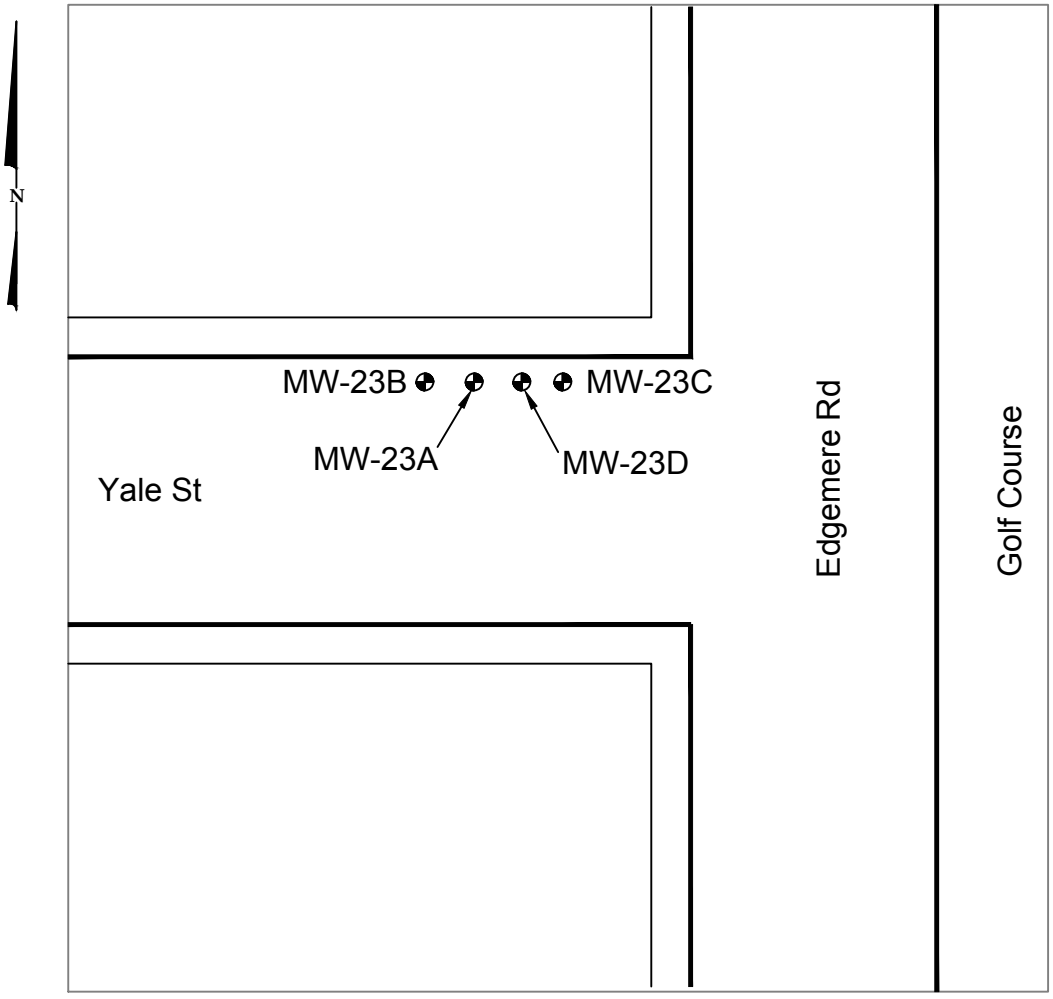
M:\Scout\Projects\GENESCO\150 Fulton Ave\NY\CAD\2017\2017-10 - Genesco - MW-22A, B & C.dwg (10/17/2017 - 10:29am Melville)

North

MW-22A (left) MW-22B (middle) and MW-22C (right)

Located on the northeast corner of Roxbury and Stewart Ave. in Garden City





Not To Scale

Wells MW-23A, B, C and D (no NYSDEC Well No.) are located at the Northwest corner of Yale St and Edgemere Rd in Garden City

TITLE

Groundwater Monitoring
Well Locations MW-23A, B, C and D
Garden City, NY

PREPARED FOR

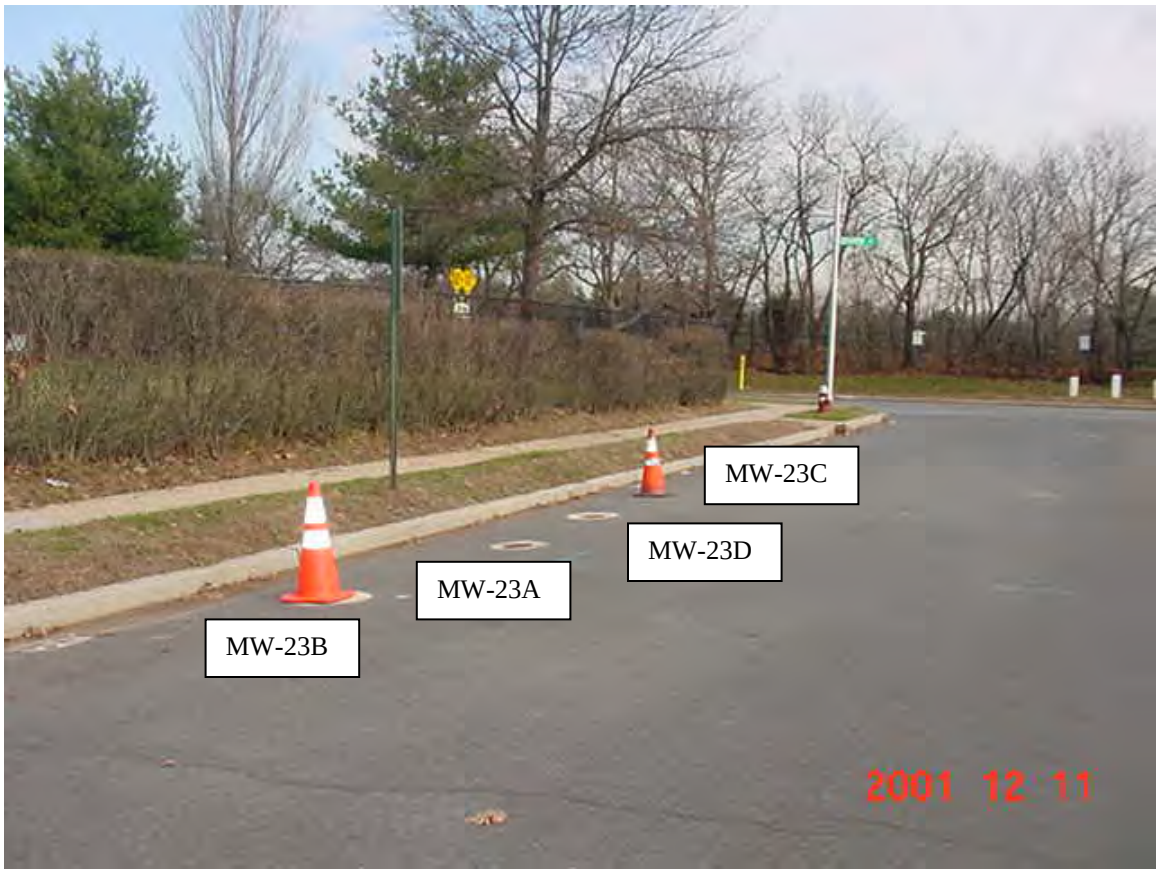
Genesco Inc.

Environmental Resources Management

FIGURE 26

DRAWN BY	SCALE	DATE	JOB NO.
EMF	AS SHOWN	10/16/17	0097881.11

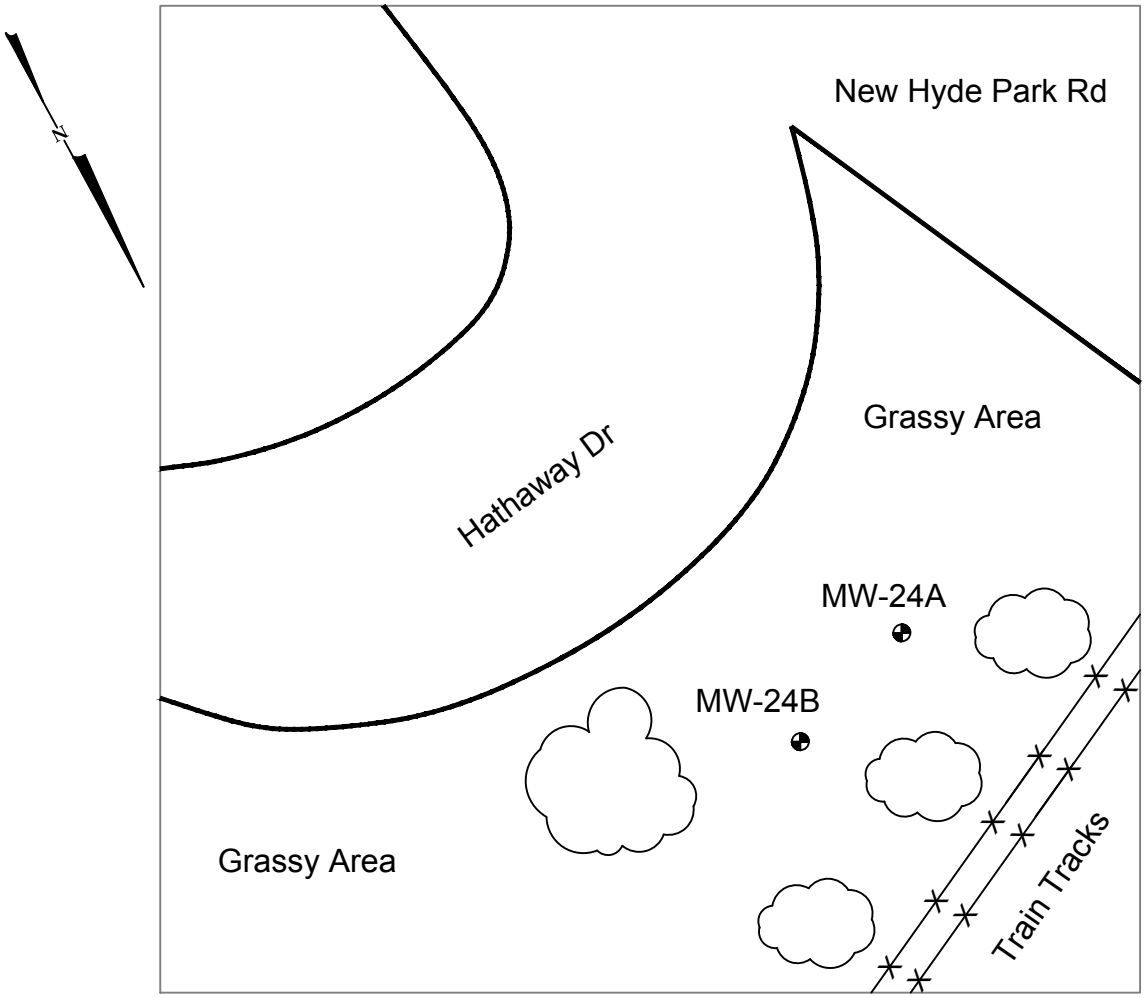
M:\Scout\Projects\GENESCO\150 Fulton Ave\NY\CAD\2017\2017-10 - Genesco - MW-23A, B, C & D.dwg (10/17/2017 - 10:28am Melville)



North

MW-23A, MW-23B, MW-23C and MW-23D

Northwest corner of Yale and Edgemere in Garden City.



Not To Scale

Wells MW-24A and MW-24B (no NYSDEC Well No.) are located at the Northeast corner of Hathaway Dr and New Hyde Park Rd in Garden City

(three way intersection of Clinch Ave which mergesinto New Hyde Park Rd and Hathaway Dr)

TITLE

Groundwater Monitoring
Well Locations MW-24A and MW-24B
Garden City, NY

PREPARED FOR

Genesco Inc.

Environmental Resources Management

FIGURE 27

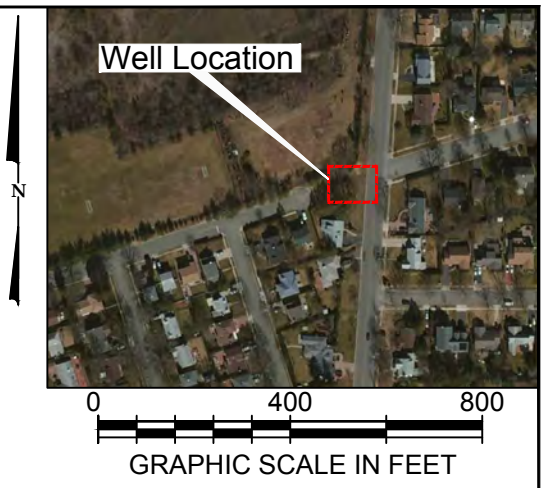
DRAWN BY	SCALE	DATE	JOB NO.
EMF	AS SHOWN	10/16/17	0097881.11

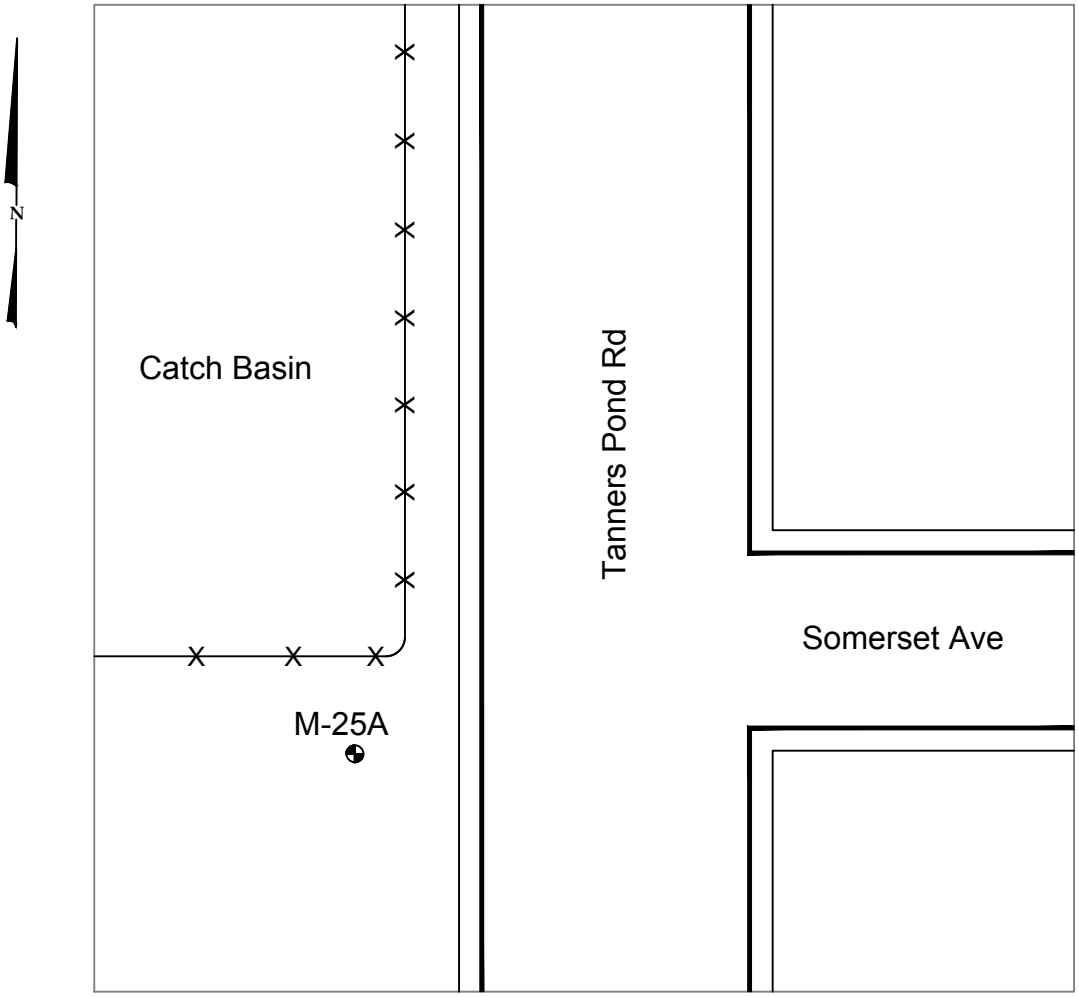
M:\Scout\Projects\GENESCO\150 Fulton Ave\NY\CAD\2017\2017-10 - Genesco - MW-24A & B.dwg (10/17/2017 - 10:28am Melville)

North ↘

MW-24A and MW-24B

Located on the northeast corner of Hathaway and New Hyde Park Rd.





Not To Scale

Well MW-25A is located on the South Side of the Tanners Pond Rd Catch Basin across from Somerset Ave

(located on grassy public area)

TITLE

Groundwater Monitoring
Well Location MW-25A
Garden City, NY

PREPARED FOR

Genesco Inc.

Environmental Resources Management

FIGURE 28

DRAWN BY	SCALE	DATE	JOB NO.
EMF	AS SHOWN	10/16/17	0097881.11

M:\Scout\Projects\GENESCO\150 Fulton Ave\NY\CAD\2017\2017-10 - Genesco - MW-25A.dwg (10/17/2017 - 10:27am Melville)

North

MW-25A

Located on the south side of the Tanners Pond Rd. Catch Basin across from Somerset Ave. in Garden City.

ATTACHMENT E - New York State Department Of Environmental Conservation
Analytical Service Protocol

NEW YORK STATE

DEPARTMENT OF ENVIRONMENTAL CONSERVATION

ANALYTICAL SERVICE PROTOCOL

EXHIBIT B

REPORTING AND DELIVERABLES REQUIREMENTS

July 2005

EXHIBIT B

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PART I -- CONTRACT REPORTS/DELIVERABLES SCHEDULE AND DISTRIBUTION

1.0 Summary Table

The following table details the Protocol reporting and deliverable requirements, their schedule, and the distribution that is required for each. Detailed requirements for each lettered "Item" listed in the chart are given in Part II of this Exhibit.

ITEM	DESCRIPTION	# of COPIES[1]	DELIVERY SCHEDULE	DISTRIBUTION		
				1	2	3
A	Standard Operating Procedures (SOPs)	1	60 days after notification of contract award, and as required in Exhibit E.	X		
B	Quality Assurance Management Plan (QAMP)	1	60 days after notification of contract award, and as required in Exhibit E.	X		
C	Weekly Sample Receipt Summary	1	The Wednesday following the calender week samples are received.	X		
D[2]	Sample Data Summary Package	2	30 days after the VTSR[3] of the last sample in the Sample Delivery Group (SDG[4]).	As Directed		
E[2]	Sample Data Package (.PDF)	1	30 days after the VTSR[3] of the last sample in the SDG[4].	X		X
F[2]	Electronic Data Deliverables (EDD)	1	30 days after the VTSR[3] of the last sample in the SDG[4].	X		X
G	Electronic Instrument Data	1	Retain for 3 years after data submission, submit within 7 days of receipt of written request from BWAM.	As Directed		
H	Samples and Extracts[5]	N/A	Retain for 365 days after data submission, submit within 7 days of receipt of written request from BWAM.	As Directed		
I	Full Verification of Instrument Parameters	1	Retain for 3 years after data submission, submit within 7 days of receipt of written request from BWAM.	As Directed		
J	Preliminary Results[6,7]	2	When requested, within 72 hours after receipt of designated samples.		X	X
K	Results of PE sample(s)	1	30 days after receipt of such Performance Evaluation (PE) sample(s).	X		

Notes (for Summary Table)

[1] The number of copies specified is the number of copies required to be delivered to each recipient, for that item.

[2] Deliverables for Items D, E, and F are to be reported total and complete. Concurrent delivery is required. Delivery shall be made such that all designated recipients receive all the items they are scheduled to receive on the same calendar day. If a deliverable item due on the same date as other deliverable items is late, all items scheduled to be due on that day shall be considered late as well. If the deliverables are due on a Saturday, Sunday, or State holiday, then they shall be delivered on the next business day.

[3] Validated Time of Sample Receipt (VTSR) is the date of sample receipt at the Contractor's facility, as recorded on the shipper's delivery receipt and sample Traffic Report/Chain of Custody Record. Sample Delivery Group (SDG) is a group of samples within a Case, received over a period of 7 days or less with the same laboratory turnaround and not exceeding 20 samples [excluding performance Evaluation (PE) Samples]. Data for all samples in the SDG are due concurrently. The date of delivery of the SDG or any samples within the SDG is the date that the last sample in the SDG is received. See Exhibit A for further description.

[4] Sample Delivery Group (SDG) is a group of samples within a Case, received over a period of 7 days or less and not exceeding 20 samples [excluding Performance Evaluation (PE) samples]. Note that preliminary results have no impact on defining the SDG. Data for all samples in the SDG are due concurrently, unless specified otherwise in a project work plan. The date of delivery of the SDG or any samples within the SDG is the date that the last sample in the SDG is received.

[5] Actual unused samples and extracts are not considered a reportable item, and their return to NYSDEC, if requested, is not billable. Unused portions or samples and extracts are considered to be a deliverable only when their return is requested in writing by NYSDEC. As specified in the Protocol, and unless otherwise instructed by the BWAM, the Laboratory shall dispose of unused sample/extract volume and used sample bottles/containers no earlier than ninety (90) days following submission of analytical data in the form of the Sample Data Package. Until these ninety days have expired, NYSDEC samples and sample extracts are the exclusive property of NYSDEC and cannot be experimented upon, disposed of, or relinquished to third parties without written permission from NYSDEC.

[6] If requested at the time of sample scheduling the contractor shall provide preliminary results, consisting of Form I and Form I TIC analytical results, by fraction, for field and quality control (QC) sample analysis via telefacsimile (fax) or electronic mail, and Form X for Pesticides and Form X for Aroclors. The Contractor will be notified of the fax number or email address at the time of the sample scheduling. Chain of Custody (COC) Records and SDG Cover Sheets shall be submitted with the Preliminary Results. The contractor shall contact the Project Officer after confirming transmission. The Contractor shall document all communication in a telephone contact log.

[7] If a sample requiring Preliminary Results arrives before 5 p.m. (Contractor's local time), the Preliminary Results are due within the required turnaround time. If a sample requiring Preliminary Results is received after 5 p.m., the Preliminary Results are due within the required turnaround time beginning at 8 a.m. the following day.

Distribution Addresses:

1. Quality Standards and Analytical Management Section
The Bureau of Watershed Assessment and Management
Division of Water
NYS Department of Environmental Conservation
625 Broadway, 4th Floor
Albany, New York 12233-3502

2. NYSDEC Sample Submitters

3. NYSDEC Project Officers

The BWAM acting on behalf of the Project Officer will provide the Laboratory with the list of addressees for the nine NYSDEC Regions. BWAM will provide the Laboratory with updated Regional address/name lists as necessary throughout the period of the contract and identify other client recipients on a case-by-case basis.

***NOTE**: Specific recipient names and addresses are subject to change during the term of the contract. The Bureau of Watershed Assessment and Management (BWAM) will notify the Laboratory in writing of such changes when they occur.*

PART II -- REPORT DESCRIPTIONS AND ORDER OF DATA DELIVERABLES

1.0 Overview

The Laboratory shall provide reports and other deliverables as specified by the schedule in Part I of this Exhibit. The required content and assembly of each deliverable is described in Part II of this Exhibit.

Descriptions of the requirements for each deliverable "Item" listed in the chart in Part I, are specified in sections A-G of this Part. Items submitted concurrently MUST BE arranged in the order listed. Additionally, the components of each item MUST BE arranged in the order presented in this Section when the item is submitted.

Examples of specific data deliverables not included herein may be obtained by submitting a written request to The Bureau of Watershed Assessment and Management clearly stating the information requested and signed and dated by the Laboratory Manager.

1.1 All deliverables MUST BE as follows:

- Legible, as specified in Section V,
- Clearly labeled and completed in accordance with instructions in this Exhibit,
- Arranged in the order specified in this Exhibit, and
- Paginated sequentially according to instructions in this Exhibit, starting from the SDG Narrative.
- Information reported on the CLP Forms or CLP-type Forms listed in this exhibit must either be typewritten or computer-generated. Handwritten corrections to the information on the CLP Forms and CLP-type Forms are not permitted. Notes or handwritten corrections on the hardcopy instrument output files must be legible, signed, and dated. Raw data consisting of handwritten worksheets should be completed in a legible fashion.
- Extraneous information should be kept to a minimum. Raw data pages, which contain no information pertaining to NYSDEC samples or QC relating to NYSDEC samples, should be excluded from the sample data package.
- Do not include redundant copies of the same supporting data in the data package. For example, if different sets of raw data reference the same standard prep log pages, include only one copy of the pages and link to it from the appropriate sections.

1.2 The contractor shall use NYSDEC Case Numbers, SDG Numbers, and NYSDEC Sample Numbers to identify samples received under this

contract, both verbally and in reports and correspondence. The Contract number shall be specified in all correspondence.

1.3 Sections III and IV of this Exhibit contain instruction for the required data reporting forms in CLP-specified formats, along with examples and templates for certain NYSDEC specific forms. Section V of this Exhibit contains the specifications for the .PDF file created for the data package. The format for electronic data deliverables (EDD) or other database compatible files are contained in Exhibit H.

1.4 In subsequent Sections of this document the words "copy" and "copies" are used when describing elements used to construct the Sample Data Package and Sample Data Summary Package. The terms "copy" and "copies", when used in this context, refer to Adobe .PDF pages produced from the original documents and included in the main .PDF file for the Package.

1.5 In all instances where a method detection limit (MDL), practical quantitation limit (PQL), or other detection limit (DL) must be reported along with the sample result, the appropriate limit should be adjusted based on the individual sample amount (mass or volume), dilution, and any additional factors they influence the limit being reported. This is referred to as the "sample specific detection limit". A sample specific detection limit should be reported along with all NYSDEC sample results, for all NYSDEC requested analytes to which a MDL, PQL, or DL applies. The only instance where the Laboratory may omit reporting of the sample specific detection limit is when a positive result is being reported for a specific analyte and the CLP/ASP Form I being used does not allow space for reporting of both a positive result and the sample specific detection limit.

1.6 Where applicable, the Laboratory shall include examples of the calculations used to arrive at the reported results. These sample calculations shall use the raw numbers from an actual sample (non-U flagged) in the data package, and show how the final reported result was arrived at for a randomly selected analyte. One sample calculation shall be included for each method used for reporting data in the SDG.

2.0 Resubmission of Data

2.1 If submitted documentation does not conform to the above criteria Section 1.1-1.4), the Laboratory will be required to resubmit such documentation with the deficiencies corrected within 6 business days, at no additional cost to NYSDEC.

2.2 Whenever the Laboratory is required to submit or resubmit data as a result of an on-site laboratory evaluation or through a Bureau of Watershed Assessment and Management (BWAM) action, or through a Project Officer's request, the data must be clearly marked as "ADDITIONAL DATA" and distributed to the specified data recipients. A cover letter must be included which describes what data is being delivered, to which NYSDEC sample(s) it pertains, and who requested the data.

2.3 Whenever the Contractor is required to submit or resubmit data as a result of Contact Compliance Screening (CCS) review by BWAM, the data shall be sent to the two contractual data recipients (BWAM and Region) and to NYSDEC's designated recipient when a written request for Sample Data Package has been made. In all instances the Contractor shall include a color-coded cover sheet (Laboratory Response to Results of Contract Compliance Screening) provided by BWAM. Electronic deliverable should be submitted or resubmitted to BWAM and the Region.

A. – Standard Operating Procedures

See Exhibits E and F for requirements

B. – Quality Assurance Management Plan

See Exhibits E and F for requirements

C. – Weekly Sample Receipt Summary

1.0 Weekly Sample Receipt Summaries shall be submitted by the Wednesday following the calender week (Sunday through Saturday) for which samples are submitted. This information must be transmitted electronically (emailed) as a Microsoft Excel compatible file. NYSDEC will provide the Excel file structure and all appropriate fields in the Excel file should be completed prior to submission.

1.1 The Weekly Sample Receipt Summary shall contain the following items:

- Lab name
- Contract number
- NYSDEC Case #
- NYSDEC SDG #
- NYSDEC Sample ID #
- Lab ID #
- Name of NYSDEC Sample Submitter
- Code numbers for requested analyses from Contract Laboratory Sample Information Sheet
- Sample Analysis Price – full sample price from contract for each sample # reported.
- List of NYSDEC sample numbers of all samples in the SDG, identifying the first and last samples received, and their dates of receipt.

***Note**: When more than one sample is received in the first or last SDG shipment, the "first" sample received would be the lowest sample number (considering both alpha and numeric designations); the "last" sample received would be the highest sample number (considering both alpha and numeric designations).*

1.2 The NYSDEC SDG# is found on the Contract Laboratory Sample Information Sheet. The SDG number is also reported on all data reporting forms.

D. – Sample Data Summary Package

As specified in the Delivery Schedule, one Sample Data Summary Package CD-ROM each shall be delivered to the project officer and the sample collector concurrently with delivery of other required sample data. The Sample Data Summary Package consists of Adobe .PDF copies of specified items from the Sample Data Package. These items are listed below and described in detail under part E, Sample Data Package.

The Sample Data Summary Package shall be ordered as follows and shall be submitted separately either as a separate .PDF file or clearly separated by a bookmark in the Sample Data Package .PDF directly preceding the Sample Data Package. Sample data forms shall be arranged by fraction, in increasing NYSDEC sample number order, considering both letters and numbers. E400 is a lower sample number than RH100, as E precedes R in the alphabet.

Specifications for the book marking of electronic (.PDF) data packages are given in Section V of this Exhibit. Sections that must be bookmarked are annotated with **"<B-*X*>**", where *X* is the numeric level of the bookmark required for the given Section or subsection. For further information on bookmarking requirements see Part V, Section 1.3.6.

The Sample Data Summary Package shall contain all data for all samples within one Sample Delivery Group of the Case as follows:

1. NYSDEC Data Package Summary Forms **<B-1>**

2. SDG Narrative **<B-1>**

3. By fraction (VOA, SV, PEST, ARO, IN, WC) and by sample within each fraction – tabulated target compound results (FORM I-*XXXX*) and tentatively identified compounds (FORM I-*XXXX*-TIC) (VOA and BNA only). (**<B-1>** for the "Sample Results" section of the Sample Data Package Summary, **<B-2>** to separate and mark the beginning of the results for each separate fraction and/or analysis method)

   ***Note:** "XXXX" represents the code for the appropriate organic data reporting form.*

4. By fraction (VOA, SV, PEST, and ARO) – surrogate spike analysis results (FORM II-*XXXX*) by matrix (water and/or soil) and for soil, by concentration (low or medium). (**<B-1>** for the "Surrogate Results" section of the Sample Data Package Summary, **<B-2>** to separate and mark the beginning of the surrogate results for each separate fraction and/or analysis method)

5. By fraction (VOA, SV, PEST, and ARO) – matrix spike/matrix spike duplicate/matrix spike blank results (FORM III-*XXXX*) – as required by method. (**<B-1>** for the "MS/MSD Results" section of the Sample Data Package Summary, **<B-2>** to separate and mark the beginning of the MS/MSD results for each separate fraction and/or analysis method)

6. By fraction (VOA, SV, PEST, and ARO) – QC Check Sample/Standard Recovery Summary – If required by method. (**<B-1>** for the "Check Sample/Standard Recovery" section of the Sample Data Package Summary, **<B-2>** to separate and mark the beginning of the check standard results for each separate fraction and/or analysis method)

7. By fraction (IN and WC only) – duplicate sample results (FORM VI-IN). (**<B-1>** for the "Duplicate Results" section of the Sample Data Package Summary, **<B-2>** to separate and mark the beginning of the duplicate results for each separate fraction and/or analysis method)

8. By fraction (IN and WC only) – spike sample results (FORM V-IN). (**<B-1>** for the "Spike Sample Results" section of the Sample Data Package Summary, **<B-2>** to separate and mark the beginning of the spike results for each separate fraction and/or analysis method)

9. By fraction (VOA, SV, PEST, ARO, IN, WC) – blank data (FORM IV-*XXXX* (for organics) and Form III-IN) and tabulated results (FORM I-*XXXX* (for organics) and FORM I-IN) including tentatively identified compounds (FORM I-*XXXX*-TIC)(VOA and BNA only). (**<B-1>** for the "Blank Results" section of the Sample Data Package Summary, **<B-2>** to separate and mark the beginning of the blank results for each separate fraction and/or analysis method)

10. By fraction (VOA and SV only) – internal standard area data (FORM VIII-*XXXX*). (**<B-1>** for the "Internal Standard Recovery" section of the Sample Data Package Summary, **<B-2>** to separate and mark the beginning of the internal standard recovery for each separate fraction and/or analysis method)

E. – Sample Data Package

The Sample Data Package is divided into the eight major units described below. The last six units are each specific to an analytical fraction (volatiles, semivolatiles, pesticides/Aroclors, GC organics, inorganics, and conventional wet-chemistry). If the analysis of a fraction is not required, then that fraction-specific unit is not required as a deliverable.

The Sample Data Package shall include data for analyses of all samples in one Sample Delivery Group, including field samples, re-analyses, blanks, duplicates, control spikes, matrix spikes, matrix spike duplicates, and matrix spike blanks. In addition, the package will also include the results of Method Detection Limit studies and reports establishing interelement correction factors for ICP-AES.

All data produced in support of Superfund investigation/remediation as identified by checked boxes under the Contract Laboratory Section of the Contract Laboratory Sample Information Sheet (CLSIS) (See Exhibit A) shall be reported as specified for the Superfund Category/CLP (Section 1.0 below). All data generated in support of the

SPDES program as identified by a CASE # beginning with the letter "E" shall be reported using ASP Category B (Section 3.0 below). All other samples shall be reported using either ASP Category A or ASP Category B described in Section 2.0 and 3.0 below. The specific reporting level to be used shall be specified by the CLSIS, unless otherwise specified in a project work plan.

The Laboratory shall retain a CD-ROM/.PDF copy of the Sample Data Package for 3 years after final acceptance of data. See Section V for a detailed explanation of these requirements. After this time, the Laboratory may dispose of/delete the package.

Specifications for the book marking of electronic (.PDF) data packages are given in Section V of this Exhibit. Sections that must be bookmarked are annotated with **"<B-*X*>**", where *X* is the numeric level of the bookmark required for the given Section.

1.0 Superfund Category/CLP

1.1 Cover Documentation **<B-1>**

Cover Page for the Data Package shall include: laboratory name; laboratory code; contract number; Case number; SDG number; and NYSDEC sample numbers in alphanumeric order.

1.2 SDG Narrative **<B-1>**

1.2.1 This document shall be clearly labeled "SDG Narrative" and shall contain: Laboratory name; Case number; Sample Delivery Group number (SDG); NYSDEC sample numbers in the SDG, differentiating between initial analyses and re-analyses; Contract number; and detailed documentation of any quality control, sample, shipment and/or analytical problems encountered in processing the samples reported in the data package. For soil samples collected and pre-weighed in the field the laboratory shall document all discrepancies between sample weights determined in the field and in the laboratory in the SDG Narrative. A statement on the use of background and interelement corrections performed for the samples should be included for inorganic analysis, if applicable.

1.2.2 The Laboratory shall document, in the SDG Narrative, the alternative technique used to determine cooler temperature if a temperature indicator bottle is not present in the cooler. The Laboratory shall also provide, in the SDG Narrative, sufficient information, including equations or curves (at least on equation or curve per method), to allow the recalculation of sample results from raw instrument output. The Laboratory shall also include a discussion of any performance-based modifications performed on the Protocol requirements or on published methods. If modifications are reoccurring, the laboratory may provide separate documentation of the modifications and reference such modifications in the SDG Narrative. Additionally, the Laboratory shall also identify and explain any differences that exist between the Form Is and the supporting documentation provided in the

data package and those previously provided as preliminary results.

1.2.3 The Contractor shall also provide, in the SDG Narrative or as attachments referenced in the SDG narrative, sufficient information, including copies of equations and definitions of variables (at least one equation per method), to allow the recalculation of sample results from raw instrument output.

1.2.4 All Gas Chromatography (GC) columns used for analysis should be documented in the SDG Narrative, by fraction. List the GC column identification—brand name, the internal diameter (in millimeters), and the length (in meters), packing/coating material, and film thickness. The trap used for volatile analysis shall be described here. List trap name, when denoted by the manufacturer, its composition (packing material/brand name, amount of packing material, in length). The Laboratory shall include any technical and administrative problems encountered, the corrective action taken, the resolution, and an explanation for all flagged edits (e.g. manual edits) on quantitation lists. The Laboratory shall document in the SDG Narrative all instances of manual integration.

1.2.5 Whenever data from sample re-analysis are submitted, the Laboratory shall state in the SDG Narrative for each re-analysis, whether it considers the re-analysis to be billable, and if so, why.

1.2.6 The Laboratory shall list the pH determined for each water sample submitted for volatile analysis. This information may appear as a simple list or table in the SDG Narrative. The purpose of this pH determination is to ensure that all water volatiles samples were acidified in the field. No pH adjustment is to be performed by the Laboratory on water samples for volatiles analysis. The SDG Narrative shall conclude with the following statement, verbatim: *"I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this Sample Data Package and in the electronic data deliverables has been authorized by the Laboratory Manager or his/her designee, as verified by the following signature."* This statement shall be directly followed by signature of the Laboratory Manager or his designee with a typed line below it containing the signer's name and title, and the date of signature.

1.3 Sample Log-In Sheet [FORM DC-1] **<B-1>**

NOTE: *Example copies of the DC-1 form can be found in CLP Exhibit B. Use the DC-1 Form in OLM04.2 for organic samples and the DC-1 Form in ILM05.3 for inorganics/conventional samples.*

In addition to the DC-1 Form, the contractor must include a listing showing NYSDEC sample numbers, in alphanumeric order, cross-referenced with laboratory Sample ID numbers.

1.4 Contract Lab Sample Information Sheets **<B-1>**

A copy of the Contract Lab Sample Information Sheets (CLSIS) for all of the samples in the SDG. The CLSIS shall be arranged in increasing NYSDEC sample number order, considering both letters and numbering in ordering samples.

1.5 Chain-of-Custody Forms **<B-1>**

Copies of both the external and internal chain-of-custody sheets for all samples within the SDG.

1.6 Superfund-CLP Volatiles Data **<B-1>**

1.6.1 QC Summary **<B-2>**

1.6.1.1 System Monitoring Compound or Deuterated Monitoring Compound Recovery Reports (FORM II VOA-1, VOA-2, VOA-3, VOA-4, VOA-SIM, VOA-SIM1, VOA-SIM2).

1.6.1.2 Matrix Spike/Matrix Spike Duplicate/Matrix Spike Blank Recovery Reports (FORM III VOA-1, VOA-2, VOA-SIM) – Provided when an MS/MSD analysis is requested by NYSDEC.

1.6.1.3 Method Blank Summary (FORM IV VOA, VOS-SIM) – If more than a single form is necessary, forms must be arranged in chronological order by date of analysis of the blank, by instrument.

1.6.1.4 GC/MS Instrument Performance Check (FORM V VOA) – If more than a single form is necessary, the forms must be arranged in chronological order, by instrument.

***Note**: This form is not required for the optical analysis when submitting data using the Selected Ion Monitoring (SIM) technique.*

1.6.1.5 Internal Standard Area and RT Summary (FORM VIII VOA, VOA-SIM) – If more than a single form is necessary, the forms must be arranged in chronological order, by instrument.

1.6.2 Volatiles Sample Data (**<B-2>** to mark Section heading, **<B-3>** to mark the beginning of each data "packet")

Sample data shall be arranged in packets with the Organic Analysis Data Sheet (FORM I VOA-1, VOA-2, including FORM I VOA-TIC), followed by the raw data for volatile samples. The sample data shall be placed in order of increasing NYSDEC sample number, considering both letters and numbers. Volatile sample data for SIM analysis must be arranged

together with the rest of the SIM Volatiles data at the end of the sub-Section.

1.6.2.1 Target Compound Results – Volatile Organics Analysis Data Sheet (FORM I VOA-1, VOA-2) – Tabulated results (identification and quantitation) of the specified Superfund-CLP target compounds (Exhibit C – Volatiles) shall be included. The validation and release of these results are authorized by a specific, signed statement in the SDG Narrative (see Section 1.2). In the event that the Laboratory Manager cannot verify all data reported for each sample, the Laboratory Manager shall provide a detailed description of the problems associated with the sample in the SDG Narrative.

1.6.2.2 Target Compound Results – Volatile Organics Analysis Data Sheet (FORM I VOA-1, VOA-2) – Tabulated results (identification and quantitation) of the specified Superfund-CLP target compounds (Exhibit C – Volatiles) shall be included. The validation and release of the results are authorized by a specific, signed statement in the SDG Narrative (see Section 1.2). In the event that the Laboratory Manager cannot verify all data reported for each sample, the Laboratory Manager shall provide a detailed description of the problems associated with the sample in the SDG Narrative.

1.6.2.3 Tentatively Identified Compounds (FORM I VOA-TIC) – FORM I VOA-TIC is the tabulated list of the highest probable match for up to 10 organic compounds not system monitoring compounds and are not target compounds, system monitoring compounds, internal standard compounds, or unsubstituted alkanes, or any other compound not listed in Exhibit C – Volatiles. It including the CAS (Chemical Abstracts Registry) number, tentative identification and estimated concentrations. For estimating concentration, assume a response factor of 1, and estimate the concentration by comparison of the compound peak height or total area count to the peak height or total area count of the nearest internal standard free of interferences on the reconstructed ion chromatogram. This form must be included even if no compounds are found. If this occurs, enter a "0" in the field for "Number found" on the form.

Note: *The Laboratory must be consistent, i.e., use peak height for all comparisons or use total area count for all comparisons.*

1.6.2.4 Reconstructed Total Ion Chromatograms (RIC) (for each sample including dilutions and reanalyzes) – RICs must be normalized to the largest non-solvent component and contain the following header information:

- NYSDEC sample number;
- Date and time of analysis;
- GC/MS instrument ID;
- Lab file ID;
- Analyst ID.

Note: *Each Selected Ion Current Profile (SICP) for samples taken through the optional analysis using the SIM technique shall be labeled as in this Section.*

1.6.2.4.1 Internal standard and system monitoring compounds should be labeled with the names of compounds, either directly out from the peak, or are to be included on a printout of retention times when the retention times are directly located over the peak. Labeling of the compounds is not required and should not detract from the legibility of the required labels.

1.6.2.4.2 If automated system procedures are used for preliminary identification and/or quantification of the Superfund Target Compound List (Superfund-TCL) compounds, the complete data system report must be included in all Sample Data Packages, in addition to the reconstructed ion chromatogram. The complete data system report shall include all of the information listed below. For laboratories that do not use the automated data system procedures, a laboratory "raw data sheet", which contains the following information, must be included in the sample data package in addition to the chromatogram.

- NYSDEC sample number;
- Date and time of analysis;
- RT or scan number of identified target compounds;
- Ion used for quantitation with measured area;
- Copy of area table from data system;
- On column concentration/amount, including units;
- GC/MS instrument ID;

- Lab file ID;
- Analyst ID.

1.6.2.4.3 In all instances where the data system report has been edited, or where manual integration or manual quantitation has been performed, the GC/MS operator must identify such edits or manual procedures by initialing and dating the changes made to the report, and shall include the integration scan range. The GC/MS Operator shall also mark each integrated area with the letter "m" on the quantitation report. In addition, a hardcopy printout of the Extracted Ion Current Profile (EICP) of the quantitation ion displaying the manual integration shall be included in the raw data. This applies to all compounds listed in Exhibit C – Volatiles, internal standards, and system monitoring compounds.

1.6.2.5 Other required Information. For each sample, by each compound identified, the following shall be included in the data package:

1.6.2.5.1 Copies of raw spectra and copies of background-subtracted mass spectra of target compounds listed in Exhibit C – Volatiles that are identified in the sample and corresponding background-subtracted TCL standard mass spectra. Spectra must be labeled with NYSDEC sample number, lab file ID, date, and time of analysis, and GC/MS instrument ID. Compound names must be clearly marked on all spectra.

1.6.2.5.2 Copies of mass spectra of organic compounds not listed in Exhibit C (Superfund-TCL) (Tentatively Identified Compounds), with associated best-match spectra (the three best matches), as labeled in 1.6.2.4 above.

1.6.3 Standards Data **<B-2>**

1.6.3.1 Initial Calibration Data (FORM VI VOA-1, VOA-2, VOA-3, VOA-SIM) – shall be included in order by instrument, if more than one instrument used. **<B-3>**

1.6.3.1.1 Volatile standard(s) reconstructed ion chromatograms and quantitation reports for the initial (five-point) calibration, as labeled in 1.6.2.4 above. Spectra are not required.

1.6.3.1.2 All initial calibration data that pertain to samples in the data package must be included, regardless of when it was performed and for which Case. When more than one initial calibration is performed, the data must be put in chronological order, by instrument.

1.6.3.1.3 Labels for standards shall be descriptive of the concentrations of the non-ketone (majority) analytes in µg/L.

1.6.3.1.4 EICPs displaying each manual integration.

1.6.3.2 Continuing Calibration (FORM VII VOA-1, VOA-2, VOA-3, VOA-SIM) – shall be included in order by instrument, if more than one instrument used. **<B-3>**

1.6.3.2.1 Volatile standard(s) reconstructed ion chromatograms and quantitation reports for all continuing (12-hour) calibration verifications, as labeled in 1.6.2.4. Spectra are not required.

1.6.3.2.2 When more than one Continuing Calibration Verification is performed, forms must be in chronological order, by instrument.

1.6.3.2.3 EICPs displaying each manual integration.

1.6.3.3 In all instances where the data system report has been edited, or where manual integration or quantitation has been performed, the GC/MS Operator shall identify such edits or manual procedures by initializing and dating the changes made to the report, and shall include the integration scan range. The GC/MS Operator shall also mark each integration area with the letter "m" on the quantitation report. In addition a hardcopy printout of the EICP of the quantitation ion displaying the manual integration shall be included in the raw data. This applies to all compounds listed in Exhibit C – Volatiles, internal standards, and system monitoring compounds.

1.6.4 Volatiles Raw QC Data **<B-2>**

1.6.4.1 4-Bromofluorobenzene (BFB) shall be arranged in chronological order by instrument for each 12-hour period, for each GC/MS system utilized. **<B-3>**

1.6.4.1.1 Bar graph spectrum, as labeled in 1.6.2.4.

1.6.4.1.2 Mass listing, as labeled in 1.6.2.4.

1.6.4.1.3 Reconstructed total ion chromatogram (RIC), labeled as in 1.6.2.4.

1.6.4.2 Blank Data shall be arranged by type of blank (method, storage, instrument) and shall be in chronological order, by instrument. **<B-3>**

***Note**: This order is different from that used for sample data (Section 1.6.2).*

1.6.4.2.1 Tabulated results (FORM I VOA-1, VOA-2, VOA-SIM).

1.6.4.2.2 Tentatively Identified Compounds (FORM I-TIC) – even if none are found.

1.6.4.2.3 Reconstructed ion chromatogram(s) and quantitation report(s) or legible facsimile (GC/MS), as labeled as in 1.6.2.4.

1.6.4.2.4 Target compound spectra with laboratory-generated standard, labeled as in 1.6.2.4. Data systems that are incapable of dual display shall provide spectra in the following order:

- Raw target compound spectra;
- Enhanced or background-subtracted spectra;
- Laboratory generated standard spectra.

1.6.4.2.5 GC/MS library search spectra for Tentatively Identified Compounds (TIC), labeled as in 1.6.2.4.

1.6.4.2.6 Quantitation/calculation of TIC concentrations.

1.6.4.3 Matrix Spike Blank Data **<B-3>**

1.6.4.3.1 Tabulated results (FORM I VOA-1, VOA-2, VOA-SIM) of all target compounds. Form I VOA-TIC is <u>not</u> required.

1.6.4.3.2 Reconstructed ion chromatogram(s) and quantitation report(s), as labeled in 1.6.2.4. Spectra are <u>not</u> required.

1.6.4.4 Matrix Spike Data **<B-3>**

1.6.4.4.1 Tabulated results (FORM I VOA-1, VOA-2) of all target compounds. FORM I VOA-TIC is <u>not</u> required.

1.6.4.4.2 Reconstructed ion chromatogram(s) and quantitation report(s), as labeled in 1.6.2.4. Spectra are not required.

1.6.4.5 Matrix Spike Duplicate Data **<B-3>**

1.6.4.5.1 Tabulated results (FORM I VOA) of all target compounds. FORM I VOA-TIC is not required.

1.6.4.5.2 Reconstructed ion chromatogram(s) and quantitation report(s), as labeled in 1.6.2.4. Spectra are not required.

1.6.5 Copy of Calculations **<B-2>**

The Laboratory must provide a copy of the calculations work sheet showing how final results are obtained from values printed on the quantitation report. If manipulations are performed by a software package, a copy of the formula used must be supplied, as well as, values for all terms in the formula.

Note: *All correction factors and equations utilized must be indicated on the work sheet.*

1.6.6 Copy of Extraction Logs **<B-2>**

These logs must be legible and include: (1) date, (2) sample weights and volumes, (3) sufficient information to unequivocally identify which QC samples (i.e. matrix spike, matrix spike duplicate, matrix spike blank) correspond to each batch extracted, (4) comments describing any significant sample changes or reactions which occur during preparation, and (5) final volumes and vial identification numbers.

1.7 Semivolatiles Data **<B-1>**

1.7.1 Semivolatiles QC Summary **<B-2>**

1.7.1.1 System Monitoring Compound Percent Recovery Summary (FORM II SV-1, SV-2, SV-3, SV-4, SV-SIM).

1.7.1.2 Matrix Spike/Matrix Spike Duplicate Summary (FORM III SV-1, SV-2, SV-SIM) - Provided when an MS/MSD analysis is requested by NYS DEC.

1.7.1.3 Method Blank Summary (FORM IV SV, SV-SIM) – If more than a single form is necessary, forms shall be arranged in chronological order by date of analysis of the blank, by instrument.

1.7.1.4 GC/MS Instrument Performance Check (FORM V SV) – If more than a single form is necessary, forms shall be arranged in chronological order, by instrument.

Note: *This form is not required when submitting data for the analysis of Polynuclear Aromatic Hydrocarbons (PAHs)/phenols using the SIM technique.*

1.7.1.5 Internal Standard Area and RT Summary (FORM VIII SV-1, SV-2) – If more than a single form is necessary, the forms shall be arranged in chronological order, by instrument.

1.7.1.6 Instrument Detection Limits.

1.7.2 Semivolatile Sample Data (**<B-2>** to mark Section heading, **<B-3>** to mark the beginning of each data "packet")

Sample data shall be arranged in packets with the Semivolatile Organics Analysis Data Sheet (FORM I SV-1, SV-2, including FORM I SV-TIC), followed by the raw data for semivolatile samples. These sample packets should then be placed in increasing DEC sample number, considering both letters and numbers in ordering samples.

1.7.2.1 Target Compound Results, Semivolatiles Organics Analysis Data Sheet (FORM I SV-1, SV-2) – Tabulated results (identification and quantitation) of the specified target compounds (Exhibit C – CLP Semivolatiles) shall be included. The validation and release of these results are authorized by a specific, signed statement in the SDG Narrative (see Section 1.2). In the event that the Laboratory Manager cannot verify all data reported for each sample, the Laboratory Manager shall provide a detailed description of the problems associated with the sample in the SDG Narrative.

1.7.2.2 Semivolatile Tentatively Identified Compounds (FORM I SV-TIC) – Form I SV-TIC is the tabulated list of the highest probable match for up to 20 organic compounds that are not target compounds, system monitoring compound, internal standard compounds, and are not listed in Exhibit C – CLP Volatiles and Semivolatiles. It includes the CAS number (if applicable), tentative identification, and estimated concentration. For estimating concentration, assume a response factor of 1, and estimate the concentration by comparison of the compound peak height or total area count to the peak height or total area count of the nearest internal standard free of interferences on the reconstructed ion chromatogram. This form must be included even if no compounds are found. If this occurs, enter a "0" in the field for "Number found" on the form.

Note: *This form is not required when submitting data for the optional analysis of PAHs/phenols using the SIM technique.*

Note*: The Laboratory must be consistent, i.e., use peak height for all comparisons or use total area count for all comparisons.*

1.7.2.3 PAHs/Phenols Analysis Data Sheet (FORM I SV-SIM) – This data form shall be submitted upon the NYS DEC's request for optional analysis of PAHs/phenols using the SIM technique. The specific target PAHs/phenols listed in Exhibit C – CLP Semivolatiles shall be included. The validation and release of these results are authorized by a specific, signed statement in the SDG Narrative (see Section 1.2). In the event that the Laboratory Manager cannot verify all data reported for each sample, the Laboratory Manager shall provide a detailed description of the problems associated with the sample in the SDG Narrative.

1.7.2.4 Reconstructed Total Ion Chromatograms (RICs) (for each sample, including dilutions and reanalyzes). RICs must be normalized to the largest non-solvent component, and must contain the following header information:

- NYSDEC sample number;
- Date and time of analysis;
- GC/MS instrument ID;
- Lab file ID; and
- Analyst ID.

1.7.2.4.1 Internal standards and system monitoring compounds are to be labeled on RICs or SICPs with the names of compounds, either directly out from the peak, or are to be included on a printout of retention times if the retention times are printed directly over the peak.

1.7.2.4.2 If automated data system procedures are used for preliminary identification and/or quantification of the target compound, the complete data system report shall be included in all Sample Data Packages, in addition to the reconstructed ion chromatogram or SICP for optional PAHs/phenols analysis. The complete data system report shall include all of the information listed below. For laboratories that do not use the automated data system procedures, a laboratory "raw data sheet," containing the following information, shall be included in the Sample Data Package, in addition to the chromatogram.

- NYSDEC sample number

- Date and time of analysis
- RT or scan number of identified Superfund-TCL compounds
- Ion used for quantitation with measured area
- Copy of area table from data system
- GC/MS instrument ID
- Lab file ID

1.7.2.4.3 In all instances where the data system report has been edited, or where manual integration or quantitation has been performed, the GC/MS operator shall identify such edits or manual procedures by initialing and dating the changes made to the report, and shall include the integration scan range. The GC/MS operator shall also mark each integrated area with the letter "m" on the quantitation report. In addition, a hardcopy printout of the EICP of the quantitation ion displaying the manual integration shall be included in the raw data. This applies to all compounds listed in Exhibit C – CLP Semivolatiles, internal standards, and system monitoring compounds.

1.7.2.5 Other Required Information – For each sample, by each compound identified, the following shall be included in the data package:

1.7.2.5.1 Copies of raw spectra and copies of background-subtracted mass spectra of target compounds listed in Exhibit C – CLP Semivolatiles that are identified in the sample and corresponding background-subtracted target compound standard mass spectra. This includes PAH/phenol target compounds that are identified during the optional analysis using the SIM technique. Spectra shall be labeled with NYS DEC sample number, laboratory file ID, date, and time of analysis, and GC/MS instrument ID. Compound names must be clearly marked on all spectra.

1.7.2.5.2 Copies of mass spectra of non-system monitoring/non-internal standard organic compounds not listed in Exhibit C – CLP Semivolatiles with associated best-match spectra (maximum of three best matches). This

includes the mass spectra for tentatively identified alkanes. Spectra shall be labeled with NYS DEC Sample Number, laboratory file ID, date and time of analysis, and GC/MS instrument ID. Compound names shall be clearly marked on all spectra.

1.7.3 Semivolatiles Standards Data **<B-2>**

1.7.3.1 Initial Calibration Data (FORM VI SV-1, SV-2, SV-3) or FORM VI SV-SIM (when optional analysis of PAHs/phenols is performed) shall be included in order by instrument, if more than one instrument used. **<B-3>**

1.7.3.1.1 Semivolatile standard(s) reconstructed ion chromatograms and quantitation reports (or legible facsimile) for the initial (five-point) calibration, labeled in 1.7.2.4. Spectra are not required.

1.7.3.1.2 When optional analysis of PAHs/phenols is requested, then SICPs and quantitation reports for the initial calibration standards (five-point), labeled as in Section 1.7.2.4, shall be submitted. Spectra are not required.

1.7.3.1.3 All initial calibration data that pertain to samples in the data package shall be included, regardless of when it was performed and for which SDG. When more than one initial calibration is performed, the data must be put in chronological order, by instrument.

1.7.3.1.4 Labels for standards shall reflect the concentrations of the majority of the analytes in µg/L.

1.7.3.1.5 EICPs displaying each manual integration.

1.7.3.2 Continuing Calibration Verification Data (FORM VII SV-1, SV-2, SV-3) or FORM VII SV-SIM (when optional analysis of PAHs/phenols is performed) shall be included in order by instrument, if more than one instrument used. **<B-3>**

1.7.3.2.1 Semivolatile standard(s) reconstructed ion chromatograms and quantitation reports for all opening, closing, and continuing calibrations verifications, as labeled in Section 1.7.2.4. Spectra are not required.

1.7.3.2.2 When optional analysis of PAHs/phenols is requested, then SICPs and quantitation reports

for all opening, closing, and CCVs, labeled as in Section 1.7.2.4. Spectra are not required.

1.7.3.2.3 When more than one continuing calibration is performed, forms must be in chronological order, by instrument.

1.7.3.2.4 EICPs displaying each manual integration.

1.7.3.3 In all instances where the data system report has been edited, or where the manual integration or quantitation has been performed, the GC/MS Operator shall identify such edits or manual procedures by initialing and dating the changes made to the report, and shall include the integration scan range. The GC/MS Operator shall also mark each integration area with the letter "m" on the quantitation report. In addition, a hardcopy printout of the EICP of the quantitation ion displaying the manual integration shall be included in the raw data. This applies to all compounds listed in Exhibit C – CLP Semivolatiles, internal standards, and system monitoring compounds.

1.7.4 Semivolatiles Raw Quality Control (QC) Data **<B-2>**

1.7.4.1 Decafluorotriphenylphosphine (DFTPP) data shall be arranged in chronological order by instrument for each 12-hour period, for each GC/MS system utilized. **<B-3>**

1.7.4.1.1 Bar graph spectrum, as labeled in 1.7.2.4.

1.7.4.1.2 Mass listing, as labeled in 1.7.2.4.

1.7.4.1.3 Reconstructed total ion chromatogram (RIC), labeled as in 1.7.2.4.

1.7.4.2 Blank Data shall be in chronological order by extraction date. **<B-3>**

Note: *This order is different from that used for samples.*

1.7.4.2.1 Tabulated results (FORM I SV-1, SV-2, SV-SIM).

1.7.4.2.2 Tentatively Identified Compounds (FORM I SV-TIC) – even if none found.

1.7.4.2.3 Reconstructed ion chromatogram(s) and quantitation report(s) or legible facsimile (GC/MS), as labeled in 1.7.2.4.

1.7.4.2.4 Target compound spectra with laboratory-generated standard, as labeled in 1.7.2.4. Data

systems that are incapable of dual display shall provide spectra in the following order:

- Raw target compound spectra;
- Enhanced or background-subtracted spectra;
- Laboratory-generated standard spectra.

1.7.4.2.5 GC/MS library search spectra for Tentatively Identified Compounds (TICs), as labeled in 1.7.2.4.

1.7.4.2.6 Quantitation/Calculation of TIC concentrations.

1.7.4.3 Semivolatiles Matrix Spike Blank Data **<B-3>**

1.7.4.3.1 Tabulated results (FORM I SV) of all target compounds. Form I SV-TIC not required.

1.7.4.3.2 Reconstructed ion chromatogram(s) and quantitation report(s) or legible facsimile (GC/MS), as labeled in 1.7.2.4. Spectra are required.

1.7.4.4 Semivolatiles Matrix Spike Duplicate Data **<B-3>**

1.7.4.4.1 Tabulated results (FORM I SV-1, SV-2) of all target compounds. FORM I SV-TIC is not required.

1.7.4.4.2 Reconstructed ion chromatogram(s) and quantitation report(s) or legible facsimile (GC/MS), as labeled in 1.7.2.4. Spectra are not required.

1.7.4.5 Semivolatile Gel Permeation Chromatography (GPC) Data – The two most recent Ultra Violet (UV) traces of the (GPC) calibration solution, and the reconstructed ion chromatogram and data system reports for the GPC blank shall be arranged in chronological order by GPC for the GPC calibration. **<B-3>**

1.7.4.5.1 Traces must be labeled with GPC column identifier, date of calibration, and with compound names labeled either directly out from the peak, or on a printout of retention times, if retention times are printed over the peak.

1.7.4.5.2 Reconstructed ion chromatogram and data system report(s) labeled as specified in Section 1.7.2.4 for the GPC blank analysis.

1.7.4.5.3 Reconstructed ion chromatogram and data system report(s) for all standards used to quantify compounds in the GPC blank, labeled, as specified in section 1.7.2.4.

1.7.5 Copy of Calculations **<B-2>**

The Laboratory must provide a copy of the calculations work sheet showing how final results are obtained from values printed on the quantitation report. If manipulations are performed by a software package, a copy of the formula used must be supplied as well as values for all terms in the formula.

Note: *All correction factors and equations utilized must be indicated on the work sheet.*

1.7.6 Copy of Extraction Logs **<B-2>**

These logs must be legible and include: (1) date, (2) sample weights and volumes, (3) sufficient information to unequivocally identify which QC samples (i.e. matrix spike, matrix spike duplicate, matrix spike blank) correspond to each batch extracted, (4) comments describing any significant sample changes or reactions which occur during preparation, and (5) final volumes and vial identification numbers.

1.8 Pesticide Data **<B-1>**

1.8.1 Pesticide QC Summary **<B-2>**

1.8.1.1 Surrogate Recovery (FORM II PEST-1, PEST-2)

1.8.1.2 Matrix Spike/Matrix Spike Duplicate/Matrix Spike Blank Recovery (FORM III PEST-1, PEST-2): MS/MSD is required for the Pesticide fraction of an SDG, unless otherwise specified by the NYS DEC.

1.8.1.3 Laboratory Control Sample Recovery (FORM III PEST-1, PEST-2).

1.8.1.4 Method Blank Summary (FORM IV PEST): If more than a single form is necessary, forms shall be arranged in chronological order by date of analysis of the blank.

1.8.2 Pesticide Sample Data (**<B-2>** to mark Section heading, **<B-3>** to mark the beginning of each data "packet")

Sample data shall be arranged in packets with the Pesticide Organic Analysis Data Sheet (FORM I PEST), followed by the raw data for pesticide samples. These sample packets should then be

placed in increasing NYSDEC sample number order, considering both letters and numbers in ordering samples.

1.8.2.1 Target Compound Results, Pesticide Organics Analysis Data Sheet (FORM I PEST). Tabulated results (identification and quantitation) of the specified target compounds (Exhibit C – CLP Pesticides) shall be included. The validation and release of these results is authorized by a specific, signed statement in the SDG Narrative (see Section 1.2). In the event that the Laboratory Manager cannot verify all data reported for each sample, the Laboratory Manager shall provide a detailed description of the problems associated with the sample in the SDG Narrative.

1.8.2.2 Copies of Pesticide Chromatograms. Positively identified compounds shall be labeled with the names of compounds, either directly out from the peak on the chromatogram, or on a printout of RTs on the data system printout if RTs are printed over the peak on the chromatogram. All chromatograms shall meet the acceptance criteria in Exhibit D, and shall be labeled with the following information:

- NYSDEC sample number;
- Volume injected (µL);
- Date and time of injection;
- On column concentration/ amount including units;
- GC column identifier (by stationary phase and internal diameter);
- GC instrument identifier; and
- Scaling factor (label the x and y axes using a numerical scale).

1.8.2.3 Copies of pesticide chromatograms from second GC column shall be included and labeled as in Section 1.8.2.2.

1.8.2.4 Data System Printout. A printout of RT, corresponding peak height or peak area, and on the column amount shall accompany each chromatogram. The printout shall be labeled with the NYS DEC sample number. In all instances where the data system report has been edited, or where manual integration or quantitation has been performed, the Gas Chromatograph/Electron Capture Detector (GC/ECD) Operator shall identify all such edits or manual procedures by initialing and dating the

changes made to the report, and shall include the integration time range. The GC/MS Operator shall also mark each integration area with the letter "m" on the quantitation report.

1.8.2.5 All manual worksheets shall be included in the Sample Data Package.

1.8.2.6 Other Required Information. If pesticides are confirmed by GC/MS, the Laboratory shall submit copies of reconstructed ion chromatograms, raw spectra, and background-subtracted mass spectra of target compounds listed in Exhibit C – CLP Pesticides that are identified in the sample and corresponding background-subtracted target compound standard mass spectra. Compound names shall be clearly marked on all spectra. For Toxaphene confirmed by GC/MS, the Laboratory shall submit mass spectra of 3 major peaks from samples and standards.

1.8.3 Pesticides Standards Data **<B-2>**

1.8.3.1 Initial Calibration of Single Component Analytes (FORM VI PEST-1, PEST-2): For all GC columns and instruments, in chronological order by GC column and instrument. **<B-3>**

1.8.3.2 Initial Calibration of Multicomponent Analytes (Toxaphene, etc.) (FORM VI PEST-3, PEST-4): For all GC columns and instruments, in chronological order by GC column and instrument. **<B-3>**

1.8.3.3 Analyte Resolution Check Summary (FORM VI PEST-5): For all GC columns and instruments, in chronological order by GC column and instrument. **<B-3>**

1.8.3.4 Performance Evaluation Mixture (PEM) (FORM VI PEST-6): For all GC columns and instruments, in chronological order by GC column and instrument. **<B-3>**

1.8.3.5 Individual Standard Mixture A (FORM VI PEST-7): For all GC columns and instruments, in chronological order by GC column and instrument. **<B-3>**

1.8.3.6 Individual Standard Mixture B (FORM VI PEST-8): For all GC columns and instruments, in chronological order by GC column and instrument. **<B-3>**

1.8.3.7 Individual Standard Mixture C (FORM VI PEST-9, PEST-10): For all GC columns and instruments, in chronological order by GC column and instrument. **<B-3>**

1.8.3.8 Calibration Verification Summary (FORM VII PEST-1): For all mid-point concentrations of Individual Standard Mixtures A and B or C and instrument blanks used for calibration verification, on all GC columns and instruments, in chronological order by GC column and instruments. **<B-3>**

1.8.3.9 Calibration Verification Summary (FORM VII Pest-2, Pest-3): For all mid-point concentrations of Individual Standard Mixtures A and B or C and instrument blanks used for calibration verification, on all GC columns and instruments, in chronological order by GC column and instrument. **<B-3>**

1.8.3.10 Analytical Sequence (FORM VIII PEST): For all GC columns and instruments, in chronological order by GC column and instrument. **<B-3>**

1.8.3.11 Florisil Cartridge Check (FORM IX PEST-1): For all lots of cartridges used to process samples in the SDG, using Individual Standard Mixtures A or C. **<B-3>**

1.8.3.12 GPC Calibration Verification (FORM IX PEST-2): For all GPC columns, in chronological order by calibration verification date. **<B-3>**

1.8.3.13 Identification Summary for Single Component Analytes (FORM X PEST): For all samples with positively identified single component analytes, in order by increasing NYSDEC Sample Number. **<B-3>**

1.8.3.14 Chromatograms and data system printouts are required for all standards including the following: **<B-3>**

- Resolution Check Mixture.
- Performance Evaluation (PE) mixtures, all.
- Individual Standard Mixture A and B, both at five concentrations, for each initial calibration and Individual Standard Mixture B, at five concentrations, for each initial calibration.

Or

- Individual Standard Mixture C, at five concentrations, each initial calibration.
- Toxaphene, at five concentrations, each initial calibration.

- All mid-point concentrations of Individual Standard Mixtures A and B or C used for calibration verification.
- All toxaphene standards analyzed for confirmation.
- All lots of Florisil cartridge check solution
- Pesticide GPC Calibration Check Solution, all calibrations relating to samples in the SDG.
- All multicomponent analyte standards analyzed for confirmation.

1.8.3.15 A printout of RT and corresponding peak height or peak areas shall accompany each chromatogram. The printout shall be labeled with the NYSDEC Sample Number. In addition, all chromatograms shall meet the acceptance criteria in Exhibit D, and shall be labeled with the following: **<B-3>**

- NYSDEC Sample Number for the standard (e.g., INDA10K, INDA20K, etc., See Forms Instructions for details);
- Label all standard peaks for all individual compounds either directly out from the peak or on the printout of retention times if retention times are labeled over the peak;
- Total nanograms injected for each standard. When total nanograms injected appear on the printout, it is not necessary to include them on the chromatogram;
- Date and time of injection;
- GC column identifier (by stationary phase and internal diameter);
- GC instrument identifier; and
- Scaling factor (label the x and y axes using a numerical scale).

Note: *In all instances where the data system report has been edited, or where manual integration or quantitation has been performed, the GC/ECD Operator shall identify such edits or manual procedures by initialing and changes made to the report, shall include the integration time range. The GC/MS Operator shall also mark each integrated area with the letter "m" on the quantitation report.*

1.8.4 Pesticides Raw Quality Control (QC) Data **<B-2>**

1.8.4.1 Blank Data shall be arranged by type of blank (method, instrument, sulfur cleanup) and shall be in chronological order by instrument. **<B-3>**

1.8.4.1.1 Tabulated results (FORM I PEST).

1.8.4.1.2 Chromatogram(s) and data system printout(s) (GC) for each GC column and instrument used for analysis, as labeled in 1.8.2.2 and 1.8.2.4 above.

1.8.4.2 Pesticide LCS Data **<B-3>**

1.8.4.2.1 Tabulated results (FORM I PEST) of target compounds for both GC columns.

1.8.4.2.2 Chromatogram(s) and data system printout(s) (GC) for each GC column and instrument used for analysis, as labeled in 1.8.2.2 and 1.8.2.4 above.

1.8.4.3 Pesticides Matrix Spike Data **<B-3>**

1.8.4.3.1 Tabulated results (FORM I PEST) of target compounds for both GC columns.

1.8.4.3.2 Chromatogram(s) and data system printout(s) (GC) for each GC column and instrument used for analysis, as labeled in 1.8.2.2 and 1.8.2.4 above.

1.8.4.4 Pesticides Matrix Spike Duplicate Data **<B-3>**

1.8.4.4.1 Tabulated results (FORM I PEST) of target compounds for both GC columns.

1.8.4.4.2 Chromatogram(s) and data system printout(s) (GC) for each GC column and instrument used for analysis, as labeled in 1.8.2.2 and 1.8.2.4 above.

1.8.4.5 Matrix Spike Blank Data **<B-3>**

1.8.4.5.1 Tabulated results (FORM I-CLP-PEST) of all Superfund-TCL compounds.

1.8.4.5.1.1 Chromatogram(s) and data system printout(s) (GC), as labeled in 1.8.2.2 and 1.8.2.4 above.

1.8.5 Raw Gel Permeation Chromatograph (GPC) Data **<B-2>**

1.8.5.1 GPC Calibration. The UV traces for the GPC calibration solution, chromatograms, and the data system reports for the GPC blank shall be arranged in chronological order for the GPC calibration.

1.8.5.1.1 UV traces labeled with the GPC column identifier, date of calibration, and compound names. Compound names shall be placed directly out from the peak, or on the printout of the RTs when the RTs are printed directly over the peak.

1.8.5.1.2 Chromatograms and data system report(s) labeled as specified in Sections 1.8.2.2 and 1.8.2.4 above.

1.8.5.1.3 Chromatograms and data system report(s) for all standards used to identify compounds in the GPC blank labeled as specified in Section 1.8.3.14 and 1.8.3.15 (i.e., Individual Standard Mixture A, Individual Standard Mixture B, Individual Standard Mixture C, and the Toxaphene standards).

1.8.5.2 GPC Calibration Verification. The Chromatogram and the data system report(s) shall be arranged in chronological order for the GPC calibration check.

1.8.5.2.1 Chromatograms and data system printouts labeled as specified in Sections 1.8.2.2 and 1.8.2.4 for the GPC calibration verification solution analyses.

1.8.5.2.2 Chromatogram and the data system report(s) for the standards used to quantify compounds in the GPC calibration verification solution labeled as specified in Section 1.8.3.14 and 1.8.3.15 (i.e., Individual Standard Mixtures A and B or C from the initial calibration sequence).

1.8.6 Raw Florisil Data **<B-2>**

1.8.6.1 The chromatogram and the data system report(s) shall be arranged in chronological order by Florisil cartridge performance check analysis.

1.8.6.1.1 Chromatograms and data system reports, labeled as specified in Sections 1.8.2.2 and 1.8.2.4 for the Florisil cartridge performance check analysis.

1.8.6.1.2 Chromatograms and data system reports for standard analyses used to quantify compounds in the Florisil cartridge performance check analysis, labeled as specified in Section 1.8.3.14 and 1.8.3.15 (i.e., Individual Standard Mixture A, Individual Standard Mixture B, Individual Standard Mixture C, and the 2,4,5-Trichlorophenol solution).

1.8.7 Copy of Calculations **<B-2>**

The Laboratory must provide a copy of the calculations work sheet showing how final results are obtained from values printed on the quantitation report. If manipulations are performed by a software package, a copy of the formula used must be supplied as well as values for all terms in the formula.

Note: *All correction factors and equations utilized must be indicated on the work sheet.*

1.8.8 Copy of Extraction Logs **<B-2>**

These logs must be legible and include: (1) date, (2) sample weights and volumes, (3) sufficient information to unequivocally identify which QC samples (i.e. matrix spike, matrix spike duplicate, matrix spike blank) correspond to each batch extracted, (4) comments describing any significant sample changes or reactions which occur during preparation, and (5) final volumes and vial identification numbers.

1.9 Aroclor Data **<B-1>**

1.9.1 Aroclor QC Summary **<B-2>**

1.9.1.1 Surrogate Recovery (FORM II ARO-1, ARO-2).

1.9.1.2 Matrix Spike/Matrix Spike Duplicate Recovery (FORM III ARO-1, ARO-2): MS/MSD is required for the Aroclor fraction, unless otherwise specified by NYSDEC. One MS/MSD set is required per SDG.

1.9.1.3 LCS Recovery (FORM III ARO-3, ARO-4).

1.9.1.4 Method Blank Summary (FORM IV ARO): If more than a single form is necessary, forms shall be arranged in chronological order by date of analysis of the blank.

1.9.2 Aroclor Sample Data (**<B-2>** to mark Section heading, **<B-3>** to mark the beginning of each data "packet")

Sample data shall be arranged in packets with Aroclors Organics Analysis Data Sheet (FORM 1 ARO), followed by the raw data for Aroclor samples. These sample packets should then be placed in

order of increasing NYSDEC Sample Number, considering both letters and numbers.

Note: *For a Sample analysis in which "S" flags are reported a FORM I ARO is required for the original analysis (NYSDEC Sample Number = XXXXX) in which the "S" flags are reported, and a FORM I ARO is required for the billable reanalysis (NYSDEC Sample Number = XXXXXRE) of the sample performed after a valid 5-point calibration of the detected Aroclor. An additional FORM I ARO is required for any necessary dilutions (NYSDEC Sample Number = XXXXXDL).*

1.9.2.1 Target Compound Results, Aroclors Organics Analysis Data Sheet (FORM I ARO). Tabulated results (identification and quantification) of the specified target compounds (Exhibit C – Aroclors) shall be included. The validation and release of these results is authorized by a specific, signed statement in the SDG Narrative (Section 1.2). In the event that the Laboratory Manager shall provide a detailed description of the problems associated with the sample in the SDG Narrative.

1.9.2.2 Copies of Aroclor Chromatograms. Positively identified compounds shall be labeled with the names of compounds, either directly out from the peak on the chromatogram, or on a printout of the RTs on the data system printout if the RTs are printed over the peak on the chromatogram. All chromatograms shall meet the acceptance criteria in Exhibit D, and shall be labeled with the following information:

- EPA Sample Number;
- Volume injected (µL);
- Date and time of injections;
- On column concentration/amount including units;
- GC column identifier (by stationary phase and internal diameter);
- GC instrument identifier; and
- Scaling factor (label the x and y axes using a numerical scale).

1.9.2.3 Copies of Aroclor chromatograms for the second GC column shall be included and labeled as in Section 1.9.2.2.

1.9.2.4 Data System Printout

A printout of RT, corresponding peak height or peak area, and the on column amount shall accompany each

chromatogram. The printout shall be labeled with the EPA Sample Number and standard concentration level. In all instances where the data system report has been edited, or where manual integration or quantitation has been performed, the GC/ECD Operator must identify such edits or manual procedures by initialing and dating the changes made to the report, and shall include the integration time range. The GC/MS Operator shall also mark each integrated area with the letter "m" in the quantitation report.

1.9.2.5 All manual worksheets shall be included in the Sample Data Package.

1.9.2.6 Other Required Information. If Aroclors are confirmed by GC/MS, the Contractor shall submit copies of reconstructed ion chromatograms. Raw spectra and background-subtracted mass spectra must be submitted for at least three major peaks of Aroclor target compounds (see Exhibit C – Aroclors) that are identified in the sample and corresponding standard mass spectra. Compound names shall be clearly marked on all spectra.

1.9.3 Aroclor Standard Data **<B-2>**

1.9.3.1 Initial Calibration of Aroclors (FORM VI ARO-1, ARO-2, and ARO-3): For all GC columns, all instruments, in chronological order by GC column and instrument. **<B-3>**

1.9.3.2 Calibration Verification Summary (FORM VII ARO): For all calibration verification standards on all GC columns and instruments, in chronological order by GC column and instruments. **<B-3>**

1.9.3.3 Analytical Sequence (FORM VIII ARO): For all GC columns and instruments, in chronological order by GC column and instrument. **<B-3>**

1.9.3.4 Identification Summary for Multicomponent Analytes (FORM X ARO): For all samples with positively identified Aroclors, in order by increasing EPA Sample Number. **<B-3>**

1.9.3.5 Chromatograms and data system printouts shall be included for all standards, including the following:

- All Aroclor standards used for initial calibration on each column and instrument.
- All Aroclor standards used for calibration verification on each GC column and instrument.

- All Aroclor standards analyzed for confirmation.

1.9.3.6 A printout of RT and corresponding peak height or peak area shall accompany each chromatogram. The printout shall be labeled with the EPA Sample Number. In addition, all chromatograms shall meet the acceptance criteria in Exhibit D, and shall be labeled with the following:

- NYSDEC Sample Number for the standard (e.g., AR10161OK, AR12601OK).
- Label all standard peaks with the compound name, either directly out from the peak on the chromatogram, or on the printout of RTs on the data system printout, if RTs are printed over the peak on the chromatogram.
- Total nanograms injected for each standard. When total nanograms injected appear on the printout, it is not necessary to include them on the chromatogram.
- Date and time of injection.
- GC column identifier (by stationary phase and internal diameter).
- GC instrument identifier.
- Scaling factor (label the x and y axes using a numerical scale).

Note: *In all instances where the data system report has been edited, or where manual integration or quantitation has been performed, the GC/ECD Operator shall identify such edits or manual procedures by initialing and dating the changes made to the report, and shall include the integration time range. The GC/MS Operator shall also mark each integrated area with the letter "m" on the quantitation report.*

1.9.4 Aroclor Raw Quality Control (QC) Data **<B-2>**

1.9.4.1 Blank data shall be arranged in chronological order by extraction data. **<B-3>**

Note: *This order is different from that used for samples.*

- Tabulated results (FORM I ARO).
- Chromatogram(s) and data system printout(s) for each GC column and instrument used for analysis, labeled as in Sections 1.9.2.2 and 1.9.2.4.

1.9.4.2 Aroclor Laboratory Control Sample (LCS) Data **<B-3>**

- Tabulated results (FORM I ARO) of target compounds for both GC columns.

- Chromatograms and data system printouts for both GC columns, labeled as in Sections 1.9.2.2 and 1.9.2.4.

1.9.4.3 Aroclors Matrix Spike Data **<B-3>**

- Tabulated results (FORM I ARO) of target compounds for both GC columns.

- Chromatograms and data system printouts for both GC columns, labeled as in Sections 1.9.2.2 and 1.9.2.4.

1.9.4.4 Aroclors Matrix Spike Duplicate Data **<B-3>**

- Tabulated results (FORM I ARO) of target compounds for both GC columns.

- Chromatograms and data system printouts for both GC columns, labeled as in Sections 1.9.2.2 and 1.9.2.4.

1.9.5 Raw Gel Permeation Chromatography (GPC) Data **<B-2>**

1.9.5.1 GPC Calibration. The UV traces for the GPC calibration solution, chromatograms, and the data system reports for the GPC blank shall be arranged in chronological order for the GPC calibration.

- UV traces labeled with the GPC column identifier, date of calibration, and compound names. Compound names shall be placed directly out from the peak, or on the printout of RTs when the RTs are printed directly over the peak.

- Chromatograms and data system report(s) labeled as specified in Sections 1.9.2.2 and 1.9.2.4 for the GPC blank analyses.

- Chromatogram and data system report(s) for all standards used to assess the Aroclor pattern, labeled as specified in Section 1.9.2.2 and 1.9.2.4 (i.e., AR10161OK, AR12601OK from the initial calibration).

1.9.5.2 GPC Calibration Verification. The chromatogram and the data system reports(s) shall be arranged in chronological order for the GPC calibration check.

- Chromatograms and data system report(s) for standards used to assess the Aroclor pattern, labeled as specified in Sections 1.9.2.2 and 1.9.2.4 (i.e., Aroclor Standard Mixture 1016/1260 from the initial calibration sequence).

1.9.6 Copy of Calculations **<B-2>**

The Laboratory must provide a copy of the calculations work sheet showing how final results are obtained from values printed on the quantitation report. If manipulations are performed by a software package, a copy of the formula used must be supplied as well as values for all terms in the formula.

Note: *All correction factors and equations utilized must be indicated on the work sheet.*

1.9.7 Copy of Extraction Logs **<B-2>**

These logs must be legible and include: (1) date, (2) sample weights and volumes, (3) sufficient information to unequivocally identify which QC samples (i.e. matrix spike, matrix spike duplicate, matrix spike blank) correspond to each batch extracted, (4) comments describing any significant sample changes or reactions which occur during preparation, and (5) final volumes and vial identification numbers.

1.10 Inorganic Data **<B-1>**

Sample data shall be submitted with the Inorganic Analysis Data Reporting Forms for all samples in the SDG, arranged in increasing alphanumeric NYSDEC sample number order, followed by the QC analyses data, quarterly and annual verification of method and instrument parameter forms, raw data, and copies of the digestion and distillation logs.

1.10.1 Results – Inorganic Analysis Data Sheet [FORM IA-IN and FORM IB-IN] – Tabulated analytical results (identification and quantitation) of the requested analytes (Exhibit C) must be accompanied by a signed statement in the SDG narrative. This signature validates and allows for the release the results. If the Laboratory Manager cannot validate all data reported for each sample, he/she must provide a detailed description of the problems associated with the sample(s) on the Cover Page. (**<B-2>** marking the beginning of results from each new fraction and/or analysis method)

1.10.1.1 Appropriate concentration units must be specified and entered on FORM IA-IN and FORM IB-IN. The quantitative values shall be reported in units of micrograms per liter (µg/L) for aqueous samples and milligrams per kilogram (mg/kg) for solid samples. Other units are acceptable only for trace level analyses. Results for solid sample must be reported

on a dry weight basis. Analytical results must be reported to two significant figures if the result value is less than 10 and to three significant figures if the value is greater than or equal to 10. Results for percent solids must be reported to one decimal place. The preceding discussion concerning significant numbers applies to FORM IA-IN, IB-IN, and IX-IN only. For the other forms, follow the Reporting Requirements and Order of Data Deliverables (Con't) instructions specific to those forms as discussed in this exhibit.

1.10.2 Quality Control (QC) Data **<B-2>**

1.10.2.1 The QC Summary for inorganic analysis shall contain the forms listed below.

Note: *If more than one form is necessary, duplicate forms must be arranged in chronological order.*

1.10.2.1.1 Initial and Continuing Calibration Verification [FORM IIA-IN] **<B-3>**

1.10.2.1.2 CRQL Check Standard [FORM IIB-IN]

1.10.2.1.3 Blanks [Form III-IN] **<B-3>**

1.10.2.1.4 ICP-AES Interference Check Sample [FORM IVA-IN] **<B-3>**

1.10.2.1.5 ICP-MS Interference Check Sample [FORM IVB-IN] **<B-3>**

1.10.2.1.6 Matrix Spike Sample Recovery [FORM VA-IN] **<B-3>**

1.10.2.1.7 Post-Digestion Spike Sample Recovery [FORM VB-IN] **<B-3>**

1.10.2.1.8 Duplicates [FORM VI-IN] **<B-3>**

1.10.2.1.9 Laboratory Control Sample [FORM VII-IN] **<B-3>**

1.10.2.1.10 ICP-AES and ICP-MS Serial Dilutions [FORM VIII-IN] **<B-3>**

1.10.2.1.11 Method Detection Limits (Annually) [FORM IX-IN] **<B-3>**

1.10.2.1.12 ICP-AES Interelement Correction Factors (Quarterly) [FORM XA-IN] **<B-3>**

1.10.2.1.13 ICP-AES Interelement Correction Factors (Quarterly) [FORM XB-IN] **<B-3>**

1.10.2.1.14 ICP-AES and ICP-MS Linear Ranges (Quarterly) [FORM XI-IN] **<B-3>**

1.10.2.1.15 Preparation Log [FORM XII-IN] **<B-3>**

1.10.2.1.16 Analysis Run Log [FORM XIII-IN] **<B-3>**

1.10.2.1.17 ICP-MS Tune [FORM XIV-IN] **<B-3>**

1.10.2.1.18 ICP-MS Internal Standards Relative Intensity Summary [FORM XV-IN] **<B-3>**

***Note**: Copies of Verification of Instrument Parameters forms for the current quarter must be submitted with each data package*.

1.10.3 Raw Data **<B-2>**

For each reported value, the Laboratory shall include in the Sample Data Package all raw data from the instrument used to obtain that value. This applies to all required QA/QC measurements, instrument standardization, as well as all sample results. This statement does not apply to the quarterly and annual Verifications of Instrument Parameters submitted as part of each Sample Data Package. When analysis of the ICP-AES or ICP-MS target analytes listed in Exhibit C (or any subset or additional analytes) is requested, the raw data shall include, for all samples, not only the results for the requested analytes(s), but also those for all the interferents. The raw data shall also contain the results of any other analyte(s), which have been determined to interfere with the requested analyte(s).

1.10.3.1 Raw data must contain all instrument readouts and data pertinent to the reconstruction of the analysis and results (e.g., Batch Sheets) used for the sample results. Each exposure or instrumental reading shall be provided, including those readouts that may fall below the Method Detection Limit (MDL). Raw data shall not be corrected for dilutions or volume adjustments. All Atomic Absorption (AA), Inductively Coupled Plasma – Atomic Emission Spectrometry (ICP-AES), and Inductively Coupled Plasma – Mass Spectrometry (ICP-MS) instruments shall provide a legible hardcopy of the direct real-time instrument readout (i.e., strip charts, printer tapes, etc.) or a printout of the unedited instrument data output file. A photocopy of the instrument's direct sequential readout shall be included. A hardcopy of the instrument's direct sequential readout shall be included for cyanide if the instrument has the capability.

1.10.3.2 The order of raw data in the Sample Data Package for inorganic analyses shall be: ICP-AES, Graphite Furnace Atomic Adsorption (GFAA), ICP-MS, Mercury, and Cyanide. All raw data shall include concentration units for ICP and absorbance or concentration units for AA, Mercury, and Cyanide. (**<B-3>** marking the beginning of raw data for each separate method)

1.10.3.3 The ICP-MS raw data shall also contain the turbidity measurement results [in Nephelometric Turbidity Units (NTU)] for the field samples.

1.10.3.4 Corrections to the laboratory data reporting forms and raw data shall be made by drawing single lines through the errors and entering the correct information. Information shall not be obliterated or rendered unreadable. Corrections and additions to information shall be signed (or initialed) and dated.

1.10.3.5 Raw data shall be labeled with NYSDEC sample number and appropriate codes, as shown in Exhibit B, "Table 2 – Codes for Labeling Data", to unequivocally identify:

- Calibration standards, including source and preparation date. Standard preparation logbooks can be submitted if they contain this information;
- Initial and Continuing Calibration Blanks (ICBs/CCBs) and Preparation Blanks (PBs).
- Initial and Continuing Calibration Verification (ICV/CCV) standards, Interference Check Samples, serial dilution samples, Contract Required Quantitation Limit (CRQL), Check Standard (CRI), Laboratory Control Sample (LCS), and Post Digestion Spike;
- Diluted and undiluted samples (by NYSDEC sample number) and all weights, dilutions, and volumes used to obtain the reported values (if the volumes, weights and dilutions are consistent for all samples in a given SDG, a general statement outlining these parameters is sufficient);
- Duplicates;
- Spikes (indicating standard solutions used, final spike concentrations, and volumes involved). If spike information (source, concentration, volume) is consistent for a given SDG, a general statement outlining these parameters is sufficient;

- Instrument used, any instrument adjustments, data corrections or other apparent anomalies on the measurement record, including all data voided or data not used to obtain reported values and a brief written explanation; and

- Time and date of each analysis. Instrument run logs can also be submitted if they contain time and date of analysis. If the instrument does not automatically provide times of analysis, these shall be manually entered on all raw data (e.g., ICV/CCV, blanks, and the CRQL check standard.

- All information for furnace analysis clearly and sequentially identified on the raw data, including DEC sample number, sample and analytical spike data, percent recovery, coefficient of variation, full MSA data, MSA correlation coefficient, slope and intercepts of linear fit, final sample concentration (standard addition concentration), and type of background correction used (BS for Smith-Heiftje, BD for deuterium Arc, or BZ for Zeeman).

- Integration times for AA analyses.

1.10.3.6 Digestion and Distillation Logs. The following logs shall be submitted as appropriate for each preparation procedure: digestion logs for ICP-AES, ICP-MS, mercury preparations, and cyanide. These logs shall include: (1) date; (2) sample weights and volumes, with initial sample weight/volume and final volume clearly indicated; (3) sufficient information to unequivocally identify which QC samples (i.e., LCS, PB) correspond to each batch digested; (4) comments describing any sufficient sample changes or reactions which occur during preparation shall be entered in the log and noted in the SDG Narrative; (5) indication of pH less than 2 or greater than 12, as applicable; and (6) identification of the sample preparer(s) [signature(s)]. **<B-3>**

1.10.4 Copy of Calculations – The Laboratory must provide a copy of the calculations work sheet showing how final results are obtained from values printed on the instrument output report. If manipulations are performed by a software package, a copy of the formula used must be supplied, as well as, values for all terms in the formula. **<B-2>**

Note: *All correction factors and equations utilized must be indicated on the work sheet.*

2.0 ASP Category A

2.1 Cover Documentation **<B-1>** - See Requirements listed in Section 1.1 above.

2.2 SDG Narrative **<B-1>** - See Requirements listed in Section 1.2 above.

2.2.1 In addition to the requirements listed in Section 1.2, the Laboratory shall also document any out of range QC parameters associated with the data. Indicate what QC parameters were out of control, the limit that was exceeded, the result of the QC in exceedance, what samples are associated with that QC item, and how the results of those samples may be affected by the out of range QC.

2.3 Contract Lab Sample Information Sheets **<B-2>** - See Requirements listed in Section 1.4 above.

2.4 Chain-of-Custody Forms **<B-1>** - See Requirements listed in Section 1.5 above.

2.5 NYSDEC Data Package Summary Forms **<B-1>** - Requirements and Instructions for these forms are listed in Section IV of this Exhibit.

2.6 GC/MS Volatiles Data **<B-1>**

2.6.1 Sample Data

Sample data shall be arranged in packets consisting of the respective "Organic Analysis Data Sheet" (FORM I VOA-1, VOA-2) followed by the FORM I VOA-TIC for that sample. These packets shall be arranged in order of increasing NYSDEC sample number, considering both numbers and letters. For a detailed explanation of the Volatile FORM I requirements, see Sections 1.6.2.1 and 1.6.2.2 above.

2.7 GC/MS Semivolatiles Data **<B-1>**

2.7.1 Sample Data

Sample data shall be arranged in packets consisting of the respective "Organic Analysis Data Sheet" (FORM I SV-1, SV-2, SV-SIM) followed by the FORM I SV-TIC for that sample. These packets shall be arranged in order of increasing NYSDEC sample number, considering both numbers and letters. For a detailed explanation of the Semivolatile FORM I requirements, see Sections 1.7.2.1, 1.7.2.2, and 1.7.2.3 above.

2.8 Pesticide Data **<B-1>**

2.8.1 Sample Data

Sample data shall be reported on individual "Organic Analysis Data Sheet(s)" (FORM I PEST). These forms shall be arranged in order of increasing NYSDEC sample number, considering both

numbers and letters. For a detailed explanation of the Pesticide FORM I requirements, see Sections 1.8.2.1, above.

2.9 Aroclor Data **<B-1>**

2.9.1 Sample Data

Sample data shall be reported on individual "Organic Analysis Data Sheet(s)" (FORM I ARO). These forms shall be arranged in order of increasing NYSDEC sample number, considering both numbers and letters. For a detailed explanation of the Aroclor FORM I requirements, see Sections 1.9.2.1, above.

2.10 GC Organic Data (Includes all Organic data generated using a GC or GC-type instrument that does not fit into any of the categories listed in Sections 2.6-2.9.) **<B-1>**

2.10.1 Sample Data

Sample data should be reported using modified versions of the "FORM I" used in the above organic categories. Questions regarding the modification of the FORM I's for this data should be directed to the NYSDEC Quality Standards and Analytical Management Section. See also Section 3.10 for further explanation.

2.11 Inorganic Data **<B-1>**

2.11.1 Sample Data

Sample data shall be submitted with the "Inorganic Analysis Data Reporting Forms" (FORM IA-IN and FORM IB-IN) for all samples in the SDG, arranged in increasing alphanumeric NYSDEC sample number order. For a detailed explanation of the Inorganic FORM I requirements, see Sections 1.10.2, above.

2.12 Toxicity Characteristic Leaching Procedure (TCLP) Data **<B-1>**

2.12.1 Sample Data (**<B-2>** the beginning of data for each unique analysis fraction)

Sample data shall be submitted on modified reporting forms based on the reporting forms used in Sections 2.6-2.11. The analysis specific FORM I's should be modified to include the following TCLP specific information, either in the footer or the header of the form:

- Matrix of Original Sample
- % Solid content of the sample, if the sample was a filterable liquid please fill this field with "<0.5%".
- Start date/time of TCLP extraction

- End date/time of TCLP extraction
- Start Temperature of TCLP extraction room
- End Temperature of TCLP extraction room.
- TCLP Fluid used (#1 or #2)
- Sample pH
- Ending extract pH

3.0 ASP Category B

3.1 Cover Documentation **<B-1>** - See Requirements listed in Section 1.1 above.

3.2 SDG Narrative **<B-1>** - See Requirements listed in Section 1.2 above.

3.3 Contract Lab Sample Information Sheets **<B-1>** - See Requirements listed in Section 1.4 above.

3.4 Chain-of-Custody Forms **<B-1>** - See Requirements listed in Section 1.5 above.

3.5 NYSDEC Data Package Summary Forms **<B-1>** - Requirements and Instructions for these forms are listed in Section IV of this Exhibit.

3.6 GC/MS Volatiles Data **<B-1>**

3.6.1 Volatiles QC Summary **<B-2>**

3.6.1.1 System Monitoring Compound Summary – See requirements listed in Section 1.6.1.1.

3.6.1.2 Matrix Spike/Matrix Spike Duplicate Summary – See requirements listed in Section 1.6.1.2.

3.6.1.3 QC Check Sample/Standard – (If Applicable) Reported on a modified version of FORM I VOA-1, VOA-2. The form should be modified in such a way that the header clearly states that the results being reported are from a "QC Check Sample/Standard".

3.6.1.4 Method Blank Summary – See requirements listed in Section 1.6.1.3.

3.6.1.5 GC/MS Instrument Performance Check – See requirements listed in Section 1.6.1.4.

3.6.1.6 Internal Standard Area and RT Summary – See requirements listed in Section 1.6.1.5.

3.6.1.7 Instrument Detection Limits – Reported on a modified version of FORM I VOA-1, VOA-2. The form should be modified in such a way that the header clearly states that the results being reported are the statistically determined detection limits for a given instrument using a given method. Detection limits should be determined annually. The "Q" column on the FORM I's should not be used.

3.6.2 Sample Data **<B-2>**

Sample Data should be reported in the same format and order as detailed in Section 1.6.2.

3.6.3 Standards Data **<B-2>**

Standard Data should be reported in the same format and order as detailed in Section 1.6.3.

3.6.4 Raw QC Data **<B-2>**

Raw QC Data should be reported in the same format and order as detailed in Section 1.6.4. In addition to the requirements listed in Section 1.6.4, the raw data for "QC Check Sample/Standard" should be reported following the raw data for "Matrix Spike Duplicate Data" as follows:

3.6.4.1 QC Check Sample/Standard **<B-3>**

3.6.4.1.1 Tabulated results (FORM I-VOA) of <u>all</u> target compounds. FORM I-VOA-TIC is <u>not</u> required.

3.6.4.1.2 Reconstructed ion chromatograms(s) and quantitation reports(s) or legible (GC/MS), labeled as in Section 1.6.2.4. Spectra are <u>not</u> required.

3.6.5 Copy of Calculations **<B-2>**

Please provide copies of calculations as specified in Section 1.6.5.

3.6.6 Copy of Extraction Logs **<B-2>**

Please provide copies of extraction logs as specified in Section 1.6.6.

3.7 GC/MS Semivolatiles Data **<B-1>**

3.7.1 QC Summary **<B-2>**

3.7.1.1 System Monitoring Compound Summary – See requirements listed in Section 1.7.1.1.

3.7.1.2 Matrix Spike/Matrix Spike Duplicate Summary – See requirements listed in Section 1.7.1.2.

3.7.1.3 QC Check Sample/Standard – (If Applicable) Reported on a modified version of FORM I SV-1, SV-2. The form should be modified in such a way that the header clearly states that the results being reported are from a QC Check Sample/Standard.

3.7.1.4 Method Blank Summary – See requirements listed in Section 1.7.1.3.

3.7.1.5 GC/MS Instrument Performance Check – See requirements listed in Section 1.7.1.4.

3.7.1.6 Internal Standard Area and RT Summary – See requirements listed in Section 1.7.1.5.

3.7.1.7 Instrument Detection Limits – Reported on a modified version of FORM I SV-1, SV-2. The form should be modified in such a way that the header clearly states that the results being reported are the statistically determined detection limits for a given instrument using a given method. Detection limits should be determined annually. The "Q" column on the Form Is should not be used.

3.7.2 Sample Data **<B-2>**

Sample Data should be reported in the same format and order as detailed in Section 1.7.2. In addition to all the requirements listed under Section 1.7.2, any GPC Chromatograms produced during the analysis of the samples should be included at the end of Section 3.7.2.

3.7.3 Standards Data **<B-2>**

Standard Data should be reported in the same format and order as detailed in Section 1.7.3. In addition to all the requirements listed under Section 1.7.3, data for "Semivolatile GPC Calibration Data" should be listed as follows:

3.7.3.1 Semivolatile GPC Calibration Data – UV detector traces showing peaks that correspond to the compounds in the semivolatile GPC calibration mixture. Traces must be labeled with GPC column identifier, date of calibration, and with compound names labeled either directly out from the peak, or on a printout of retention times, if retention times are printed over the peak. Do not include FORM IX Pest-2, as the compounds used on that form

are not appropriate for semivolatile sample extracts. **<B-3>**

3.7.4 Raw QC Data **<B-2>**

Raw QC Data should be reported in the same format and order as detailed in Section 1.7.4. In addition to the requirements listed in Section 1.7.4, the following should be added directly after the raw data for "Matrix Spike Duplicate Data" but before the GPC Raw QC data:

3.7.4.1 QC Check Sample/Standard **<B-3>**

3.7.4.1.1 Tabulated results (FORM I-SV) of all target compounds. FORM I-SV-TIC is not required.

3.7.4.1.2 Reconstructed ion chromatograms(s) and quantitation reports(s) or legible (GC/MS), labeled as in Section 1.7.2.4. Spectra are not required.

3.7.5 Copy of Calculations **<B-2>**

Please provide copies of calculations as specified in Section 1.7.5.

3.7.6 Copy of Extraction Logs **<B-2>**

Please provide copies of extraction logs as specified in Section 1.7.6.

3.8 GC/ECD and GC/MS Pesticide Data **<B-1>**

3.8.1 QC Summary **<B-2>**

3.8.1.1 System Monitoring Compound Summary – See requirements listed in Section 1.8.1.1.

3.8.1.2 Matrix Spike/Matrix Spike Duplicate Summary – See requirements listed in Section 1.8.1.2.

3.8.1.3 Laboratory Control Sample Recovery – See requirements listed in Section 1.8.1.3.

3.8.1.4 QC Check Sample/Standard – (If Applicable) Reported on a modified version of FORM I PEST-1. The form should be modified in such a way that the header clearly states that the results being reported are from a QC Check Sample/Standard.

3.8.1.5 Method Blank Summary – See requirements listed in Section 1.8.1.4.

3.8.1.6 GC/MS Instrument Performance Check – (if Applicable) No Form exists for this requirement. A Narrative statement should be included for GC/MS pesticide data. The narrative should document the following.

- Frequency at which instrument performance checks were performed. Include the date and time the check was run and the sample runs (file IDs) associated with the check.
- The results of the Instrument Performance Check (Pass or Fail).
- The criteria used to evaluate the acceptance of the check.

3.8.1.7 Instrument Detection Limits – Reported on a modified version of FORM I PEST-1. The form should be modified in such a way that the header clearly states that the results being reported are the statistically determined detection limits for a given instrument using a given method. Detection limits should be determined annually. The "Q" column on the Form Is should not be used.

3.8.2 Sample Data **<B-2>**

Sample Data should be reported in the same format and order as detailed in Section 1.8.2, up to and including Section 1.8.2.5 (omit 1.8.2.6). In addition to all the requirements listed under Section 1.8.2, please include the following:

3.8.2.1 UV traces from GPC (if GPC performed).

3.8.2.2 If pesticides are confirmed by GC/MS or run solely via GC/MS, the Laboratory shall submit copies of reconstructed ion chromatograms, raw spectra and copies of background-subtracted mass spectra of Pesticide target compounds listed in Exhibit C that are identified in the sample and corresponding background-subtracted Superfund-TCL standard mass spectra. Compound names must be clearly marked on all spectra. For multi-component pesticides/Aroclors confirmed by GC/MS, the Laboratory shall submit mass spectra of 3 major peaks of multi-component compounds from samples and standards.

3.8.3 Standards Data **<B-2>**

Standard Data should be reported in the same format and order as detailed in Section 1.8.3. For the purposes of NYSDEC ASP Category B reporting the requirements of Section 1.8.3.4-7 may be omitted. In addition to the requirements of Section 1.8.3, please include the following:

3.8.3.1 Pesticide GPC Calibration Data – UV detector traces showing peaks that correspond to the compounds in the pesticide GPC calibration mixture. Traces must be labeled with GPC column identifier, date of calibration, and with compound names labeled either directly out from the peak, or on a printout of retention times, if retention times are printed over the peak. **<B-3>**

3.8.4 Raw QC Data **<B-2>**

Raw QC Data should be reported in the same format and order as detailed in Section 1.8.4. In addition to the requirements listed in Section 1.8.4, the following should be added directly after the raw data for "Matrix Spike Duplicate Data":

3.8.4.1 QC Check Sample/Standard **<B-3>**

3.8.4.1.1 Tabulated results (FORM I-PEST) of all target compounds.

3.8.4.1.2 Chromatogram(s) and data system printout(s) (GC), as labeled in Section 1.8.2.2.

3.8.5 Copy of Calculations **<B-2>**

Please provide copies of calculations as specified in Section 1.8.5.

3.8.6 Copy of Extraction Logs **<B-2>**

Please provide copies of extraction logs as specified in Section 1.8.6.

3.9 GC/ECD and GC/MS Aroclor Data **<B-1>**

3.9.1 QC Summary **<B-2>**

3.9.1.1 System Monitoring Compound Summary – See requirements listed in Section 1.9.1.1.

3.9.1.2 Matrix Spike/Matrix Spike Duplicate Summary – See requirements listed in Section 1.9.1.2.

3.9.1.3 Laboratory Control Sample Recovery – See requirements listed in Section 1.9.1.3.

3.9.1.4 QC Check Sample/Standard – (If applicable) Reported on a modified version of FORM I ARO. The form should be modified in such a way that the header clearly states that the results being reported are from a QC Check Sample/Standard.

3.9.1.5 Method Blank Summary – See requirements listed in Section 1.9.1.4.

3.9.1.6 GC/MS Instrument Performance Check – (if Applicable) No Form exists for this requirement. A Narrative statement should be included for GC/MS Aroclor data. The narrative should document the following.

- Frequency at which instrument performance checks were performed. Include the date and time the check was run and the sample runs (file IDs) associated with the check.
- The results of the Instrument Performance Check (Pass or Fail)
- The criteria used to evaluate the acceptance of the check.

3.9.1.7 Instrument Detection Limits – Reported on a modified version of FORM I ARO. The form should be modified in such a way that the header clearly states that the results being reported are the statistically determined detection limits for a given instrument using a given method. Detection limits should be determined annually. The "Q" column on the Form Is should not be used.

3.9.2 Sample Data **<B-2>**

Sample Data should be reported in the same format and order as detailed in Section 1.9.2. In addition to all the requirements listed under Section 1.9.2, please include the following:

3.9.2.1 UV traces from GPC (if GPC performed).

3.9.2.2 If pesticides are confirmed by GC/MS or run solely via GC/MS, the Laboratory shall submit copies of reconstructed ion chromatograms, raw spectra and copies of background-subtracted mass spectra of Pesticide target compounds listed in Exhibit C that are identified in the sample and corresponding background-subtracted Superfund-TCL standard mass spectra. Compound names must be clearly marked on all spectra. For multi-component pesticides/Aroclors confirmed by GC/MS, the Laboratory shall submit mass spectra of 3 major peaks of multi-component compounds from samples and standards.

3.9.3 Standards Data **<B-2>**

Standard Data should be reported in the same format and order as detailed in Section 1.9.3. In addition to the requirements of Section 1.9.3, please include the following:

3.9.3.1 Pesticide GPC Calibration Data – UV detector traces showing peaks that correspond to the compounds in the pesticide GPC calibration mixture. Traces must be labeled with GPC column identifier, date of calibration, and with compound names labeled either directly out from the peak, or on a printout of retention times, if retention times are printed over the peak. **<B-3>**

3.9.4 Raw QC Data **<B-2>**

Raw QC Data should be reported in the same format and order as detailed in Section 1.9.4. In addition to the requirements listed in Section 1.9.4, the following should be added directly after the raw data for "Matrix Spike Duplicate Data":

3.9.4.1 QC Check Sample/Standard **<B-3>**

3.9.4.1.1 Tabulated results (FORM I ARO) of all target compounds.

3.9.4.1.2 Chromatogram(s) and data system printout(s) (GC), as labeled in Section 1.9.2.2.

3.9.5 Copy of Calculations **<B-2>**

Please provide copies of calculations as specified in Section 1.9.5.

3.9.6 Copy of Extraction Logs **<B-2>**

Please provide copies of extraction logs as specified in Section 1.9.6.

3.10 GC Organic Data **<B-1>**

On occasion NYSDEC may require samples to be analyzed by various GC methods for organic analytes. The reporting of these analytes represents a challenge because no EPA CLP forms exist to report this data. Since most environmental reporting software packages are very rigid in their output formats, it is prohibitive for NYSDEC to develop specialized reporting forms for GC organic data. NYSDEC recognizes that some software venders have created "CLP-like" reporting for GC organic data, and when feasible NYSDEC recommends the use of such software for this data. If such software is not available or unobtainable to the laboratory, the laboratory should modify and use the reporting formats and reports specified in Sections 1.6, 1.7, 1.8, and 1.9. The order of the reporting elements should be unaltered from the original Section being modified. If the reporting software package allows, the identifier for the Forms should be changed to "GC" (i.e. FORM I GC, FORM II GC, etc.). The basic structure of this reporting section should be as follows:

3.10.1 QC Summary **<B-2>**

3.10.1.1 Surrogate/System Monitoring Compounds Recovery Reports (FORM II GC)

3.10.1.2 Matrix Spike/Matrix Spike Duplicate Summary (FORM III GC)

3.10.1.3 QC Check Sample/Standard (FORM I GC + Raw Data)

3.10.1.4 Method Blank Summary (FORM IV GC)

3.10.1.5 Instrument Detection Limits (Performed annually)

3.10.2 Sample Data **<B-2>**

3.10.2.1 Results and raw data for each individual sample should be assembled in packets as follows, and placed in order according to NYSDEC Sample ID, from lowest to highest:

3.10.2.1.1 Target Compound Results (FORM I GC)

3.10.2.1.2 Manual calculation worksheets, if applicable,

3.10.2.1.3 Appropriate raw instrument data**,**

3.10.2.1.4 GPC chromatograms or other qualitative sample specific clean-up data, if applicable.

3.10.3 Standards Data **<B-2>**

3.10.3.1 Initial Calibration Data

3.10.3.2 Continuing Calibration Data

3.10.3.3 Standard chromatograms and data system printouts for all standards.

3.10.4 Copy of Calculations **<B-2>**

3.10.5 Copy of Extraction Logs **<B-2>**

3.11 Inorganic Data **<B-1>**

Sample data shall be submitted with the Inorganic Analysis Data Reporting Forms for all samples in the SDG, arranged in increasing alphanumeric DEC sample number order, followed by the QC analysis data, Quarterly Verification of Instrument Parameter forms, raw data, and copies of the digestion and distillation logs.

3.11.1 Results – Should be reported on FORM IA-IN and FORM IB-IN, and reported according to the specifications in Section 1.10.1. **<B-2>**

3.11.2 Quality Control Data – Should be reported and ordered per the specifications listed above in Section 1.10.2. Verification of Instrument Parameters should also be reported in this Section. Frequency of verifications is unmodified from the CLP requirements. **<B-2>**

3.11.3 Raw Data – Should be reported and ordered per the specifications listed above in Section 1.10.3. **<B-2>**

3.11.4 Digestion and Prep Logs – Should be reported and ordered per the specifications listed above in Section 1.10.4. **<B-2>**

3.12 Wet Chemistry Data **<B-1>**

On occasion NYSDEC may require samples to be analyzed by wet chemistry methods for "conventional" analytes. The reporting of these analytes represents a challenge because no EPA CLP forms exist to report such data. Since most environmental reporting software packages are very rigid in their output formats, it is prohibitive for NYSDEC to develop specialized reporting forms for wet chemistry analysis data. NYSDEC recognizes that some software venders have created "CLP-like" reporting for wet chemistry parameters, and when feasible NYSDEC recommends the use of such software for this data. If such software is not available or unobtainable to the laboratory, the laboratory should modify and use the reporting formats and reports specified in Sections 1.10 (Inorganics). The order of the reporting elements should be unaltered from the original Section being modified. If the reporting software package allows, the identifier for the Forms should be changed to "WC" (i.e. FORM I-WC, FORM II-WC, etc.). The basic structure of this reporting section should be as follows:

3.12.1 Results – Modified Inorganic Analysis Data Sheet **<B-2>**

Tabulated analytical results (identification and quantitation) of the specified analytes (Exhibit C) must be accompanied by a specific, signed statement in the SDG Narrative, which authorizes the validation and release of analytical results (Section 1.2). If the Laboratory Manager cannot validate all data reported for each sample, he/she must provide a detailed description of the problems associated with the sample(s) on the Cover Page.

Appropriate concentration units must be specified and entered on FORM I-WC. The quantitative values shall be reported in units of micrograms per liter (µg/L) for aqueous samples and milligrams per kilogram (mg/kg) for solid samples. Units may be adjusted in order to make excessively large or small concentration numbers more manageable. Results for solid samples must be reported on a dry weight basis. Analytical results must be reported to two significant figures if the result value is less than 10; to three significant figures if the value is greater than or equal to 10. Results for percent solids must be

reported to one decimal place. Data qualifiers should be added according to Table 2.

3.12.2 Quality Control Data – include each only when applicable to the parameter being analyzed. **<B-2>**

3.12.2.1 Initial and Continuing Calibration Verification

3.12.2.2 CRQL Standard for Wet-Chemistry Analysis

3.12.2.3 Blanks

3.12.2.4 Spike Sample Recovery

3.12.2.5 Post Digest Spike Sample Recovery

3.12.2.6 Duplicates

3.12.2.7 Laboratory Control Sample

3.12.2.8 Holding Times

3.12.3 Raw Data **<B-2>**

For each reported value, the Laboratory shall include in the data package all raw data from the instrument used to obtain that value and the QA/QC values reported (except for raw data for Verifications of Instrument Parameters). Raw data must contain all instrument readouts used for the sample results, including those readouts that may fall below the IDG. ALL instruments must provide a legible hard copy of the direct real-time instrument readout (i.e., stripcharts, printer tapes, etc.). A photocopy of the direct sequential instrument readout must be included. A hardcopy of the direct instrument readout for cyanide must be included if the instrumentation has the capability. All raw data shall include absorbance values with concentration units (unless instrument direct readout is in concentration units). A photocopy of manual worksheets used must be included for all non-instrumental parameters. Raw data must be labeled with NYSDEC sample number or be associated to a group of NYSDEC sample numbers for the following:

3.12.3.1 Calibration standards, including source and prep date.

3.12.3.2 Initial and continuing calibration blanks and preparation blanks.

3.12.3.3 Initial and continuing calibration verification standards.

3.12.3.4 Diluted and undiluted samples (by NYSDEC sample number) and all weights, dilutions and volumes used to obtain the reported values. (If the volumes, weights, and dilutions are consistent for all samples in a given

SDG, a general statement outlining these parameters is sufficient).

3.12.3.5 Duplicates.

3.12.3.6 Spikes (indicating standard solutions used, final spike concentrations, volumes involved). If spike information (source, concentration, volume) is consistent for a given SDG, a general statement outlining these parameters is sufficient.

3.12.3.7 Instrument used, any instrument adjustments, data corrections, or other apparent anomalies on the measurement record, including all data voided or data not used to obtain reported values and a brief written explanation.

3.12.3.8 Time and date of each analysis. Instrument run logs can be submitted if they contain this information. If the instrument does not automatically provide times of analysis, these must be manually entered on all raw data for initial and continuing calibration verification and blanks, as well as, interference check samples and linear range analysis.

3.12.4 Digestion and Distillation Logs **<B-2>**

These logs must include: (1) date, (2) sample weights and volumes, (3) sufficient information to unequivocally identify which QC samples (i.e., laboratory control sample, preparation blank) correspond to each batch digested, (4) comments describing any significant sample changes or reactions which occur during preparation, and (5) indication of pH <2 or >12, as applicable.

3.13 Toxicity Characteristic Leaching Procedure (TCLP) Data **<B-1>**

Sample data shall be submitted with the Toxicity Characteristic Leaching Procedure Analysis Data Reporting Forms for all samples in the SDG, arranged in packets by analysis fraction. The packets shall consist of the sample results in increasing alphanumeric DEC sample number order, followed by the QC analyses data, Verification of Instrument Parameters forms, raw data, and copies of the digestion and distillation logs pertaining to that analysis fraction. The logbook page or pages dedicated to the TCLP extraction procedure should be included at the end of all the packets for the applicable analysis fractions.

Neither NYSDEC nor EPA CLP have created specific forms for reporting the results of TCLP extracted analytes. Due to the lack of any standardized forms for this data, it is unlikely that any commercial software would be or will be available to report TCLP analysis data. NYSDEC requests that the laboratory report TCLP analysis results on the analogous FORM *X* reports for each analysis and/or QC procedure

performed on the TCLP extraction fluid. The only modification to the traditional CLP-type Forms specified for use in the NYSDEC ASP is that these forms clearly be marked either in the header or in the footer comments that the results being reported on the form are from the analysis of a TCLP extract. If feasible the codes for the forms should be modified and a final suffix of "-TCLP" should be added. For example a "FORM 1 VOA-1" reported for the analysis of a TCLP extract would be "FORM 1 VOA-1-TCLP".

Note: *Data for every separate analysis performed on a TCLP extract should be separated and marked with a second level bookmark* ***(<B-2>)****.*

3.13.1 Results – Toxicity Characteristic Leaching Procedure (TCLP) Analysis Data Sheet (TCLP Modified FORM Is) **<B-3>**

Tabulated analytical results (identification and quantitation) of the specified analytes (Exhibit C) must be accompanied by a specific, signed statement in the SDG Narrative, which authorizes the validation and release of analytical results (Section 3.1). If the Laboratory Manager cannot validate all data reported for each sample, he/she must provide a detailed description of the problems associated with the sample(s) on the Cover Page.

Appropriate concentration units must be specified and entered on TCLP Modified FORM Is. The quantitative values shall be reported in units of milligrams per liter (mg/L). No other units are acceptable. Analytical results must be reported to two significant figures if the result value is less than 10; to three significant figures if the value is greater than or equal to 10. Results for percent solids must be reported to one decimal place. Qualifiers are to be added according to Table 1 and Table 2.

3.13.1.1 Organic Data Results – Should be reported in order by NYSDEC Sample ID, with the raw data and TIC's (if applicable) directly following the modified FORM I from the sample. See specifications in Sections 1.6.2, 1.7.2, 1.8.2, and 1.9.2 for instructions of reporting sample result for TCLP Organics

3.13.1.2 Inorganic Data Results – Should be reported according to the specifications listed in Section 1.10.1. Raw data will not be assembled directly after the sample data, but included later in Section 3.14.4.

3.13.2 TCLP Quality Control Data – quality control reporting should be accomplished in a manner similar to that used to report sample data on the modified FORM I's above. The key features of all CLP or CLP-like reporting forms should be retained, while notation should be added to denote that the results being reported are from the analysis of a TCLP extract. **<B-3>**

3.13.2.1 Organic Analysis of TCLP Extracts

3.13.2.1.1 Report all QC data according to the specifications listed in Sections 1.6.1, 1.7.1, 1.8.1, and 1.9.1.

3.13.2.2 Inorganic analysis of TCLP Extracts

3.13.2.2.1 Report all QC data according to the specifications listed in Section 1.10.2.

3.13.3 Verification of Instrument Parameters **<B-3>**

3.13.3.1 Organic Analysis of TCLP Extracts – Not required to be included in data package.

3.13.3.2 Inorganic analysis of TCLP Extracts – Data pertaining to the verification of inorganic instrument parameters relative to TCLP extract analysis should be reported according to the specifications in Section 1.10.3.

Note: *Copies of Verification of Instrument Parameters forms for the current quarter must be submitted with each data package.*

3.13.4 Raw Data **<B-3>**

3.13.4.1 Organic Raw Data – Raw data supporting sample results should be included in Section 3.13.1.

3.13.4.1.1 Standards Data – This section should include the raw data for calibration and calibration verifications run to support the analysis of the TCLP extract. See Sections 1.6.3, 1.7.3, 1.8.3, and 1.9.3 for instructions and specifications.

3.13.4.1.2 Raw QC Data – This section should include the raw data need to support the QC results reported in Section 3.13.2.1. The data should be presented and arranged according to the specifications in Sections 1.6.5, 1.7.5, 1.8.5, and 1.9.5.

3.13.4.2 Inorganic Raw Data – Raw data supporting the results reported in Section 3.13.1 and Section 3.13.2 should be included in this section. The raw data should follow the order and format specified in section 1.10.3.

3.13.5 Prep/Digestion Logs (Analysis Specific) – Directly following the Forms and raw data for a fraction packet, all applicable preparation and digestion logs should be included that are relevant to that analysis fraction. **<B-3>**

3.13.6 Prep Logs (TCLP Specific) – A report or copy of the logbook for the TCLP extraction process is required. If multiple TCLP extraction batches were performed within the SDG, a report or logbook page per TCLP batch is required. This report should include the following information: **<B-2>**

- NYSDEC Sample IDs
- Laboratory Sample IDs
- Sample Matrix
- % Total Solids for Sample
- Extract Filterable or Non-filterable
- Average Particle Size in Sample
    - Was Sample Particle Size Reduced?
- Data on Extraction Fluid Determination
    - Initial pH of Sample
    - pH of Sample after Addition of Acid
    - Extraction Fluid Used (Type 1 or Type 2)
- Data on the Extraction Fluid
    - Extraction Fluid Type
    - Extraction Fluid Batch ID
    - Initial pH of Fluid
- Amount (grams) of Sample Extracted
- TCLP Extraction Start Date and Time
- Temperature of TCLP Extraction Room at Start Time
- TCLP Extraction End Date and Time
- Temperature of TCLP Extraction Room at End Time
- pH of TCLP Extract at End Time

F. – Data In Computer Readable Form

Exhibit H details the requirements for electronic data deliverables (EDDs) and any other sample data submissions required to comply with NYSDEC database requirements.

For the purposes of this Protocol, and specifically Exhibit H, Sample Data Packages and Sample Summary Data Packages in the form of .PDF files are not considered “Data In

Computer Readable Form". Requirements for .PDF files are given in this Exhibit, under Section V.

G. – Electronic Instrument Data

The Laboratory must archive all raw and processed instrument data on portable electronic storage media, in the format specified by the instrument manufacturer. Portable electronic storage media can be any of the following: magnetic tapes, CD-ROM, DVD-ROM, DAT, ZIP Disks, or any other portable storage media meeting the following requirements: must be "locked, read only" after the initial "write" to the media, stable over time, easily stored on site. Data may be archived to a non-portable media such as an auxiliary hard drive, but the capability must exist to extract data upon request from NYSDEC. Data archived to an auxiliary hard drive must meet the following criteria: (a) the capability must exist to migrate the files back into the instruments data system in order to generate/regenerate appropriate analysis data and (b) the capability must exist to transfer archived files to portable storage media in order to ship the raw data to NYSDEC. This storage media must contain all instrument files used directly or indirectly to construct the NYSDEC Sample Data Packages. NYSDEC related instrument files do not need to be archived separately if the lab uses an all-inclusive archive technique for instrument data. Output files subject to this archive requirement include, but are not limited to, samples, blanks, spikes, matrix spikes, matrix spike duplicates, calibration standards, continuing calibrations, instrument tunes, as well as all laboratory-generated spectral libraries and quantitation reports required to generate the data package. The Laboratory shall maintain a written reference logbook of stored files to NYSDEC sample number, calibration data, standards, blanks, matrix spikes, and matrix spike duplicates. The logbook should include NYSDEC sample numbers and standard and blank ID's, identified by Case and Sample Delivery Group.

The Laboratory is required to retain the stored files for 3 years after data submission. During that time, the Laboratory shall submit copies of archived files and associated logbook pages within seven days after receipt of a written request from the Bureau of Watershed Assessment and Management.

H. – Samples and Extracts

1.0 Unused and Excess Sample Amounts

After the required sample aliquot has been successfully analyzed and reported, the Laboratory shall preserve any unused and excess sample amounts at the required storage temperature and conditions as specified in Exhibit I. Samples should be stored in their original containers, clearly lableled with their NYSDEC Sample Numbers and associated Case and SDG numbers. The Laboratory is required to retain samples for 365 days following data submission. During that time, the Laboratory shall submit samples and associated custody documents within seven days following receipt of a written request from the Bureau Watershed Assessment and Management or the Project Officer.

2.0 Sample Extracts (Organincs only)

The Laboratory shall preserve sample extracts at a temperature less than 4°C in bottles/vials with Teflon-lined septa. Extract bottles/vials shall be labeled with

NYSDEC sample number, Case number, and Sample Delivery Group (SDG) number. The Contractor shall maintain a logbook of stored extracts, listing NYSDEC Sample Numbers and associated Case and SDG numbers. The Laboratory is required to retain extracts for 365 days following data submission. During that time, the Laboratory shall submit extracts and associated logbook pages within seven days following receipt of a written request from the Bureau Watershed Assessment and Management or the Project Officer.

I. – Verification of Instrument Parameters

1.0 Organic Verifications

The contractor shall perform and report annual verification of MDLs by the technique specified in 40 CFR Part 136 using the analytical methods specified in Exhibit D (by type, matrix, and model for each instrument used on the contract) to the Bureau of Watershed Assessment and Management. All the MDLs shall meet the CRQLs specified in Exhibit C.

2.0 Inorganic Verifications

The Laboratory shall perform verification of instrument detection limits, method detection limits, correction factors, and linear ranges for those instrument-types specified in Exhibit E. The methods and frequency for such verifications are detailed in Exhibit E. For the ICP instrumentation and methods, the Laboratory shall also report annually interelement correction factors (including method of determination), wavelengths used, and integration times. Verification of Instrument Parameters forms for the current period shall be submitted in each Sample Delivery Group data package, using Forms X, XI, and XII. Submission of Full Verification of Instrument Parameters shall include the raw data used to determine those values reported.

3.0 All Analyses

Method Detection Limit (MDL) Study is to be performed at minimum annually, or for each new instrument brought into service, whichever is more frequent. Some analyses and methods may require more frequent running of the MDL study. If a method requires more frequent running of the MDL study, that requirement supercedes the annual requirement set herein. The information on current and past MDL studies should be maintained on file at the laboratory. The Laboratory shall maintain records for any and all instrument performance verifications performed for a period of 3 years. During that time, the Laboratory shall submit copies of such records within seven days following receipt of a written request from the Bureau Watershed Assessment and Management or the Project Officer.

J. – Preliminary Results

1.0 Organic Preliminary Results

The FORM I data results shall be submitted for all samples in one SDG of a Case. This includes tabulated target compound results (FORM I *XXXX-X*) for the volatile, semivolatile, pesticide, and Aroclor fractions, and Tentatively Identified

Compounds (FORM I *XXXX*-TIC) for the volatile and semivolatile fractions. The contractor shall clearly identify the Preliminary Results by labeling each FORM I and FORM I TIC as "Preliminary Results" under each form title (e.g., under "Volatile Organics Analysis Data Sheet", "Volatile Organics Analysis Data Sheet Tentatively Identified Compounds").

2.0 Inorganic Preliminary Results

The FORM I IN data results (including all appropriate qualifiers and flags) shall be submitted for all samples in one SDG of a Case. Sample analysis shall follow all requirements stipulated in the Method, Exhibit D. The Contractor shall clearly identify the Preliminary Results by labeling each FORM I as "Preliminary Results" under the form title (e.g., under "Inorganic Analysis Data Sheet"). The Contractor shall also include a disclaimer in the "Comments" field on all Form Is stating that the "Data results contained on the Form I are for scanning purposes only, and may not have been validated for CLP/ASP criteria." Copies of Sample Traffic Reports/Chain of Custody Records shall be submitted with the Preliminary Results.

3.0 All Preliminary Results (Organic and Inorganic)

Copies of Sample Traffic Reports/Chain of Custody Records shall be submitted with the Preliminary Results. The Contractor shall also submit a Cover Page following the specifications in Exhibit B, Part E, Section 1.1. In addition, the Cover Page shall be clearly labeled to indicate that the data being reported are Preliminary Results. The Cover Page shall contain the following statement, (usually included in the SDG Narrative) verbatim: **"I certify that these Preliminary Results are in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or the Manager's designee, as a verified by the following signature."** This statement shall be directly followed by the signature of the Laboratory Manager or designee with typed lines containing the signer's name and title, and the date of signature.

K. – Results of PE Samples

Results of Performance Evaluation (PE) Samples should be reported similar to a standard environmental sample with deliverables as specified in Items E and F (Sample Data Package (.PDF) and Electronic Data Deliverables (EDD)).

Table 1

List of Organic Method Qualifiers

Qualifier (Q)	Description
B	Entered if the analyte is found in the associated blank as well as the sample.
C	Applied to pesticide results when the identification has been confirmed by GC/MS.
D	Included when the all identified compounds in the analysis are at the secondary dilution factor.
E	Identified compounds whose concentrations exceed the calibration range of the instrument for that specific analysis.
J	Indicates an estimated value, may indicate one of the following, depending on the situation: (1) The reported value is estimated and below the MDL. (2) Used when estimating a concentration for TIC where a 1:1 response is assumed or when the result indicates the presence of a compound that meets the identification criteria, but the results is less than the quantitation limit, but greater than zero. (3) QC associated with this analyte is within warning limits.
N	Included for TIC that indicate presumptive evidence of a compound.
U	Entered if the analyte was analyzed for, but not detected.
P	Used for a pesticide/Aroclor target analyte when the concentration difference between 2 GC columns is greater than 25%; the lower value is flagged with a "P".
EMPC	"Estimated Maximum Possible Concentration" – The amount of analyte cannot be accurately quantified, so a maximum concentration has been estimated for the compound.
"XYZ"	"Wildcard" or Laboratory defined qualifier.

Note: *Form I allows only one character in each qualifier column. If multiple qualifiers are applicable, please assess qualifier priority in the following order: U, E, J, B, D, C, P, N. Reporting done in the EDD may include multiple qualifiers when applicable, separated by a single space.*

Table 2

List of Inorganic Method Qualifiers

Qualifier	Column[1]	Description
Concentration qualifiers		
B	C	Entered if the reported value was less than the CRDL, but greater than the IDL.
U	C	Entered if the analyte was analyzed for, but not detected.
J	C	Entered if the reported value is estimated and below the MDL.
*	C	Duplicate precision exceeds RPD limit.
M	C	Replicate precision exceeds RPD limit.
"XYZ"	C	"Wildcard" or Laboratory defined qualifier.
Qualifier specific entries		
E	Q	Entered if the reported value is estimated because of the presence of interferences.
Method qualifiers		
A	M	Flame atomic absorption
AS	M	Semi-automated spectrophotometric
AV	M	Automated cold vapor atomic absorption
C	M	Manual spectrophotometric
F	M	Furnace atomic absorption
MS	M	Mass spectrometry (ICP-MS)
NR	M	Analyte is not required to be analyzed
P	M	Inductively coupled plasma (ICP)
" "	M	No data have been entered

[1] The term "Column" is used to indicate under which column heading in the reporting forms that the qualifier will be found under.

Note: *Form I allows only one character in each qualifier column. If multiple qualifiers are applicable to column C, please assess qualifier priority in the following order: U, J, B. Reporting done in the EDD may include multiple qualifiers when applicable, separated by a single space.*

PART III -- CLP REPORTING FORMS AND INSTRUCTION GUIDE

1.0 NYSDEC has not created any specific reporting forms for the purpose of ASP reporting. Since most data is now reported using software formatted to produce data in the EPA CLP or EPA CLP-Like Forms, the ASP relies on the forms and instructions specified by the EPA in the CLP. Copies of the CLP SOWs, containing the required Organic and Inorganic Reporting forms and their instructions, can be found in ASP Exhibit D, in the CLP folder.

2.0 The Exhibit B forms and instructions contained in the CLP SOWs can be followed verbatim in most cases. Please note that the following exceptions and modifications to the CLP Forms and Form Instructions should be made.

2.1 Substitutions, General

- All references to "USEPA" or "EPA" should be substituted with "NYSDEC".
- All references to "EPA Sample Number" should be substituted with "NYSDEC Sample Number".
- All references to the "CLP SOW" or "SOW" should be substituted with "NYSDEC ASP" or "ASP", respectively.
- All references to "USEPA Regional Contract Laboratory Program Project Officer (CLP PO)", "USEPA OERR Analytical Operations/Data Quality Center (AOC)" and "Inorganic Program Manager (AOC PM)" should be substituted with "NYSDEC Bureau of Watershed Assessment and Management".
- The "Laboratory Code" to be used on all reporting documents should be the NYSDOH ELAP code assigned to the laboratory.

2.2 All references to the following can be disregarded:

- Non-Routine Analytical Services (NRAS)
- Sample Traffic Reports

2.3 The Forms and Instructions for Organic Data Reporting should follow CLP, Draft SOM01.X, Exhibit B with the following exceptions:

- References to "Modification Reference Number" or "Mod. Ref. Num." can be omitted or ignored in ASP reporting.

2.4 The Forms and Instructions for Inorganic Data Reporting should follow CLP, ILM05.3, Exhibit B, Section 3 with the following exceptions (All Section Numbers refer to directly to the CLP documents):

- The items under Section 3.3.5 may be disregarded.

- The requirement listed in Section 3.4.1.2.1 requiring the entry of the Statement of Work as “ILM05.3” should be modified and the label “ASP2004” should be inserted in the field for the SOW.

- Section 3.6 (CSF Instructions) may be disregarded.

PART IV -- NYSDEC DATA PACKAGE SUMMARY FORMS

The completion of Data Package Summary Forms is no longer a standard requirement for NYSDEC sample data or sample data packages. However for a small portion of NYSDEC Projects, completion of summary forms will be requested and required. These requests will be dependent upon the needs of the data users at NYSDEC. NYSDEC may also request changes in the style and content of the summary forms from those given herein.

The Data Package Summary Forms provided in this Exhibit are similar to the summary forms requested by NYSDEC in the past. If summary forms are requested and no specific template or blank forms have been provided to the laboratory, the following forms should be considered the default format. If custom forms are requested, the laboratory must report the summary data in the format requested. When summary data is requested in a non-standard format, the Laboratory should anticipate that the amount of information required in the summary forms would be similar to the amount of data required to complete the standard summary forms.

Instructions for NYSDEC Data Package Summary Forms

I. Sample Identification and Analytical Requirement Summary (Form S-I)

A. NYSDEC Sample ID/Code

Sample code number or ID assigned to the sample by NYSDEC personnel.

B. Laboratory Sample ID/Code

Code number given to respective sample by the laboratory and used for identification throughout analysis.

C. Analytical Requirements

This column is broken down into 6 sub-columns. The heading of each sub-column is an analytical parameter group. If the sample listed in a row is being analyzed for the parameter group listed at the top of the sub-column, complete the box below with the method number being used to analyze that sample for that parameter group. If no analysis is being performed in that parameter group, the space should be left blank.

II. Sample Preparation and Analysis Summary - Semivolatile (BNA), Volatile (VOA), and Pesticides/PCB's (Form S-IIa/b/c)

A. Laboratory Sample ID

The sample code number that the laboratory will use throughout the analysis for a specific sample.

B. Matrix

Label the sample with matrix indicated as water, soil, oil, grease, or drum solvent, etc.

C. Date Collected

Record the date that sample was collected on site.

D. Date Received at Laboratory

Record the date the Laboratory received the sample. (Validated Time of Sample Receipt - VTSR)

E. Date Extracted

Record the date the sample was extracted. This field should be left blank for aqueous VOA samples.

F. Date Analyzed

Record the date the sample was analyzed.

III. Sample Preparation and Analysis Summary – Miscellaneous Organics (Form S-III)

A. Laboratory Sample ID

The sample code number that the laboratory will use throughout analysis for a specific sample.

B. Matrix

Label the sample with matrix indicated as water, soil, oil, grease, or drum solvent, etc.

C. Analytical Protocol

Record the number of the method used to analyze the sample.

D. Extraction Method

Write the method used for sample extraction.

E. Auxiliary Clean-Up

If cleanup was done on sample, record the method or methods used.

F. Dil/Con Factor

If sample was diluted, record the final (just prior to analysis) dilution factor, or if concentrated, record also.

IV. Sample Preparation and Analysis Summary - Inorganics Analysis

A. Laboratory Sample ID

The sample code number that the laboratory will use throughout analysis for a specific sample.

B. Matrix

Label the sample with matrix indicated as water, soil, oil, grease, or drum solvent, etc.

C. Metals Requested

List metals that are to be analyzed. If for NYSDEC ASP, write full TCL in column, or more individual metals required.

C. Date Received at Laboratory

Record the date the Laboratory received the sample. (Validated Time of Sample Receipt - VTSR).

D. Date Digested

Date the sample was digested or otherwise prepared for analysis.

E. Date Analyzed

Date sample was analyzed on instrument.

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

FORM S-I

SAMPLE IDENTIFICATION AND ANALYTICAL REQUIREMENT SUMMARY

NYSDEC Sample ID/Code	Laboratory Sample ID/Code	Analytical Requirements					
		VOA GC/MS (Method #)	BNA GC/MS (Method #)	VOA GC (Method #)	Pest PCBs (Method #)	Metals (Method #)	Other (Method #)

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

FORM S-IIa

SAMPLE PREPARATION AND ANALYSIS SUMMARY
SEMIVOLATILE (BNA)
ANALYSES

Laboratory Sample ID	Matrix	Date Collected	Date Rec'd at Lab	Date Extracted	Date Analyzed

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

FORM S-IIb

SAMPLE PREPARATION AND ANALYSIS SUMMARY
VOLATILE (VOA)
ANALYSES

Laboratory Sample ID	Matrix	Date Collected	Date Rec'd at Lab	Date Extracted	Date Analyzed

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

FORM S-IIc

SAMPLE PREPARATION AND ANALYSIS SUMMARY
PESTICIDE/PCB
ANALYSES

Laboratory Sample ID	Matrix	Date Collected	Date Rec'd at Lab	Date Extracted	Date Analyzed

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

FORM S-III

SAMPLE PREPARATION AND ANALYSIS SUMMARY
MISCELLANEOUS ORGANIC
ANALYSES

Laboratory Sample ID	Matrix	Analytical Protocol	Extraction Method	Auxiliary Cleanup	Dil/Conc Factor

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

FORM S-IV

SAMPLE PREPARATION AND ANALYSIS SUMMARY
INORGANIC ANALYSES

Laboratory Sample ID	Matrix	Metals Requested	Date Rec'd at Lab	Date Digested	Date Analyzed

PART V – NYSDEC ACROBAT DOCUMNENT REQUIREMENTS

1.0 Sample Data Package .PDF File

In order to comply with the Paperless Office requirements being implemented by various New York State government organization, the Department of Environmental Conservation requires that all data packages be submited as Adobe Acrobat .PDF files on a CD-ROM. The following steps must be followed for the submission of Sample Data Packages and other related documents in .PDF format to insure that all data received by NYS DEC can be easily read, understood, and used for Department decision making.

1.1 CD-ROM Requirements

1.1.1 The CD-ROM containing the sample data package must be of the CD-R media type. Use of CD-RW media type is strictly prohibited for the submittal of NYSDEC Sample Data Packages.

1.1.2 The Laboratory is required to produce an additional copy of the Data Package CD-ROM submitted to NYSDEC and retain it for their records, stored for a minimum period of 3 years. This archive copy of the Sample Data Package and accociated SDG submitted files should be stored on CD-R type media. Use of CD-RW media is not permitted.

1.2 Sample Data Package Hardcopy Requirements

1.2.1 Generation of a hardcopy original Sample Data Package for storage at the Laboratory facility is no longer required.

1.2.1.1 Two (2) hardcopies of the SDG Cover Page and SDG Narrative from the Sample Data Package must be generated and signed by the appropriate Laboratory representative. One set of copies must be submitted to NYSDEC with the Sample Data Package CD-ROM. The second set of copies must be kept on file at the laboratory for a minimum period of 3 years from the date of sample receipt.

1.2.2 At the request of NYSDEC the lab should be prepared to generate a hardcopy of the full Sample Data Package, certifiy the newly generated hardcopy with the appropriate signatures, and submit the entire certified Sample Data Package to NYSDEC within 7 business days.

1.2.2.1 The associated computer files required to produce a hardcopy data package should be archived and stored at the laboratory for a minimum of 3 years from the date of sample receipt.

1.3 .PDF File Requirements

Sample Data Packages submitted to NYS DEC in .PDF file format should be of the "Formatted Text and Graphics" .PDF-type. Sample Data Package .PDFs should not be "Image Based" documents. This format allows .PDF documents to be searched for specific text strings within the data package. It also prevents poor integrity of original documents and poor scan qaulity from affecting the overall legibility of the data package.

1.3.1 File to .PDF Conversion – Whenever possible data packages should be constructed from instrument output files and report generator output files converted to .PDF format by processing the files through Adobe Acrobat Writer. When output files are converted into .PDF, the .PDF files created are searchable and the characters/fonts tend to be more legible. Care must be taken to insure that the fonts contained in output files are recognized by Acrobat and are properly converted. Converted files should also be checked to insure formatting (spacing, margins, etc.) and graphics are preserved from the original.

1.3.2 Hardcopy to .PDF Conversion - In some cases output files cannot be used and hard copy data must be scanned to create an image file (non-.PDF) and then converted into .PDF format. In these cases the integrity of the scanned document and the quality of the scan must be closely monitored to insure to overall legibility of the data package. The following requirements should be adhered to when creating .PDF files from hardcopy data.

1.3.2.1 The document should be scanned at 300 dpi or greater.

1.3.2.2 The document should be scanned at a speed slow enough not to distort the fonts or images in the rusultant image file.

1.3.2.3 NYS DEC requires that all scanned image files be processed through the Adobe Acrobat Capture Utility to convert the image file into a Formatted Text and Graphics .PDF. Whenever possible, original hardcopy documents should have no smaller than an 8 pt. font.

Note: *All text of 8 pt. size and greater, orientated along the horizontal axis of the page, should be recognizeable and convertable when processed through ScanSoft OmniPage or a similar Optical Charact Recognition (OCR) software engine. The OCR conversion should produce a .rtf document with an accuracy of 99% or greater when compared to the .PDF original. Text smaller than 8 pt. size or text not oriented along the horizontal axis of the document is not subjuect to the 99% accuracy requirement.*

1.3.3 Cropping of Pages - The pages in the .PDF file should be completely viewable to the reader, with a minimum margin width, on the left, right, top, and bottom of the document, of 0.5 inches when printed on a standard 8.5 by 11 inch piece of paper,. No part of an original image "page" shall be cropped in order to fit the document into a single .PDF "page". If necessary an original document may be proportionally reduced in size by 78%. If a document requires reduction greater than 78% in order to fit on a

single page, the document should be cafefully divided into equally sized parts and a .PDF page created for each part. An 8.5 by 14 inch legal sized document reduced by 78% will fit into a standard page by this requirement.

1.3.4 Page Orientation – Every effort should be made to have pages in the .PDF pages oriented in a consistant manner. NYS DEC prefers all pages to be in the portrait orientation when feasible. If the data system allows for the format of instrument output to be programmed between portrait and landscape, the output should be set to the portrait mode. If landscape is the only output mode possible, or in the case of the NYS Sample Summarry Forms, .PDF pages with landscape orientation should be inserted into the .PDF rotated counter-clockwise 90°. Landscape pages setup with this orientation would be displayed normally after a 90° clockwise rotation by the reader. If, due to the unprogrammable format of instrument data systems or report generation software, the majority of the pages are converted into .PDF in landscape orientation, they may remain in landscape orientation. If landscape is the majority orientation of the pages, portrait pages should be rotated counter-clockwise 90°, so that a clockwise rotation of 90° by the reader will orientate the image properly.

1.3.5 Linked Table of Contents – NYS DEC requuires that all Sample Data Packages include a Table of Content. The Table of Contents in the .PDF file should provide clickable links to the various sections and sub-sections listed in the Table.

1.3.6 Bookmarks – The Sample Dat Package shall contain bookmarks within the Adobe Acrobat file, arranged in the following manner:

1.3.6.1 The Sample Data Package .PDF should contain bookmarks to separate individual sections and the subsections within. All sections and subsections requiring bookmarks are marked in this Exhibit with a "**<B-*X*>**".

1.3.6.1.1 Sections marked with "**<B-1>**" should be bookmarked with a level one bookmark. Level one is the hightest level of bookmarking in the data package.

1.3.6.1.2 Sections marked with "**<B-2>**" should be bookmarked with a level two bookmark. Level two bookmarks are sub-bookmarkes to the parent level one bookmarks.

1.3.6.1.3 Sections marked with "**<B-3>**" should be bookmarked with a level three bookmark. Level three bookmarks are sub-bookmarkes to the parent level two bookmarks.

1.3.6.2 All items listed in the table of contents should be bookmarked within the .PDF and accessable from the bookmark navigation panel in Acrobat Reader.

1.3.6.3 Sample Data Packages should be further bookmarked when either one of the following conditions are met.

1.3.6.3.1 In cases when sample data exceeds more than 5 pages per sample data "packet", in either a "Sample Results" Section or a "Raw Data" Section, the beginning of each data "packet" must be bookmarked with the appropriate level bookmark **<B-(*X*+1)>**. Where *X* is the level of the parent bookmark for the Section in which the data is being placed in.

1.3.6.3.2 In cases when the total amount of data in any of the Sample Data Package sections designated for either a "Sample Results" or "Raw Data" exceeds 40 pages, the beginning of each data "packet" must be bookmarked with the appropriate level bookmark **<B-(*X*+1)>**. Where *X* is the level of the parent bookmark for the Section in which the data is being placed in.

APPENDIX D

OU1 Health and Safety Contingency Plan

This Level 2 health and safety plan (HASP) is intended to provide health and safety guidelines for project work meeting one or more of the following criteria:

- Some likelihood of physical and/or chemical hazard exposure (e.g., sampling, use of equipment and tools);
- Number of job tasks is five or greater;
- Use of contractors;
- Work meets the definition of being "high hazard", which includes, but is not limited to:
  - Activities that could have an adverse effect on the environment (e.g., use of bulk liquid storage tanks, generators, etc.);
  - Air or boat transport via charter or non-commercial carrier/vendor;
  - Confined space entry;
  - Construction;
  - Decommissioning, decontamination, and demolition (DDD) operations;
  - Diving;
  - Excavations, trenching, drilling, or other ground disturbance activities (i.e., activities requiring subsurface clearance [SSC] operations);
  - Hazardous energy control operations;
  - Hot work (e.g., welding, flame cutting, or other spark-producing activities);
  - Injection well operations;
  - Off-shore or over water work (including oil platform visits);
  - Rigging and lifting operations; and
  - Work at heights in excess of four feet.

The HASP should be developed with input from the project team and reviewed with all ERM project personnel, including contractors. A signed copy of the HASP must be maintained at the project site during work and must be archived in the project files.

H&S Team review is required for the Level 2 HASP. You can e-mail completed plans requiring review to the ERM North America HASP Review Team (ERMNASafetyLeads@erm.com). This HASP must be reviewed by the Project Manager and reviewed/approved by the Partner in Charge (PIC) and updated as warranted to address changes in scope, hazards present, project personnel, etc. At a minimum, HASPs must be reviewed annually or if the scope of work changes. Updated HASPs should also be sent to the H&S Team for review and PIC for approval.

Administrative Information

This document has been developed for the sole use of ERM staff. Contractors and other project participants must develop their own HASP.

This document is valid for a maximum time period of one year after completion. The document must be reviewed if the scope of work or nature of site hazards changes and must be updated as warranted.

Project Name: Fulton Ave.	Site Name & Location: Garden City NY
Client Contact and Phone: Roger Sisson (615) 367-8444	Client: Confidential
Health & Safety Plan Date: 7/14/2017	GMS Project #: 0097881
Partner in Charge: Jim Perazzo	Revision Number and Date: Rv1
Project Manager: Chris Wenczel	Field Work Start Date: Ongoing project work
Field Safety Officer: Brice Lynch	Anticipated Field Work End Date: Ongoing project work
SSC Experienced Person (if applicable): Karen Pickering	Short Service Employees (SSE): 39T
Additional ERM personnel on site: James Harvey, Mat Frankel	SSE Mentor: 39T

H&S Team Review

Reviewer Name: ELS Review Date: 7/14/2017	Signature File: 

Site Description

Include relevant background information regarding the site, such as location, size, type of facility, topography, weather, infrastructure, security, previous site use, etc. Describe nature and extent of any soil/air/water/groundwater contamination. Describe any other aspects of the site that may potentially affect the health, safety, or security of on-site personnel.

Add Site Description here. The Fulton Avenue Superfund Site is located at 150 Fulton Ave, Garden City Park, NY. The Site was used as a dry cleaning facility from 1966 through 1977. The site contributes Tetrachloroethene (PCE) and daughter constituents to the groundwater, as localized by the Upper Glacial and Magothy aquifers. The Site property is 0.8 acres; the USEPA Superfund Site extends into surrounding neighborhoods. Work on the Site will involve well installation and groundwater monitoring events in public areas where sub-surface and overhead, and street level hazards are expected.

Project Background and Scope of Work

Include list of tasks to be completed by ERM personnel during this project, and a separate list of tasks to be completed by any contractors at the site. A site-specific Job Hazard Analysis (JHA; ERM-1115-FM1) must be completed for each task to be performed. Contractors must provide their own HASP and a JHA for each task they will perform for ERM review.

A JHA template and reference/example JHAs for more common tasks can be found at: North America H&S Page - JHAs.

Add ERM Scope of Work here. ERM provides oversite for groundwater, soil, and air quality with the object of minimizing human exposure to site contaminants. This includes monitoring well installation, groundwater sampling, soil gas and sub-slab vapor monitoring.

ERM Task 1: Oversight of Well Installation	☒ JHA Attached?
ERM Task 2: Groundwater sampling	☒ JHA Attached?
ERM Task 3: Travel to and From Site	☒ JHA Attached?
ERM Task 4:	☐ JHA Attached?
ERM Task 5: 39T	☐ JHA Attached?
ERM Task 6: 39T	☐ JHA Attached?
ERM Task 7: 39T	☐ JHA Attached?

Add Contractor Scope of Work here.

Contractor Task 1: Advance borings	☒ JHA Reviewed?
Contractor Task 2: Monitoring Well Installation	☒ JHA Reviewed?
Contractor Task 3:	☐ JHA Reviewed?
Contractor Task 4: 39T	☐ JHA Reviewed?
Contractor Task 5: 39T	☐ JHA Reviewed?
Contractor Task 6: 39T	☐ JHA Reviewed?
Contractor Task 7: 39T	☐ JHA Reviewed?

Contractor(s) to be used:	Approved under Contractor Management Program?
1. Delta Well & Pump Company, Inc.	☒ Yes ☐ No
2. Accutest Laboratories	☒ Yes ☐ No
3. 39T	☐ Yes ☐ No
4. 39T	☐ Yes ☐ No
5. 39T	☐ Yes ☐ No

Site/Project General Information

Site Type (check all applicable boxes)

☒	Industrial	☒	Hazardous waste release (Hazwoper)
☒	Residential	☐	Remote site or inactive facility**
☒	Unsecured	☒	Other (specify): Public Golf Course
☐	Coastal/offshore (on or near water)*	☐	Other (specify): 39T

* ERM Form NAM-1534-FM1 (*Coastal and Offshore Risk Management*) must be completed and attached to this document.
** ERM Form NAM-1501-FM2 (*Undeveloped, Remote, or Inactive Sites*) must be completed and attached to this document.

Main Project Hazards (check all applicable boxes)

☐	Aerial Lift Use (e.g., Scissor Lifts, Cherry Pickers)[1]	☐	Helicopter/Fixed Wing Aircraft Transportation[3]
☐	All-Terrain Vehicle/Snowmobile Use[1]	☒	High Noise (>85 dBA)
☐	ASTs/USTs	☐	Hot Work (Welding, Cutting, Brazing)[2]
☐	Biological Hazards	☐	International Travel[4]
☒	Chemical Exposure Potential (including asbestos)	☐	Long Distance/Duration Driving[5]
☐	Chemical Mixing/Injection	☐	Mining (Surface/Underground)
☒	Compressed Gas	☒	Natural Hazards (Plants, Animals, Insects)
☐	Confined Space Entry[2]	☐	Off-Shore Platform Work[6]
☐	Construction[1]	☒	Overhead Power Lines
☐	Control of Hazardous Energy (i.e., Lockout/Tagout)[2]	☐	Portable/Fixed Ladders
☐	DDD Operations[1]	☐	Radiation (Ionizing/Non-ionizing)
☐	Diving[1]	☐	Rigging/Lifting[2]
☐	Ergonomics/Material Handling	☐	Scaffold Use
☒	Excavation/Trenching/Drilling[2]	☐	Shift Work (e.g., night work)
☐	Extended or Nonstandard Work Shifts (>14 hours)	☐	Short Service Employees
☒	Extreme Weather	☒	Slips/Trips
☐	Explosives Use[1]	☒	Subsurface Clearance (Buried Utilities)[2]
☐	Falls from height (>4 feet)[1]	☐	Working on/over/near Water (including transport)[1]
☐	Forklift/Industrial Truck Use[1]	☐	Unexploded Ordnance/Munitions and Explosives of Concern (UXO/MEC)[1]
☒	Hand/Power Tool Use		
☒	Heavy Equipment Use	☐	Other (specify): 39T

1 High hazard work requiring H&S team coordination. Additional control measures may be required beyond JHA.
2 Permit-required high hazard work requiring H&S Team coordination and ERM or equivalent client-required permit to be completed.
3 If traveling using a helicopter or fixed wing aircraft, ERM employees are required to follow the provisions of ERM Standard ERM-1440-ST1 (*Fixed Wing Aircraft and Helicopter Safety*).
4 A Travel Risk Assessment (TRA) is required for all international travel (with the sole exception of travel to a Low Risk country where ERM has a permanent office). Consult ERM Standard ERM-1410-ST1.
5 If driving more than 500 km (310 miles) in a single day, driving in excess of 4.5 hours in a single day, or driving in a remote location, a Journey Management Plan (*ERM-1430-FM1*) is required and should be appended to this HASP.
6 If traveling to/from and working on an off shore platform, ERM employees are required to follow the provisions of ERM Standard ERM-1531-ST1 (*Offshore Platform Safety*).

Chemicals of Concern

Chemical Products Used or Stored On-Site

For each chemical product identified, a Safety Data Sheet (SDS) must be attached to this HASP.

☒ Alconox or Liquinox	☐ Household bleach (NaOCl)
☐ Hydrocholoric acid (HCl)	☐ Calibration gas
☐ Nitric acid (HNO_3)	☐ Other (specify): 39T
☐ Sulfuric acid (H_2SO_4)	☐ Other (specify): 39T
☐ Sodium hydroxide (NaOH)	☐ Other (specify): 39T
☐ Isopropyl alcohol	☐ Other (specify): 39T

Note: Emergency eyewash solution must be readily available on all project sites where materials are used or stored that pose a risk of getting into the eyes via splashing or through contact with airborne gases, vapors, dusts, or mists. This includes sample preservatives. The size and flushing capability of the eyewash must be proportional to the potential for contact with corrosive or injurious materials in the field and the resulting potential for injury. Contact your BU H&S Director for additional information or assistance.

Regulated Chemicals of Concern

Check any chemicals known or suspected to be present on the site to which the ERM team may be exposed. These chemicals include OSHA-regulated potential carcinogens (29 CFR 1910.1003 through 1016) as well as those chemicals for which OSHA has established specific respiratory protection requirements (29 CFR 1910.134). A list of these chemicals is provided in Section 3 of ERM Standard NAM-1340-PR1 (*Chemical Hazards*).

Are any of the chemicals that appear on the list in Section 3 of NAM-1340-PR1 known or suspected to be present on the site?

☐ Yes ☒ No

If the answer to the question above is Yes, follow the requirements of NAM-1340-PR1. For additional assistance with interpretation /evaluation of the regulatory impacts, contact your Business Unit H&S Director.

Additional Known or Suspected Chemicals of Concern

Are there additional known or suspected chemicals of concern present on the site not identified in the ***Regulated Chemicals of Concern*** section above? ☒ Yes ☐ No

If the answer to the question above is Yes, NAM-1340-FM1 (Known or Suspected Chemicals of Concern) must be completed and attached to this HASP. Information on each chemical must be provided to all team members.

Monitoring Equipment

Will ERM staff be using equipment on the project site to monitor potential exposures to known or suspected chemicals of concern?

☒ Yes ☐ No

If the answer to the question above is Yes, attach ERM Form NAM-1302-FM3 (Monitoring Equipment) to define the equipment to be used and the action levels to be applied.

All monitoring equipment on site must be calibrated per manufacturer specifications (including daily bump tests) and results recorded. See ERM Procedure NAM-1302-PR1 (*Equipment Maintenance and Calibration*) for additional information. Under stable conditions, measurements must be made in the breathing zone at least once every 30 minutes.

Personal Protective Equipment

Req = Required PPE for one or more tasks to be performed; required on site at all times. NA = Not applicable to this project.

Equipment	Req	NA	Supplies	Req	NA
Steel-toed Boots	☒	☐	Inner Chemical Gloves	☐	☒
Outer Disposable Boots	☐	☒	Outer Chemical Gloves	☐	☒
Long Sleeve Shirt/Pants	☒	☐	Leather or Kevlar Gloves	☒	☐
Tyvek Suit	☐	☒	Safety Glasses/Goggles	☒	☐
Poly-Coated Tyvek Suit	☐	☒	Face Shield	☐	☒
Fully Encapsulated Chemical Suit	☐	☒	Hearing Protection	☒	☐
Flame Resistant Clothing/Coveralls	☐	☒	Half-face Respirator	☐	☒
High Visibility Traffic Vest	☒	☐	Full-face Respirator	☐	☒
Hard Hat/Approved Helmet	☒	☐	Personal Floatation Device	☐	☒
Wet Suit/Dry Suit	☐	☐	If either half or full-face respirator checked: • Define cartridge type: 39T • Define cartridge change frequency: 39T		
Other (specify): 39T	☐	☐			

Respirator selection should be based on the Assigned Protection Factor (APF) and the Maximum Use Concentration (MUC). To determine the appropriate respirator selection, the lowest appropriate published exposure guideline should be known. The Business Unit H&S Director or project H&S consultant can provide assistance in defining the APF and MUC, as necessary. They can also assist in defining actions levels and cartridge change schedules when air-purifying respirators are used. Note that cartridge change schedules must be outlined above and in the JHA for any task requiring respiratory protection.

Use of respiratory protection requires three elements: training in respiratory protection techniques, completion of medical surveillance confirming that you are fit to wear a respirator, and fit testing with the make and model of respirator you will be using. Refer to NAM-1311-PR1 (*Respiratory Protection*) for additional information.

Training, Medical Surveillance, and Safety Supplies

Req = Required; requirements are based on the specific tasks performed in the field and the type of environments, chemicals, or hazards encountered. NA = Not applicable to this project.

Training	Req	NA	Medical Surveillance***	Req	NA
40-Hour Hazwoper	☒	☐	Medical Clearance	☒	☐
Current 8-hour Hazwoper Refresher	☒	☐	Respirator Clearance and Fit Test	☐	☐
8-Hour Hazwoper Supervisor*	☐	☐	Blood Lead and ZPP	☐	☐
Current First Aid/CPR	☒	☐	Other (specify): 39T	☐	☐
40-Hour MSHA New Miner	☐	☐	Other (specify): 39T	☐	☐
Current 8-hour MSHA Refresher	☐	☐	**Safety Supplies**	**Req**	**NA**
ERM Field Safety Officer (FSO)	☒	☐	First Aid Kit	☒	☐
DDD Practice FSO/DM	☐	☐	Emergency Eyewash Solution	☐	☐
Subsurface Clearance (SSC)	☒	☐	Air Horn	☐	☐
EPA Hazardous Waste	☐	☐	Decontamination Supplies	☒	☐
Hazmat/Dangerous Goods Shipping**	☐	☐	Fire Extinguisher	☒	☐
International Traveler	☐	☐	Potable Water	☐	☐
Other (specify): 39T	☐	☐	Toilets	☐	☐
Other (specify): 39T	☐	☐	Other (specify): 39T	☐	☐

* Provides specialized training to serve as an on-site manager supervising employees engaged in work covered by 29 CFR 1910.120.

** In Canada, Workplace Hazardous Materials Information System (WHMIS)/Globally Harmonized System (GHS) and Transportation of Dangerous Goods (TDG) regulations apply.

*** Physical examination requirements should be discussed with Workcare well in advance of project to allow adequate time to schedule exams.

Work Zones

Complete if exclusion zones are necessary because of chemical and/or equipment hazards. Describe the set-up of these zones. Include landmarks, dimensions (as necessary), and whether they are for equipment or personnel decontamination.

Define Exclusion Zone Requirements, if any, here. Exclusion zones pertain to any well installation or sampling tasks and will be demarcated by cones for well sampling and additional safety tape and barricades for installation work. The space size will be dictated by specific need and availability.

Define Contamination Reduction Zone requirements, if any, here. For installation tasks the contamination reduction zone will be adjacent to the exclusion zone. The decon pad will be set up adjacent to the well head for well installation tasks. City water from hydrants will be available and will be containerized in drums after decon.

Define Support Zone requirements, if any, here. Street or off street parking is available sitewide and will serve as the support zones for incidental material and tool availability. Safety cones will be placed on the street side of parked work vehicles.

Site Access/Control

Describe procedures for limiting unauthorized entry to the work zone(s). Describe any security requirements.

Define Site Access/Control procedures, if any, here. As described above, the exclusion and reduction zones will be marked off with safety cones and caution tape. An overnight watch will be in place during reverse rotary drilling installation.

Decontamination Procedures

Describe procedures for the decontamination of personnel and equipment.

Define personnel decontamination procedures, if any, here. Nitrile gloves and tyvek suits will be disposed of as non-regulated waste material. City water is available for wash up after exposure to impacted groundwater or soil.

Define equipment decontamination procedures, if any, here. : Decontamination will be conducted on a pad with an impermeable synthetic liner and fluid containment boom. Equipment will be placed on the pad and rinsed, brushed, and/or steam cleaned to remove any contamination. Rinse water generated will be containerized in drums in accordance with approved work plans. For major equipment, use a soap and/or water rinse and steam clean with temperature between 160 degrees to 180 degrees Fahrenheit with a pressure at greater at or greater than 1,200 psi.

Spill Prevention and Response

Ensure all chemical containers on site are labeled and lids are secured when not in use. When transferring chemicals from one container to another, or when refueling vehicles or equipment, provide containment beneath the transfer point to capture potential spills. Immediately report all chemical spills to the PIC/PM and submit an ECS entry with 24 hours.

Will ERM staff or ERM-hired contractors possess containerized chemicals on the project site? ☐ Yes ☒ No

Will container size be greater than or equal to one gallon? ☐ Yes ☒ No

If the answer to both of these questions is Yes, follow the requirements outlined in ERM Procedure NAM-1123-PR1 (*Spill Prevention and Response*)?

Waste Management Planning

Will ERM's project activities generate waste materials? ☒ Yes ☐ No

Will ERM undertake some level of contractual responsibility for handling waste for the client? ☒ Yes ☐ No

If the answer to either of these questions is Yes, follow the requirements outlined in ERM Procedure NAM-1122-PR1 (*Waste Management Planning*).

Describe any waste reduction/minimization techniques to be used on the site here. Sufficient and judicious amounts of water will be used for decon.

Client-Specific Emergency Response

In the event of an emergency, client-specific emergency response procedures may take precedence over ERM established procedures.

While engaging in field-related activities on an active client site, measures they have in place to signal either emergency response or evacuation need to be reviewed and documented.

Once completed, this summary should be discussed with all visitors, contractors, and others subject to HASP review upon site visit.

Describe any contributing factor potentially initiating emergency response (e.g., process, material, or weather) here.

Describe any lights and/or sounds associated with evacuation here.

Describe any emergency drill requirements for contractors on-site here.

Describe any primary and alternative muster points here.

Describe any site-specific evacuation procedures here.

Describe the methodology to be used for accounting for site visitors here.

Describe any PPE and spill kit requirements here.

Is a map associated with evacuation attached? ☐ Yes ☒ No

Emergency Contacts

All ERM employees are empowered to pause or stop work to address any unsafe acts/conditions, questions, concerns or changed conditions. All work-related safety events should be shared with the project team and promptly entered into the Event Communication System (ECS).

FOR ALL MEDICAL EMERGENCIES, CALL 911 OR THE LOCAL EMERGENCY NUMBER.

For ALL non-emergency incidents resulting in any injury or illness, you must:

- *Give appropriate first aid care to the injured or ill individual and secure the scene.*
- *Immediately notify the PM, PIC, and the H&S Team.*
- *At direction of PM, PIC, or H&S Team, call WorkCare Incident Intervention at (888) 449-7787 (available 24 hours/7 days per week in US only).*
- *Clients may have their own procedures which we need to follow.*

For all incidents (injuries, illnesses, spills, fires, property damage, etc.) and significant near misses, enter the event into ECS within 24 hours.

Contact	Name	Location	Phone
Hospital (attach map)	Winthrop University Hospital	259 1st St, Mineola, NY 11501	(866) 946-8476
Police	911	39T	39T
Fire	911	39T	39T
Incident Intervention	WorkCare	NA	888-449-7787
Partner-in-Charge	Jim Perazzo	Melville	Work: (631) 756-8913
			Cell: 39T
Project Manager	Chris Wenczel	Melville	Work: (631) 756-8920
			Cell: (516) 315-8221
Field Manager (if not PM)	Brice Lynch	Melville	Work: 631-756-8944
			Cell: 39T
Field Safety Officer (if not PM)	Karen Pickering	Melville	Work: 631-756-8944
			Cell: 39T
SSC Experienced Person	Chris Wenczel/Karen Pickering	Melville	Work: 631-756-8960
			Cell: 39T
Business Unit H&S Director	Matt Botzler	Philadelphia, PA	Work: 484-913-0339
			Cell: 39T
Regional H&S Director	Mark Hickey	Denver	Work: (720) 200-7172
			Cell: 39T
Contractor Contact	Chris Okon	Ronkonkoma NY	Work: (631) 981-2255
			Cell: (631) 300-8353
Client Contact	Roger Sisson	Nashville TN	Work: (615) 367-8444
			Cell: 39T
Additional Contact	39T	39T	Work: 39T

			Cell: 39T

Acknowledgement

I have read, understood, and agree with the information set forth in this health and safety plan (HASP), and will follow guidance in the plan and in ERM's Document Control System (DCS). I understand the training and medical monitoring requirements (if any) for conducting activities covered by this HASP and have met these requirements.

ERM has prepared this plan solely for the purpose of protecting the health and safety of ERM employees. Contractors, visitors, and others at the site are required to follow provisions in this document at a minimum, but must refer to the organization's health and safety program for their protection.

Printed Name	Signature	Organization	Date

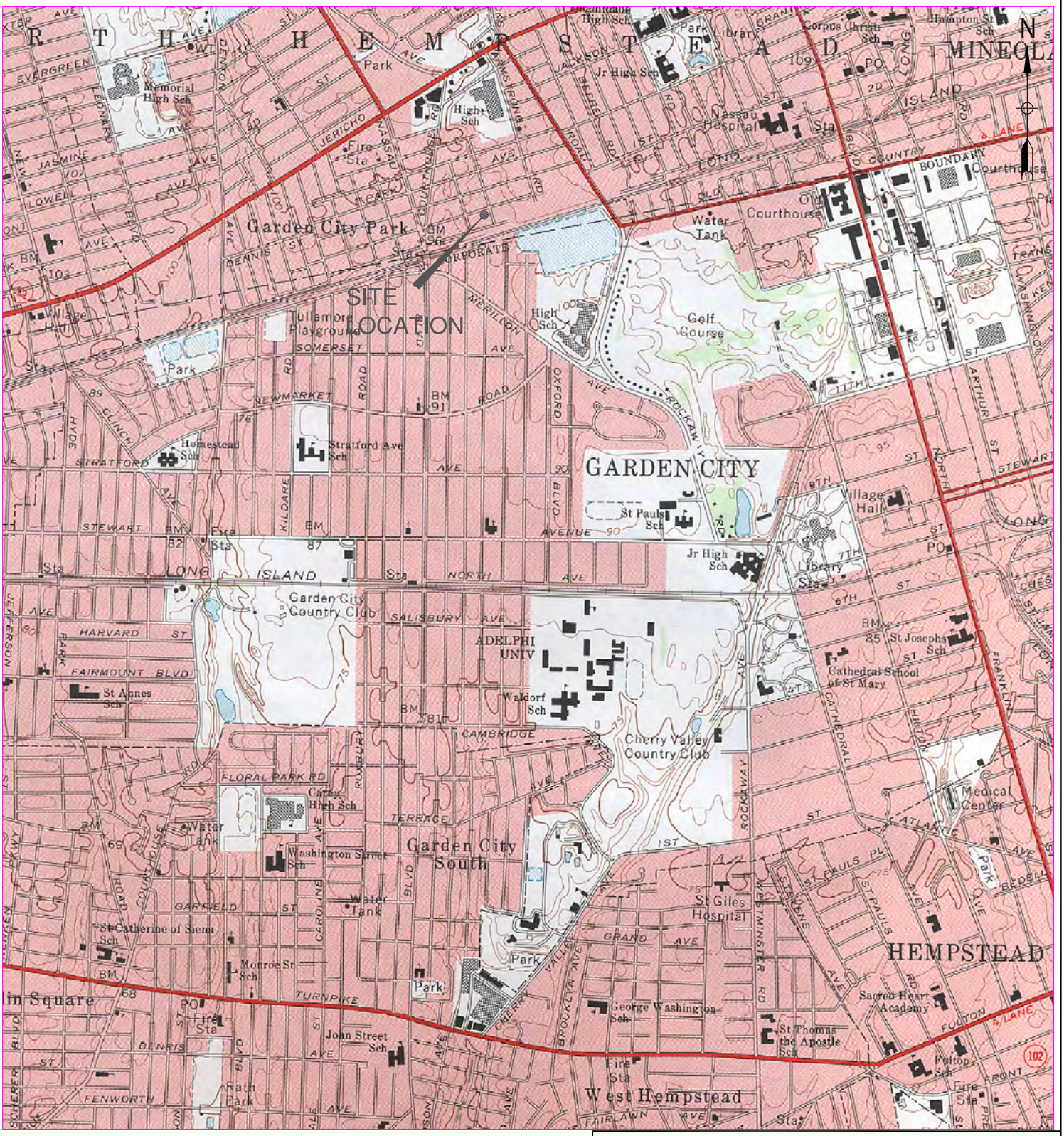
Approval Signatures

Signatures in this section indicate the signing employee will comply with and enforce this HASP, as well as procedures and guidelines established in ERM's DCS. Signatures also indicate that any contractors performing work under contract to ERM have met the minimum safety standards in NAM-1130-PR1 (Contractor Management).

Project Manager	Date
Typed Name: Chris Wenczel Signature File: 	7/14/2017
Partner-in-Charge	**Date**
Typed Name: Jim Perazzo Signature File: 	7/14/2017

Attachments ***Check all appropriate documents to be attached to this HASP.***	
☒ Site-specific JHAs for all tasks (including contractors)	☒ Map of route to hospital with turn-by-turn instructions
☒ Subsurface Clearance (SSC) Project Plan	☒ SNAP Cards
☒ Site Safety Meeting Form (NAM-1501-FM1)	☒ Field Audit Form (ERM-1941-FM4)
☒ Vehicle Inspection Forms (ERM-1430-FM2)	☐ Industrial Hygiene Sample Data (NAM-1302-FM1)
☒ Journey Management Plans (ERM-1430-FM1)	☒ Ambient Air Monitoring Form (NAM-1302-FM2)
☒ Safety Data Sheets (SDS) for chemicals brought to site	☐ Client-specific requirements
☐ PLAN Risk Assessment	☐ Other: 39T
☒ Facility site map(s)	☐ Other: 39T
Applicable ERM Safety Standards/Procedures ***Check procedures/standards that are applicable to this project. Refer to the documents for guidance and, where applicable, use forms, work instructions, and guidelines associated with these standards/procedures in the completion of site work. Indicated documents must be procured from ERM's Document Control System. Note that this list is not comprehensive!***	
Global Standards/Procedures	
☐ Short Service Employees (ERM-1611-PR1)	☐ Travel Risk Assessment (ERM-1410-ST1)
☐ Offshore Platform Safety (ERM-1531-ST1)	☒ Subsurface Clearance Standard (ERM-1511-ST1)
☒ Driver and Vehicle Safety (ERM-1430-PR1)	☐ Fixed Wing Aircraft/Helicopter Standard (ERM-1440-ST1)
Regional Standards/Procedures	
☐ Fire Prevention (NAM-1213-PR1)	☐ Demolition (NAM-1544-PR1)
☐ Confined Space Entry (NAM-1572-PR1)	☒ Excavation and Trenching (NAM-1512-PR1)
☐ Fall Protection (NAM-1313-PR1)	☒ Hazard Communication (NAM-1301-PR1)
☐ Ladder Safety (NAM-1521-PR1)	☐ Cold Stress (NAM-1323-PR1)
☒ Hearing Conservation (NAM-1312-PR1)	☒ Heat Stress (NAM-1323-PR2)
☒ Incident Reporting and Investigation (NAM-1220-PR1)	☒ Medical Services (NAM-1840-PR1)
☐ Medical Surveillance (NAM-1810-PR1)	☒ Personal Protective Equipment (NAM-1310-PR1)
☐ Hot Work (NAM-1542-PR1)	☐ Respiratory Protection (NAM-1311-PR1)
☐ Blood-borne Pathogens (NAM-1325-PR1)	☒ Contractor Management (NAM-1130-PR1)
☒ Hand Tools/Portable Power Equipment (NAM-1329-PR1)	☒ Insect Bite Prevention Standard (NAM-1361-ST1)
☐ Electrical Safety (NAM-1561-PR1)	☒ Incident/Illness Management (NAM-1210-PR1)
☒ Waste Management Planning (NAM-1122-PR1)	☐ Energy Isolation (NAM-1562-PR1)
☐ Work Over Water (NAM-1460-PR1)	☐ Spill Prevention and Response (NAM-1123-PR1)
☐ Fatigue Management (NAM-1328-PR1)	☒ Safe Use of Cutting Tools (NAM-1324-PR1)
☐ Lone Worker (NAM-1326-PR1)	☒ Compressed Gas Cylinders (NAM-1341-PR1)

See It; Own It; Share It	Stop Work Authority
It means that: • **We know that we have a responsibility to look out for each other, to intervene when necessary, to be proactive and to help keep safety issues from becoming problems.** • **We also look out for ourselves. If we recognize that a situation is unsafe, we are expected to stop what we're doing, reassess the situation and consult with others if necessary before proceeding safely.** • **We assign no blame to anyone who raises safety issues.** • **We strive to learn lessons from the large and small events that are part of our daily experience.**	**It is ERM policy that all ERM and ERM Contractor employees have the authority, without fear of reprimand or retaliation to:** • **Immediately stop any work activity that presents a danger to the site team or the public.** • **Get involved, question and rectify any situation or work activity that is identified as not being in compliance with the HASP or with broader ERM health and safety policies.** • **Report any unsafe acts or conditions to supervision or, preferably, intervene to safely correct such acts or conditions themselves.**



SOURCE: U.S.G.S. QUADRANGLE MAPS, LYNBROOK, N.Y.

TITLE

SITE LOCATION MAP
150 FULTON AVENUE
(GARDEN CITY PARK INDUSTRIAL AREA)
TOWN OF NORTH HEMPSTEAD, NEW YORK

PREPARED FOR

GENESCO INC.

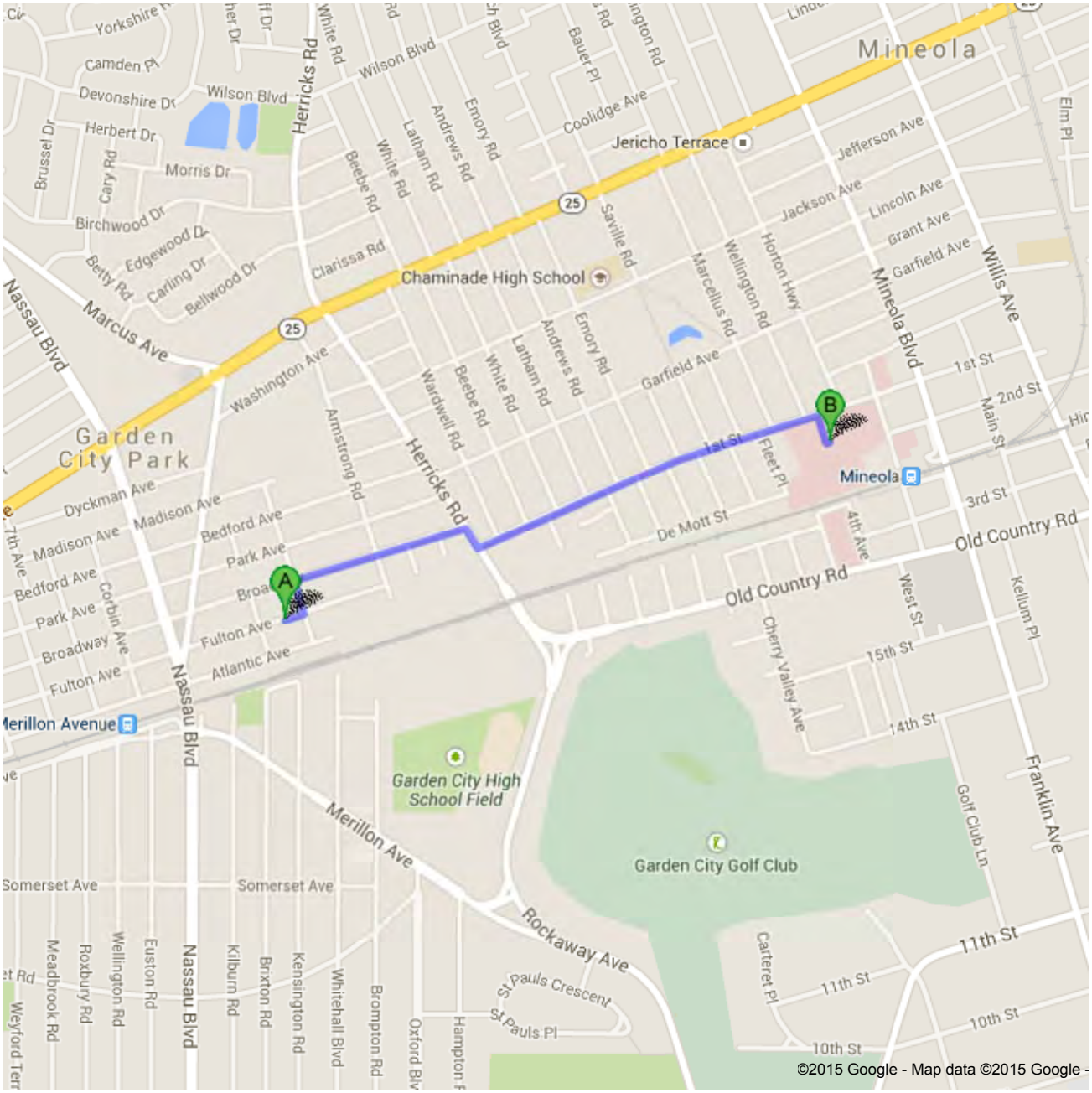
Environmental Resources Management

SCALE	FIGURE
1"=2000'	1

DRAWN:	JOB NO.:	FILE NAME:	DATE
MKR/EMF	0097881.06	0097881-06-012	1/11/10

R:\projects\GENESCO\0097881.06-Fulton Ave\0097881-06-012 Site Location Map.dwg (01/11/2010 - 10:11am Melville)

Directions to Winthrop University Hospital
259 First Street, Mineola, NY 11501 -
(516) 663-0333
0.9 mi – about **4 mins**



150 Fulton Ave, New Hyde Park, NY 11040

	1. Head **east** on **Fulton Ave** toward **Thorens Ave**	go 157 ft total 157 ft
	2. Turn left at the 1st cross street onto **Thorens Ave**	go 262 ft total 420 ft
	3. Turn right at the 1st cross street onto **Broadway** About 1 min	go 0.3 mi total 0.3 mi
	4. Turn right onto **Herricks Rd**	go 184 ft total 0.4 mi
	5. Turn left at the 1st cross street onto **1st St** About 2 mins	go 0.5 mi total 0.9 mi
	6. Turn right Destination will be on the right About 51 secs	go 253 ft total 0.9 mi

Winthrop University Hospital
259 First Street, Mineola, NY 11501 - (516) 663-0333 (866) 946-8476

These directions are for planning purposes only. You may find that construction projects, traffic, weather, or other events may cause conditions to differ from the map results, and you should plan your route accordingly. You must obey all signs or notices regarding your route.

Directions weren't right? Please find your route on maps.google.com and click "Report a problem" at the bottom left.

Inclement Weather Guidance

Has there been a warning or watch issued for the work area by a local or National Weather Service?

No → Are the hazards and mitigation steps for the type of Inclement Weather outlined in the HASP or JHA ?

Yes → Contact PM, PIC and/or District Safety Representative to determine if continuation of work activities and/or travel is appropriate. Team will utilize Federal, State, Province and local authority information/resources (e.g., websites and/or Hotlines) to determine if work activities or driving should be attempted.

Do Federal, State, Province or local authority information or resources indicate travel or work should not be completed?

No → (return to: Are the hazards and mitigation steps for the type of Inclement Weather outlined in the HASP or JHA ?)

Yes → Stop work and do not travel. Find appropriate shelter. Do not complete work or travel until advisory has been lifted or approval from PM, PIC, and/or District Safety Representative has been granted.

Yes → Are there changes in conditions or unique conditions not previously addressed in the HASP or JHA?

Yes → Revise JHA with PM and PIC to mitigate hazards resulting from the inclement weather. Continuously evaluate the situation for change of conditions as work proceeds.

No → Follow mitigation steps outlined in HASP & JHA when completing job steps. Continuously evaluate the situation for change of conditions as work proceeds.

No → Revise JHA with PM and PIC to mitigate hazards resulting from the inclement weather. Continuously evaluate the situation for change of conditions as work proceeds.

Remember: Exercise **Stop Work Authority** in the event that a weather pattern presents an imminent danger to the health, safety, and well being of employees and neither the PM, PIC, or District Safety Representative are available.

Notes:
PM – Project Manager
PIC – Partner-In-Charge

JHA Development Checklist

This checklist provides common hazards and some hazard control measures for consideration, and can be used to help develop site-specific JHAs

Hazards	Some Methods To Eliminate/Control Hazard for JHA Consideration:
Sharp Edges (designate in JHA the specific cut or puncture hazard associated with the task step)	Wear ____ gloves (designate type, e.g. heavy leather, cut-resistant, puncture-resistant). Wear ___ footwear (designate type, e.g. puncture-resistant insoles). Wear ___ clothing (designate type, e.g. long sleeves, heavy coveralls). Have gloves on your person at all times. Employees performing significant amounts of cutting tool use should wear high-visibility gloves to encourage awareness of where hands are being placed. Do not attempt to catch falling tools/equipment. Ensure guards are in place. Use ___ cutting tool (designate type, e.g. scissors, shears, snips). Do not use dull blades. Do not use open-bladed knives. Inspect tools/equipment in area prior to start of task to identify sharp edges and, if possible, remove/protect or position body to ensure no contact during task. Always cut away from hand, body and face. Ensure others are not in line-of-fire when cutting. Place object to be cut in a vise or on a flat surface or use another tool to hold object while cutting. Do not place fingers in ends of piping or other tubular material.
Pinch Points (designate in JHA the specific pinch hazard associated with the task step)	Wear ___ gloves (designate type, e.g. heavy leather, puncture-resistant). Have gloves on your person at all times. Inspect work area prior to start of task to identify pinch points and remove/protect to ensure do not contact during task. Consider body positioning prior to start of task to identify potential pinch points and change position to ensure do not contact during task. Identify pinch points by warning label and/or paint color. Do not position your hand or body so it can be caught between a lifted load and adjacent objects. Do not place fingers/hands between sections of multi-component/moveable items (e.g. fencing sections, sheet piling, hinged panels).
Slips / Trips / Falls from Surface Conditions (designate in JHA the specific slip, trip, fall hazard associated with the task step)	Wear ___ footwear (designate type, e.g. shoes with rubber soles or low heels, crampons). Identify and use only safe pathways and stairs when entering/exiting/working in area. Obtain additional lighting and use clear safety glasses in areas with low/unclear visibility. Inspect work area for potential slip/trip/fall obstructions prior to start of work and remove or, if not possible, mark with highly visible tape/flags, etc. Keep work area organized and free of surface obstructions during task. Immediately dry wet areas or restrict access (e.g. with warning tape, signs, cones). Remove snow/ice prior to start of work. Reassess surface conditions if weather changes and address any new hazards (e.g. slick surface developing as a result of wet/freezing conditions). Do not carry loads that restrict visibility. Do not stack objects higher than ___ (designate height). Ensure steps, walkways and shoes are not slippery or loose prior to use. Keep work area surfaces clear of debris (e.g. mud, leaves) and store tools/equipment to eliminate trip hazards when not in use. Keep eyes on path and nearby surroundings when walking. Take small steps and shuffle feet in potentially slippery areas. Walk slowly around corners and when entering/exiting doors. Use slip-resistant mats. Use handrails when going up/down stairs. Fill in/flatten uneven ground. Use steps/stepladders for access in and out of shallow trenches/excavation.
Fall from Elevated Position (designate in JHA the specific elevated hazard associated with the task step)	Use carts with high sides to contain load. Ensure load is secure and balanced prior to moving. Maintain 3-points of contact when mounting/dismounting vehicle/equipment. Maintain 3-points of contact when climbing/descending ladders. Use equipment/mechanical means (e.g. tool belt, rope) to transport tools/materials. Ensure steps, ladder rungs and shoes are not slippery or loose. Do not stand or work off top of ladder (e.g. top 2 steps of stepladder). Extend ladder at least 3-feet beyond top bearing point. Have another person hold bottom of ladder at all times while working or until top is secured; if ladder is not equipped with grip pads, hold bottom at all times. Position extension ladder at 1 foot distance for every 4 feet of working height. Do not overreach; keep body between ladder rails and both feet on same rung. Wear fall protection when working at a height of 6 feet (1.8 meters) or greater. Wear full body harness with double-locking snap hooks and shock absorbing lanyard. Inspect fall protection prior to use and do not use if: worn or frayed lanyard or webbing/stitching; locking devices, snap hooks, etc. are not working properly; metal components are worn, damaged, or have burrs, etc.; annual inspection tag is not in place and current. Connect to secure anchor point meeting fall protection specifications (capable of supporting 5,000# per person attached, above shoulder height, no sharp edges, etc.). Ensure scaffolding has secured boards, is adequately braced, has a handrail, is free of debris and holes and is in good working condition. Stand only on secured and inspected flooring and uprights. Work only within the scaffolding structure.

JHA Development Checklist

This checklist provides common hazards and some hazard control measures for consideration, and can be used to help develop site-specific JHAs

Hazards	Some Methods To Eliminate/Control Hazard for JHA Consideration:
Heat Stress and Burns (designate in JHA the specific heat hazard associated with the task step)	**Hot Equipment:** Allow equipment/material to cool prior to working with. Use designated handles to open/move equipment. Turn off equipment and allow to cool prior to refueling. Identify hot surfaces prior to start of task and avoid direct contact with.Drink cool fluids and take rest breaks every ___ (designate frequency). Wear ___ gloves (designate type, e.g. oven mitts, thermal, etc...). Use ___ (designate type, e.g. tongs, insulated handles) tool to move equipment or materials. **Hot Weather:** Check the weather forecast in advance & be prepared for those conditions Wear ___ clothing (designate type, e.g. light-weight fabrics with long sleeves & trousers, cool vest, etc...). Schedule regular breaks, watch your colleagues using the buddy system. Use sun block for skin protection, drink cool drinks regularly (i.e.: before you become thirsty), take breaks in the shade (advice on the regularity and duration of these can be found in the SWP linked to below) Stop work if fatigue or physical stress situations develop in your or those around you High humidity, working in direct sunlight, work in contact with hot surfaces influence the severity of hot working conditions. Seek specific guidance and training if work in these conditions is necessary. (Advice is available on the SWP for heat stress available on Minerva Americas H&S pages at the following link: http://minerva.erm.com/Support/HS/AmericasHS/Safe%20Work%20Practices%20SWP/04%20-%20Heat%20Stress%20-%20updated%208-11.doc)
Cold Stress (designate in JHA the specific cold hazard associated with the task step)	Drink hot/warm fluids and take rest breaks every ____ (designate frequency) Wear ___ clothing (designate type, e.g. insulating layers, down jacket, chef coat). Wear ___ gloves (designate type, e.g. thermal, freeze-protection). In temperatures below freezing do not touch bare metal surfaces with the naked skin without adequate PPE, such as gloves. At or below 4°C/40°F adequate dry insulating clothing must be available to keep worker's core temperature at or above 36°C/96.8°F Dampness/condensation, work in contact with cold water or surfaces, and wind speed all influence the severity of cold working conditions. Seek specific guidance and training if work in these conditions is necessary. (Training is available on ERM North American Minerva page at the following link: http://minerva/erm/globalsupport/healthandsafety/NA/HS%20Training%20Materials/Home.aspx)
High Voltage/Electrical Contact (designate in JHA the specific high voltage / electrical hazard associated with the task step)	Use wooden or fiberglass ladder. Stand on non-conductive surface. Remove metal jewelry. Footwear worn around electrical circuits should be non-conductive. Ensure power cords are free of defects and exposed wires. Do not work in ___ (designate condition, e.g. thunderstorm) weather. Use___ gloves (designate type in JHA, e.g. electrical-insulted). Use ground fault circuit interrupter (GFCI). Use low voltage lighting. Ground equipment by ___ (designate how or refer to separate procedure). Pre-inspect travel route to ensure clearance. Inspect above and below ground areas prior to start of work to identify electrical lines and communicate locations to site personnel. **SSC:** Ensure completion of subsurface clearance procedure requirements. Ensure line locator service identification of underground lines. Use non-destructive drilling techniques (e.g. air-knife). When excavating, assign spotter to stop work at sign of subsurface conduits/wires. Keep distance from overhead power lines (designate distance in JHA based on voltage, regulations, etc.). Lock-Out/Tag-Out (LOTO): LOTO equipment must be available as per the LOTO procedure and verify isolation of energy source prior to start of task. Tags must read “DANGER – DO NOT OPERATE” and be resistant to wear and tear by the environment they are being used in. Employees who perform LOTO must receive authorized employee training, subcontractors must provide evidence that they have (e.g.: a certficate) Wear a cotton t-shirt, Class II Electrical Arc Protection suit, Class O (low voltage) gloves, and non-conductive footwear. Only the person who placed the LOTO device is authorized to remove it, so after-hours contact information for LOTO employees must be in the HASP. Ensure all associated/potentially impacted personnel are notified of work activities. Before working on live equipment, it should be brought to a “zero-energy state” by turning off the equipment’s power (at source, such as by switching off specific circuit breakers. (“Zero-energy” is not attained until the individual working on the machinery attempts to turn the machine on and is unsuccessful.) In certain situations, where machinery must stay live to do work, and Lock-Out is not possible, the Project Manager and Field Safety Officer must be directly involved when Tag-Out is taking place. For all sites where work extends beyond 1 year, a LOTO a documented process inspection must occur to check that LOTO procedures in-place are still valid.
	Wear ___ eye/face protection (designate type, e.g. safety glasses, face shield, chemical splash goggles or combination) Wear ___ clothing (designate type, e.g. long sleeves, paper suit, protective apron, polyethylene coated suit). Wear ___ gloves (designate type, e.g. butyl, nitrile, rubber, resistant to specific chemical/duration). Ensure that gloves and boots are taped to the suit to prevent liquid splash.

JHA Development Checklist

This checklist provides common hazards and some hazard control measures for consideration, and can be used to help develop site-specific JHAs

Hazards	Some Methods To Eliminate/Control Hazard for JHA Consideration:
Chemical/Liquids Contact or Release (designate in JHA the specific chemical/liquid hazard associated with the task step)	Double-layering nitrile or latex protective gloves is a good idea for added protection. If acidic or caustic chemicals are present, wear outer neoprene or rubber gloves. Restrict access to work area by ___ (designate how). Use funnel when pouring liquid. Ensure bleed valves are open and lines are clear prior to disconnect and/or use dry couplings. Have ___ (designate type/amount, e.g. pads, boom) absorbent material on hand. Place container and/or absorbent/plastic sheeting under connection prior to disconnect. Store hazardous materials in dedicated container/area (e.. shed, box). Wash hands frequently. Inspect pressurized lines and all fittings/couplings to ensure integrity/closure. Assess rating and compatibility of materials used vs purpose. Ensure storage compatibility of multiple products. **Hazard Communication:** For each chemical product used by ERM employees or subcontractors, a MSDS sheet must be obtained and kept on-file. Chemical containers must be labeled in accordance with OSHA regulations. Review MSDS and container label prior to start of task/handling and follow associated requirements. Ensure all employees on the jobsite have been told about the chemical in-use and are protected. Confirm MSDS is relevant when working with legacy material (e.g. historic releases). A chemical inventory list must be prepared and updated as new or different chemicals are procured. If chemical exposure occurs, even if medical symptoms are not present, inform the Field Safety Office or Office H&S Contact.
Biological Contact (designate in JHA the specific biological hazard associated with the task step)	Wear ___ clothing (designate type, e.g. long sleeves, hood, paper suit). Wear ___ gloves (designate type, e.g. fabric, nitrile). Use insect repellant. Inspect area prior to start of task and remove/avoid animal (e.g. dogs), insect (e.g. bees, wasps), plant (e.g. poison ivy) hazards if possible; otherwise reschedule work and/or contact professional service for removal. Report allergies and ensure treatment is available on site. Avoid loud noises/brightly colored clothing if bees are known to be in area.
Repetitive Motion (designate in JHA the specific repetitive motion hazard associated with the task step)	Use ___ tool and/or ___ technique (designate, e.g. ratchet wrench) to minimize repetitive stress risk. Change position frequently during job (e.g. vary grip, hand motion). Keep wrists in a neutral (straight) position as you work. When possible, rotate tasks to give body parts a rest. Take breaks every ___ (designate frequency) and do simple stretches/exercises. Ensure gloves fit hands properly to decrease stress on hand/joints.

JHA Development Checklist

This checklist provides common hazards and some hazard control measures for consideration, and can be used to help develop site-specific JHAs

Hazards	Some Methods To Eliminate/Control Hazard for JHA Consideration:
Traffic (designate in JHA the specific pedestrian / motorized traffic hazard associated with the task step)	Wear ___ clothing (designate type, e.g. reflective vest, neon orange/green shirt). High-visibility safety vests: class I may be used when traffic is below 25 mph, Class II for 25-50 mph, and Class 3 for >50 mph. Set up work zone to restrict non-essential access by ___ (designate how, e.g. with cones/barricades/fencing, placed specified distance apart/from work area, etc.). Avoid risks posed by detour (e.g. pedestrians forced into other traffic). Use parked vehicle with hazard lights facing oncoming traffic to protect work zone. Use buddy system to establish traffic watch. Use trained spotters when backing and when visibility is restricted. Inspect surrounding area prior to backing. Adjust mirrors and check equipment back-up alarm to confirm operational prior to start of task. Use horn to alert others prior to backing. Use traffic management consultant. Stay ___ (designate distance) from operating equipment/extended arm, etc. Make eye contact with equipment operator and receive approval prior to approaching. Ensure spotters and equipment operators maintain eye contact. Establish parking/staging/loading/unloading areas (consider equipment turning circles, swing zones etc.). Ensure trailers / trucks are rated and balanced. Chock truck/trailer wheels when not moving. Ensure load is distributed during load/unload to avoid tip/roll-over. Ensure all personnel remain outside of tip-over radius when dumping.
Improper Waste Transport / Disposal (designate in JHA the specific waste disposal hazard associated with the task step)	Designate safe waste storage area/container prior to start of task. Ensure waste materials meet container specifications prior to use. Label waste containers. Separate hazardous and non-hazardous wastes. Place waste containers in designated storage area and secure prior to leaving site. Confirm waste transport truck/container integrity prior to loading. Confirm shipping document description/approved destination with waste container label prior to off-site shipment. For unsealed/partially exposed loads, perform ___ monitoring (designate method and frequency) and stop work if monitoring result ___ (designate limits).
H&S Risks and Increase in ERM Liability caused by Subcontractors Working on the Jobsite	Select only subcontractors that have been prequalified and approved for use. Ensure a signed, executed subcontract agreement is in-place prior to subcontractors performing work on the jobsite for ERM. Ensure the subcontractor has received a copy of the ERM HASP and supporting documentation prior to mobilization to the jobsite. Specify both the ERM and the subcontractor's scope of work in the ERM HASP document. Ensure that any subcontractor personnel on-site have reviewed and signed the site HASP. In all cases, require the ERM subcontractor to either develop their own site-specific HASP, or at minimum develop Job Hazard Analyses (JHA) for the specific tasks they will perform. Attach these documents to the ERM HASP as appendices. Ensure subcontractor work is overseen by ERM personnel at all times. Always include subcontractor personnel in daily jobsite tailgate safety meetings. Do not supply subcontractor personnel with personal protective equipment (PPE). If ERM is performing air monitoring for the subcontractor, ensure calibration of air monitoring equipment is done before and after each use. At a minimum, air monitoring equipment must be calibrated at least once per day. Document equipment calibration and file with the site HASP.
Exposure to Toxic and Hazardous Chemical Substances (designate in the JHA the specific chemicals of concern)	Determine whether there is a potential for exposure to any toxic or hazardous chemical substances in the work area prior to performing any work that may involve handling of one or more of the chemicals or may result in exposure through production, research, or process activities. This would include, but not be limited to, OSHA's 13 regulated carcinogens, and the following: • Acrylonitrile • Asbestos • Benzene • Cadmium • Chromium (VI) • Coke oven emissions • Cotton Dust • Ethylene oxide • Formaldehyde • Hydrogen sulfide • Inorganic arsenic • Lead • Methylene chloride • Methylenedianiline • Vinyl chloride • 1,2-dibromo-3-chloropropane • 1,3-butadiene
	If any of the substances are identified, conduct an exposure assessment to determine whether employees have the potential to be exposed above any action level identified in the substance-specific regulations.
	Where the initial assessment identifies the potential for employee exposures above an established action level or permissible exposure limit, develop a site-specific program to address all required regulatory concerns for that substance. Completed programs shall be included in the site-specific health and safety plan.
	Ensure the health and safety plan specifies the airborne contaminants that may be encountered and the need for respiratory protection. Ensure the plan provides a selection process for the respirator and cartridge type, develops actions levels for upgrades/downgrades of respiratory protection, describes cartridge change out schedules, and provides information on medical surveillance criteria and respirator fit testing requirements.
	Prior to donning any respirator, complete a thorough inspection to ensure it is in good operating condition. Inspected elements should include, but not be limited to, straps, sealing surfaces, inhalation/exhalation vales, and facepieces. Do not use respirators with any signs of damage.
	Where necessary, replace damaged parts. If repair is not possible, discard and replace entire respirator.
	Clean and disinfect respirators using a mild soap and water solution following use. Where respirator sharing is allowed, ensure respirators are cleaned and sanitized before being exchanged by employees.
	For cartridge-type respirators, affix the cartridges to the respirator as indicated in the manufacturer's guidelines. Cartridges should be hand tightened only.
	Employee must be clean shaven in those areas of the face where the respirator makes skin contact, including any inner nose cups.

JHA Development Checklist

This checklist provides common hazards and some hazard control measures for consideration, and can be used to help develop site-specific JHAs

Hazards	Some Methods To Eliminate/Control Hazard for JHA Consideration:
Respiratory Protection	Don the respirator prior to other personal protective equipment in the head/neck area so that nothing comes between the respirator straps and the head surface. Safety glasses, hard hats, etc. must be donned after the respirator.
	For cartridge-type respirators, perform a positive and negative fit check to ensure a good respirator seal.
	Adjustments made while wearing tight-fitting respirators within the work area may result in a compromised respirator seal. If this occurs, stop work, move to an area with no chemical contamination (go through the decontamination process, if present), readjust the respirator, and perform positive and negative fit-checks to ensure a proper facepiece seal.
	If it becomes difficult to breathe due to particulate clogging of respirator cartridges, stop work, move to an area with no chemical contamination (go through the decontamination process, if present), replace the cartridges, readjust the respirator, and perform positive and negative fit-checks to ensure a proper facepiece seal.
	If using a chemical catridge and you either (1) reach or exceed the required wear time as described in the cartridge change schedule or (2) detect any evidence of chemical breakthrough (odors, tastes, burning sensations, etc.), stop work, move to an area with no chemical contamination (go through the decontamination process, if present), replace the cartridges, readjust the respirator, and perform positive and negative fit-checks to ensure a proper facepiece seal. If chemical breakthrough was detected, determine what level of exposure may have occurred through testing of the work atmosphere.
	If a decontamination line is present, proceed through the line as directed. If no decontamination line is present, remove all other PPE except clean gloves before removing the respirator. Once removed, clean as directed.
Natural Hazards (designate in JHA the specific natural hazards associated with the task step)	For sites where poison ivy, oak, and sumac are present, have a poison ivy wash available for employees on-site. If exposure occurs and no poison ivy wash is available, employees should wash in cool water and use soap. Keep work areas free from clutter so that ground surfaces can be easily seen by employees. **Working around poisonous insects:** Use insect repellant containing DEET at all times on the jobsite. Periodically throughout the day and at the end of the day, perform a thorough "tick-check" to ensure ticks or other insects are found and removed promptly. Avoid obvious conical mounds of dirt that may indicate ants, wasps, or other flying insects. Before reaching into dark or damp spaces such as monitoring well-heads, inspect the area thoroughly to ensure spiders are not present. Always take a shower as soon as possible after leaving a jobsite for the day to remove any insects, such as chiggers. **Working around snakes:** Visually inspect the work are prior to beginning any work to located areas with high grass and underbrush. Do not walk through these areas if at all possible to avoid snakes. Wear leather steel-toe boots and snake chaps in areas where snakes are suspected or confirmed to be present. Do not attempt to kill snakes, as people are commonly bitten attempting this. **Working around feral animals:** High rat populations within an enclosed space present a hazard of Hanta virus. Spray such areas with bleach solution prior to performing any work in the area (10 parts water to 1 part household bleach). If dogs or other animals are spotted that are acting strangely, do not approach them. Contact the local animal control center for assistance.

JHA
Job Hazard Analysis

Project Number:	0097881	Project / Client Name:	Fulton Avenue Superfund Site
Project Manager:	Chris Wenczel	Location:	150 Fulton Avenue, Garden City Park, Nassau County, New York
Partner-in-Charge:	Jim Perazzo	Date and Revision Number:	1/19/2017

SPECIFIC TASK:	**Groundwater Well Sampling**

Minimum Required PPE for Entire Task:	☑ Hard Hat ☑ Safety-Toe Shoes ☐ Hearing Protection ☐ Goggles ☐ Face Shield ☐ Respirator <enter type and cartridge type> ☐ Other (specify): ☑ Safety Glasses ☑ Reflective Vest ☑ Gloves Nitrile ☐ PPE clothing <enter type here (eg, Tyvek, FRC, long sleeves)> <enter additional PPE here>		
Additional Task-Step Specific PPE: (as indicated below under Controls)		Equipment / Tools Required:	Flow through cell, bladder pump, hand tools
Training Required for this Task:	40 Hour Hazwoper	Permits Required for this Task:	Site access agreement
Associated Forms:	Field sheets	Associated Procedures:	

JHA Developed / Reviewed By:			JHA Review In Field
Name / Job Title:	Name / Job Title:	Name / Job Title:	Field Safety Officer (FSO) to ensure all personnel performing this task have reviewed JHA and agree to follow it. Site-specific changes to this JHA have been made as warranted based on this review. **FSO Signature/Date:**
Maddox			

Task Steps[1]		Potential Hazards & Consequences[2]		select	Likelihood	Severity	RISK	Controls to Eliminate or Reduce Risks[3]	
1	Load / Attach / Disconnect Equipment	1a	Pinch Points	H&S	3	2	6	1a	Consider body positioning prior to start of task to identify potential pinch points and change position to ensure no contact during task. Do not position your hand or body so it can be caught between a lifted load and adjacent objects. Wear heavy leather or cut-resistant gloves; have gloves on your person at all times.
		1b	Property Damage from vehicle / sample trailer movement	multiple	2	3	6	1b	Inspect surrounding area prior to backing. Use trained spotters when backing and when visibility is restricted. Ensure spotters and equipment operators maintain eye contact. Establish parking/staging/loading/unloading areas (consider equipment turning circles, swing zones, etc.). Ensure trailers/trucks are rated and balanced. Chock truck/trailer wheels when not moving. Ensure load is distributed during load/unload to avoid tip/roll-over.
		1c	Muscle strain from lifting / handling equipment	H&S	3	2	6	1c	Use cart, dolly, or get assistance. Do not lift anything manually by yourself that is awkwardly shaped or weighs more than 35 pounds. When lifting lighter objects, bend and lift with legs/arms, not back. Keep objects close to body and do not twist while lifting (turn with feet). Position work equipment to avoid over-reaching while working. Store heavy/bulky items with safe access in mind.
2	Set up / break down at well	2a	Getting struck by vehicular traffic and unauthorized access to work area	H&S	2	4	8	2a	Set up barricades around work zone (specify type: snow fencing, cones [min height should be such that drivers can see], delineator posts). Use parked vehicle(s) as barricades to protect work zone from oncoming traffic. Use traffic control contractor for work in public streets or at center divider of public streets. Wear reflective vest for all off-site work in or adjacent to traffic areas.
		2b	Tripping hazards in work area	H&S	3	2	6	2b	Identify and use only safe pathways when entering/exiting/working in area. Obtain additional lighting and use clear safety glasses in areas with low/unclear visibility. Inspect work area for potential slip/trip/fall hazards prior to start of work; remove if possible, or, if not possible, cordon off with cone or mark with highly visible tape/flags, etc. Keep work area organized and free of surface obstructions during task. Immediately dry wet areas or restrict access (e.g., warning tape, signs, cones). Remove snow/ice/debris/vegetation prior to start of work. Reassess surface conditions if weather changes and address any new hazards (e.g., slick surface developing as a result of wet/freezing conditions). Do not carry loads that restrict visibility. Keep work area surfaces clear of debris (e.g., mud, leaves) and store tools/equipment to eliminate trip hazards when not in use. Keep eyes on path and nearby surroundings when walking. Fill in/flatten uneven ground. Wear footwear with appropriate traction for conditions (i.e., rubber non-slip soles, tread, crampons, etc.).
		2c	Electrical shock from portable tools	H&S	2	3	6	2c	Use GFCIs. Make sure the equipment is properly grounded. Use flexible cords that are splice-free and not worn or frayed. Do not turn on generator breaker until pump is down well.
		2e	Muscle strain from lifting / handling equipment	H&S	3	2	6	2d	See above, 1c
3	Opening and closing well cover and cap	3a	Skin / eye contact with contaminated water or free product	H&S	2	2	4	3a	Wear chemical resistant gloves selected for the specific chemials of concern and safety glasses. State glove type on Line 9 above. Have portable eyewash available on site. Ensure SDS is available (in HASP) for all chemicals of concern
		3b	Inhalation of contaminant vapors	H&S	2	2	4	3b	An exposure assessment must be conducted to identify the potential for exposures above an established action level or permissible exposure limit; and a site-specific program to address all required regulatory concerns must be included in the HASP. Perform ambient air monitoring (designate method and frequency) and if action levels are reached or exceeded, follow plan established in HASP. Position work area upwind. Set-up work zone to restrict non-essential access and minimize off-site impacts.
		3c	Back strain from bending over wellhead	H&S	2	2	4	3c	Obtain and use a chair or stool; otherwise use kneeling position or bend at knees, not waist.

Task Steps[1]		Potential Hazards & Consequences[2]		select	Likelihood	Severity	RISK	Controls to Eliminate or Reduce Risks[3]	
		3d	Struck by / pinch point - wellhead lid	H&S	2	2	4	3d	Inspect work area prior to start of task to identify pinch points. Remove/protect or adjust body position to ensure no contact during task. Identify pinch points on wellhead by warning label and/or paint color. Do not position your hand or body so it can be caught in identified pinch points. Use a sturdy screw driver to lift small well box lids, or a manhole hook if larger. Wear heavy leather or cut-resistant gloves; have gloves on your person at all times.
		3e	Hit by well cap or contact with contaminated water from pressure build-up	H&S	1	2	2	3e	Open well cap slowly to allow for pressure release. Use heavy leather or cut resistant gloves and maintain firm grip (use two hands). Keep body out of the line of fire if well cap slips.
		3f	Posionous / stinging insects	H&S	2	2	4	3f	Visually inspect area around wellhead before approaching. Listen for buzzing / other noises inside vault before opening. Inspect well vault before reaching in to open well cap. Wear heavy leather or cut resistant gloves.
4	Gauging / sampling	4a	Skin / eye contact with contaminated water or free product	H&S	2	2	4	4a	Lower and raise downwell equipment slowly to avoid splashes. Wipe excess liquids from equipment as it is being raised. Wear chemical resistant gloves (selected for the specific chemials of concern) and wear safety glasses; state glove type above on Line 9. Have portable eyewash available on site. Ensure SDS is available (in HASP) for all chemicals of concern
		4b	Inhalation of contaminant vapors	H&S	2	2	4	4b	See above, 3b
		4c	Back strain from bending over wellhead / repetitive motion stress	H&S	3	2	6	4c	See above, 3c. Change position frequently during job (e.g., vary grip, hand motion). Keep wrists in a neutral (straight) position as you work. When possible, rotate tasks to give body parts a rest. Share tasks among employees present. Take breaks as needed and do simple stretches/exercises. Ensure gloves fit hands properly to decrease stress on hand/joints.
		4d	Struck by / pinch point - wellhead lid	H&S	2	2	4	4d	See above, 3d
		4e	Cuts from broken glass from sample container	H&S	2	2	4	4e	Store bottles in shipping container prior to filling. Inspect containers for any damage, cracks. When capping sample containers, do not place fingers across gap between cap and bottle neck. Wear chemical resistant gloves that are also cut resistant, or wear thin cut-resistant inner gloves.
		4f	Spills of contaminated purge water	E	2	2	4	4f	Store purge water in dedicated drums; close containers when not in use. Chemical and purge water containers must be labeled in accordance with regulations. Secure end of sample tubing to container so it doesn't slip off. Have absorbent material on hand. Place container and/or absorbent/plastic sheeting around wellhead. Inspect lines, tubing, hoses and all fittings/couplings to ensure integrity/closure. Assess rating and compatibility of materials used vs purpose.

ONE JHA PER TASK. SUBCONTRACTORS MUST PROVIDE THEIR OWN JHAS. JHAS SHOULD BE WRITTEN IN PLAIN LANGUAGE AND SHOULD BE NO MORE THAN 2-3 PAGES IN LENGTH.
INSERT ADDITIONAL ROWS AS NEEDED ABOVE (MUST MANUALLY COPY AND PASTE FORMULA IN COLUMN H). ROW HEIGHTS MAY NEED TO BE MANUALLY EXPANDED TO VIEW ALL TEXT.
LEAVE SEVERAL BLANK OVERSIZED ROWS TO ALLOW HANDWRITTEN FIELD ADDITIONS. CAN ALSO DELETE UNNEEDED ROWS TO FIT PAGE(S).

1. Each task consists of a set of steps. List and number all the steps in the sequence they are performed. Specify the equipment or other details.
2. List potential health & safety hazards and consequences - ONE PER ROW - and select "H&S" from the drop-down list. Then list any potential security, environmental, and/or property loss impacts - ONE PER ROW - and select the corresponding code(s) from the drop-down list. Use numbers and letters for each hazard/impact listed (1a, 1b, etc). Hazards should be described in terms of their specific origin and negative consequences (e.g., instead of "moving equipment", write "injury from getting struck by forklift").
3. Describe the specific actions or procedures that will be implemented to eliminate or reduce each hazard. Be clear, concise, and specific. Use objective, observable, and quantified terms (e.g., instead of "use good body positioning," write "don't bend at waist or reach above head"). Use numbers and letters corresponding to listed hazards.
4. Select the likelihood of occurrence and severity of each hazard, AFTER implementation of the planned control measures (use the Risk Matrix as a guide). The corresponding risk rating will then be automatically calculated [RISK = Likelihood x Severity].

A risk rating shaded red indicates that work cannot continue without additional control measures and approval of Partner-in-Charge.

WAYS TO ELIMINATE OR REDUCE RISKS (IN ORDER OF PREFERENCE):

ELIMINATE / AVOID --> SUBSTITUTE / MODIFY --> ISOLATE --> ENGINEER / SAFEGUARD --> TRAINING AND PROCEDURES --> WARNING AND ALERT MECHANISMS --> PPE

Risk Matrix

What could go wrong? What is the worst thing that could happen if something goes wrong?

			Hazard Severity				
			1	2	3	4	5
			INSIGNIFICANT negligible or no injury could result	**MINOR** minor injury requiring only first aid	**MODERATE** Injury resulting in lost time could occur	**HIGH** Serious injury or death could occur	**VERY HIGH** multiple deaths could occur
Likelihood	**1**	**VERY UNLIKELY**	1	2	3	4	5
	2	**UNLIKELY**	2	4	6	8	10
	3	**POSSIBLE**	3	6	9	12	15
	4	**LIKELY**	4	8	12	16	20
	5	**VERY LIKELY**	5	10	15	20	25

JHA
Job Hazard Analysis

Project Number:	0097881	Project / Client Name:	Fulton Avenue Superfund Site
Project Manager:	Chris Wenczel	Location:	150 Fulton Avenue, Garden City Park, Nassau County, New York
Partner-in-Charge:	Jim Perazzo	Date and Revision Number:	1/20/2017

SPECIFIC TASK:	**Lifting, Moving, and Transporting Equipment**

Minimum Required PPE for Entire Task:	☑ Hard Hat ☑ Safety-Toe Shoes ☐ Hearing Protection ☐ Goggles ☐ Face Shield ☐ Respirator <enter type and cartridge type> ☐ Other (specify): ☑ Safety Glasses ☑ Reflective Vest ☑ Gloves heavy leather or cut resistant ☐ PPE clothing <enter type here (eg, Tyvek, FRC, long sleeves)> <enter additional PPE here>		
Additional Task-Step Specific PPE: (as indicated below under Controls)		Equipment / Tools Required:	Hand truck
Training Required for this Task:		Permits Required for this Task:	
Associated Forms:	S1-ERM-008-FM2 - Vehicle Inspection Form	Associated Procedures:	S1-ERM-008-PR - Driver and Vehicle Safety

JHA Developed / Reviewed By:			JHA Review In Field
Name / Job Title:	Name / Job Title:	Name / Job Title:	Field Safety Officer (FSO) to ensure all personnel performing this task have reviewed JHA and agree to follow it. Site-specific changes to this JHA have been made as warranted based on this review. **FSO Signature/Date:**
Maddox			

Task Steps[1]		Potential Hazards & Consequences[2]		select	Likelihood	Severity	RISK	Controls to Eliminate or Reduce Risks[3]	
1	Mobilize to / from location	1a	Loose articles inside the vehicle and carried in truck beds or on trailers can shift and cause distractions or traffic accidents	multiple	2	3	6	1a	Use the ERM Vehicle Inspection Form to document daily inspections of the vehicle. During vehicle inspection make sure any loose articles either inside the vehicle or in truck beds/on trailers are well-secured.
		1b	Accidents caused by larger vehicles or heavy equipment, and when backing / maneuvering in tight spaces.	multiple	2	3	6	1b	Inspect surrounding area prior to backing. Use spotter when driving large trucks or heavy equipment onto project sites, and for all vehicles when maneuvering in/out of tight spaces and backing up. Ensure spotters and equipment operators maintain eye contact. Establish parking/staging/loading/unloading areas (consider equipment turning circles, swing zones, etc.). Ensure trailers/trucks are rated and balanced. Chock truck/trailer wheels when not moving. Ensure load is distributed during load/unload to avoid tip/roll-over. Follow designated travel routes. Employees pulling trailers must first receive training and authorization from BU Fleet Manager. Make sure vehicle is capable to pull the weight of the trailer and its contents. Inspect the trailer to ensure brake and turn signals work properly and in concert with the main vehicle's signals, and that tire pressure is acceptable. Make sure trailer is attached securely to the main vehicle and the safety chain or other backup attachment device is in-place. Evenly distribute weight on any trailers pulled. Turn off engine, set parking brake, and chock tires for larger vehicles and when parking on inclines.
		1c	Inadequate / malfunctioning / damaged equipment and tools	multiple	2	2	4	1c	Inspect all tools and equipment and test for proper working condition prior to mobilizing to site / work area. Select only the right tools / equipment for the task. Audit contractor process / forms for equipment inspection. If contractor equipment is deficient, stop work and have the deficiency addressed prior to starting work again.
2	Load / Attach / Disconnect Equipment	2a	Pinch Points	**H&S**	3	2	6	2a	Consider body positioning prior to start of task to identify potential pinch points and change position to ensure no contact during task. Do not position your hand or body so it can be caught in identified pinch points. Do not position your hand or body so it can be caught between a lifted load and adjacent objects. Wear heavy leather or cut-resistant gloves; have gloves on your person at all times.
		2b	Property Damage from vehicle / trailer movement	multiple	2	3	6	2b	See above, 1b.
		2c	Muscle strain from lifting / handling equipment	**H&S**	3	2	6	2c	Use cart, dolly, or get assistance. Do not lift anything manually by yourself that is awkwardly shaped or weighs more than 35 pounds. When lifting lighter objects, bend and lift with legs/arms, not back. Keep objects close to body and do not twist while lifting (turn with feet). Position work equipment to avoid over-reaching while working. Store heavy/bulky items with safe access in mind.
3	Lifting and carrying equipment	3a	Slips/Trips/Falls Resulting in Injury	**H&S**	3	2	6	3a	Determine travel path and staging area before lifting materials. Scan travel path to avoid trip hazards - walk on established roadways as much as possible. Keep work area and walkways free of trip hazards. Avoid uneven surfaces, overhead obstructions, soft/ muddy/ wet ground, and high vegetation where you can't see the ground. Wear boots with sufficient tread. Do not run.
		3b	Muscle strain from lifting and carrying equipment	**H&S**	3	2	6	3b	Determine travel path and staging area before lifting materials. When possible, use powered equipment, lift truck, drum cart, or other mechanical means to move heavy items (machine instead of manpower). Use of powered equipment / forklifts requires trained drivers and documented daily inspections. Establish plan for all forklift movements and ensure adequate space/clearances. Do not lift anything manually by yourself that is awkwardly shaped or weighs more than 35 pounds. When lifting lighter objects, bend and lift with legs/arms, not back. Keep objects close to body and do not twist while lifting (turn with feet). Position work equipment to avoid over-reaching while working. Do not reach, stretch, or twist to lift. Take breaks in addition to scheduled rest periods as needed.
		3c	Sharp/rough edges and pinch points	**H&S**	3	2	6	3c	See above, 2a. Position hands away from pinch points or sharp/rough areas where fingers may be crushed or cut/punctured/abraded. Wear appropriate PPE including cut-resistant gloves or leather / other heavy work gloves, and steel-toed boots.
		3d	Equipment rollover	multiple	2	3	6	3d	Choose level paths/terrain for equipment. Assess all paths prior to moving equipment onto the site (look for muddy areas in which the vehicle may slip, hidden travel path hazards, etc). Distribute loads/equipment on vehicles evenly to avoid tipping. Where inadequate travel paths exist, terrain modifications should be designed and implemented by a qualified professional engineer prior to start of work.

Task Steps[1]		Potential Hazards & Consequences[2]		select	Likelihood	Severity	RISK	Controls to Eliminate or Reduce Risks[3]	
4	Securing tools and equipment	4a	Damage to equipment, unauthorized use resulting in incident, or theft	multiple	2	2	4	4a	Turn off the engine and lock any vehicle being left for even a short period of time when not on a secure jobsite. If the vehicle will be left for long periods or overnight, remove any company documents, computers, and equipment, personal valuables, or any items that would attract thieves. Secure all equipment in locked storage areas after use and at end of day. All heavy equipment must be placed in a neutral position when not in operation. Dump truck beds must be lowered, buckets must be at ground level, forklift tines must be at ground level, etc. Keys must be removed from all heavy equipment when not in use.

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JHA
Job Hazard Analysis

Project Number:	0097881	Project / Client Name:	Fulton Avenue Superfund Site
Project Manager:	Chris Wenczel	Location:	150 Fulton Avenue, Garden City Park, Nassau County, New York
Partner-in-Charge:	Jim Perazzo	Date and Revision Number:	1/20/2017

SPECIFIC TASK:	**Accessing manhole/well vaults**

Minimum Required PPE for Entire Task:	☑ Hard Hat ☑ Safety-Toe Shoes ☐ Hearing Protection ☐ Goggles ☐ Face Shield ☐ Respirator <enter type and cartridge type> ☐ Other (specify): ☑ Safety Glasses ☑ Reflective Vest ☑ Gloves nitrile, leather for removing covers ☐ PPE clothing		
Additional Task-Step Specific PPE: (as indicated below under Controls)	Nitrile gloves should be worn under the leather or workgloves if potential for chemical exposure is present	Equipment / Tools Required:	Manhole hook for large (≥12" diameter) covers, suitable pry bar or magnetic manhole lifter.
Training Required for this Task:	40 Hour Hazwoper	Permits Required for this Task:	
Forms Associated with This Task:			

JHA Developed / Reviewed By:			JHA Review In Field
Name / Job Title:	Name / Job Title:	Name / Job Title:	Field Safety Officer (FSO) to ensure all personnel performing this task have reviewed JHA and agree to follow it. Site-specific changes to this JHA have been made as warranted based on this review. **FSO Signature/Date:**
Maddox			

Task Steps[1]			Potential Hazards & Consequences[2]	select	Likelihood	Severity	RISK		Controls to Eliminate or Reduce Risks[3]
1	Manhole well cover removal and replacement		Moving heavy/cumbersome object - Ergonomic risk, Back/muscle strain	H&S	3	3	9		Before lifting: • Develop a plan to remove the cover. Announce/discuss plan with field team. • Identify the safest path and resting location for the cover. • Perform stretching exercises before attempting removal. • If possible, use an appropriate tool that allows you to remove the lid without bending (hook, pry, magnetic lifter, etc.). Make sure it is suitable for the size/weight of the cover. IF A SUITABLE TOOL IS UNAVAILABLE, CALL THE PM AND DO NOT REMOVE THE COVER. When removing the lid: • Keep back straight and upright; avoid twisting or leaning when lifting. • Use smooth/controlled movements; avoid jerking. • **Know your limits**. Do not attempt to remove a cover that is too heavy to handle safely. If multiple manholes are accessed, take breaks or alternate personnel as necessary to avoid fatigue. For manholes covers requiring access by kneeling, bend at the knees, not at the waist, and use kneepads to reduce joint strain.
			Well lid or vault cover closing/falling, creating pinch points - Hand/bodily injury	H&S	3	4	12		• Anticipate worst-case scenarios and consider body placement to minimize risk of injury should the lid fall. • Do not place fingers underneath lids at any point. • Use work gloves to ensure a firm grip on the lifting tool. Make sure gloves are clean to reduce chance of grip slippage. • Keep bystanders clear of the area.
			Slips, Trips, falls within work area - Bodily injury	H&S	3	3	9		• Maintain a tidy work area. Be aware of any nearby equipment, especially along your intended path. • Ensure stable footing while moving a cover and be aware of changing conditions (precipitation, ice, or spills). • Keep area secure. Identify and protect opening to prevent stepping or falling into open vault. • When replacing lids/covers, ensure that the collar is clear of debris and lid/cover is properly aligned and seated firmly when replaced. • Secure lid/cover as designed.

Task: Accessing Manhole/Well Vaults	TOOLS OF THE TRADE				

HOOK

MAGNETIC LIFTER

PRY

ONE JHA PER TASK. SUBCONTRACTORS MUST PROVIDE THEIR OWN JHAS. JHAS SHOULD BE WRITTEN IN PLAIN LANGUAGE AND SHOULD BE NO MORE THAN 2-3 PAGES IN LENGTH.
INSERT ADDITIONAL ROWS AS NEEDED ABOVE (MUST MANUALLY COPY AND PASTE FORMULA IN COLUMN H). ROW HEIGHTS MAY NEED TO BE MANUALLY EXPANDED TO VIEW ALL TEXT.
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1. Each task consists of a set of steps. List and number all the steps in the sequence they are performed. Specify the equipment or other details.
2. List potential health & safety hazards and consequences - ONE PER ROW - and select "H&S" from the drop-down list. Then list any potential security, environmental, and/or property loss impacts - ONE PER ROW - and select the corresponding code(s) from the drop-down list. Use numbers and letters for each hazard/impact listed (1a, 1b, etc.). Hazards should be described in terms of their specific origin and negative consequences (e.g., instead of “moving equipment”, write “injury from getting struck by forklift”).
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4. Select the likelihood of occurrence and severity of each hazard, AFTER implementation of the planned control measures (use the Risk Matrix as a guide). The corresponding risk rating will then be automatically calculated [RISK = Likelihood x Severity].

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WAYS TO ELIMINATE OR REDUCE RISKS (IN ORDER OF PREFERENCE):

ELIMINATE / AVOID --> SUBSTITUTE / MODIFY --> ISOLATE --> ENGINEER / SAFEGUARD --> TRAINING AND PROCEDURES --> WARNING AND ALERT MECHANISMS --> PPE

Risk Matrix

What could go wrong? What is the worst thing that could happen if something goes wrong?

			Hazard Severity				
			1	2	3	4	5
			INSIGNIFICANT negligible or no injury could result	**MINOR** minor injury requiring only first aid	**MODERATE** Injury resulting in lost time could occur	**HIGH** Serious injury or death could occur	**VERY HIGH** multiple deaths could occur
Likelihood	**1**	**VERY UNLIKELY**	1	2	3	4	5
	2	**UNLIKELY**	2	4	6	8	10
	3	**POSSIBLE**	3	6	9	12	15
	4	**LIKELY**	4	8	12	16	20
	5	**VERY LIKELY**	5	10	15	20	25

JHA
Job Hazard Analysis

Project Number:	0097881	Project / Client Name:	Fulton Avenue Superfund Site
Project Manager:	Chris Wenczel	Location:	150 Fulton Avenue, Garden City Park, Nassau County, New York
Partner-in-Charge:	Jim Perazzo	Date and Revision Number:	1/20/2017

SPECIFIC TASK:	**Motor Vehicle Operation (excluding commercial vehicles and heavy equipment)**

Minimum Required PPE for Entire Task:	☐ Hard Hat ☐ Safety-Toe Shoes ☐ Hearing Protection ☐ Goggles ☐ Face Shield ☐ Respirator <enter type and cartridge type> ☐ Other (specify): <enter additional PPE here> ☐ Safety Glasses ☐ Reflective Vest ☐ Gloves ☐ PPE clothing <enter type here (eg, Tyvek, FRC, long sleeves)>		
Additional Task-Step Specific PPE: (as indicated below under Controls)	Reflective safety vests	Equipment / Tools Required:	Anti-lock braking system (ABS); Air bags fitted for driver and passenger side; Three point lap/diagonal seat belts for front and rear outboard seats and lap belts for all other seats
Training Required for this Task:	Valid Drivers License, Alert Driving Training	Permits Required for this Task:	None
Associated Forms:	S1-ERM-008-FM2 - Vehicle Inspection Checklist S1-ERM-008-FM1 - Journey Management Plan	Associated Procedures:	S1-ERM-008-PR - Driver and Vehicle Safety

JHA Developed / Reviewed By:			JHA Review In Field
Name / Job Title:	Name / Job Title:	Name / Job Title:	Field Safety Officer (FSO) to ensure all personnel performing this task have reviewed JHA and agree to follow it. Site-specific changes to this JHA have been made as warranted based on this review. **FSO Signature/Date:**
Maddox			

Task Steps[1]		Potential Hazards & Consequences[2]		select	Likelihood	Severity	RISK	Controls to Eliminate or Reduce Risks[3]	
1	Inspect vehicle (walk-around exterior and interior)	1a	Broken or malfunctioning equipment resulting in unsafe operation/accidents, break-downs, or spill of engine fluids to ground	multiple	2	5	10	1a	For ERM owned or leased vehicles, rental vehicles and personal vehicles used for field operations: document regular inspections of the vehicle (S1-ERM-008-FM2 - Vehicle Inspection Checklist). Do not operate any vehicle if its safety is in question and report any vehicle safety issues to ERM Fleet Manager or Project Manager/Supervisor.
		1b	Loose articles inside the vehicle and carried in truck beds or on trailers can shift and cause distractions, property damage, and accidents	multiple	2	5	10	1b	During vehicle inspection make sure any loose articles either inside the vehicle or in truck beds/on trailers are well-secured. For trailers, ensure trailers are properly and securely attached to hitch. Do not tow a trailer unless you have received training and the vehicle is rated for the load.
2	Loading / unloading vehicle	2a	Loose articles inside the vehicle and carried in truck beds or on trailers can shift and cause distractions, property damage, and accidents	multiple	2	5	10	2a	See above, 1b
		2b	Muscle strain from lifting and carrying heavy or awkwardly-shaped objects	**H&S**	2	3	6	2b	Use a dolly/cart to transport items, or get assistance from another person. Only carry what can safely be transported to/from the vehicle. Make as many trips as necessary. While lifting and carrying, keep materials close to your core - do not bend at waist, reach above your head, twist, or extend weight out away from your core. If materials slip, just let them drop rather than try to catch them and risk getting hurt.
		2c	Slip / trip / fall resulting in injury	**H&S**	2	3	6	2c	Inspect area for potential slip/trip/fall obstructions prior to loading / unloading, and remove or avoid these. Obtain additional lighting and use clear safety glasses in areas with low/unclear visibility. Keep work area organized and free of surface obstructions. Immediately dry wet areas or restrict access. Remove snow/ice prior to start of work. Reassess surface conditions if weather changes and address any new hazards (e.g. slick surface developing as a result of wet/freezing conditions). Do not carry loads that restrict visibility. Ensure steps, walkways and shoes are not slippery or loose prior to use. Keep eyes on path and nearby surroundings when walking. Take small steps and shuffle feet in potentially slippery areas. Walk slowly around corners and when entering/exiting doors. Wear footwear with nonslip soles and good tread.
		2d	Property damage from dropping equipment or improper loading	PL	2	2	4	2d	Use a dolly/cart to transport items, or get assistance from another person. Only carry what can safely be transported to/from the vehicle. Make as many trips as necessary. Secure equipment in the vehicle using tie-down straps (avoid bungee cables as they can slip and cause injury!). Ensure equipment will not move or shift during transport. Don't stack equipment such that equipment on bottom could be crushed by the weight.
3	Entering and exiting the vehicle.	3a	Caught in doors, trunk covers, and other vehicle equipment, causing injury	**H&S**	2	3	6	3a	Keep hands, feet, head, and loose articles of clothing or equipment out of the line of fire. Check before opening or closing any door to ensure you and others are not in line of fire.
		3b	Slip / trip / fall resulting in injury	**H&S**	1	3	3	3b	Use three points of contact when entering and exiting, and keep hands and feet placement and body posture in balance.
		3c	Property damage / theft from unattended vehicles	PL	2	3	6	3c	Unattended vehicles (even for a short period of time) must be locked so that all equipment inside them is secured (verify the vehicle is locked before walking away). Critical documents and equipment should be removed from the vehicle if unattended, or locked in the trunk/boot of the vehicle.
4	Driving to and from work locations	4a	Distraction resulting in accident	multiple	2	5	10	4a	Do not talk or text on phone while driving. Ensure all loose items and equipment inside the vehicle or in truck beds/on trailers are secured. Program electronics like GPS and radio before driving, or have passenger do this. Know how AC / heater / windshield wiper controls work before driving. Any activity that takes your eyes away from the road is dangerous - if you must read a map, make detailed adjustments to mirrors or other controls, or other related tasks - pull over to a safe area. Avoid drinking hot beverages or eating while driving. Avoid conversations with passnegers that will distract your mental focus from driving.
		4b	Fatigue resulting in accident	multiple	2	5	10	4b	Take a 15 minute break after every two hours of driving. Don't drive more than 8 hours/day, or after doing more than 12 hours of work-related activities. Avoid driving between 10 p.m. and 5 a.m. Share driving with others, if possible. Avoid driving after consecutive work days of 14 hours. Avoid driving after a flight of six hours or more without appropriate rest. A documented and approved Journey Management Plan (JMP) is mandatory for the following conditions: • Single day journey in excess of 500 km (310 miles) • Single day estimated driving duration in excess of 4.5 hours • Driving in a remote location (including off-road driving) • Driving in any location/region identified as "High Risk" by Control Risk Group (CRG) and/or Regional H&S Lead The JMP shall be completed using S1-ERM-008-FM1.
		4c	Broken or malfunctioning equipment resulting in unsafe operation/accidents, break-downs	multiple	2	5	10	4c	See above, 1a. If vehicle malfunctions during driving, pull safely off the road before exiting. ERM vehicles and vehicles used for field operations should be equipped with spare tire and jack; warning triangles (reflective), road flares (flares may not be stored in the passenger compartment of the vehicle), or LED road flares/emergency lighting; and reflective safety vests.
		4d	Actions of driver (or other drivers / pedestrians / cyclists) resulting in accident	multiple	3	5	15	4d	Follow designated vehicle travel routes only. Passengers and drivers are required to wear available passenger restraints (i.e. seatbelts with shoulder harness) while operating or riding in a vehicle. The number of passengers carried shall not exceed the seating capacity specified for the vehicle. All drivers must hold a current driver's license valid in the location where they will be driving. Follow all posted signs and speed limits, all applicable laws and regulations, ERM safe driving policies, and any client-specific or site specific vehicle safety policies. ERM drivers must complete regular safe driver training through Alert Driving. Practice defensive driving techniques as learned during these trainings. Do not drive under the influence of alcohol or drugs, or any other substance or medication that could impair their ability to drive (per ERM Global Policy – Drug and Alcohol Use).
		4e	Becoming lost or stranded, resulting in accident or exposure to elements / crime	multiple	2	3	6	4e	Prepare a JMP as required. Program GPS prior to driving. Inspect vehicle before driving - see above 1a. Check weather forecasts and adjust trip accordingly to avoid inclement weather.

Task Steps[1]		Potential Hazards & Consequences[2]		select	Likelihood	Severity	RISK	Controls to Eliminate or Reduce Risks[3]	
5	Towing	5a	Accident resulting in injury or property damage	multiple	2	5	10	5a	No ERM employee shall tow a trailer or equipment without having first received documented training on safe towing methods. Refer to and comply with the vehicle owner's manual for safe towing capacity. Conduct an equipment inspection prior to use to ensure that weight is distributed evenly and that warning/signal lights are working properly. Ensure trailer is attached securely to the main vehicle and the safety chain or other backup attachment device is in-place. Use a spotter when driving in reverse. The use of straps or chains for towing purposes is prohibited.
6	Backing up	6a	Accident resulting in injury or property damage	multiple	2	4	8	6a	Use spotter when maneuvering in/out of tight spaces and backing up. Make all backing maneuvers slowly and cautiously. Check mirrors and over shoulders. When parking, look for pull-through parking or back into parking spot when safe to do so.
7	Parking	7a	Accident resulting in injury or property damage	multiple	2	3	6	7a	Always set parking brake. Park only in designated areas. Park away from other cars when possible. Back into parking spot when safe to do so. Do not exit cab of vehicle with ignition running except in emergency. Maintain cushion of safety from fixed objects. Park so that driver and all passengers have enough room to open doors fully and enter/exit vehicle without obstructions or slip/trip/fall hazards. Look for pull-through parking to avoid backing. When parking on an incline, turn the wheels away from the curb and allow the vehicle to roll back until the wheels touch the curb. On a decline, turn the wheels toward the curb and allow the vehicle to roll forward until the wheels touch the curb. If parking on a hill without a curb, park with the wheels turned away from the roadway.
8	Driving on dirt roads or off road, or in remote areas	8a	Accident resulting in injury or property damage	multiple	2	3	6	8a	Only drivers trained on specific hazards of off-road driving may do so. Vehicles must be suitable for off-road use, including the use of 10-ply tires. Scan travel path for obstructions, debris. Do not drive through areas overgrown with vegetation where a clear view of the ground surface is obscured.
		8b	Property damage from rough terrain, sharp objects, uneven terrain	PL	3	2	6	8b	See above 8a. ERM has negotiated a separate contract with Enterprise for rental trucks for use on non-maintained, unpaved roads.
		8c	Getting stuck / stranded in soft / muddy / standing water conditions	multiple	3	3	9	8c	Where possible, carry a second spare tire if travelling off paved roads, and an emergency tire patch kit (these are usually a foam that is injected into the flat tire and can be used to temporarily seal a leak). Use of the buddy system is mandatory for remote site work – if for some reason this is not feasible then project teams must engage the H&S Leads and the Business Unit Managing Partner to discuss options. A communications plan must be established in advance and documented, to include: - Equipment suitable for the part of the world you're in (satellite GPS messenger, sat phone, etc.) – assume a cell phone will not work - Regular check-ins with office and client - Process to follow if no check-in occurs at scheduled time Be prepared for overnight conditions, including suitable clothing, water and survival items (this applies to any remote work, not just off-road travel).
9	Renting a vehicle	9a	Accident resulting in injury or property damage	multiple	2	5	10	9a	See above, 1a. Try to reserve a vehicle that is about the same size as your personal vehicle, so you are familiar with how it maneuvers. When renting a vehicle, proof of inspection must be available to the driver.
		9b	Renting a vehicle from an agency for which no negotiated contract is in place, resulting in unnecessary liability and risk.	PL	1	2	2	9b	Only rent from companies with which ERM has negotiated rates and contract terms. If employees cannot rent from a preferred provider with negotiated contract terms, the employee should purchase the collision damage waiver and personal accident insurance.
10	Reporting and documenting vehicular accidents and property damage.	10a	Inadequate response / documentation resulting in increased liability (personal or ERM)	PL	1	2	2	10a	No matter how minor a vehicle accident or property damage event is, report it as a safety event. If involved in a vehicular accident, always call the police, so a report will be available. In addition, reporting will protect your liability and ERM liability. Take as many pictures as you can of the accident scene if you can do so without placing yourself in further danger.
11	Driving the vehicle near and across railroad tracks.	11a	Passing trains cannot stop quickly, and there is a risk for collisions resulting in property damage, injury, and death.	multiple	1	5	5	11a	Use caution when crossing any railroad track in a vehicle and do so only on designated crossing roads. Never come to a stop on RR tracks.
12	Minor Vehicle Maintenance - topping off fluids, cleaning windows, changing wiper blades, fuses	12a	Tool hazards, sharp edges	**H&S**	2	2	4	12a	Inspect all tools and equipment prior to use; if faulty or inappropriate, do not proceed until repaired or replaced. Use only the proper tool for the job, and only tools that you are trained / qualified to use. Position hands/fingers away from contact/striking/pinch points. Do not position any part of body such that it is in "line of fire". Use stable/neutral body position and do not reach, stretch, or twist when using tools. Wear heavy duty work gloves. For sharp edges and punture hazards, wear cut-resistant gloves.
		13b	Electrical hazards from jump-starting dead battery	multiple	1	2	2	12b	Line both cars up so the batteries are as close as can be. Make sure the cars are in park, parking brake is set, and the engine is turned off. Make sure all headlights, blinkers, radios, and ACs are off. If the battery is cracked and liquid is leaking out, DO NOT go further! Inspect jumper cables for worn insulation. Ensure the red clamp is on (+) terminal and the black clamp is on (-) terminal. If unsure, refer to owner's manual.

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4. Select the likelihood of occurrence and severity of each hazard, AFTER implementation of the planned control measures (use the Risk Matrix as a guide). The corresponding risk rating will then be automatically calculated [RISK = Likelihood x Severity].

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Risk Matrix

What could go wrong? What is the worst thing that could happen if something goes wrong?

			Hazard Severity				
			1	2	3	4	5
			INSIGNIFICANT negligible or no injury could result	**MINOR** minor injury requiring only first aid	**MODERATE** Injury resulting in lost time could occur	**HIGH** Serious injury or death could occur	**VERY HIGH** multiple deaths could occur
Likelihood	**1**	**VERY UNLIKELY**	1	2	3	4	5
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JHA
Job Hazard Analysis

Project Number:	0097881	Project / Client Name:	Fulton Avenue Superfund Site
Project Manager:	Chris Wenczel	Location:	150 Fulton Avenue, Garden City Park, Nassau County, New York
Partner-in-Charge:	Jim Perazzo	Date and Revision Number:	1/20/2017

SPECIFIC TASK:	**Using hand tools**

Minimum Required PPE for Entire Task:	☑ Hard Hat ☑ Safety-Toe Shoes ☐ Hearing Protection ☐ Goggles ☐ Face Shield ☐ Respirator <enter type and cartridge type> ☐ Other (specify): ☑ Safety Glasses ☑ Reflective Vest ☑ Gloves cut resistant ☐ PPE clothing <enter type here (eg, Tyvek, FRC, long sleeves)> <enter additional PPE here>		
Additional Task-Step Specific PPE: (as indicated below under Controls)	cut-resistant gloves	Equipment / Tools Required:	Miscellaneous hand tools (screwdrivers, hammers, cutting tools, etc.)
Training Required for this Task:	Tool Specific	Permits Required for this Task:	Hot Work Permit if working in classified area with combustible atmosphere
Associated Forms:		Associated Procedures:	S3-NAM-046-PR - Safe Use of Cutting Tools

JHA Developed / Reviewed By:			JHA Review In Field
Name / Job Title:	Name / Job Title:	Name / Job Title:	Field Safety Officer (FSO) to ensure all personnel performing this task have reviewed JHA and agree to follow it. Site-specific changes to this JHA have been made as warranted based on this review. **FSO Signature/Date:**
Maddox			

Update Tasks and hazards in the field

Task Steps[1]		Potential Hazards & Consequences[2]		select	Likelihood	Severity	RISK	Controls to Eliminate or Reduce Risks[3]	
1a	Gather tools to take to jobsite	1a	An improper tool available at jobsites encourages unsafe behaviors and could lead to injury or property damage	H&S	2	2	4	1a	Ensure tools taken to jobsites are kept in optimal condition (sharp, clean, oiled, etc.) to ensure efficient operation. Tools must only be used for their intended purposes – tools should not be used as pry-bars. Ensure power cords attached to powered-equipment are not damaged. Inspect all power cords for damage prior to use. Remove all damaged tools and cords from service. Any damaged tool or electrical cord must be tagged and taken out of service. If a tool is designed to be handles and used with two hands then two hands must be used. Only use tools for their intended purpose and according to instructions.
		1b	Muscle strain from lifting / handling equipment	H&S	3	2	6	1b	Use cart, dolly, or get assistance. Do not lift anything manually by yourself that is awkwardly shaped or weighs more than 35 pounds. When lifting lighter objects, bend and lift with legs/arms, not back. Keep objects close to body and do not twist while lifting (turn with feet). Position work equipment to avoid over-reaching while working. Store heavy/bulky items with safe access in mind.
		1c	pinch points	H&S	2	2	4	1c	Do not position your hand or body so it can be caught in identified pinch points. Do not position your hand or body so it can be caught between a lifted load and adjacent objects. Wear heavy leather or cut-resistant gloves; have gloves on your person at all times.
2a	Using cutting tools	2a	Major and/or minor laceration bodily injury	H&S	2	3	6	2a	The prefered means of cutting tubing for purging is to use an enclosed blade tubing cutter. Fixed open-blade knives (such as pocket knives) may not be used on ERM jobsites. Cut-resistant gloves must be worn while using cutting tools or sharp objects. Employees performing significant amounts of cutting tool use should wear high-visibility gloves to encourage awareness of where hands are being placed. Review *Cutting Tools - Operational Control Document* prior to performing cutting tasks.
3a	Using screwdrivers	3a	Puncture and laceration bodily injuries	H&S	2	3	6	3a	Do not hold objects in the palm of your hand and press a screwdriver into it – these objects should be placed on a flat surface. Do not use screwdrivers as hammers or as a cutting tool, or use screwdrivers with broken handles. Use insulated screwdrivers for work on electrical equipment.
4a	Using hammers / sledgehammers	4a	Creation of sparks which can cause bodily harm or damage to property or fire	multiple	2	2	4	4a	Use brass hammers and tools in areas where creating sparks would pose ignition hazards.
		4b	Particles may lodge in employee's eyes	H&S	3	3	9	4b	Always use safety glasses when striking any object with a hammer. If hammer-head shows signs of mushrooming, replace it immediately.

Task Steps[1]		Potential Hazards & Consequences[2]		select	Likelihood	Severity	RISK	Controls to Eliminate or Reduce Risks[3]	
		4c	Loose handles may create a projectile hazard - causing bodily injury or property damage	multiple	2	3	6	4c	Replace any hammer with a loose handle so the hammer-head does not detach and cause injuries.
		4d	Smashed fingers	H&S	3	2	6	4d	Do not position your hand or body so it is in line of fire. Use minimal force when first driving nails and fingers are being used to hold nailhead in place. Use a stake driver tool for driving stakes to keep your hands out of line of fire of sledgehammer. Wear heavy leather gloves; have gloves on your person at all times.

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JHA
Job Hazard Analysis

Project Number:	0097881	Project / Client Name:	Fulton Avenue Superfund Site
Project Manager:	Chris Wenczel	Location:	150 Fulton Avenue, Garden City Park, Nassau County, New York
Partner-in-Charge:	Jim Perazzo	Date and Revision Number:	1/19/2017

SPECIFIC TASK:	**Well Installation and Soil Sampling**

Minimum Required PPE for Entire Task:	☑ Hard Hat ☑ Safety-Toe Shoes ☑ Hearing Protection ☐ Goggles ☐ Face Shield ☐ Respirator <enter type and cartridge type> ☐ Other (specify): ☑ Safety Glasses ☑ Reflective Vest ☑ Gloves nitrile ☐ PPE clothing <enter type here (eg, Tyvek, FRC, long sleeves)> <enter additional PPE here>		
Additional Task-Step Specific PPE: (as indicated below under Controls)	Face shield for air lancing. Leather gloves for moving rods and augers.	Equipment / Tools Required:	Geoprobe Machine, Air Vac/lance, Hollow Stem Auger
Training Required for this Task:	40 HR Hazwoper, FSO, SSC EP	Permits Required for this Task:	New York 811 utility markouts, SSC approval
Forms Associated with This Task:	SSC Field Process, Location Disturbance Permit, Project Plan		

JHA Developed / Reviewed By:			JHA Review In Field
Name / Job Title:	Name / Job Title:	Name / Job Title:	Field Safety Officer (FSO) to ensure all personnel performing this task have reviewed JHA and agree to follow it. Site-specific changes to this JHA have been made as warranted based on this review. **FSO Signature/Date:**
Maddox			

Task Steps[1]		Potential Hazards & Consequences[2]		select	Likelihood	Severity	RISK	Controls to Eliminate or Reduce Risks[3]	
1	Drilling Oversight	1a	Plant, Insect, Animal Hazards	H&S	2	2	4	1a	Visually inspect area around wellhead before approaching. Listen for buzzing / other noises inside vault before opening. Inspect well vault before reaching in to open well cap. Wear heavy leather or cut resistant gloves. Use permethrin and long sleeved, light colored clothes.
		1b	Slips and Trips	H&S	2	3	6	1b	Identify and use only safe pathways when entering/exiting/working in area. Obtain additional lighting and use clear safety glasses in areas with low/unclear visibility. Inspect work area for potential slip/trip/fall hazards prior to start of work; remove if possible, or, if not possible, cordon off with cone or mark with highly visible tape/flags, etc. Keep work area organized and free of surface obstructions during task. Immediately dry wet areas or restrict access (e.g., warning tape, signs, cones). Remove snow/ice/debris/vegetation prior to start of work. Reassess surface conditions if weather changes and address any new hazards (e.g., slick surface developing as a result of wet/freezing conditions). Do not carry loads that restrict visibility. Keep work area surfaces clear of debris (e.g., mud, leaves) and store tools/equipment to eliminate trip hazards when not in use. Keep eyes on path and nearby surroundings when walking. Fill in/flatten uneven ground. Wear footwear with appropriate traction for conditions (i.e., rubber non-slip soles, tread, crampons, etc.).
		1c	Rotating Equipment/Pinch Points	H&S	1	4	4	1c	Consider body positioning prior to start of task to identify potential pinch points and change position to ensure no contact during task. Do not position your hand or body so it can be caught in identified pinch points. Do not position your hand or body so it can be caught between a lifted load and adjacent objects. Wear heavy leather or cut-resistant gloves; have gloves on your person at all times. No jewelry, loose hair or clothing near drill rig.
		1d	Hazards to others in working vicinity	S	1	2	2	1d	Establish exclusion zone with safety barriers, cones, or caution tape. Provide road signage compliant with necessary. Communicate the need for caution to passersby.
		1e	Underground utilities	multiple	1	4	4	1e	Perform SSC audit prior to work. Local One call, Private utility mark-out, hand clear/air vac before mechanical intrusion.
2	Air vac oversight	2a	Plant, Insect, Animal Hazards	E	2	3	6	2a	Visually inspect area around wellhead before approaching. Listen for buzzing / other noises inside vault before opening. Inspect well vault before reaching in to open well cap. Wear heavy leather or cut resistant gloves. Use permethrin and long sleeved, light colored clothes.

Task Steps[1]		Potential Hazards & Consequences[2]		select	Likelihood	Severity	RISK	Controls to Eliminate or Reduce Risks[3]	
		2b	Slips and Trips	H&S	2	2	4	2b	Identify and use only safe pathways when entering/exiting/working in area. Obtain additional lighting and use clear safety glasses in areas with low/unclear visibility. Inspect work area for potential slip/trip/fall hazards prior to start of work; remove if possible, or, if not possible, cordon off with cone or mark with highly visible tape/flags, etc. Keep work area organized and free of surface obstructions during task. Immediately dry wet areas or restrict access (e.g., warning tape, signs, cones). Remove snow/ice/debris/vegetation prior to start of work. Reassess surface conditions if weather changes and address any new hazards (e.g., slick surface developing as a result of wet/freezing conditions). Do not carry loads that restrict visibility. Keep work area surfaces clear of debris (e.g., mud, leaves) and store tools/equipment to eliminate trip hazards when not in use. Keep eyes on path and nearby surroundings when walking. Fill in/flatten uneven ground. Wear footwear with appropriate traction for conditions (i.e., rubber non-slip soles, tread, crampons, etc.).
		2c	Hand/Portable Power Tools	H&S	1	4	4	2c	Wear leather gloves if working on or near equipment, no loose clothing. Wear face shield if compressed air is used.
		2d	Hazards to others in working vicinity	S	1	2	2	2d	Establish exclusion zone with safety barriers, cones, or caution tape. Provide road signage compliant with necessary. Communicate the need for caution to passersby.
		2e	Underground utilities	H&S	1	4	4	2e	Perform SSC audit prior to work. Local One call, Private utility mark-out, hand clear/air vac before mechanical intrusion.

ONE JHA PER TASK. SUBCONTRACTORS MUST PROVIDE THEIR OWN JHAS. JHAS SHOULD BE WRITTEN IN PLAIN LANGUAGE AND SHOULD BE NO MORE THAN 2-3 PAGES IN LENGTH.
INSERT ADDITIONAL ROWS AS NEEDED ABOVE (MUST MANUALLY COPY AND PASTE FORMULA IN COLUMN H). ROW HEIGHTS MAY NEED TO BE MANUALLY EXPANDED TO VIEW ALL TEXT.
LEAVE SEVERAL BLANK OVERSIZED ROWS TO ALLOW HANDWRITTEN FIELD ADDITIONS. CAN ALSO DELETE UNNEEDED ROWS TO FIT PAGE(S).

1. Each task consists of a set of steps. List and number all the steps in the sequence they are performed. Specify the equipment or other details.
2. List potential health & safety hazards and consequences - ONE PER ROW - and select "H&S" from the drop-down list. Then list any potential security, environmental, and/or property loss impacts - ONE PER ROW - and select the corresponding code(s) from the drop-down list. Use numbers and letters for each hazard/impact listed (1a, 1b, etc). Hazards should be described in terms of their specific origin and negative consequences (e.g., instead of "moving equipment", write "injury from getting struck by forklift").
3. Describe the specific actions or procedures that will be implemented to eliminate or reduce each hazard. Be clear, concise, and specific. Use objective, observable, and quantified terms (e.g., instead of "use good body positioning," write "don't bend at waist or reach above head"). Use numbers and letters corresponding to listed hazards.
4. Select the likelihood of occurrence and severity of each hazard, AFTER implementation of the planned control measures (use the Risk Matrix as a guide). The corresponding risk rating will then be automatically calculated [RISK = Likelihood x Severity].

A risk rating shaded red indicates that work cannot continue without additional control measures and approval of Partner-in-Charge.

WAYS TO ELIMINATE OR REDUCE RISKS (IN ORDER OF PREFERENCE):

ELIMINATE / AVOID --> SUBSTITUTE / MODIFY --> ISOLATE --> ENGINEER / SAFEGUARD --> TRAINING AND PROCEDURES --> WARNING AND ALERT MECHANISMS --> PPE

Risk Matrix

What could go wrong? What is the worst thing that could happen if something goes wrong?

			Hazard Severity				
			1	2	3	4	5
			INSIGNIFICANT negligible or no injury could result	**MINOR** minor injury requiring only first aid	**MODERATE** Injury resulting in lost time could occur	**HIGH** Serious injury or death could occur	**VERY HIGH** multiple deaths could occur
Likelihood	**1**	**VERY UNLIKELY**	1	2	3	4	5
	2	**UNLIKELY**	2	4	6	8	10
	3	**POSSIBLE**	3	6	9	12	15
	4	**LIKELY**	4	8	12	16	20
	5	**VERY LIKELY**	5	10	15	20	25

Subsurface Clearance Field Process Checklist

Site/Project Name: Fulton Avenue
Client: Genesco
ERM Project No.: 0097881
SSC Exp. Person:

Project Information Utilized for Field SSC Activities	Yes	No	N/A	Comments
Knowledgeable Contact Person(s) requested and identified				
Contractors prequalified and approved				
ERM / client SSC requirements have been communicated to all field personnel (including contractors)				
As-built drawings, site plans, aerial photographs, and/or other information sources available and reviewed				
Site plan(s) / drawing(s) developed showing subsurface lines/structures, Critical Zones, and planned ground disturbance locations				
SSC Experienced Person (EP) with current SSC certification assigned				
Project staff with current SSC certification assigned				
UXO / MEC risks assessed: UXO / MEC is present or potentially present				If Yes, stop work and contact PIC

General Field Activity & Site Walk	Yes	No	N/A	Comments
HASP available, reviewed, and signed by project team				
Site walk visual clues / site features (below) integrated into Site Services Model				

Identified Visual Clue	Yes	No		Identified Visual Clue	Yes	No
Lights				Heated floors (in-floor radiant heating)		
Signage				Fire hydrants		
Sewer drains / cleanouts				Sprinkler systems		
Cable / pipeline markers				Water meters		
Utility poles with conduit leading to the ground				Natural gas meters		
Utility boxes				UST fill ports and vent pipes		
Manholes				Equipment / manifold locations		
Pavement scarring				Steam lines		
Distressed vegetation or vegetation in linear pattern				Remote buildings with no visible utilities		

Comments / Others:

Contact Person Approval of Ground Disturbance at All Locations (indicate verbal approval by printing "Verbal" in the signature space)

Name (Print)	Company	Name (Sign)	Date / Time

Utility Markouts	Yes	No	N/A	Comments
Public Utility Markouts completed (where available; waiver required if "NO")				
List utilities notified:				
Responses received from ALL companies notified?				
Private Utility Markout completed (waiver required if "NO");				

NOTE: Private utility markouts must be performed by competent, trained personnel. Contractors must be overseen directly by SSC EP with "eyes on" supervision".

Performed by:

Type of equipment / methods used:

Note any issues or limitations (e.g., sources of interference, geology, etc.):

Subsurface Clearance Field Process Checklist

Site/Project Name: Fulton Avenue
Client: Genesco
ERM Project No.: 0097881
SSC Exp. Person:

Final Critical Zone determinations made by the SSC EP				

Critical Zones

Are there any ground disturbance locations known or suspected to be inside Critical Zones?

☐ **Yes.** PIC and BU MP (or designee) must BOTH grant waiver for work within the Critical Zone. The SSC Location Disturbance Permit or equivalent is required for those locations.

☐ **No.** Physical Clearance will proceed to the deeper of: 0.6 m / 2 feet below the frost line or 1.5 m / 5 feet below ground level, whichever is deeper.

Overhead Clearance	Yes	No	N/A	Comments
Overhead utility lines in the general vicinity of ERM work onsite?				
If overhead utilities are present, has nominal voltage been determined? If yes, list in comments section.				Voltage:
Overhead clearances confirmed with equipment operators for safely deploying equipment to the location? (The minimum horizontal distance from any point on the equipment to the nearest overhead electrical power line should adhere to the minimum clearance requirements stipulated by regulation, utility companies, client requirements, and/or industry best practice.)				Clearance distance(s):
Proximity alarms and /or spotters necessary to ensure safe clearances?				
If the equipment is to be closer than the minimum clearance distance to the overhead utility, can utility be de-energized via formal lockout/tagout (LOTO) program?				
If utility cannot be de-energized, alternate plan developed with approval from the PIC, H&S Team, and client/site owner?				

Clearance for Point Disturbances	Yes	No	N/A	Comments
Physical Clearance technique used: (waiver required if no Physical clearance performed)				Specify:
Diameter of physical clearance at least 125% of outside diameter of largest downhole tool (150% is best practice)				
Physical Clearance successfully completed at all locations				

Clearance for Excavations	Yes	No	N/A	Comments
Communicate excavation plan and Excavation Buffer location(s) to contractor. Delineate excavation buffers.				
There are disturbance locations known or suspected to be inside Critical Zones (waiver required if yes)				
De-energize subsurface services via formal LOTO program prior to beginning excavation				

Additional Notes:

SSC Process Completed By (SSC Experienced Person)

Subsurface Clearance Field Process Checklist

Site/Project Name: Fulton Avenue
Client: Genesco
ERM Project No.: 0097881
SSC Exp. Person:

Name (Print)	Name (Sign)	Date / Time

Subsurface Clearance Location Disturbance Permit

Disturbance Location Designation:

ERM Project No.: 0098771

SSC Exp. Person:

Contact Person Approval of Ground Disturbance Locations (indicate verbal approval by printing "Verbal" in the signature space)

Name (Print)	Company	Name (Sign)	Date / Time

Critical Zone Determination and Clearance Depth (It is not preferred to initiate ground disturbance activities within a Critical Zone)

If the Disturbance Location is known or suspected to fall within a Critical Zone, then a sketch (see reverse) or other map **must be** developed showing the location of all potential utilities within 10 feet (3 m) of the disturbance location. Sketch / map must be to scale.

This Location Is:

☐ Inside a Critical Zone. Partner-in-Charge (PIC) and Business Unit Managing Partner (BU MP) must BOTH grant waiver for disturbance at this location. Ensure documentation in the SSC Project Plan addendum to the HASP. Physical Clearance for point disturbances will proceed to the deeper of: **0.6 m / 2 feet below the frost line, 0.6 m / 2 feet deeper than the expected invert elevation of the service, OR 2.4 m / 8 feet below ground level.**

☐ Outside a Critical Zone.
Physical Clearance for point disturbances will proceed to the deeper of: **0.6 m / 2 feet below the frost line or 1.5 m / 5 feet below ground level.**

Utility Markouts

Has this location been cleared through both public and private utility locates?	Y ☐	N ☐	*"N" requires waiver*

Physical Clearance Technique at This Location

☐ Cleared using the following techniques / equipment:

Clearance depth and diameter (specify units):

☐ None – or not completed to required depth or diameter. For point disturbances, this must be waived by PIC and BU MP. (Ensure documentation in the SSC Project Plan addendum to HASP.)

Reason: Date / Time:

Physical Clearance Executed & Observed By:

Company	Representative(s)	Date / Time Complete	Notes

Was any Subsurface Structure discovered (damaged or undamaged) during Clearance?

☐ No (Proceed) ☐ Yes If Yes: Work stopped and discussed with PIC (Date / Time):

Agreed Action:

SSC Process Complete

Subsurface Clearance Location Disturbance Permit.

Disturbance Location Designation:

ERM Project No.: 0098771

SSC Exp. Person:

Name of SSC Experienced Person (Print)	Name (Sign)	Date / Time

Critical Zone Determination Sketch (use this or other map to confirm proximal Critical Zones).

Instructions:

1. Create a sketch of the disturbance (in the space to left or attach) that is drawn to scale and contains the following information:
   a. The disturbance location
   b. Surface landmarks and overhead obstructions (buildings, roads, overhead lines, etc.)
   c. Critical landmarks and Subsurface Structures (tanks, transformers, wells, racks, etc.)
   d. Underground services:
      i. Identified in the Site Service Model
      ii. Marked by Public and Private utility markouts
      iii. As relayed by the Contact Person
      iv. Nearest shutoff / isolation mechanism for each
   e. Any surface clues as to potential underground services (junction boxes, drains, disturbed concrete, signage, etc.)
   f. The site property boundary
2. Use your sketch to mark Critical Zones (3m or 10 feet) around critical landmarks and underground structures / services.
3. For Excavations, use your sketch to mark Excavation Buffers (0.6m or 2 feet) from Subsurface Structures.
4. If the disturbance location falls inside the Critical Zone, the preferred course of action is step out to a safe location outside a Critical Zone.
5. Disturbance within a Critical Zone can only proceed with both PIC and BU MP (or designee) approval.

SUBSURFACE CLEARANCE PROJECT PLAN
Addendum to HASP
GMS Project No: 0097881

This Subsurface Clearance (SSC) Project Plan should be completed for each phase of ground disturbance activities at a project location, and included as an addendum to the Project-Specific Health & Safety Plan (HASP).

Ground disturbance activities that fall under this SSC Project Plan include ALL activities which require penetration of the ground surface (regardless of depth), and/or the drilling, coring or removal of engineered surfaces (pavement, concrete, etc.). Examples of ground disturbance activities include, but are not limited to:

- Hand digging / hand augering
- Drilling
- Direct-push or Geoprobe® borings
- Well installation
- Well decommissioning by over-drilling
- Excavation (by hand or with mechanical equipment)
- Trenching
- Grading
- Concrete coring
- Driving of posts, stakes, rods, poles, or sheet pile.

This SSC Project Plan summarizes the types and sources of SSC information obtained, describes the Site Services Model, and documents any waivers to ERM's Global SSC Process. The ERM Partner-in-Charge (PIC), Project Manager (PM), and SSC Experienced Person (EP)[1] must review and approve this SSC Project Plan, and maintain a copy (1) at the project location for the duration of ground disturbance activities and (2) in the project files.
All waivers must be approved by BOTH: (1) the ERM PIC and (2) the Business Unit Managing Partner (BU MP) or the BU MP's designee (cannot be the same person as the PIC).

Administrative Information		
	Project Name and Location: Fulton Ave. Garden City NY	
	Scope of Ground Disturbance Activities: *Check all that apply:* ☐ Point disturbances ☐ Excavation / trenching ☐ Removal of engineered surfaces ☐ Other - Describe:	*Use field documentation to document SSC:* • *Process Checklist – broadly across the site* • *Remote/Greenfield Site Process Checklist – broadly across the site for those projects that meet these criteria and where ONLY hand digging will occur (refer to SSC Process Document Section 1.2)* • *Location Disturbance Permit – for each location inside a Critical Zone*
	SSC Project Plan Date:	Field Work Start Date:
	Project Manager: Chris Wenczel Signature:	Partner In Charge: Jim Perazzo Signature:
	SSC EP: Karen Pickering/Chris Wenczel Signature:	BU MP (req'd for waivers): Signature:
	List any SSC General Employees (GEs) working on this project: Brice Lynch	

[1] SSC EP not required for project sites determined to be Remote/Greenfield sites (as defined in the ERM Global SSC Process), where ONLY hand digging will occur.

Subsurface Clearance Information Sources Summary **Document the information sources that ERM used or will use to locate Subsurface Structures on site.**	**Information Sources**	**Yes**	**No**	**N/A**	**Comments**
	Facility-provided as-built drawings, maps, site plans showing subsurface structures / utilities	☐	☐	☐	Date(s):
	Other information obtained (e.g., easements, right-of-ways, historical plot plans, current/historical aerial photographs, fire insurance plans, tank (dip) charts, SSC information obtained as part of previous site investigations, soil surveys, boring logs	☐	☐	☐	List (including dates):
	Knowledgeable Contact Person	☐	☐	☐	Who: Time in Job: Time at Site:
	Utility Markouts	**Yes**	**No**	**N/A**	**Comments**
	Site is Remote/Greenfield site AND only hand digging will occur	☐	☐	☐	*If "YES", utility markouts are not required by ERM process (Note that public markouts may be legally required based on jurisdiction of project site – it is the responsibility of the PIC and PM to determine these requirements and comply)*
	Public Utility Markouts (where they are available)	☐	☐	☐	*Required where available – if not available check "N/A". If available and checked "NO", a Waiver is required (if legally able to do so).* Who:
	Private Utility Markouts	☐	☐	☐	*If checked "NO" and site is not a Remote/Greenfield site, a Waiver is required* ERM employee ☐ or Subcontractor ☐ Who: List methods / equipment used:

For Remote/Greenfield Sites where ONLY hand digging will occur – the remaining sections of this SSC Project Plan do not apply and can be left blank.

Site Services Model

List the utilities or other below ground services present on site.

Do we know the locations of these services, their conveyance on site (to the site boundary, as appropriate) and the location of isolation switches or valves?

If "Present" and not located or "Unknown", comment on how those gaps will be addressed.

Attach a site plan / drawing (to scale) showing planned ground disturbance location(s), the locations/routes of all identified or suspected subsurface structures and services, and associated critical zones.

Utility / Service	Present	Anticipated Depth (note units)	Located? Yes	Located? No	Absent	Unknown	Status (active/ inactive/ abandoned)	Comment *(how located? Lines of evidence – types and quality. How will gaps be addressed?)*
Electricity	☐		☐	☐	☐	☐		Voltage:
Gas	☐		☐	☐	☐	☐		
Petroleum Pipeline	☐		☐	☐	☐	☐		
Other Pressurized Lines	☐		☐	☐	☐	☐		Type:
Process Sewer	☐		☐	☐	☐	☐		
Sanitary Sewer	☐		☐	☐	☐	☐		
Storm Sewer	☐		☐	☐	☐	☐		
Potable Water	☐		☐	☐	☐	☐		
Telephone / Communication	☐		☐	☐	☐	☐		
Fiber Optic	☐		☐	☐	☐	☐		
Plant air / steam	☐		☐	☐	☐	☐		
Fuel / oil	☐		☐	☐	☐	☐		
Reclaimed / waste water	☐		☐	☐	☐	☐		
Fire suppression	☐		☐	☐	☐	☐		
Underground tank(s)	☐		☐	☐	☐	☐		
Other:	☐		☐	☐	☐	☐		

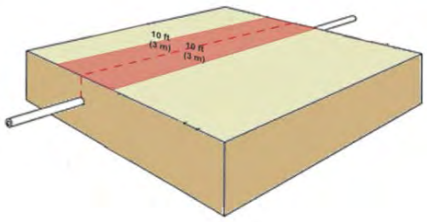
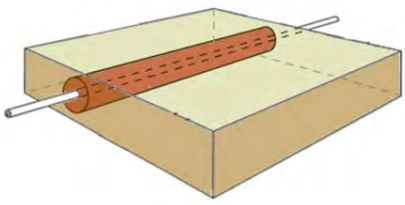
Subsurface Clearance Process Waivers **Document any waivers to the process approved by BOTH the PIC and BU MP.** **Legally required steps cannot be waived.**	Process Component Being Waived:	Waived By (PIC)	Waived by (BU MP)	Date	Reason
	Performance of Public Utility Markouts (where they are available)				
	Performance of Private Utility Markouts				
	No ground disturbance inside a Critical Zone				
	Physical Clearance to required depth(s) and diameters(s) at Point Disturbance Location(s). Indicate specific location(s):				
	Requirement for SSC EP to be present on site, when ONLY hand digging/hand augering will occur in the uppermost 1 foot (0.3 meters)				

Subsurface and Overhead Utility Clearance Map	**Attach a site plan / drawing (to scale) showing planned ground disturbance location(s), the locations/routes of all identified or suspected subsurface structures and services, associated critical zones, and location of all isolation devices and/or shutoff valves.**

Subsurface Clearance (SSC)
Field Review Checklist for Contractors

Site Name:	
Client:	
ERM Project No.:	
Contractor activities to be performed on Site:	

Use this form to conduct and document review with contractor field personnel, to ensure they have been properly briefed on the applicable components of ERM's SSC Process.

TOPIC	REVIEWED	N/A	COMMENTS
All personnel on ERM projects are empowered to stop work, without fear of reprimand, if it is unsafe to proceed or if there are concerns or questions.	☐	☐	
If at any time during project execution, the scope of work or jobsite conditions change, work should be stopped and the potential H&S effect of the change discussed.	☐	☐	
Ground disturbance activities may NOT be performed at any location without authorization by the ERM SSC Experienced Person (EP). Clearance activities may NOT be performed at any location unless the ERM EP is physically present.	☐	☐	
Unless explicitly authorized by ERM's Partner-in-Charge and Business Unit Managing Partner, ground disturbance may NOT be performed within 10 feet (3 meters) distance (referred to as the "Critical Zone") of the surface projection of: • Any known or suspected underground pipes, cables, conduits, drains, galleries, edges of tanks, or any other useful property; or • Aboveground structures with associated subsurface pipes and/or cables, including but not limited to pump islands, pump galleries, manifolds, electrical transformers, compressors, production wells, loading racks, or other process equipment.	☐	☐	**"The Critical Zone"** 
Unless authorized by the ERM EP, ground disturbance / clearance activities must NOT be performed in areas that are in direct conflict with any markings made by public or private utility locators.	☐	☐	
Unless explicitly authorized by ERM's Partner-in-Charge and Business Unit Managing Partner, all borehole and small test pit locations must be physically cleared prior to use of mechanized equipment. Required physical clearance depths and diameters for point disturbances are as follows: • Physically clear to a diameter at least 125% of the largest downhole tool to be used. • Physically clear to the deeper of: o 2 feet (0.6 meters) beyond the bottom of the frost line at the site, or: o Outside Critical Zones to 5 feet (1.5 meters), or o Inside Critical Zones to the deeper of: 8 feet (2.4 meters), or 2 feet (0.6 meters) deeper than the expected invert elevation of the subsurface structure.	☐	☐	**"The Excavation Buffer"** 

TOPIC	REVIEWED	N/A	COMMENT:
Mechanical digging is prohibited inside a 2-foot (0.6-meter) distance (referred to as the "Excavation Buffer") in all directions from subsurface structures that will be intentionally exposed due to ground disturbance activities. Removal of material inside the Excavation Buffer may only proceed by hand using non-conductive tools.	☐	☐	
For all equipment brought to the site, the minimum horizontal distance from any point on the equipment to the nearest overhead electrical power line must adhere to the minimum safe clearance requirements stipulated by regulation, utility companies, client requirements, and/or industry best practice.	☐	☐	
If subsurface structures are to be de-energized prior to ground disturbance activities, only trained personnel may do so via a formal, written energy isolation program.	☐	☐	
Contractor personnel should be observant during ground disturbance activities for the presence of warning signs indicating non-native soil, fill materials, and/or the presence of unexpected subsurface structures. Any evidence of warning signs, unexpected encounters with subsurface structures, or any other near misses or incidents must be immediately reported to the ERM EP or field supervisor. Contractor personnel must participate, as requested, in investigations of near misses and incidents.	☐	☐	
Other topics discussed:	☐	☐	

N/A = Not applicable to this project.

REQUIREMENTS FOR TOOLS AND EQUIPMENT:

- Hand digging tools must have a non-conductive handle (e.g., fiberglass, wood, composite) AND / OR fully insulated handles and upper shaft. It is a best practice to also wear insulated electrical gloves certified to appropriate standards.
- Blades on shovels and post-hole diggers must have rounded or blunt edges.
- Pick axes or pointed spades are not to be used for physical clearance.
- Electric-powered equipment must have ground fault protection. If this is not feasible, fully insulated electrical gloves certified to appropriate standards must be worn at all times during equipment use/operation.
- Equipment must be inspected prior to use, maintained according to manufacturer recommendations, and operated only by trained personnel.
- Rig- or stand-mounted concrete coring equipment must be anchored to the ground/floor using proper anchors.

Checklist Completed By: (SSC Experienced Person)		
Name (Print)	Name (Sign)	Date / Time

Reviewed By: (All Contractor Personnel)		
Name (Print)	Name (Sign)	Date / Time

Subsurface Clearance (SSC)
Considerations for Private Utility Locates

This form provides additional guidance and considerations for conducting effective private utility locates.

SSC PROCEDURE REQUIREMENTS
• Excluding remote-greenfield sites, private utility locates are required on all SSC projects. Only the Partner in Charge (PIC) and Business Unit Managing Partner (BU MP) may waive this requirement.
• Locates must be performed by: (1) a prequalified contractor, with direct ("eyes on") supervision by the ERM SSC Experienced Person (EP); or (2) an ERM employee who has an appropriate level of formal training and experience to perform utility locates.
• Locates must be conducted to: (1) verify the routes and locations of all known or suspected services associated with a site; AND (2) clear a minimum distance of 10 feet (3 meters) around each planned ground disturbance location, including excavations / trenches.
• Vegetation or surface obstructions must be cleared / removed as necessary to facilitate private utility markouts. If engineered surfaces such as reinforced concrete are interfering with private locate signals, consider doing an additional locate AFTER removal of the surface but prior to additional ground disturbance.
• Utilities should be marked with paint or other semi-permanent markings whose meaning is clearly understood by the site team. Markings must remain clear and visible for the duration of the ground disturbance activities, and re-marked if necessary.
PLANNING PHASE
• Communicate the detailed scope of work and review all available SSC information with private locators in advance, prior to mobilizing to the site. This way they can bring the right equipment and schedule sufficient time to achieve the clearance objectives.
• Select the right equipment and methods to be used, based on your discussions with the contractor and the "Guidance on Selection and Applicability of Detection Equipment Used for Private Utility Location" in Appendix G of the SSC Process Document.
PRE-CLEARANCE PHASE
• Provide all available information to locators to help them confirm the routes of all known or suspected services. This includes but may not be limited to: as-builts, public locator responses/markings, knowledgeable site contact information, and results of visual clues survey.
• We must ensure that utility locators are thorough and use multiple tools and methods, including active tracing techniques. Ground penetrating radar (GPR) surveys should be used wherever possible.
• For electromagnetic (EM) location, insist on inducement of a signal and active tracing of all conductors, wherever possible.
• Perform at least two different depth scans with GPR: (1) a higher frequency near-surface scan and (2) a lower-frequency scan within the target depth range for site services. This is especially critical for sites with concrete slabs or other engineered surfaces, where utilities may be direct buried within or directly below the surface.
• Ask the private locators about any issues or limitations with their surveys. Have them provide a written report of their findings.

Journey Management Plan

Purpose of Journey:		**Is this trip necessary?**	☐ Yes ☐ No
Client Name:	**Genseco**	**GMS number:**	0098771
Project Name:	**Fulton Ave**	**Journey Date:**	
Originating From: Address/Location		**Destination:** Address/Location	

Driver and Vehicle Details			
Journey Leader		**Contact Number:**	

Passenger Details

Name	Contact Number	Name	Contact Number

Route to be Taken (Detail Journey legs / stages, destinations, route to be taken and speed limits)

Date	Start Location and Estimated Time	Finish Location and Estimated Time	Anticipated Check-in Call Time	Journey Point of Contact

Identified Risks and Mitigation Plan	
Identified Risks	**Mitigation Techniques**
Anticipated call in not received	

Pre-Departure Checklist	**Yes**	**No**
Has the PIC (or the Journey Leader's supervisor if the Journey Leader is the PIC or there is no PIC associated with the travel) approved the journey?	☐	☐
Pre-trip briefing conducted with Journey Leader and Journey Point of Contact including call in requirements and response if call is not received	☐	☐
Driver has a current driver's license for the class of vehicle and has completed relevant driving safety training	☐	☐
Immediately Before Journey Commences	**Yes**	**No**
Driver is physically and mentally fit to perform task (Sufficient rest based on past work hours, time of the day etc.)	☐	☐
Vehicle selected is suitable for the trip and cargo/loads are separated from vehicle occupants	☐	☐
Vehicle inspected by driver	☐	☐
Correct Safety Equipment in vehicle for task - Emergency Triangles, Water, First Aid kit, Fire Extinguisher (recommended)	☐	☐
Suitable (checked and operational) communication devices (i.e. mobile telephone, satellite phone, 2 way radio)	☐	☐
Operational In-Vehicle Monitoring System (IVMS), if required	☐	☐
Weather and Road conditions checked	☐	☐

Journey Approved by PIC / Line Manager	**Pre-Trip Briefing Completed with Journey Point of Contact**
Name: _____	**Name:** _____
Signature: _____ **Date:** _____	**Signature:** _____ **Date:** _____

Journey Management Plan

Include a Map and/or Directions for the Proposed Journey:

ERM Vehicle Safety Checklist

Date	Operator	Project# 0098771	Mileage
Vehicle Make/Model License#			Company Vehicle? ☐ Y ☐ N

I. Inspection	Before Driving: OK	Deficient	N/A	Comments
Prior to Use, and Weekly Thereafter for all vehicles used for field work.				
All glass and mirrors	☐	☐	☐	
Engine Fluids (oil, radiator coolant)	☐	☐	☐	
Headlights (incl Hi/Lo lights)	☐	☐	☐	
Horn	☐	☐	☐	
Instrumentation warning lights	☐	☐	☐	
Misc. vibration, noise, loose parts (requires comment)	☐	☐	☐	
Overall vehicle cleanliness/damage	☐	☐	☐	
Reverse warning/alarm	☐	☐	☐	
Seatbelts for all seats	☐	☐	☐	
Tail Lights / Brake lights	☐	☐	☐	
Tires - visual condition/tread/pressure	☐	☐	☐	
Turn signal / hazard lights	☐	☐	☐	
Under vehicle – leaks	☐	☐	☐	
Windshield cleanliness and lack of damage/cracks	☐	☐	☐	
Windshield wipers & fluid	☐	☐	☐	

Required H&S supplies/ equipment	☐ Anti-lock brakes	☐ Air bags	☐ First aid kit	☐ Reflective safety vest (for all occupants)	☐ Spare tire and jack – in good condition	☐ Roadside warning (triangles or flares)
Optional H&S supplies/equipment		☐ Jumper cables	☐ Fire Extinguisher		☐ Torch / flashlight	☐ Camera

Name & signature of reviewer : ……

Safety Reminders

1. Drive defensively - scan road ahead and anticipate actions of other drivers.
2. Ensure sufficient rest before and during the trip. Take a 15 minute break after every 2 hours of continuous driving.
3. Seat belts to be worn by all passengers and driver at all times.
4. Adjust seat / mirrors / headrest / steering wheel and ensure clean windows with no obstructions; Secure loose items.
5. Eliminate distractions – do not use mobile phones or any other electronic devices while driving. Refer to ERM's ***Global Policy on Mobile/Cellular Telephone and Personal Digital Assistant (PDA) Use While in a Vehicle.***
6. Secure all loose loads.
7. Obey all posted road signs and speed limits.
8. Maintain safe following distance - use "3-second rule." in good weather conditions. Adjust speed / following distance for adverse road/weather conditions.
9. Do not consume any alcohol or drugs, or any other substance or medication that could impair their ability to drive. Refer to ERM's ***Global Policy on Drug and Alcohol Use***.

1. Project Information

Name/Location	
Project Number	
Date	

2. Instrument Information

Type (check)	Active (pump)		Passive (OVM)		Noise dosimeter	
Brand						
Model						

3. Sample Location Information

Type (check)	Personal		Area	
Facility Name				
Work Area				
Name/ID Number of Employee Sampled				
Named of Employee Collecting Sample				

4. Calibration Information

Type						
Brand						
Model						
Dosimeter Calibration	Primary standard calibration check?		Yes		No	NA
Pump Calibration	Test #1	Test #2	Test #3	Test #4	Test #5	Average
Pre-calibration						
Post-calibration						
Note: If calibrated flowrates are in units other than liters/minute (lpm), please note so in this area.			Average of pre/post calibration			

5. Sample Collection Information

Sample Number	Start Time	Stop Time	Elapsed Time (minutes)	Sample Air Volume (liters)

6. Field Notes

Describe items such as, but not limited to:

- Was the work day a light, average, or busy day?
- What tasks did the worker perform? Were any of the tasks unusual?
- Were there any upsets or upset conditions during the day? If so, what were they?
- Attach a diagram of the worker's position or workstation. Note wind direction or direction of local dilution ventilation if helpful.
- What PPE ensemble was used?
- What were the environmental conditions (temperature, humidity, wind speed/direction, indoor or outdoor samples, etc.)?

7. Analytical Results

Laboratory Used: _____ Lab Report No.: _____

Analyte	Lab Results	Analyte	Lab Results

1. Project Information

Name/Location	
Project Number	
Date/Time	

2. Instrument Information

Type	
Brand	
Model	

3. Calibration Details (use one form per instrument per day)

Type	Calibration Gas Value	Measured Result	Correction Factor (CF) Needed?[1] (Yes/No)
Fresh Air	NA		NA
Zero Gas			NA
Span Gas #1:			
Span Gas #2:			
Span Gas #3:			
Span Gas #4:			

4. Monitoring Results

Time	Contaminant	Location	Result	CF (if needed)	Adjusted Result (Result x CF)

Time	Contaminant	Location	Result	CF (if needed)	Adjusted Result (Result x CF)

5. Completion[2]

Name	
Signature	

6. Notes

1. Correction factors (CF) may be needed for instrumentation where the span gas used is different from the chemical of concern (COC) being evaluated. Many air monitors, such as photoionization detectors (PIDs), are broadband instruments which will respond to all gases which the detector will ionize. Because the instrument will respond differently to the span gas than the COC, a CF can be applied to adjust the reading, producing a result more indicative of actual COC concentrations.

   The CF for a compound is developed under laboratory conditions by the manufacturer and is the ratio of the instrument response to the calibration gas over the instrument response to the COC. Therefore, the true concentration of the COC can be obtained by multiplying the monitor response by the CF. The instrument manufacturer's documentation will provide a list of CFs where applicable.

   Note that some instrumentation is designed to adjust for CFs automatically and produce true readings. Consult instrument documentation to determine if this is a feature of your instrument.

2. Retain completed form in project files.

	Applicability:	Form	Document Number:	Version:
	North America		S3-NAM-006-FM2	1
	Title: **Emergency Drill Evaluation Form**		**Last Revision Date:**	3/30/15

Project/Office Name/ Location: **Genesco Fulton Ave.**		
Project Number (where applicable): 0098771	**Date:**	**Time:**
Drill Leader/Facilitator:		
1. Describe the drill scenario below.		
2. Post Drill Review		
Evaluation Date:		
List the positive attributes of the drill:		
List the opportunities for improvement.		
List the corrective actions taken and their completion dates. Be sure to include this information in ECS.		

Corrective Action	Assigned To	Completion Date

"Worst Case" Vapor Exposure Calculation
Volatile Compounds in Water

Common Volatile Contaminants	Concentration (site water) (ug/l)	Water Solubility (mg/l)	Vapor Pressure (torr)	OSHA PEL (ppm)	Concentr'n in Air (ppm)	Total vapor in Air (% by ppm)	Concentr'n in Air % of PEL
Acetone	0.E0	1,000,000.	180	1000	0.000	#DIV/0!	0.00%
Benzene	0.E0	1,750.	75	1	0.000	#DIV/0!	0.00%
Bromochloromethane	0.E0	15,000.	115	200	0.000	#DIV/0!	0.00%
Carbon Disulfide	0.E0	1,190.	297	20	0.000	#DIV/0!	0.00%
Carbon Tetrachloride	0.E0	793.	91	10	0.000	#DIV/0!	0.00%
Chlorobenzene	0.E0	500.	9	75	0.000	#DIV/0!	0.00%
Chloroform	0.E0	7,920.	160	50	0.000	#DIV/0!	0.00%
Cresol	0.E0	20,000.	0.18	5	0.000	#DIV/0!	0.00%
1,2-Dichlorobenzene	0.E0	156.	1	50	0.000	#DIV/0!	0.00%
1,4-Dichlorobenzene	0.E0	74.	1.3	75	0.000	#DIV/0!	0.00%
1,1-Dichloroethane	0.E0	6,000.	182	100	0.000	#DIV/0!	0.00%
1,2-Dichloroethane	0.E0	9,000.	64	50	0.000	#DIV/0!	0.00%
cis-1,2-Dichloroethylene	0.E0	3,500.	200	200	0.000	#DIV/0!	0.00%
trans-1,2-Dichloroethylene	0.E0	6,300.	200	200	0.000	#DIV/0!	0.00%
1,4-Dioxane	0.E0	1,000,000.	29	100	0.000	#DIV/0!	0.00%
Ethyl Benzene	0.E0	170.	7	100	0.000	#DIV/0!	0.00%
Ethyl Chloride	0.E0	6,000.	1000	1000	0.000	#DIV/0!	0.00%
2-Hexanone	0.E0	20,000.	11	100	0.000	#DIV/0!	0.00%
Methyl Chloride	0.E0	5,000.	3800	100	0.000	#DIV/0!	0.00%
Methyl Ethyl Ketone	0.E0	280,000.	78	200	0.000	#DIV/0!	0.00%
Methylene Chloride	0.E0	13,000.	350	25	0.000	#DIV/0!	0.00%
Naphthalene	0.E0	31.	0.08	10	0.000	#DIV/0!	0.00%
Propylene Dichloride	0.E0	3,000.	40	75	0.000	#DIV/0!	0.00%
Styrene	0.E0	310.	5	100	0.000	#DIV/0!	0.00%
1,1,2,2-Tetrachloroethane	0.E0	2,970.	5	5	0.000	#DIV/0!	0.00%
Tetrachloroethylene	0.E0	200.	14	200	0.000	#DIV/0!	0.00%
Toluene	0.E0	526.	21	200	0.000	#DIV/0!	0.00%
1,1,1-Trichloroethane	0.E0	1,330.	100	350	0.000	#DIV/0!	0.00%
1,1,2-Trichloroethane	0.E0	4,420.	19	10	0.000	#DIV/0!	0.00%
Trichloroethylene	0.E0	1,100.	58	100	0.000	#DIV/0!	0.00%
Vinyl Chloride	0.E0	2,760.	2508	1	0.000	#DIV/0!	0.00%
Xylene	0.E0	175.	8.3	100	0.000	#DIV/0!	0.00%
Totals	Combined Volatiles Level (ppm)				.	#DIV/0!	
Totals	Fraction Combined Exposure Limit						0.00%

Instructions: To estimate the potential "worst case" exposure, enter the known water concentration (in micrograms per liter, or ug/l) of the contaminant of concern in the box to the right of the known contaminant. If more than one contaminant is present, enter information for each. If the contaminant is not on the primary list provided, additional analytes and their respective data are provided below the table and can be cut and pasted into the table. Contaminants with an asterisk (*) adjacent their name do not have an OSHA PEL; NIOSH RELs have been inserted into the table for these contaminants.

"Worst Case" Vapor Exposure Calculation
Volatile Compounds in Soil

Carbon Fraction = 0.1

Common Volatile Contaminants	Concentration (site soil) (mg/Kg)	Water Solubility (mg/l)	Vapor Pressure (torr)	Organic Carbon Partition Coefficient	OSHA PEL (ppm)	Saturation Concentration in Air (ppm)	Fraction of Total Vapor in Air (% by ppm)	Saturation Concentration in Air (% of PEL)
Acetone	0.E0	1,000,000.	180	0.23	1000	0.E+0	#DIV/0!	0.00%
Benzene	0.E0	1,750.	75	83	1	0.E+0	#DIV/0!	0.00%
Bromochloromethane	0.E0	15,000.	115	13	200	0.E+0	#DIV/0!	0.00%
Carbon Disulfide	0.E0	1,190.	297	54	20	0.E+0	#DIV/0!	0.00%
Carbon Tetrachloride	0.E0	793.	91	110	10	0.E+0	#DIV/0!	0.00%
Chlorobenzene	0.E0	500.	9	330	75	0.E+0	#DIV/0!	0.00%
Chloroform	0.E0	7,920.	160	31	50	0.E+0	#DIV/0!	0.00%
1,2-Dichlorobenzene	0.E0	156.	1	1700	50	0.E+0	#DIV/0!	0.00%
1,4-Dichlorobenzene	0.E0	74.	1.3	1700	75	0.E+0	#DIV/0!	0.00%
1,1-Dichloroethane	0.E0	6,000.	182	30	100	0.E+0	#DIV/0!	0.00%
1,2-Dichloroethane	0.E0	9,000.	64	14	50	0.E+0	#DIV/0!	0.00%
cis-1,2-Dichloroethylene	0.E0	3,500.	200	59	200	0.E+0	#DIV/0!	0.00%
trans-1,2-Dichloroethylene	0.E0	6,300.	200	59	200	0.E+0	#DIV/0!	0.00%
1,4-Dioxane	0.E0	1,000,000.	29	3.5	100	0.E+0	#DIV/0!	0.00%
Ethyl Benzene	0.E0	170.	7	1100	100	0.E+0	#DIV/0!	0.00%
Ethyl Chloride	0.E0	6,000.	1000	11	1000	0.E+0	#DIV/0!	0.00%
2-Hexanone	0.E0	20,000.	11	9.8	100	0.E+0	#DIV/0!	0.00%
Methyl Chloride	0.E0	5,000.	3800	35	100	0.E+0	#DIV/0!	0.00%
Methyl Ethyl Ketone	0.E0	280,000.	78	4.5	200	0.E+0	#DIV/0!	0.00%
Methylene Chloride	0.E0	13,000.	350	8.8	25	0.E+0	#DIV/0!	0.00%
Naphthalene	0.E0	31.	0.08	400	10	0.E+0	#DIV/0!	0.00%
Propylene Dichloride	0.E0	3,000.	40	40.1	75	0.E+0	#DIV/0!	0.00%
Styrene	0.E0	310.	5	365	100	0.E+0	#DIV/0!	0.00%
1,1,2,2-Tetrachloroethane	0.E0	2,970.	5	118	5	0.E+0	#DIV/0!	0.00%
Tetrachloroethylene	0.E0	200.	14	364	200	0.E+0	#DIV/0!	0.00%
Toluene	0.E0	526.	21	300	200	0.E+0	#DIV/0!	0.00%
1,1,1-Trichloroethane	0.E0	1,330.	100	152	350	0.E+0	#DIV/0!	0.00%
Trichloroethylene	0.E0	1,100.	58	126	100	0.E+0	#DIV/0!	0.00%
Vinyl Chloride	0.E0	2,760.	2508	57	1	0.E+0	#DIV/0!	0.00%
Xylene	0.E0	175.	8.3	240	100	0.E+0	#DIV/0!	0.00%
Totals	Combined Volatiles Level (ppm)					.	#DIV/0!	
								0.00%

Instructions: To estimate the potential "worst case" exposure, enter the known soil concentration (in milligrams per kilogram of soil, or mg/Kg) of the contaminant of concern in the box to the right of the known contaminant. If more than one contaminant is present, enter information for each. If the contaminant is not on the primary list provided, additional analytes and their respective data are provided below the table and can be cut and pasted into the table. Contaminants with an asterisk (*) adjacent their name do not have an OSHA PEL; NIOSH RELs have been inserted into the table for these contaminants.

1. Purpose and Scope

This document establishes a procedure to assist ERM team members in determining what airborne exposure may occur as a result of the presence of contaminants of concern (COCs) in soils and groundwater. Further, this procedure will help in determining how to choose types of air monitoring equipment and types of monitoring to be performed, assist with setting action levels, and aid in developing control mechanisms in response to the established action levels.

This document applies to all ERM field activities which involve known or potential exposures to COCs as a result of field work, specifically those involving the manipulation of soils and groundwater.

2. Roles and Responsibilities

Partner in Charge (PIC): Responsible for the following elements:

- Ensure the procedure is implemented, understood, and followed by employees under their charge and working on their projects;
- Properly resource the field efforts; and
- Correct deficiencies in the implementation of the procedure as identified by the Division Health, Safety, Security, and Environment (HSSE) Leader.

Project Manager (PM)/Supervisor: Responsible for the following elements:

- Perform observations of ERM work processes to assess whether or not employees are operating in accordance with the procedure;
- Stop work where deviations from this procedure are observed; and
- Correct, in conjunction with the PIC and the Division HSSE Leader, any observed deficiencies in the implementation of the procedure.

Division HSSE Leader: Responsible for the following elements:

- Evaluate implementation of the procedure during health and safety plan reviews and project audits; and
- Communicate identified deficiencies to the PIC, Business Unit Managing Partner (BU MP), and others, as necessary.

Employee: Responsible for the following elements:

- Comply with the requirements of the procedure; and

- Seek assistance from the Division HSSE Leader and staff safety personnel, where required, when developing exposure guidelines.

3. Definitions

- Contaminants of concern – Known or suspected hazardous chemical substances within the work area to which the employee may be exposed through normal work activities.
- Photoionization detector – A portable instrument which detects a variety of organic compounds in gas and vapor form via the creation of ions using absorption of ultraviolet light
- Flame ionization detector – A portable or stationary instrument which detects a variety or organic compounds in gas and vapor form via the creation of ions using the combustion of a hydrogen flame.
- Exposure limit – The proposed limit to which a person may be safely exposed to a hazardous substance without endangering his/her health.

4. Procedure

4.1 Identification of Known or Potential Contaminants of Concern

Work with soils and groundwater creates the potential for release of contaminants of concern (COC) from the substrates in which they reside. Manipulation of these substrates through sampling, pumping, dredging, removal, mixing, or other activities may create opportunities for the employee to be exposed to potentially hazardous quantities of these contaminants.

The first step in determining what potential exposures might occur is to fully characterize the site. Site characterization is the continual evaluation of site hazards followed by the development or modification of hazard control techniques. When done correctly, it provides the ERM team with the information needed to identify site hazards and chose the appropriate worker protection methodologies. It is important to note that site characterization is a continuous process that must be applied throughout the project duration.

Initial site characterization should be accomplished in two phases:

- Off-site characterization, and
- On-site characterization.

Off-site characterization should be focused on gathering as much information as possible through interviews, records reviews, and research. The focus should be on identifying all potential COCs, with special emphasis on potential or suspected contaminants that may be

immediately dangerous to life and health (IDLH). Examples of information sources that may be helpful include:

- Company records, logbooks, or ledgers, including access to any previous surveys or remediation activity reports;
- Records from regulatory and enforcement agencies, including pollution control entities, occupational safety and health agencies, law enforcement and fire protection offices, and judicial agencies;
- Waste storage inventories and manifests or shipping papers;
- Interviews with past and present personnel working at the site;
- Generator and transport records;
- Utility company reports;
- Interviews with nearby residents; and
- Media reports.

During this phase, the team should also gather information on the terrain, any geologic or hydrologic data which might impact the proposed work, and potential pathways of dispersion for COCs.

Following initial assessment of gathered data, on-site characterization can be used to further define areas of work and identify COCs through visual assessment and collection of air, water, sediment, and soil samples.

Once data has been gathered, consider having it reviewed by ERM experts for interpretation. This may include industrial hygienists, safety professionals, chemists, toxicologists, and health physicists

4.2 Contaminant Types

4.2.1 Particulates

Many harmful contaminants exist as particulate matter. Particulates can exist as solids or liquids and can come in any shape or size. Common particulates include dusts, mists, fumes, bioaerosols, and fibers. For this procedure, we will not consider fibers, as they are a unique form of particulate with their own requirements for measurement.

Particulates are typically measured in milligrams of particulate per cubic meter of air (mg/m^3). A brief discussion of each type follows:

- Dusts: Dusts are solids that are broken into smaller pieces (typically 0.5 to 10 microns in diameter; note that human hairs are approximately 75 microns in

diameters). They are commonly created by sanding, grinding, crushing, demolition, and construction activities.

- Mists: Mists are atomized or condensed liquids (typically 5 to 100 microns in diameter). They are commonly created by mixing, cleaning, spraying, or sparging, and may be formed from oils, acids, or paints commonly.
- Fumes: Fumes are small (generally less than 1 micron) solids that were vaporized at high temperatures and then cooled. Welding, casting, cutting, soldering, and smelting frequently produce fumes. Common fumes include lead, cadmium, and iron.
- Bioaerosols: Bioaerosols include airborne bacteria, fungi, mycotoxins, and viruses. Sizes may range from less than 1 to 100 microns in diameter). Examples include pollens, influenza, molds, and tuberculosis.

On most ERM projects, dusts will be the greatest contributor to potential particulate exposures.

4.2.2 Gases and Vapors

Gases and vapors are similar in nature. Both diffuse freely to fill the area or container they are in and both are measured in parts of the gas or vapor per million parts of air (ppm). Gases are states of matter defined by their physical properties. Examples include chlorine, carbon monoxide, helium, and nitrogen. Vapors are not states of matter, but are forms of a substance in a gaseous phase, typically caused by boiling or evaporation. Some examples are mercury, benzene, toluene, and ethyl benzene.

4.3 Air Monitoring Equipment

4.3.1 Particulates

Airborne concentrations of particulates can be measured through the use of an aerosol or dust monitor. Aerosol monitors measure the quantity of particulate in the atmosphere using light scattering techniques. A sample of the atmosphere is drawn through a dark housing within the instrument. A light is shined upon the sample. The light scattered by the particulate within the housing is measured and related to a lab-derived value of atmospheric particulate.

4.3.2 Organic Compounds

Airborne organic compounds can usually be measured using a photoionization detector (PID) or flame ionization detector (FID). PIDs are simpler to use, more mobile, and are more commonly used for most organics. FIDs are bulkier and require a hydrogen source, but have a higher ionization range.

PIDs work by using an ultraviolet (UV) light to break down chemicals into positive and negative ions. The gas becomes electrically charged; the charged particles produce a

current that can be amplified and displayed. FIDs use a hydrogen flame to break down the chemicals, but otherwise works in essentially the same fashion.

In order for the UV light to break down a chemical, the strength of the UV lamp, as measured in electron volts (eV), must exceed the ionization potential (IP) of the compound. For example, a 10.6 eV lamp would ionize benzene (IP of 9.24 eV), but not diborane (IP of 11.38 eV).

It is important to note that these instruments are not compound-specific. Only collection of air samples on media with laboratory analysis will be able to determine the actual airborne concentrations of the individual organic compounds. Indeed, in many cases, multiple organic compounds will be present, all of which may be ionizable by the PID. In these cases, the best course of action may be to choose a single compound to represent the mixture of organics which may be present. This will be discussed further in Section 4.9.1 (Action Levels).

Another issue to consider with PIDs and FIDs is the response factor. Both PIDs and FIDs respond to different compounds with differing degrees of sensitivity. The detectors are set to the compound used to calibrate the instrument (typically isobutylene for PIDs and methane for FIDs). In essence then, a PID calibrated with isobutylene is providing readings in terms of "ppm of isobutylene", not the organic compound we are looking for. To correct this, we will need to apply a response factor (RF). The RF helps us to convert the readings from ppm of the calibration gas to ppm of the contaminant of concern, if that is the only contaminant present.

Response factors are provided by the equipment manufacturer for each compound which the instrument can detect. The RFs are derived through laboratory analysis and represent the variation in response between the calibrating gas and the contaminant of concern. Different manufacturers apply RFs differently, so you will need to consult the manufacturer's instrument manual or website to determine what the RFs are and how they should be applied. Some instrumentation may even calculate the effect of RFs internally

4.3.3 Inorganic Compounds

Inorganic compounds, such as ammonia, hydrogen sulfide, and chlorine dioxide, create additional monitoring concerns. Some airborne inorganic compounds can be measured using a PID, provided that they are ionizable using UV light. For many, chemical specific monitoring devices must be used to identify their presence in the atmosphere.

Chemical specific monitors typically have a film or coating which is sensitive to interactions with the contaminant of concern. Sensors measure this interaction as either resistance in the film/coating or production of electrical charges which are amplified and related to a lab-derived value of the contaminant.

An alternate methodology of detecting inorganic compounds is the use of colorimetric tubes. These tubes contain coated media which interact with the atmosphere. If the contaminant is present, it will interact with the coated media, creating a chemical reaction and a change in the color of the media. The length of color change or "stain" within the tube determines the approximate quantity of the contaminant in the atmosphere.

Colorimetric tubes, while simple to use and useful during spot checks, are subject to significant cross contamination and a high level of inaccuracy (+/- 25%). For these reasons, properly calibrated chemical specific monitors are the preferred choice.

4.4 Estimating Airborne Concentrations of Particulate Contaminants in Soil

If the concentration (C) of the contaminant of concern in soil is known, a worst case airborne concentration can be estimated. This estimate assumes that:

- All airborne dust is derived from the soils on site.
- Concentrations of contaminants in the dust are equivalent to the concentrations measured during soil testing.
- A specific published exposure limit (EL) has been selected for comparison. Note that there may be many published ELs and that they may vary significantly. Some have the force of law and some are suggestion based on research. In general, ERM employees should use the lowest published EL for comparison and use in calculations.

The following calculation indicates the level of airborne particulate (PL) that, if measured, would create a situation whereby the published EL would be exceeded.

$$PL = EL \times 10^6/C$$

Example:

At a contaminated soils site, arsenic is identified at 500 mg/kg during soil testing. We will use the National Institute of Occupational Safety and Health (NIOSH) recommended exposure limit (REL) of 0.002 mg/m^3 as the chosen EL, as this represents the lowest published exposure limit and thus the most conservative.

$$PL = (0.002 \text{ mg/m}^3) \times 10^6/500 \text{ mg/kg} = 4 \text{ mg/m}^3$$

Thus, at 4 mg/m^3, we would theoretically be generating enough arsenic-containing dust to exceed the chosen EL.

Another consideration with soil-bound particulates is that sometimes the quantity of airborne dust itself can be a nuisance. The OSHA permissible exposure limit (PEL) for particulates is 15 mg/m^3. If it will take more than 15 mg/m^3 of airborne dust to create an overexposure to the contaminant, your greater concern is the dust itself, as well as visibility at the site

4.5 Estimating Airborne Concentrations of Particulate Contaminants in Groundwater

Particulates in groundwater are typically either found in solution or maintained in the liquid matrix, so exposures are negligible

4.6 Estimating Airborne Concentrations of Organic Compounds in Groundwater

If the concentration (C) of the contaminant of concern in water is known, the worst case airborne concentrations can be estimated.

First, let's look at the relationship of C, the concentration of the contaminant in water (in ug/L) to S, the solubility of the contaminant (in mg/L). Divide C by S. Where the value is less than 1,000 (as it will be in nearly all cases), calculate the potential airborne concentration as follows:

Concentration in air (in ppm) = (1.3155 x VP x C)/S, where VP equals the vapor pressure of benzene when pure

Where the value of C/S is greater than 1,000, calculate the potential airborne concentration as follows:

Concentration in air (in ppm) = 1315.5 x VP

Example:

Benzene is identified at 5µg/l in groundwater following testing. The solubility of benzene (S) is 600 mg/L. Since 5/600 is less than 1,000, we use the first equation to estimate worst case airborne concentrations. For benzene, VP equals 75.

Concentration in air = (1.3155 x 75 x 5)/600 = 0.82 ppm

In this situation, the potential worst case for benzene release would exceed 0.1 ppm, the published NIOSH REL for benzene.

Note that data on the pure vapor pressure of contaminants (VP) can typically be found in the National Institute of Occupational Safety and Health (NIOSH) Pocket Guide to Chemical Hazards.

S3-NAM-010-FM2 (***Estimating Vapor Exposure from Volatile Compounds in Water***) provides assistance in calculating worst case scenarios using the formulas indicated above.

4.7 Estimating Airborne Concentrations of Organic Compounds in Soil

If the concentration (C) of the contaminant of concern in soil is known, the worst case airborne concentrations can be estimated. The calculations are very similar to that of water, but require information on the carbon fraction of the soil (F) and the organic carbon partition coefficient (K_{OC}) for the contaminant of concern. The carbon fraction can vary greatly depending on location, soil quality, and depth of sample, as most carbon is found in the upper

few centimeters of the soil. The carbon fraction can have a huge difference in the potential release of organic compounds, as carbon serves as an excellent organic trap.

Let's look at the relationship of C, the concentration of the contaminant in soil (in mg/kg) to S, the solubility of the contaminant (in mg/L). However, we also need to figure in the effects of the carbon fraction (F) and the partition coefficient (K_{OC}). Divide C by (S x F x K_{OC}). Where the value is less than 1, calculate the potential airborne concentration as follows:

Concentration in air (in ppm) = (1315.5 x VP x C)/(S x F x K_{OC})

Where the value of C/(S x F x K_{OC}) is greater than 1, calculate the potential airborne concentration as follows:

Concentration in air (in ppm) = 1315.5 x VP

Example:

Benzene is identified at 5 mg/kg in soil following testing. The solubility of benzene (S) is 600 mg/L and the partition coefficient (K_{OC}) is 83. Assuming a soil carbon fraction (F) of 0.4%, we find that the value of C/(S x F x K_{OC}) is 2.5 x 10^{-4}. This is well less than 1, so we use the first equation to estimate worst case airborne concentrations. For benzene, VP equals 75.

Concentration in air = (1315.5 x 75 x 5)/(600 x 0.4 x 83) = 24.8 ppm

In this situation, the potential worst case for benzene release would exceed 0.1 ppm, the published NIOSH REL for benzene.

As stated in the previous section, VP for a contaminant can typically be found in the NIOSH Pocket Guide. The values for the organic carbon partition coefficient (K) can be found through an on-line literature search. Suggested values are typically available from Environmental Protection Agency (EPA) data. Carbon fraction (F) data is available through the Web Soil Survey, created by the US Department of Agriculture (USDA)

S3-NAM-010-FM3 (***Estimating Vapor Exposure from Volatile Compounds in Soil***) provides assistance in calculating worst case scenarios using the formulas indicated above.

4.8 Estimating Airborne Concentrations of Inorganic Compounds

Simple calculations are not available to derive estimates of inorganic compounds from soil or water. Where these compounds may exist in the work area, it is simply best to assume their presence and utilize direct-read instrumentation to measure actual concentrations

4.9 Actions Levels and Respiratory Protection

4.9.1 Action Levels

Action levels are guidelines which direct the implementation of necessary exposure controls to limit employee exposure to contaminants of concern. Multiple action levels may be set and may trigger controls such as changes in work activity, implementation of engineering controls, upgrades to personal protective equipment (PPE), or evacuation of the work area. The number of action levels established for a project may vary, but there are three common levels:

- Defining an exposure level at which actions such as administrative and engineering controls may be implemented to help ensure that airborne concentrations of contaminants are diminished or do not continue to climb. Examples could include changing work zone boundaries to limit exposure or covering/wetting soils which are off-gassing contaminants.
- Defining an exposure level when use of personal protective equipment, and most specifically respiratory protection, will be implemented.
- Defining an exposure level at which the airborne concentrations of a contaminant climb to the point that either (1) additional upgrades in PPE will be implemented or (2) work will be stopped and evacuation from site will be conducted.

Of greatest concern among these is defining the action level when respiratory protection is necessary. Typically, the action level for donning PPE is set at one-half of the lowest published EL identified for the potential contaminants at the site. For example, the lowest published EL for ethyl benzene is 100 ppm. The action level for moving into respiratory protection would typically be set at 50 ppm to be conservative.

The selection of action levels for particulates can seem difficult since we are measuring a surrogate (airborne particulate) rather than the actual contaminant of concern. In these cases, action levels have to be based on the measured material.

In our example in Section 4.4, we determined that 4 mg/m^3 of airborne dust would contain enough arsenic to be equal to the NIOSH REL for arsenic of 0.002 mg/m^3. Using the same logic as above for upgrading PPE, we would want to start respiratory protection usage at one-half the REL. In this case, one-half the REL would occur when we had one-half the quantity of dust indicated in our example, or 2 mg/m^3. Therefore, our action level for moving into PPE would be 2 mg/m^3.

In some cases, multiple particulate contaminants may be present in soils. A way of handling this concern is to develop action levels for each particulate contaminant as demonstrated above and in Section 4.4. Whichever contaminant presents the lowest calculated action level sets the action level for all particulate contaminants at the site. For example, assume a site is contaminated with arsenic, lead, and nickel, and that a calculation of action levels for each reveals an action level of 4 mg/m^3 for arsenic, 5

mg/m^3 for lead and 2 mg/m^3 for nickel. Since the lowest action level is 2 mg/m^3, we will use this for all particulates since it ensures that we will not be over-exposed to any of the three.

Selecting an action level for moving into PPE when organics are present is relatively easy if only one contaminant is present. We would simply set our action level at one half the lowest published EL. However, we frequently find that multiple organics are present and that each of them can be detected via the use of the PID. As we previously noted, PIDs are not compound specific, so the readings we receive from the unit will be a compilation of signals from each of the contaminants being ionized.

To combat this problem, we need to assume that the instrument reading is from a single contaminant. To be conservative, we assume that the known contaminant with the lowest published EL is what we are reading on the instrument and we base action levels on that.

Example:

Assume styrene (REL of 50 ppm; IP of 8.4 eV) and toluene (REL of 100 ppm; IP of 8.82 eV) are both present in soils and that we are using a PID with a 10.6 eV lamp as a measurement device. Both have ionization potentials below that of the PID lamp, so they should be ionized to some degree and thus both contribute to the instrument reading.

Since styrene has the lower published EL, we will be conservative and assume that the instrument is only reading styrene. Thus we will base our action levels on the styrene REL and move into respiratory protection if readings exceed 25 ppm.

An additional concern that arises when monitoring for multiple organics occurs when there is a significant disparity in the published ELs for the compounds. For example, when monitoring in an area where petroleum spills have occurred, it is not uncommon to find that benzene, toluene, ethyl benzene, and xylene are all present. The RELs for toluene, ethyl benzene, and xylene are all 100 ppm. However, the REL for benzene is 0.1 ppm. Setting the action level table based on our contaminant with the lowest published EL would normally be the correct action; however, here we have several orders of magnitude difference in the ELs. In these cases, you may choose to develop a split action level table – one set of action levels if contaminant with the exceptionally low EL is present and one set if the contaminant is not. The use of a contaminant specific monitor, benzene filter, or colorimetric tube will help to determine the presence of absence of the outlying contaminant

4.9.2 Respiratory Protection

It is important to note that the type of respiratory protection used will play a role in determining action levels. Respirators, when properly fit tested, have an Assigned Protection Factor (APF). The APF is a measure of the degree of protection offered by the respirator. For example, the APF of a half-face air-purifying respirator (APR) is 10. This means that concentrations of a contaminant inside the respirator are essentially 10 times

less than those outside the respirator due to the fit and filtering mechanisms of the device. This is important when deciding to change levels of protection or determining when to evacuate a site.

The following APFs have been assigned to properly fitted respirators by NIOSH:

- Half-face APR – 10
- Full-face APR – 50
- Powered APRs (half or full-face) – 50
- Half-face pressure demand supplied air respirator – 1000
- Full-face pressure demand supplied air respirator – 2000
- Full-face pressure demand self-contained respirator – 10,000

If we know how much of a contaminant we are allowed to be exposed to, we can use the respirator's APF to determine a maximum use concentration (MUC). The MUC is derived by multiplying the APF by the allowable exposure limit.

Example:

In our example in Section 4.9.1, we identified styrene as the primary contaminant of concern and noted that we would use 25 ppm as our action level for moving into respiratory protection. Let's assume we choose a half-face APR as our respirator. The APF for this respirator is 10. Multiplying our APF of 10 by the 25 ppm action level (our allowable exposure limit) gives us an MUC of 250 ppm. If our measured concentrations of styrene exceed 250 ppm, we would have to either evacuate the area or move into a higher level of protection. By calculating the MUC, we have essentially established a new action level

4.9.3 Health and Safety Plans

Projects requiring significant chemical exposure and use of respiratory protection at ERM require completion of a Level 2 health and safety plan (HASP). Identified action levels should be posted in the plan under the section entitled "Monitoring Equipment". If any assistance is needed in identifying appropriate ELs, establishing action levels and associated mitigating activities, or identifying appropriate respiratory protection, please contact you Division HSSE Leader or the Project Health and Safety Consultant

5. References

- ERM Form S3-NAM-010-FM1 (***Action Level Development for Particulates in Soils***)
- ERM Form S3-NAM-010-FM2 (***Estimating Vapor Exposure from Volatile Compounds in Water***)
- ERM Form S3-NAM-010-FM3 (***Estimating Vapor Exposure from Volatile compounds in Soil***)

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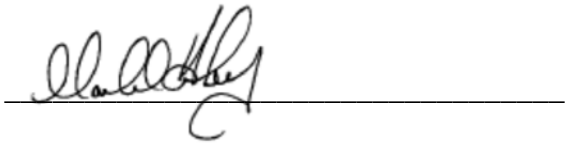
Approval Signature: 

Revision History

Section	Reason for Revision	Date
All	New procedure.	2/10/15
Intro; 5	Updated Applicability; added references to Section 5	1/11/16

1. Purpose and Scope

This procedure is designed to ensure that information necessary for the safe use, handling, and storage of hazardous chemicals is provided and made available to all ERM employees. This document applies to all ERM employees and covers all ERM work activities.

2. Roles and Responsibilities

Regional Health and Safety (H&S) Director: Responsible for ensuring that a written hazard communication program is prepared, implemented, and regularly evaluated for applicability.

Partner in Charge (PIC): Responsible for the following elements:

- Ensure this program is implemented, understood, and followed by employees under their charge and working on their projects;
- Ensure, in conjunction with the Branch Manager/Project Manager, that employees are properly trained in accordance with this procedure;
- Ensure that any site-specific health and safety plans (HASP) address hazard communication elements as described herein; and
- Correct any deficiencies in the implementation of this program as identified by the Division H&S Leader.

Branch Manager/Project Manager: Responsible for the following elements:

- Maintain a master inventory of all chemicals brought to and/or used in the workplace;
- Ensure that current Safety Data Sheets (SDS) for each chemical on the inventory are readily available to all employees;
- Ensure that all chemical containers are properly labeled upon receipt at the workplace and that labels are not defaced ore moved from the container until it is empty;
- Ensure that each ERM employee and affected ERM contractors are familiar with the chemicals present in the work area and their associated hazards; and
- Ensure that, when working on client sites, the client informs the project team of the location of applicable SDS or provides a copy of applicable SDS.

Division H&S Leader: Responsible for the following elements:

- Monitor new employees for completion of appropriate training;
- Assist PICs, Branch Managers, and Project Managers in the implementation of this program, as needed, and
- Evaluate compliance with this program during office and project audits.

Employee: Responsible for the following elements:

- Complete all ERM-required initial and update training;
- Follow all hazard control information provided on SDS and chemical labels; and
- Notify their Branch Manager/Project Manager if unlabeled chemicals are observed in the workplace.

3. Definitions

- Globally Harmonized System (GHS) – A system for standardizing and harmonizing the classification and labelling of chemicals
- Hazardous Materials Identification System (HMIS) – A numerical hazard rating that incorporates colors to convey broad health warning information for chemical users.
- National Fire Protection Association (NFPA) Diamond – A labeling system used by emergency response personnel to quickly and easily define the risks associated with hazardous materials.
- Safety Data Sheet (SDS) – A document that contains information on the potential hazards of, and how to work safely with, a chemical product.

4. Procedure

4.1 Labeling

Labels on all containers of chemicals, whether used, handled, or stored in the field or on ERM property, will minimally provide the following information:

- A product or chemical identifier;
- Appropriate hazard warnings (i.e., words, statements, pictures, and/or symbols) which provide general information regarding chemical hazards; and
- The identification of the manufacturer, distributor, or supplier of the chemical.

A container is defined as a bag, barrel, bottle, box, can, cylinder, drum, pail, vessel, or storage tank containing a hazardous chemical. Pipes or piping systems, as well as engines, fuel tanks, and other operating systems in a vehicle, are not considered to be containers.

Portable containers into which chemicals are transferred from labeled containers must themselves have an equivalent label except in the following circumstances:

- The person who transferred the chemical into the portable container is the only person who will use the chemical; and

- All of the chemical in the portable container will be used completely by the end of the work shift.

Labels will be legible, in English, and prominently displayed at all times. In addition to English, labels may be presented in other languages. However, if a label is in only one language, that language shall be English. If non-English speaking employees are present in the work area, all labels will be available and presented in their language as well as English.

Sites which utilize chemicals governed by this procedure will periodically audit chemical containers to ensure that labels are present, intact, and legible. Examples of labeling formats, such as the GHS, HMIS, and NFPA systems, are provided in S3-NAM-011-WI1 (***Examples of Common Labeling Systems***).

4.2 Chemical Inventory

A chemical inventory must be maintained at any office or project site where chemicals are in use. The inventory must be updated and revised as chemicals are received or depleted. The name/identifier of the chemical as it appears on the chemical inventory must allow employees to be able to match the chemical with the SDS.

The chemical inventory for field projects will be incorporated into the project-specific HASP. The chemical inventory for office locations will be incorporated into the office-specific Emergency Action Plan (EAP).

4.3 Safety Data Sheets

The SDS provides written information on the chemicals of concern to the employees. The minimum data which must appear on an SDS is provided in S3-NAM-011-WI2 (***Safety Data Sheet Composition***).

For field projects, Project Managers will determine during HASP development if ERM employees will use chemicals during execution of the project. During this development and review period, the Project Manager will evaluate any new products which are proposed to be used at the site to determine if they contain extremely hazardous or carcinogenic chemicals. If so, the Project Manager will work with the Division H&S Leader to identify potential alternatives. Any new chemical products which will be introduced throughout the course of the job will be similarly evaluated. The SDS for any chemical used on a project site will be attached to the HASP and will be readily available at the site.

For offices, Branch Managers will evaluate any new products which are proposed to be used at the office to determine if they contain extremely hazardous or carcinogenic chemicals. If so, the Branch Manager will work with the Division H&S Leader to identify potential alternatives. The SDS for any chemical used in the office will be attached to the EAP and will be readily available at the site.

SDS will be made available, upon request, to any ERM employee, contractor, or client. Upon receipt of an SDS, the Project Manager/Branch Manager shall review the SDS to ensure it is written in English, is legible, appears to be complete (in accordance with the requirements outlined in S3-NAM-011-WI2), and is current, with an effective date of less than five years. Older SDS will be replaced with updated sheets when they are received.

4.4 Contractors

The Project Manager will provide the following information to contractors prior to the start of any work at a client's site:

- Chemicals to which they may be exposed, including any soil or groundwater contaminants;
- Hazards associated with specific chemicals;
- Measures taken to reduce the hazard, including use of personal protective equipment (PPE);
- Location of the SDS;
- Locations of any applicable safety equipment, including first aid supplies, safety showers, and/or eye wash stations; and
- Emergency response procedures.

Prior to starting work, the contractor will provide the Project Manager with information about any chemicals brought onto the client's site. This information should include, at a minimum, the name of the chemical, the associated hazards, and any PPE required. Contractors will have a legible SDS for each chemical brought onto the project site.

4.5 Employee Training and Information

Training of all employees potentially exposed to hazardous materials on the job will be conducted as follows:

- Before new employees begin their jobs; and
- Whenever new chemicals are introduced into the workplace.

This training will include:

- Applicable regulatory requirements (including state or province-specific requirements, where applicable);
- Elements of this program;
- Location of the program, chemical inventory, and SDS;

- Chemicals used in their work areas and the associated hazards (chemical, physical, and health);
- How to detect the presence or release of chemicals, including monitoring techniques, visual indicators, or odors;
- Protective measures to be used, including safe work/handling practices, use of PPE, and emergency response procedures;
- How to read and use SDS and labels; and
- How to obtain additional hazard information.

Where non-English speaking workers are employed, provisions for training in the appropriate language will be arranged.

All initial training will be documented electronically via ERM's Academy Learning Management System (LMS). Documentation will include a brief description of the training and the trainer's name, and will be retained throughout the duration of the employee's tenure with the organization. Information on project-specific chemical hazards, labeling requirements, etc. will be documented as part of daily safety meetings at the project site using S3-NAM-029-FM5 (***Site Safety Meeting Form***).

4.6 Non-Routine Tasks

Occasionally, ERM employees may be required to perform non-routine field tasks which include exposure to hazardous chemicals. Prior to any non-routine work involving hazardous chemicals, the Project Manager will ensure that each affected employee is given information about the hazards presented by the chemicals, as well as the protective measures which will be utilized during the work.

4.7 Procedure Availability

The most recent version of the procedure will be available electronically at all times to employees and their designated representatives through ERM's Document Control System (DCS).

5. References

- ERM Form S3-NAM-011-FM1 (Chemical Inventory Sheet)
- ERM Work Instruction S3-NAM-011-WI1 (Examples of Common Labeling Systems)
- ERM Procedure S3-NAM-029-PR (Project Health and Safety)
- ERM Procedure S3-NAM-006-PR (Emergency Action Plans)

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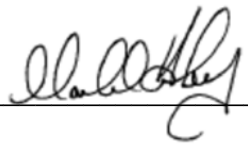
Approval Signature: 

Revision History

Section	Reason for Revision	Date
All	Changed format; updated to meet state and federal regulations	6/2/15
4.1	Require all portable containers to have equivalent labels except where noted	8/18/16

1. Purpose and Scope

This procedure establishes minimum requirements for work in environments where exposures to cold stress are encountered and provides guidance to evaluate and control these stressors. This procedure is applicable to all North American operations, and will be made available to employees at the work site upon request.

2. Roles and Responsibilities

Partner in Charge (PIC): Responsible for the following elements:

- Ensure this procedure is implemented, understood, and followed by employees under their charge and working on their projects; and
- Correct any deficiencies in the implementation of this procedure as identified by the Division Health and Safety (H&S) Leader or other staff member.

Project Manager: Responsible for the following elements:

- Perform observations of ERM work processes to assess employee compliance with this procedure;
- Stop work where deviations from this procedure are observed; and
- Correct, in conjunction with the PIC and the Division H&S Leader, any observed deficiencies in the implementation of this procedure.

Division H&S Leader: Responsible for the following elements:

- Evaluate implementation of this procedure during health and safety plan reviews and project audits; and
- Communicate identified deficiencies to the PIC.

3. Definitions

- **Temperature:** The dry bulb temperature in degrees Fahrenheit (°F) or Celsius (°C).
- **Frostbite:** Injury caused by freezing of the skin and underlying tissues.
- **Hypothermia:** A medical emergency that occurs when the body loses heat faster than it can produce it, creating a dangerously low internal body temperature, typically less than 95 °F (35 °C).

4. Procedure

Cold stress can present a significant hazard to workers and can result in hypothermia or frostbite. Several factors incorporate the harmful effects of cold, including wet clothing, smoking, drinking alcoholic beverages, fatigue, emotional stress and certain diseases and medications.

4.1 Classification and Prevention

4.1.1 Hypothermia

Hypothermia is a potentially life threatening condition which results in a drop in the body's core temperature. At lower body temperatures, the body can react by a reduction in mental awareness, reduced rational decision making, loss of consciousness, and death.

The signs and symptoms of hypothermia include shivering, dizziness, numbness, confusion, weakness, impaired judgment, impaired vision and drowsiness. The stages of hypothermia are shivering, apathy, loss of consciousness, decreasing pulse and breathing rates, and death

First aid measures for hypothermia include calling emergency medical services and moving the victim to a warm area and into dry clothing.

4.1.2 Frostbite

Frostbite is the most common injury caused by cold. It happens when ice crystals form in body tissues, usually the nose, ears, chin, cheeks, fingers, or foes. This restricts blood flow to the injured parts. The effect is worse if the frostbitten parts are thawed and then refrozen.

Signs and symptoms of frostbite include an initial slight flushing of the skin. The skin color then changes to white and then grayish blue. Pain is sometimes felt early but later goes away. The frostbitten parts feel very cold and numb, and the victim may not be aware of the injury. In severe cases, frostbite may result in blisters or gangrene.

First aid measures for frostbite include moving the victim to a warm area and placing the frozen parts in warm water (100 to 105 °F/37.8 to 40.5 °C). Handle them gently and do not rub or massage them. Loosely bandage the injured parts. Seek prompt medical attention.

4.2 Recognition, Prevention, and Control

The first signs of cold stress are pain in the extremities. Severe shivering may result as body temperature drops.

Protection from cold stress must be considered in addition to provisions for personal protective equipment. Provisions for insulating dry clothing must be provided, regularly inspected, and replaced as required.

Wind chill can substantially reduce the cooling rate experienced by personnel. Prevention of excessive cooling exacerbated by wind chill condition requires increased insulation value of the protective work clothing. The effects of wind chill and temperature can be referenced in S3-NAM-013-WI1 (***Equivalent Chill Temperatures***).

The following work practices should be followed to minimize the effects of cold stress conditions:

- Wear adequate layers of insulating dry clothing. Keep a change of dry clothes available in case clothing becomes wet. Ensure adequate supplies of cold weather gear are available and stocked.
- Use the buddy system to look for signs of cold stress.
- If appropriate, use windshields to reduce the effects of wind.
- Heated warming shelters should be available when the equivalent chill temperature (ECT) is less than 20°F (-29°C). See S3-NAM-013-WI1 for additional information.
- To prevent dehydration, which can increase the susceptibility of workers to cold injuries, warm sweet drinks and soups should be provided. Coffee and soft drink intake should be limited due to the diuretic effects.
- Consult S3-NAM-013-WI2 (Work/Warm-up Schedule) for guidance on applications of work/warming regimens in extreme cold situations (-15 °F/-26 °C).
- Ensure regularly-used travel pathways are kept as clear of snow and ice as practicable.
- Be aware of the hazards of unstable snow and ice buildup, and avoid working close to areas of accumulated snow and ice whenever possible

4.3 Training Requirements

Worker training should be provided to discuss the hazards of cold stress environments and to review preventative work practices. Training is conducted during daily tailgate safety meetings when working in cold environments. This ensures more effective and timely training than a once-annual session. The training should include:

- Proper clothing and PPE requirements;
- Recognition, prevention, and first aid treatment of frostbite and hypothermia, including a discussion of re-warming procedures;
- Suggested work/rest regimens and eating/drinking habits; and
- Safe work practices in cold stress environments.

5. References

- ERM Work Instruction S3-NAM-013-WI1 (Equivalent Chill Temperatures)
- ERM Work Instruction S3-NAM-013-WI2 (Work/Warm-up Schedule)

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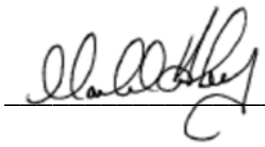
Approval Signature: 

Revision History

Section	Reason for Revision	Date
All	New document.	6/8/15

1. Purpose and Scope

This procedure describes the requirements for prevention of occupational noise-induced hearing loss in those employees working in potentially noisy areas. Implementation of this hearing conservation procedure is required whenever noise exposures equal or exceed an 8-hour time-weighted average (TWA) of 85 decibels (dB). It is ERM policy that its employees will not be exposed to noise that exceeds 85 dB averaged over an 8-hour work day.

2. Roles and Responsibilities

Partner in Charge (PIC): Responsible for the following elements:

- Ensure this procedure is implemented, understood, and followed by employees under their charge and working on their projects; and
- Correct any deficiencies in the implementation of this procedure as identified by the Division Health and Safety (H&S) Leader or other staff member.

Project Manager: Responsible for the following elements:

- Perform observations of ERM work processes to assess employee compliance with this procedure;
- Stop work where deviations from this procedure are observed; and
- Correct, in conjunction with the PIC and the Division H&S Leader, any observed deficiencies in the implementation of this procedure.

Regional H&S Director: Responsible for the development and implementation of this procedure.

Division H&S Leader: Responsible for the following elements:

- Evaluate implementation of this procedure during health and safety plan reviews and project audits; and
- Communicate identified deficiencies to the PIC.

Employee: Responsible for the use of provided hearing protection in all designated areas.

3. Definitions

- **Decibel (dB):** A unit used to measure the intensity of a sound by comparing it with a given level on a logarithmic scale.
- **Hertz (Hz):** A unit of frequency equal to one cycle per second.

- **High noise area:** A work area in which employee noise exposures equal or exceed 85 dB (decibels) averaged over an eight hour workday.
- **Standard threshold shift (STS):** A change in hearing threshold relative to a baseline audiogram of an average 10 dB or more at 2000, 3000, and 4000 Hz in one or both ears.

4. Procedure

4.1 Noise Monitoring

Noise monitoring to characterize potential noise exposure will be conducted wither by a subject matter expert familiar with noise monitoring or a Field Safety Officer (FSO) that has received training in conducting noise monitoring. Both personal monitoring using noise dosimeters and area monitoring using a sound level meter may be conducted. Noise monitoring will be repeated whoever a change in production, process equipment, or controls occurs which could affect the number of employees exposed or render the attenuation of hearing protector no longer effective.

4.2 Employee Notification

All employees participating in personal noise monitoring will be notified of their results. Any employee whose exposure is determined to have met or exceeded 85 dB as an 8-hour TWA will be notified in writing within 15 calendar days. The results of area noise surveys will be communicated to project team members during daily site safety meetings.

4.3 Observation of Monitoring

Employees or their designated representatives will be offered the opportunity to observe any noise monitoring conducted which impacts their job or position.

4.4 Audiometric Testing

ERM employees who are exposed to noise at or above 85 dB as an 8-hour TWA within the working environment will receive a baseline audiogram within six months of the first exposure. Annually after obtaining the baseline audiogram, the employee shall receive a new audiogram for comparison to the baseline.

In preparation for both baseline and annual examinations, employees will be instructed to avoid noisy environments at both work and home for at least 14 hours before audiometric testing. Hearing protectors may be used as a substitute for the requirement that baseline audiograms be preceded by 14 hours without exposure to workplace noise.

Each employee's annual audiogram will be compared to the baseline audiogram. If the results of the annual audiogram indicate a standard threshold shift (STS), an average change in hearing threshold of 10 dB or more at the 2000, 3000, and 4000 Hz frequency in either ear relative to the baseline audiogram, the following actions will be taken (unless the shift is determined to be non-occupational in nature):

- The employee will be notified in writing with 21 days of the determination;
- The employee shall be referred for additional medical follow-up, as appropriate;
- Employees using hearing protectors will be refitted and retrained in their use;
- Where necessary, hearing protectors with greater noise attenuation properties will be offered; and
- Employees not using hearing protectors will be fitted with such, trained in their care and use, and required to use them.

Employees or their designated representatives will be offered the opportunity to observe any noise monitoring conducted. These tests are conducted at no cost to the employee. Results of audiograms and employee physicals will be forwarded directly to each employee within 10 working days of receipt of results.

4.5 Hearing Protectors and Hearing Protector Attenuation

A variety of hearing protectors will be provided to the employees at no cost. Hearing protectors will be maintained in good condition. Employees will wear hearing protectors in all designated high noise areas while performing tasks that generate loud noises (e.g., use of portable power tools) and while working within 25 feet of noisy operations (e.g., drilling).

The adequacy of the hearing protector will be evaluated to ensure that the hearing protector attenuates the employee exposure to an 8-hour TWA of 85 dB or less. The FSO is responsible for making this determination.

4.6 Training

Hazard recognition and general awareness training on hearing conservation is provided to all ERM employees during the new hire orientation process which occurs during the first week of employment. Recognition of completion of this training is provided in ERM's Academy Learning Management System (LMS). A certificate of training is available to all employees.

Where employees are required to work regularly in areas where their exposure to noise is determined to be, or has the potential to be, in excess of 85 dBA as an 8–hour TWA, additional annual training will provide. The training will contain at least the following elements:

- Effects of noise on hearing;
- Purpose of hearing protectors and manufacturer's instructions on use and fitting;

- Advantages/disadvantages and attenuation of various types of hearing protectors;
- Instructions on selection, fitting, use, and care of hearing protectors (in accordance with manufacturer instructions);
- Purpose of audiometric testing program including an explanation of the test procedure; and
- Changes in ERM work processes and/or personal protective equipment (PPE) used.

4.7 Recordkeeping

Audiometric testing records will be maintained for each affected employee and contain the following information:

- Name and job classification;
- Date of audiogram;
- Name of person conducting audiogram;
- Date of last acoustic or exhaustive calibration of audiometer; and
- Employee's most recent noise exposure assessment.

Records of audiometric testing will be maintained by ERM's medical consultant WorkCare. All audiometric testing records shall be maintained for the duration of employment plus thirty years. All noise monitoring records shall be maintained for the duration of employment.

5. References

- US Occupational Safety and Health Administration (OSHA) regulations – 29 CFR 1910.95; ***Occupational Noise Exposure***

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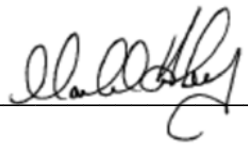
Approval Signature: 

Revision History

Section	Reason for Revision	Date
All	New document.	3/17/14
All	Reformatted document. Minor language changes for clarity.	6/24/15
1.0	Added line clarifying that ERM employees will not be exposed to noise levels in excess of 85 dB averaged over an 8-hour day.	12/15/15
4.6	Updated training requirements	8/3/16

1. Purpose and Scope

This procedure establishes minimum requirements for work in environments where exposures to heat stress are encountered and provides guidance to evaluate and control these stressors. This procedure is applicable to all North American operations, and will be made available to employees at the work site upon request.

2. Roles and Responsibilities

Partner in Charge (PIC): Responsible for the following elements:

- Ensure this procedure is implemented, understood, and followed by employees under their charge and working on their projects; and
- Correct any deficiencies in the implementation of this procedure as identified by the Division Health and Safety (H&S) Leader or other staff member.

Project Manager: Responsible for the following elements:

- Perform observations of ERM work processes to assess employee compliance with this procedure;
- Stop work where deviations from this procedure are observed; and
- Correct, in conjunction with the PIC and the Division H&S Leader, any observed deficiencies in the implementation of this procedure.

Division H&S Leader: Responsible for the following elements:

- Evaluate implementation of this procedure during health and safety plan reviews and project audits; and
- Communicate identified deficiencies to the PIC.

3. Definitions

- **Acclimatization** – The temporary adaptation of the body to work in the heat. Acclimatization peaks in most people within 4 to 14 days of regular work for at least two hours per day in the heat.
- **Heat Illness** – A serious medical condition resulting from the body's inability to cope with a particular heat load; includes heat cramps, heat rash, heat exhaustion, and heat stroke.

- **Environmental risk factors for heat illness** – Working conditions that create the possibility that heat illness could occur, including air temperature, relative humidity, radiant heat from the sun and other sources, conductive heat sources such as the ground, air movement, workload severity and duration, protective clothing and personal protective equipment worn by employees (e.g., impervious clothing vs. standard work attire).
- **Personal risk factors for heat illness** – Factors such as an individual's age, degree of acclimatization, health, water consumption, alcohol consumption, caffeine consumption, and use of prescription medications that affect the body's water retention or other physiological responses to heat.
- **Shade** – Blockage of direct sunlight. One indicator that blockage is sufficient is when objects do not cast a shadow in the area of blocked sunlight. Shade is not adequate when heat in the area of shade defeats the purpose of shade, which is to allow the body to cool. For example, a car sitting in the sun does not provide acceptable shade to a person inside it, unless the car is running with air conditioning. Shade may be provided by any natural or artificial means that does not expose employees to unsafe or unhealthy conditions and that does not deter or discourage access or use.
- **Temperature** – The dry bulb temperature in degrees Fahrenheit (°F) or Celsius (°C).

4. Procedure

4.1 Classification and Prevention

4.1.1 Heat Stroke

- Condition: (a) Hot dry red skin, (b) high and rising core temperature 105°F (40 °C) and over; and (c) brain disorders, including mental confusion, loss of consciousness, convulsions, or coma, as core temperature continues to rise. Fatal is treatment is delayed.
- Predisposing Factors: (a) Sustained exertion in heat by non-acclimatized workers; (b) obesity and lack of physical fitness; (c) recent alcohol intake; (d) dehydration; (e) individual susceptibility; and (f) chronic cardiovascular disease in the elderly.
- Corrective Actions: Immediate and rapid cooling by immersion in chilled water with massage or by wrapping in wet sheet with vigorous fanning with cool dry air. Avoid overcooling. Treat shock if present. Seek medical attention.
- Prevention: Medical screening of workers. Selection based on health and physical fitness. Acclimatization for 8 to 14 days by graded work and heat exposure. Monitoring workers during sustained work in severe heat environments.

4.1.2 Heat Exhaustion

- Clinical Features: (a) Fatigue, nausea, headache, giddiness; (b) skin clammy and moist, complexion pale, muddy, or with hectic flush; and (c) may faint on standing, with rapid pulse and low blood pressure.
- Predisposing Factors: (1) Sustained exertion in heat, (2) lack of acclimatization, and (3) failure to replace water and/or salt lost in sweat.
- Treatment: Remove to cooler environment. Provide fluids with electrolytes such as Gatorade™ or equivalent. Seek medical attention.
- Prevention: Acclimatize workers using a breaking-in schedule for 1 to 2 weeks. Supplement dietary salt only during acclimatization. Ensure ample drinking water, Gatorade™ or equivalent is available at all times and taken frequently during the day.

4.1.3 Heat Cramps

- Clinical Features: Painful spasms of muscles used during work (arms, legs, or abdominal). Onset can occur during or after work hours.
- Predisposing Factors: (1) Heavy sweating during hot work and (2) drinking large volumes of water without replacing salt loss.
- Treatment: Drinking liquids with salt supplement such as Gatorade™ or equivalent. Seek medical attention.
- Prevention: Adequate salt intake with meals. In un-acclimatized persons, provide salted (0.1 percent) drinking water.

4.1.4 Heat Rash

- Clinical Features: Profuse tiny raised red blisters on affected areas. Pricking sensations during heat exposure.
- Predisposing Factors: Unrelieved exposure to humid heat with skin continuously wet with un-evaporated sweat.
- Treatment: Seek medical attention.
- Prevention: Cooled resting and sleeping quarters to allow skin to dry between heat exposures.

4.2 Prevention Procedures

Working in a hot environment requires that employers take precautions and provide adequate protection to prevent heat stress. The following procedures should be utilized on ERM project sites to recognize and prevent heat stress conditions.

4.2.1 Monitoring and Risk Evaluation

- Track the weather forecast for the job site and use forecasted information to plan daily activities. Forecasts may be obtained from National Weather Service, Weather Channel, local news, or other available reliable source.
- Review this procedure at daily tailgate safety meetings, including:
  - Encouraging employees to drink plenty of water and not wait until they are thirsty,
  - Reminding employees of their right to take a cool-down rest in the shade when necessary,
  - Establishing the number and schedule of water and rest breaks, and
  - Reviewing the signs and symptoms of heat illness and emergency response procedures in the project-specific health and safety plan (HASP) with all workers onsite.
- Use a thermometer to measure the outdoor temperature in an area where there is no shade. While the temperature measurement must be taken in an area with full sunlight, the bulb or sensor of the thermometer should be shielded while taking the measurement (e.g., with the hand or some other object) from direct contact by sunlight.
- The U.S. Occupational Safety and Health Administration (OSHA) has made available a Heat Safety Tool for use on smartphones (https://www.osha.gov/SLTC/heatillness/heat_index/heat_app.html). The tool allows workers and supervisors to calculate the heat index for their worksite and, based on the heat index, display a risk level to outdoor workers. The tool also provides reminders about the measures that should be taken at that risk level to protect workers from heat-related illness.

4.2.2 Establishing Work Assignments and Work/Rest Regimens

- Make assignments for work involving physical labor and heat stress based on physical fitness level of available labor pool. Employees newly exposed to heat should begin their work level at 50% of suggested work schedule and increase level by 10% per day to allow for acclimatization.
- An employee who has been newly assigned to a high heat area should be closely observed by the supervisor or Field Safety Officer (FSO) for the first 14 days of the employee's employment.
- Supervision and the “buddy system” should be used to carefully observe workers in heat stress environments to evaluate each individual’s susceptibility to heat stress. Any employee exhibiting signs of heat stress should be promptly investigated.

- All employees shall be closely observed by the supervisor or FSO during a heat wave. For purposes of this section, "heat wave" means any day in which the predicted high temperature for the day will be at least 80 °F (27 °C) and at least 10 °F (5 °C) higher than the average high daily temperature in the preceding five days.
- Initiate a modified work/rest regimen when ambient temperatures and protective clothing create a potential heat stress hazard. If ambient temperatures are greater than or equal to 75°F, the following work/rest regimen is recommended (guidelines assume light to moderate work):

Temperature	Work Period	Rest Period
75 – 80 °F/24 – 27 °C	90 Minutes	15 Minutes
80 – 85 °F/27 – 29 °C	60 Minutes	15 Minutes
85 – 90 °F/29 – 32 °C	45 Minutes	15 Minutes
90 – 95 °F/32 – 35 °C	30 Minutes	15 Minutes

- Rest periods should be taken in a shaded area as described in Section 4.2.3 with open air movement, if available, as this will considerably reduce the effects of heat stress.
- Employees shall be allowed and encouraged to take a preventative cool-down rest in the shade for a period of no less than five minutes at a time when they feel the need to do so to protect themselves from overheating. Such access to shade shall be permitted at all times. An individual employee who takes a preventative cool-down rest:
  - Shall be monitored and asked if he or she is experiencing symptoms of heat illness;
  - Shall be encouraged to remain in the shade; and
  - Shall not be ordered back to work until any signs or symptoms of heat illness have abated, but in no event less than five minutes in addition to the time needed to access the shade.
- If an employee exhibits signs or reports symptoms of heat illness while taking a preventative cool-down rest or during a preventative cool-down rest period, the supervisor or FSO shall provide appropriate first aid or emergency response, as outlined in Section 4.2.5.
- Schedule physically demanding and strenuous tasks, or tasks requiring full-body chemical protection, for early in the day, if possible.
- Protective clothing inhibits the transfer of heat between the body and the surrounding environment. This can increase the onset of heat stress symptoms. The following

consideration should be evaluated when protective clothing is worn in heat stress environments.

- More frequent rest breaks in the shade;
- Worker rotation to provide frequent breaks in cool areas;
- Wear ice vests or vortex tubes, if practical; and
- Schedule changes to accommodate work at night or early morning hours.

4.2.3 Provision of Water and Shade

- Employees shall have access to potable drinking water that is fresh, pure, suitably cool, and provided to employees free of charge. The water shall be located as close as practicable to the areas where employees are working. Where drinking water is not plumbed or otherwise continuously supplied, it shall be provided in sufficient quantity at the beginning of the work shift to provide one quart per employee per hour for drinking for the entire shift. Supervisors or FSOs may begin the shift with smaller quantities of water if they have effective procedures for replenishment during the shift as needed to allow employees to drink one quart or more per hour. The frequent drinking of water shall be encouraged.
- When the outdoor temperature in the work area exceeds 80 °F (27 °C), the supervisor or FSO must establish and maintain one or more areas with shade at all times while employees are present that are either open to the air or provided with ventilation or cooling. The amount of shade present shall be at least enough to accommodate 25% of the number of employees on recovery or rest periods, so that they can sit in a normal posture fully in the shade without having to be in physical contact with each other. The shade must be located as close as practicable to the areas where employees are working.
- When the outdoor temperature in the work area does not exceed 80 °F (27 °C), the supervisor or FSO must either provide shade or provide timely access to shade upon an employee's request.
- Where it is infeasible or unsafe to have a shade structure, or otherwise to have shade present on a continuous basis, the project team may utilize alternative procedures for providing access to shade if the alternative procedures provide equivalent protection. Cooling measures other than shade (e.g., use of misting machines) may be provided in lieu of shade if these measures are at least as effective as shade in allowing employees to cool.

4.2.4 High Heat Procedures

When the temperature equals or exceeds 95 °F (35 °C), the following procedures will be implemented to the extent practicable:

- Ensuring that effective communication by voice, observation, or electronic means is maintained so that employees at the work site can contact a supervisor or the FSO when necessary. An electronic device, such as a cell phone or text messaging device, may be used for this purpose only if reception in the area is reliable.
- Observing employees for alertness and signs or symptoms of heat illness. The ERM project team must ensure effective employee observation/monitoring by implementing one or more of the following:
  - Supervisor or FSO observation of 20 or fewer employees,
  - Mandatory buddy system,
  - Regular communication with sole employee such as by radio or cellular phone, or
  - Other effective means of observation.
- Designating one or more employees on each worksite as authorized to call for emergency medical services, and allowing other employees to call for emergency services when no designated employee is available.
- Reminding employees throughout the work shift to drink plenty of water.
- Reviewing the heat stress procedures at daily tailgate safety meetings, encouraging employees to drink plenty of water, and reminding employees of their right to take a cool-down rest when necessary.

4.2.5 Emergency Response Procedures

- If a supervisor or FSO observes, or any employee reports, any signs or symptoms of heat illness, the supervisor or FSO must take immediate action commensurate with the severity of the illness.
- When an employee displays possible signs or symptoms of heat illness, the supervisor or FSO will check the employee and determine whether resting in the shade and drinking cool water will suffice or if emergency service providers will need to be called. WorkCare Incident Intervention (888-449-7787) should also be contacted to provide guidance on appropriate care.
- An employee exhibiting signs or symptoms of heat illness must be monitored and not left alone or sent home without being offered onsite first aid and/or being provided with emergency medical services in accordance with the site HASP.
- If the signs or symptoms are indicators of severe heat illness (such as, but not limited to, decreased level of consciousness, staggering, vomiting, disorientation, irrational behavior or convulsions, incoherent speech, red and hot face), the supervisor or FSO must implement emergency response procedures outlined in the HASP. Emergency

service providers must be contacted immediately, and while the ambulance is in route, initiate first aid (follow guidance in Section 4.1.1).

- In the event a heat stress related incident or near miss occurs, the supervisor or FSO will notify the PIC and PM and report the event following guidelines in the HASP.

4.3 Training Requirements

All field employees, including supervisors, shall be provided training on heat stress and working in hot environments in the language that they understand. Training shall be provided prior to working in hot environments and will be documented in ERM's Academy Learning Management System (LMS). Employee training to recognize heat stress conditions and the methods necessary to prevent and treat heat stress include:

- The environmental and personal risk factors for heat illness, as well as the added burden of heat load on the body caused by exertion, clothing, and personal protective equipment.
- How to monitor weather reports and how to respond to hot weather advisories.
- The procedures for providing water, shade, cool-down rests, and access to first aid as well as the employees' right to stop work without retaliation.
- The importance of frequent consumption of small quantities of water, up to four cups per hour, when the work environment is hot and employees are likely to be sweating more than usual in the performance of their duties.
- The concept, importance, and methods of acclimatization.
- The different types of heat illness, the common signs and symptoms of heat illness, and appropriate first aid and/or emergency responses to the different types of heat illness.
- The importance to employees of immediately reporting any symptoms or signs of heat illness in themselves or in co-workers.
- ERM procedures contained in the HASP for responding to signs or symptoms of possible heat illness, including how emergency medical services will be provided should they become necessary.

5. References

- California Division of Occupational Safety and Health (Cal/OSH) Heat Illness Prevention Standard – California Labor Code Section 226.7

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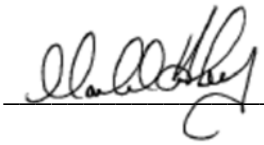
Approval Signature: 

Revision History

Section	Reason for Revision	Date
All	New document.	4/26/10
All	Reformatted document. Edits for clarity; addition of new regulatory information,	6/5/15
4.2.1; 4.2.2; 5	Deleted references to ACGIH TLVs; language added confusion to implementation of procedure	6/8/16

1. Purpose and Scope

This document supports the Management System and establishes the procedures to ensure that safety events are being properly reported and investigated within ERM operations. This document applies to all ERM field and office locations.

2. Roles and Responsibilities

Partner in Charge (PIC): Responsible for the following elements:

- Ensuring this procedure is implemented, understood, and followed by employees under their charge and working on their projects; and
- Correcting any deficiencies in the implementation of this procedure as identified by the Division Health, Safety Security, and Environment (HSSE) Leader.

Project Manager (PM)/Supervisor/Branch Manager (BM): Responsible for the following elements:

- Performing observations of ERM work processes to assess whether or not employees are operating in accordance with this procedure; and
- Correcting, in conjunction with the PIC and the Division HSSE Leader, any observed deficiencies in the implementation of this procedure.

Division HSSE Leader: Responsible for the following elements:

- Evaluating implementation of this procedure by Division personnel during ECS reviews; and
- Communicating identified deficiencies to the PIC and Divisional management teams.

Employee: Responsible for the following elements:

- Completing ECS entries within 24 hours of a safety event; and
- Participating in the investigation of the event as directed by the ERM management and health and safety (H&S) teams.

3. Definitions

Event Communication System (ECS): The primary tool utilized at ERM for communicating the occurrence of safety events.

Event Principals: People who may be involved in safety events, including ERM employees, subcontractors, and third parties (including clients).

5 Why: A question-asking technique used to explore the cause and effect relationship underlying a problem or event.

Incident: One of the following:

- An employee becomes injured or is made ill;
- Useful property is damaged in some fashion;
- A hazardous material is spilled or released to air, water, or ground;
- Operational security is breached;
- A regulatory citation is issued; or
- A loss of reputation to clients or the general public is sustained.

Near Miss: An unplanned event that did not result in an incident, but had the potential to do so.

Reporting Person: The ERM employee entering the Safety Event into the ECS.

Root Cause Analysis: A method of problem solving that tries to identify the root causes of an issue. A root cause is one that, once removed, would have prevented the final undesirable event from occurring.

Safe Behavior: A positive action or attitude toward safety or that promoted safety within the workplace.

Safety Event: An incident, near miss, unsafe act/condition, or safe behavior occurring within or due to the working environment experienced by ERM personnel.

Unsafe Act: A task or activity conducted in a manner that may threaten the health and safety of co-workers.

Unsafe Condition: A condition in the work environment likely to lead an incident if not corrected.

Workcare: The occupational health consulting firm which assists ERM in management of its medical surveillance programs.

Working Environment: Anywhere ERM, its employees, and its subcontractors are engaged in work activity, including ERM offices, client sites (visits, meetings, field work, etc.), or during travel.

4. Procedure

4.1 Safety Event Initial Response

4.1.1 Injuries or Illnesses

The general steps for responding to an injury or illness incident include the following:

- For emergency situations, employees shall call 911. This would include chest pains, stroke, severe shortness of breath, sudden and severe pain, major injury (including potential fractures and trauma), uncontrolled bleeding, electrocution, second or third degree burns, or unconsciousness. If transport to an urgent care center or hospital is required, a second ERM employee must accompany or follow the injured or ill employee to the medical treatment center.
- For non-emergency situations, employees shall give necessary first aid care for the employee (if qualified to do so) and secure the scene.
- After stabilizing the scene and ensuring appropriate initial treatment is provided to the employee, contact the PM/Supervisor, who will then contact the BM and/or PIC, as well as the local and/or Division H&S team, to report the event.
- Immediately after contacting the ERM management and H&S personnel, an ERM representative shall call ERM's medical service provider (Workcare) to initiate the Incident Intervention process if follow-up medical treatment is deemed necessary by the management or health and safety team. The phone number is 888-449-7787.
- Within 24 hour, ERM employees shall enter the basic details of the event into the ECS.

Note that the above direction may change based on site-specific circumstances or client-specific requirements. Emergency response elements, including contact information and directions to urgent care facilities, will be included in the project health and safety plan (HASP) as well as the Emergency Action Plan (EAP) within each office.

In the event of a fatality or the hospitalization of three or more ERM employees from a single incident, ERM's management team with the assistance of the Regional H&S Director is responsible for notifying the Occupational Safety and Health Administration (OSHA) within eight hours of the incident.

4.1.2 Non-injury Incidents and Near Misses

After the occurrence of a work related non-injury incident (property damage, environmental release, etc.), work will be halted, the scene will be secured, and initial facts gathered regarding the event. Work should not continue until the causes of the incident or near miss are understood and corrected. Within 24 hours, ERM employees must enter the basic details of the event into the ECS.

4.1.3 Unsafe Acts and Conditions/Safe Behaviors

When a work related unsafe act or condition is identified, work will be halted until the act or condition is addressed and corrected. Similarly, when safe behaviors are identified, the employee(s) involved should be commended for their safe performance. Within 24 hours of the observation, ERM employees must enter the basic details of these events into the ECS.

4.2 Safety Event Follow-up

4.2.1 ECS Information/Routing

All safety events, including injuries/illnesses (including first aid cases), near misses, unsafe acts, and unsafe conditions, will be documented in ECS. An investigation into the safety event will be conducted, which will include at a minimum:

- The time, date, and location of the event;
- The type of event;
- The persons involved in the event, including injured personnel and witnesses;
- A brief description of the event;
- Immediate actions taken in response to the event;
- Information to the support the investigation and response, including additional details, photographs, documents, timelines, etc.;
- An evaluation of causal factors affecting the event;
- Corrective actions to prevent similar occurrences; and
- The names of the investigators and reviewers.

After the basic details of a safety event are entered into the ECS by the employee or designated reporting person, the system will automatically notify appropriate parties. All individuals receiving automatic notification are included on the communication chain for the safety event's ECS record. Automatic notifications per Event Type are summarized in Appendix 1.

Any ERM employee may be added to the communication chain for an ECS record as an additional affected party.

4.2.2 Initiating and Conducting Follow-up

ERM assigns and tracks corrective actions for all safety events. The required detail of the follow-up and the personnel involved is based on the Event Type and its actual or potential severity, as judged by the project and/or safety team. The ECS record created by entering the Safety Event is meant to both guide follow-up and document the findings of the investigation.

At the option of ERM's safety and/or management team, or as required by actual or potential severity of the event, a more robust follow-up may be required, including root cause analysis.

Within 24 hours of the initial communication of the Safety Event into ECS, a member of the BU safety team will contact the Reporting Person to gather initial facts and begin the investigation. The safety team will be responsible for:

- Stewarding the completion of the investigation with the persons involved in the Safety Event; and
- Verifying that all assigned corrective actions have been completed.

4.2.3 Determining Recordability

If the Safety Event is an occupational illness or injury, then the Regional H&S Director will confer with ERM's Global H&S Director to determine recordability of the Safety Event. This will include a calculation of lost work days and/or restricted duty/job transfer time. These determinations will be made based on the established facts of the Safety Event and according to US recordkeeping criteria established by the OSHA. Collected data on events meeting OSHA's recordability definition will be summarized on OSHA Forms 300 and 300A and will be maintained as required by OSHA recordkeeping and reporting requirements.

4.2.4 Root Cause Analysis

A root cause analysis (RCA) will be performed for all recordable incidents and high value learning events as determined by the client, ERM management and/or the Regional H&S Director.

The RCA process should begin no less than two business days after all immediate response measures have been taken and the situation is under control. The default ERM RCA methodology in the "5 Why" technique, but ERM reserves the right to substitute other valid methods as deemed appropriate by management or the Regional H&S Director.

The first step in the process is to assemble the RCA team. The team shall be led by the PIC and facilitated by a member of the ERM safety team or another ERM employee trained in RCA methods. Other team members may include:

- The PM of the project;
- The BM (if the Safety Event was based in the office);
- The person directly involved in the event;
- Other employees familiar with the activities during which the event occurred;
- Subcontractor representatives (if a subcontractor was involved); and
- A senior ERM Partner not involved in the event (e.g., Practice Leader or BU Managing Partner).

The RCA team leader will facilitate the implementation of the process, which may include:

- Interviews and fact gathering;
- Casual factor determination;
- Root cause identification using the "5 Why" method; and
- Corrective action recommendation.

Target deadlines for completing an RCA are as follows:

- Conduct interviews within five working days after the event;
- Distribute draft RCA report to the RCA team for review within 10 working days after the event; and
- Issue the final RCA report, including photos and an RCA flowchart, within 15 working days after the event.

The final RCA report will be uploaded to the ECS record after the event. Adopted corrective actions will be tracked to completion in the ECS. All corrective actions must be completed within 30 days of the issuance of the RCA report. If additional time is needed to complete a corrective action, the Regional H&S Director must be notified.

4.2.5 Approval and Record Finalization

When the corrective actions are verified as complete, the following individuals will indicate their approval of the event:

- For incidents, the applicable Business Unit (BU) H&S Leader, the BU Managing Partner (MP), and the Regional H&S Director.
- For all other safety events, the BU H&S Leader.

After all approvals are made, the BU H&S Leader will initiate the finalization check within ECS to save and close the record. Future changes are locked out are event finalization.

4.3 Additional Procedures for Mine-Related Safety Events

For ERM projects covered by the regulatory statues of the Mine Safety and Health Administration (MSHA), additional recordkeeping is required when specific safety events occur. Safety events meeting one or more of the following criteria must be reported to both the mine operator and MSHA immediately (i.e., no later than 15 minutes after occurrence):

- Death of an ERM employee;
- Injury to an ERM employee at the mine that had the reasonable potential to cause death;
- Entrapment of an ERM employee for more than 30 minutes or which had the reasonable potential to cause death;
- An unplanned inundation of a mine by liquid or gas;
- An unplanned ignition or explosion of gas or dust;

- In underground mines, an unplanned fire not extinguished within 10 minutes of discovery;
- In surface mines, an unplanned fire not extinguished within 30 minutes of discovery;
- An unplanned ignition or explosion of a blasting agent or explosive;
- An unplanned roof fall at or above the anchorage zone in active workings that impair ventilation or impede passage;
- A coal or rock outburst that causes withdrawal of miners or which disrupts regular mining activity for more than one hour;
- An unstable condition at an impoundment, refusal pile, or culm bank which requires emergency action to prevent failure, or which cause individuals to evacuate an area, or failure of an impoundment, refuse pile, or culm bank;
- Damage to hoisting equipment in a shaft or slope which endangers an individual or which interferes with use of the equipment for more than 30 minutes, and
- An event at a mine which causes death or bodily injury to an ERM employee not at the mine when the event occurs.

Within 10 days of occurrence, ERM must submit a report of any work-related incidents to MSHA using MSHA Form 7000-1. Additionally, each calendar quarter, ERM must submit employment information to MSHA utilizing MSHA Form 7000-2. The form must be completed and submitted to MSHA no later than 15 days after the end of each calendar quarter.

5. References

- Occupational Safety and Health Administration (OSHA) 29 CFR 1904, ***"Recording and Reporting Occupational Injuries and Illnesses"***
- Mine Safety and Health Administration (MSHA) 30 CFR 50, ***"Notification, Investigation, Reports, and Records of Accidents, Injuries, Illnesses, Employment, and Coal Production in Mines"***
- ERM Work Instruction S3-NAM-016-WI1 (***ECS E-mail Notification Matrix***)
- ERM Work Instruction S3-NAM-016-WI2 (***Event Severity Matrix***)
- ERM Work Instruction S3-NAM-016-WI3 (***Verbal Communication Matrix***)

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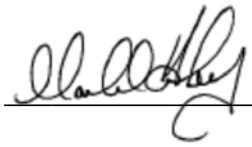
Approval Signature: 

Revision History

Section	Reason for Revision	Date
All	Revised and edited to meet new Global SMS requirements and update procedures	10/17/14
Intro; 5	Updated Applicability; added references to Section 5	1/11/16
4.2.1	Added information on data collected in ECS reports	7/14/16

1. Purpose and Scope

This document provides guidance on qualifying personnel for hazardous materials work, monitoring personnel for evidence of adverse health effects due to job site hazard exposure, and determines suitability for future work assignments. This document applies to all ERM field and office locations.

2. Roles and Responsibilities

Partner in Charge (PIC): Responsible for the following elements:

- Ensuring this procedure is implemented, understood, and followed by employees under their charge and working on their projects; and
- Correcting any deficiencies in the implementation of this procedure as identified by the Division Health and Safety (H&S) Leader.

Project Manager (PM)/Supervisor/Branch Manager (BM): Responsible for the following elements:

- Performing observations of ERM work processes to assess whether or not employees are operating in accordance with this procedure;
- Pausing or stopping work where deviations from this procedure are observed; and
- Correcting, in conjunction with the PIC and the Division H&S Leader, any observed deficiencies in the implementation of this procedure.

Division H&S Leader: Responsible for the following elements:

- Evaluating implementation of this procedure during health and safety plan reviews and project audits; and
- Communicating identified deficiencies to the PIC.

3. Definitions

Field Safety Officers: Employees who are responsible for the day-to-day implementation of ERM's health and safety processes on project sites.

4. Procedure

4.1 Applicability

ERM employees who perform hazardous waste-related work must undergo periodic medical evaluation by a medical doctor specializing in occupational medicine before participating in field work. Medical evaluations will be provided to employees at no cost, without loss of pay, and at a reasonable time and place. Medical evaluations required for contractors will be provided at the expense of the contractor.

If an FSO determines that a site worker has potentially been exposed to hazardous materials, a follow-up exam will be offered to the exposed individual as soon as possible. An exit exam will be given to employees upon termination of employment or upon transfer to a group not engaged in hazardous waste work.

The Project Manager or FSO must confirm project-specific medical surveillance is completed before site entry. Contractor personnel must provide proof of medical evaluations to the Project Manager or FSO before site entry. If any worker has not satisfactorily met medical requirements, such individuals will not be allowed to work on the site.

4.2 Physical Examination Requirements

All employees and contractor personnel participating in site work, operating waste processing equipment, or decontaminating equipment will be required to have baseline and periodic physical examinations by a medical doctor. The physical examination will determine whether the employee will experience an increased health risk due to exposure to and operation of site equipment, use of safety equipment including respirators, or working in a potentially contaminated environment. The medical doctor will make this medical determination for each employee prior to field work.

In the United States, the medical surveillance program must meet requirements outlined in 29 CFR 1910.120, which allows the physician to determine the content of the medical examination. Annual and biennial refresher physicals shall include at least the following:

- Complete medical histories;
- Physical examinations;
- Pulmonary function tests;
- EKG;
- Eye examinations and visual acuity;
- Audiograms;
- Urinalysis; and

- Blood chemistry, including hematology and serum.

The determination of whether an employee requires an annual or biennial update to their physical is dependent on a number of factors. ERM has provided WorkCare, our medical surveillance management provider, details on the types of work performed by ERM employees. Additionally, during yearly respirator questionnaires administered by WorkCare, ERM employees disclose how often and which types of respirators are worn. If respirators are worn more than 30 days per year by an employee, an annual physical is required. If not, WorkCare assists in making the determination of the appropriate timetable for refresher physicals.

In addition to the required medical evaluations and tests, any additional medical testing will be completed as required by a site-specific health and safety plan (HASP).

4.3 Documentation

Employee medical examination results shall be retained by the occupational physician and sent only to the employee. This information packet will include:

- Exam results and conditions requiring further evaluation or treatment;
- Conditions detected which would place the employee at risk while working at sites containing hazardous substances; and
- Any work limitations in hazardous site work.

A medical clearance letter shall be sent to ERM. This letter does not reveal any medical test results to ERM, rather it only states whether the employee is medically cleared to perform assigned work. The letter will also list any work restrictions applicable to the employee. The ERM H&S team, in concert with ERM Human Resources, will follow up on all medical clearance issues or work restrictions. At a minimum, the letter will contain the following:

- Employee name and office location;
- Date of physical exam and date of required follow-up exam;
- Physician's recommended work limitations; and
- Any employee medical complaints relating to exposure to hazardous substances.

5. References

- Occupational Safety and Health Administration (OSHA) 29 CFR 1910.120, ***"Hazardous Waste Operations and Emergency Response"***

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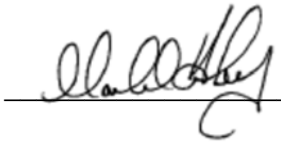
Approval Signature: 

Revision History

Section	Reason for Revision	Date
All	New document.	1/21/15
All	Reformatted to meet new Global documentation requirements. Minor language changes for clarity.	7/23/15

1. Purpose and Scope

This document establishes safe work procedures to be used by ERM to minimize injury resulting from various occupational hazards through the use of personal protective equipment (PPE). Other types of hazard mitigation – including elimination, substitution, engineering controls, and administrative controls – are the best methods of hazard mitigation; however, in many cases the nature of consulting requires the use of PPE to supplement or replace those methods.

This procedure is applicable to all ERM operations. Note that respiratory protection (***S3-NAM-026-PR***) and hearing protection (***S3-NAM-014-PR***) are covered in other procedures.

2. Roles and Responsibilities

Partner in Charge (PIC): Responsible for the following elements:

- Ensure this program is implemented, understood, and followed by employees under their charge; and
- Correct any deficiencies in the implementation of this procedure as identified by the Division Health and Safety (H&S) Leader.

Project Manager/Supervisor: Responsible for the following elements:

- Implement program during any project activities where the use of PPE is determined to be necessary;
- Perform observations of ERM work processes to assess whether or not employees are operating in accordance with this procedure; and
- Correct, in conjunction with the PIC and the Division H&S Leader, any observed deficiencies in the implementation of this procedure.

Division H&S Leader: Responsible for the following elements:

- Evaluate implementation of PPE during health and safety plan reviews and project audits; and
- Communicate identified deficiencies to the PIC.

Employee: Responsible for complying with the requirements stated within the procedure.

3. Definitions

None.

4. Procedure

4.1 Hazard Assessments

The PPE requirements for any work task will be addressed in the appropriate planning document, including health and safety plans (HASP) and job hazard analyses (JHA). Hazard assessments are performed by considering multiple basic types of hazards which may be able to the work scope. These include, but may not be limited to, impacts, heat or cold, penetration, dusts, compression, radiation, chemical hazards, and electrical hazards.

Site-specific HASPs will include information outlining the actual PPE requirements for the project, including those required by client-specific mandate. All project team members will be briefed on the elements of the site-specific HASP prior to participating in field activities. This briefing will include information on what PPE is required for the various project tasks.

A completed JHA addresses both the hazards specific to a job task and the appropriate controls, which may include PPE. All project team members are required to review the JHA prior to commencement of task-specific activities.

4.2 PPE Selection

Once hazards have been identified and evaluated though the hazard assessment process, the process of selecting PPE includes:

- Becoming familiar with the potential hazards and the types of PPE available to mitigate those hazards;
- Comparing available PPE to hazards associated with the project site;
- Selecting PPE meeting any applicable regulatory and client requirements that ensures a level of protection greater than the minimum required to protect employees; and
- Fitting the employees with proper, comfortable, and well-fitting PPE and instructing them on its use and care.

If conditions change on a project site or PPE fails for any reason, the PPE originally selected for employee protection must be re-evaluated. Re-evaluation should include the following elements:

- Levels of exposure, established through appropriate site monitoring;
- Adequacy of PPE originally selected;
- Number of hours PPE must be worn;
- Adequacy of training and fitting of PPE;
- Adequacy of PPE program records;
- Recommendations for H&S program improvement and modification; and

- Coordination with the overall H&S program.

4.2.1 Eye and Face Protection

When hazards present as a result of flying particulates, molten metal, liquid chemicals that are highly acidic or basic, chemical gases or vapors, or ionizing or nonionizing radiation, a combination of safety glasses, safety goggles, and/or face shields should be worn. For employees who wear prescription glasses, S3-NAM-021-WI1 (***Prescription Safety Eyewear***) provides additional details regarding purchase and care of prescription safety glasses.

4.2.2 Foot Protection

In most field situations, protective footwear should be worn by employees performing work in the field. Employees performing ancillary work activities, such as client meetings or work in the office environment at a client site, are not required to wear protective footwear unless client requirements dictate their use. S3-NAM-021-WI2 (***Protective Footwear***) provides additional details regarding selection and purchase.

4.2.3 Hand Protection

Gloves provide protection against a wide variety of hazards, including chemical exposure, burns, cuts, and other hand injuries. S3-NAM-047-PR (***Safe Use of Cutting Tools***) provides additional information on gloves types providing protection from cuts.

4.2.4 Head Protection

Hard hats approved by the American National Standards Institute (ANSI)/International Safety Equipment Association (ISEA) must be worn whenever a hazard exists from falling objects or other impact/bump hazards. The inner suspension of the hard hat must be inspected regularly and must ensure that at least 1 to 1-1/4" of gap exists between the suspension and the hard hat shell. ERM employees required to wear hard hats shall generally utilize Type 1 Class G (General) hard hats, although other types and classes may be appropriate based on site conditions.

4.3 Training

Employees shall receive training on PPE. Training topics include, but are not limited to:

- Routes of exposure;
- Categories of exposure;
- Selection of chemical protective clothing;
- Eye and face protection;
- Hand protection;

- Foot protection;
- Head protection;
- Limitations of PPE;
- Storage, cleaning, and maintenance of PPE;
- Proper donning and doffing procedures;
- Adjusting PPE and determining proper fit; and
- Disposal of PPE.

Retraining will be conducted if any of the following occur:

- Employee observed not using appropriate PPE for task;
- Employee observed using PPE in a manner that is inconsistent with previous training;
- Changes in types of PPE used; and
- New hazards identified at the site which required the use of a different level or type of PPE.

All training is tracked in ERM's Academy learning Management System (LMS).

4.4 Usage, Storage, and Maintenance

All PPE must be kept clean and properly maintained by the employee to whom it is assigned. PPE will be inspected, cleaned, and maintained by employees at regular intervals as part of their normal job duties. Project Managers are responsible for ensuring compliance with cleaning of PPE by employee working on their projects.

In ERM's typical role on projects, PPE does not become grossly contaminated. During projects where chemical contamination of PPE occurs, PPE will be decontaminated (if it is to be reused) or discarded in accordance with waste management practices for the project site. If gross contamination with liquid chemicals occurs, employees will immediately stop work and proceed to the decontamination area. Details of PPE and equipment decontamination are specified for each project in the site-specific HASP and/or JHA.

Change rooms and shower rooms are not typically required for ERM projects due to several factors, including the short duration and non-permanency of the projects. In the event change rooms and shower rooms are required for a project, details will be included in the site-specific HASP.

All PPE will be inspected prior to use and any damaged or defective PPE will not be used. All damaged or defective PPE will be immediately discarded.

4.5 ERM-Provided PPE

ERM provides PPE to our employees in accordance with applicable regulatory standards. Prescription safety glasses and protective footwear are subsidized (see ***S3-NAM-021-WI1*** and ***S3-NAM-021-WI2***, respectively). Employees are discouraged from providing their own PPE. Employees are responsible for ensuring that ERM-provided PPE is maintained and replaced as needed. During routine inspections of field-based activities, the Field Safety Officer (FSO), Project Manager, or Division HSSE Leader will observe the condition of employee PPE.

5. References

- ERM Work Instruction S3-NAM-021-WI1 (***Prescription Protective Eyewear***)
- ERM Work Instruction S3-NAM-021-WI2 (***Protective Footwear***)
- ERM Work Instruction S3-NAM-021-WI3 (***Selection, Care, and Use of Flame-Resistant Clothing***)
- ERM Procedure S3-NAM-047-PR (***Safe Use of Cutting Tools***)

Document Control Information

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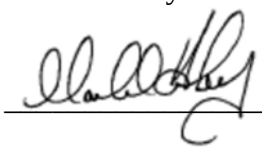
Policy Approval by: Mark Hickey

Approval Signature: 

Revision History

Section	Reason for Revision	Date
All	New document.	2/10/15
All	Reformatted to meet ERM Global standards; language changes for clarity	1/14/16

1. Purpose and Scope

ERM will provide active field employees with protective eyewear that meets the general requirements of Title 29 Code of Federal Regulations (CFR) 1910.132 found in Subpart I (***Personal Protective Equipment***) and the specific requirements of 29 CFR 1910.133 (***Eye and Face Protection***). This policy applies to new employees who will perform field work and current employees who need to replace their protective eyewear.

2. Specifications

The eye protection standard in 29 CFR 1910.133 specifies that protective eyewear must comply with American National Standards Institute (ANSI) Standard ANSI Z41-1989/2003/2010 (***American National Standard Practice for Occupational and Education Eye and Face Protection Devices***). The ANSI standard provides minimum requirements for eye and face protective devices including selection, use, and maintenance of selected devices. Note that ERM will use safety glasses in conjunction with other applicable mitigation techniques to minimize eye and face hazards.

There are variations in the various editions of the ANSI standard. These include:

- The 2003 edition and its predecessors are organized by the type of device. The 2010 edition is organized by the nature of the hazard.
- The 2003 edition and its predecessors had no defined minimum coverage requirements. The 2010 edition has a minimum frontal coverage requirement and, for impact rated devices, a lateral coverage requirement.
- The 2003 edition and its predecessors had no defined performance criteria or protection ratings for splash/droplet, dust, or fine dust. The 2010 edition has specific performance and marking criteria for devices claiming to provide protection from these hazards,
- The 2010 edition eliminates flammability tests in favor of ignition tests. It also has sections on selection, use, and maintenance that have been revised to show recommended protectors for various types of work activities.

Markings on the protective eyewear also vary slightly according to the ANSI standard edition under which they were created:

- 2003 Edition:
    - Products are designated as basic impact or high impact.
    - Products must be marked with a manufacturer's monogram.
    - Products with basic impact lenses must be marked "Z87"; products with high impact lenses must marked "Z87+".

- Marking must be on the frame or temple for spectacles and on any component for goggles.
- If applicable, lenses must be marked with appropriate shade and special purpose designation.

- 2010 Edition:
  - Products are designated as non-impact or impact.
  - Products must be marked with a manufacturer's monogram.
  - Products with non-impact lenses must be marked "Z87"; products with impact lenses must be marked with "Z87+".
  - Prescription lenses must be marked "Z87-2" (plus the impact designation as required).
  - Additional markings indicating lens type, and use markings must be added when claims of protection are made by the manufacturer:
    - Welding – "W" plus shade number
    - Ultraviolet Filter – "U" plus scale number
    - Visible Light Filter – "L" plus scale number
    - Infrared Light – "R" plus scale number
    - Variable Tint – "V"
    - Special Purpose – "S"
    - Splash/Droplet – "D3"
    - Dust – "D4"
    - Fine Dust – "D5"

Note that OSHA has not designated a specific timeframe in which current regulations will be updated to reflect the most recent changes to this standard. As such, compliance with either the 2003 or 2010 edition will be considered acceptable, although every effort should be made to ensure purchased prescription eyewear is in compliance with the 2010 standard.

3. Purchase Requirements

ERM will reimburse employees for the cost of the following prescription protective eyewear:

- Prescription spectacles with a fixed bridge and non-removable side shields;
- Prescription spectacles as part of an integrated exterior protection system (spectacles insert into protective frames and are secured via removable nose pad); and/or
- Prescription spectacles as part of a respirator spectacle kit.

The following requirements will apply:

- Employees must consult with their personal ophthalmologist or optometrist to obtain prescriptions.
- ERM will not reimburse the employee for the cost of the eye examination or the time spent in acquisition of the exam.
- Employees must select an appropriate vendor to purchase the frames and lenses. Frames and lenses must be made to the specifications provided previously in this document.
- Protective prescription eyewear will be replaced at a frequency of not more than once every 24 months.
- Purchase of variable tint lenses (lenses that darken when exposed to sunlight) is acceptable.

Note that ERM has not set a specific dollar limit on reimbursement for protective prescription eyewear because the cost will vary by vendor and the strength of the prescription.

1. Purpose and Scope

ERM will provide active field employees with protective footwear that meets the general requirements of Title 29 Code of Federal Regulations (CFR) 1910.132 found in Subpart I (***Personal Protective Equipment***) and the specific requirements of 29 CFR 1910.136 (***Foot Protection***). This policy applies to new employees who will perform field work and current employees who need to replace their protective footwear.

2. Specifications

The foot protection standard in 29 CFR 1910.136 specifies that protective footwear must comply with ASTM International (formerly known as the American Society for Testing and Materials) Standard F2412-11 (***Standard Test Methods for Foot Protection***) and ASTM International Standard F2413-11 (***Standard Specification for Performance Requirements for Protective Footwear***).

The ASTM standards cover minimum requirements for the design, performance, testing and classification of protective footwear. Footwear certified as meeting ASTM F2413-11 must meet impact resistance and compression resistance tests. The requirements of additional sections of the standard may be met as needed (e.g., metatarsal protection, conductive protection, electric shock protection, static dissipative protection and protection against punctures).

All footwear manufactured to the ASTM specification must be marked with the specific portion of the standard with which it complies. One shoe of each pair must be clearly and legibly marked (stitched in, stamped on, pressure sensitive label, etc.) on either the surface of the tongue, gusset, shaft or quarter lining. The marking must be enclosed in a rectangular border and a four-line format is suggested. Line #4 is used only when more than three sections of the ASTM standard applies to the footwear.

Line #1: This line identifies the ASTM standard that the protective footwear meets (ASTM F2413-11).

Line #2: This line identifies the gender [M (Male) or F (Female)] of the user. It also identifies the existence of impact resistance (I), the impact resistance rating (75 or 50 foot-pounds), compression resistance (C), and the compression resistance rating (75 or 50 which correlates to 2500 pounds and 1750 pounds of compression respectively). The metatarsal designation (Mt) and rating (75 or 50 foot-pounds) is also identified, as necessary.

Lines #3 and #4: These lines are used to identify footwear made to offer protection from specific types of hazards referenced in the standard, including conductive (Cd) properties, electrical hazard resistance properties (EH), footwear designed to reduce the accumulation of excess static electricity (SD), and puncture resistance (PR), if applicable.

Example:

3. Purchase Requirements

The following shall apply to the purchase of protective footwear:

- The footwear must consist of a boot with steel or composite toes, a leather upper, and a durable outsole and heel. The boots must provide adequate ankle support and have either a steel or fiberglass shank that provides arch support. Puncture resistance is suggested, but not required. The employee must be able to prove the boots meet one of the standards described previously in this document.
- The maximum allowable subsidy for protective footwear purchase is $150.00 (US). Note that any amount, including tax, above $150.00 (US) is the responsibility of the employee and will not be reimbursed. The cost of the boots will be reimbursed through the ERM expense report process. Time spent shopping or getting fitted for new boots is not chargeable.
- Protective footwear will be replaced at a frequency of not more than once every 12 months.

1. Purpose and Scope

This procedure describes the steps that will typically occur when a regulatory inspector arrives on site. Additionally, the procedure defines actions that should be taken by ERM management and staff during the inspector's visit.

Note that regulatory inspectors typically have a legal right of entry to all work places without delay. Employers have a right to require a search warrant; however, for ERM project sites, this would be a very extreme case under special circumstances and would not be exercised unless specifically directed by the legal department.

2. Roles and Responsibilities

Partner in Charge (PIC): Responsible for ensuring this procedure is implemented, understood, and followed by employees under their charge and working on their projects.

Project Manager: Responsible for the following elements:

- Serve as the primary contact with the regulatory inspector during the visit; and
- Contact the PIC and the Division Health and Safety (H&S) Leader if a regulatory inspector should visit the project site.

Division H&S Leader: Responsible for the following elements:

- Provide assistance to the PIC and Project Manager during any regulatory inspection;
- Notify the Regional H&S Director as soon as possible of any regulatory inspections in their Division; and
- Where possible, travel to the project site to assist the Project Manager during the inspection.

3. Definitions

None.

4. Procedure

4.1 Pre-Inspection

- All employees should be polite, respectful, and cooperative with inspectors visiting the project site. A professional, helpful disposition will ensure the best possible outcome.

- The arrival of a regulatory inspector should immediately prompt any ERM employee to notify the highest-ranking manager at the project site (typically the Project Manager). This manager will assume responsibility for interactions with the inspector.
- The manager should ask the inspector to present valid credentials in the form of a badge or card, to accompany them to a comfortable spot for an opening conference, and to allow notification to ERM upper management as directed in this procedure.
- The manager will immediately notify the PIC and the Division H&S Leader, who will notify the Regional H&S Director.
- If practical, the inspection should occur when an ERM safety representative is able to be at the project site, even if it causes a short delay in proceeding.

4.2 Opening Conference

The opening conference should be attended by the highest-ranking manager on the project site and the appropriate ERM safety representative (if available). A representative from the ERM legal department should also attend the meeting by phone, if feasible.

During the opening conference, the inspector will explain the purpose of the inspection, indicate records he/she wishes to review, and identify employees he wishes to question. This will serve as a guideline of the inspection and does not preclude additional areas that the inspector may deem necessary to investigate. It will also inform ERM managers on the project site if pictures or air samples are to be collected by the inspector.

The beginning of the opening conference is an appropriate time to ask the inspector if there is a specific purpose to the inspection. The inspector should disclose whether the inspection is the result of an employee complaint, a scheduled inspection, or a response to another type of scenario.

Documentation shall be kept of the opening conference to include:

- Names, businesses affiliations, and addresses of all persons present;
- Date and time the inspector arrived on the project site; and
- The reason for the inspection, including copies of complaints, as applicable. Note that ERM should not ask to be informed of the identity of a complainant. If the inspector reveals the name of a complainant, ERM may not discriminate against the complainant in any way.

4.3 Inspection

The Project Manager and Field Safety Officer (FSO) must accompany the inspector on the tour of the project site and should ensure the inspector is constantly accompanied. The only time the inspector should be left alone is when he/she stops to speak privately

to an employee that does not wish to have a management representative present during the conversation.

ERM team members accompanying the inspector should only answer specific questions posed by the inspector. If the inspector requests specific information, provide that information in a cooperative, concise and polite manner, but do not voluntarily progress from one related item to another for his benefit. In no case should ERM management admit to wrong-doing, fault, or non-compliance.

During the walk around inspection, it is imperative to follow the same procedure and record the same information as the inspection, including:

- Take the same pictures and measurements from the same angles;
- Collect any air samples and/or record sampling results and survey readings;
- Note the areas visited;
- Note any equipment examined; and
- Record the name of employees and other people interviewed or involved in the investigation.

It is appropriate to ask the inspector throughout the inspection what he/she believes they found wrong, although this will be summarized in the closing conference document. This will allow ERM to correct any deficiencies noted as soon as possible. If you can correct a recognized deficiency at the time it is communicated by the inspector, do so immediately in the presence of the inspector or direct work crews to begin to abate the noted violations.

4.4 Avoidance of Disruption

The inspector must conduct inspections so as to avoid any undue and unnecessary disruption of the normal operations of the employer. If a critical activity is underway, critical operations are occurring, or the inspection is to occur at a time that would prove costly, the inspector should be informed so an alternate inspection time and date can be arranged.

4.5 Imminent Danger

If an inspector concludes that conditions or practices exist which could cause death or serious harm, he shall inform the ERM manager. The inspector does not have the authority to cease work at the project site; however, ERM should stop all work if an imminent danger situation exists and is communicated to us.

4.6 Closing Conference

Upon completion of the inspection, the inspector will confer with ERM's management team and informally advise of apparent safety and health deficiencies noted during the inspection. Items communicated by the inspector during the closing conference are typically those he/she intends to issue citations for; however, the inspector is not bound to limit citations to items discussed in the closing conference. The inspector will not issue citations or indicate any proposed penalties during the closing conference, but will inform ERM only of what deficiencies were noted and what potential citations may be forthcoming. As with the opening conference, detailed notes should be recorded during the closing conference and communicated to the Division H&S Leader and the Regional H&S Director upon completion.

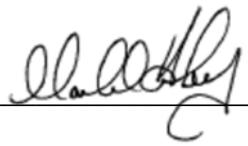
5. References

- ERM Form #S3-NAM-024-FM1 – Regulatory Inspection Checklist

Document Control Information

Original Effective Date: 7/20/15

Policy Approval by: Mark Hickey

Approval Signature: 

Revision History

Section	Reason for Revision	Date
All	New document.	3/20/14
All	Reformatted document. Minor language changes for clarity. Eliminated references to OSHA	7/20/15

	Applicability:	Form	Document Number:	Version:
	North America		S3-NAM-029-FM5	2
	Title: **Site Safety Meeting Form**		**Last Revision Date:**	6/24/15

Project Name/ Location:	Genesco Fulton Ave Garden City NY			**Phone:**	
Project Number:	0097881	**Date:**		**Time:**	
Meeting Leader:					

Today's Work Tasks(s)	**Conducted By:**

1. **Review relevant sections of the Health and Safety Plan (HASP), Job Hazard Analyses (JHAs) for planned tasks, and any other applicable procedures. Discuss potential hazards of planned work and control measures to be used to eliminate or reduce risks (including PPE). Pay specific attention to overlapping/ simultaneous operations.**
2. **Review emergency response procedures including emergency phone numbers, location of emergency equipment (fire extinguishers, first aid kit, AED, eyewashes, safety showers, etc.), exit routes, muster points, methods of conducting head count at muster point, and identity of first responders trained in first aid/CPR.**
3. **Does everyone fully understand the task(s)? Are there any changes that need to be assessed? Use SNAP cards to assess risks associated with changed or unplanned tasks.**
4. **Remind the team that everyone on the job site is empowered to stop work if something is unsafe or if there are any questions or concerns regarding safety.**

What tools and equipment are required for today's tasks? Have they been inspected and are they in good condition?

What training/qualifications/experience is necessary for today's assigned tasks?

List any new or Short Service personnel on site today:

Discuss any recent incidents, near misses, field inspection findings, or other safety observations (or observations from similar tasks performed at other sites):

Additional Safety Meeting Topics (check those discussed)
☐ What client safety rules or procedures are applicable to today's activities?
☐ How will you communicate with others on site? How will you communicate with the PIC and PM?
☐ What are the potential impacts of planned activities to visitors, nearby workers, or the public?
☐ Who do you contact if you have questions or before deviating from written procedures?
☐ What happens and who do you contact if there is an injury or other emergency? If working at an active facility, how will you be alerted of an emergency and what will you do?
☐ Where is nearest medical facility and how would we get an injured employee there? If medical help is more than five minutes away, is at least one person on site trained in first aid/CPR? How do you contact them?
☐ Do you have any medical condition or allergy that the project team needs to be aware of? Write this down and keep it in your pocket for reference in the event of an emergency.
☐ Are any work permits required?
☐ Has anything unexpected or out-of-the-ordinary occurred on this job recently to share?
☐ Is there anything different about today's operations as compared to yesterday or previous days?
☐ What is the worst that could happen if something goes wrong today?
☐ What activities occurring today could result in hand injuries? Is everyone aware that the use of fixed open-blade knives is not permitted?
☐ What natural hazards are present (including plants, animals, and insects)?
☐ What areas of the site have slip/trip/fall hazards? Can these be avoided? Are everyone's work boots in good shape?
☐ Other items:

Meeting Attendees (including employees, contractors, and visitors)

Name	Company	Sign-In*	Sign-Out**

* Signature/initials in this space verify that the employee is fit for performing work.

** Signature/initials in this space verify that the employee was uninjured during the workday.

	Applicability:	Form	Document Number:	Version:
	North America		S3-NAM-029-FM6	1
	Title: **Undeveloped, Remote, or Inactive Sites**		**Last Revision Date:**	3/26/15

No.	Issue	Considered?	Additional Actions Necessary Before Beginning Work?
Personnel Management			
1	Has an effort been made to secure at least a two-person team for this field work?	☒ Y ☐ N ☐ NA	Two and three member sampling teams are typical.
2	If only one person is making the site visit, has that decision been reviewed and approved by the Partner-in-Charge (PIC), in consultation with the H&S Team?	☐ Y ☐ N ☒ NA	Click here to enter text.
3	Has someone been designated as the team leader to supervise the site activities?	☒ Y ☐ N ☐ NA	Click here to enter text.
4	Does the team have instructions on where to park safely?	☒ Y ☐ N ☐ NA	Click here to enter text.
5	Has the most appropriate location for site entry been determined?	☒ Y ☐ N ☐ NA	Click here to enter text.
6	Has the client/site been notified that an ERM representative will be on site so that entry and security issues are addressed?	☒ Y ☐ N ☐ NA	Click here to enter text.
7	Has a site map been provided, if available?	☐ Y ☐ N ☒ NA	Click here to enter text.
8	Has ERM been informed of any hazards unique to this site?	☒ Y ☐ N ☐ NA	Click here to enter text.
9	If driving more than 500 km (310 miles) in a single day, driving in excess of 4.5 hours in a single day, or driving in a remote location, a Journey Management Plan is required and should be appended to the HASP. Consult ERM H&S Standard #S1-ERM-005-ST (*Travel Risk Assessment*) for requirements.	☐ Y ☐ N ☒ NA	Click here to enter text.
Field Communications			
1	Do team members have a reliable means of communicating with other ERM team members in event of an emergency (e.g., mobile phone, two-way radio, satellite phone or beacon, etc.)?	☒ Y ☐ N ☐ NA	All team members have cell phones
2	Is there a plan in place to ensure that the Project Manager or PIC communicates with the field team members during the day and when all team members have safely left the site at the end of the day and arrived back at their evening destination?	☒ Y ☐ N ☐ NA	Click here to enter text.
3	Has a plan been developed on how to address or deal with unauthorized people encountered on or near the site?	☒ Y ☐ N ☐ NA	Click here to enter text.

No.	Issue	Considered?	Additional Actions Necessary Before Beginning Work?
Field Safety			
1	Have PPE requirements been evaluated and the following minimum issues been considered?	☒ Y ☐ N ☐ NA	Click here to enter text.
	• Sturdy work boots (steel-toed/steel shank if crushing or puncture hazards are present)	☒ Y ☐ N ☐ NA	Click here to enter text.
	• Long pants/long-sleeved shirt (protection against poisonous plants, insects, and sunburn)	☒ Y ☐ N ☐ NA	Click here to enter text.
	• Safety glasses (if potential for flying particulates is present)	☒ Y ☐ N ☐ NA	Click here to enter text.
	• Gloves (leather or Kevlar for exposure to cut, pinch, or abrasion hazards; chemical resistant gloves as needed)	☒ Y ☐ N ☐ NA	Click here to enter text.
	• Hi-visibility vest (potential exposure to vehicle traffic)	☒ Y ☐ N ☐ NA	Click here to enter text.
	• Hard hat (falling objects, struck against, or contact between head and electrical shock hazard is present)	☒ Y ☐ N ☐ NA	Click here to enter text.
2	Is there a process in place to monitor weather forecasts?	☒ Y ☐ N ☐ NA	Team lead checks forecast
3	Is there a sheltering plan in the event of inclement weather?	☒ Y ☐ N ☐ NA	Click here to enter text.
4	Is there access to potable water on the site or have plans been made to bring water with the team members?	☒ Y ☐ N ☐ NA	Click here to enter text.
5	Is an ERM-approved first aid kit immediately available?	☒ Y ☐ N ☐ NA	Click here to enter text.
6	Is there at least on first aid trained person on site?	☒ Y ☐ N ☐ NA	All field personnel are 1st Aid trained.
7	Is the team aware of any local plants, insects, arachnids, or animals that could carry disease or cause harm?	☒ Y ☐ N ☐ NA	Click here to enter text.
8	If so, have appropriate repellents, clothing, or other protective measures been considered and acquired?	☒ Y ☐ N ☐ NA	Click here to enter text.
9	If a team member is allergic to any natural agents, do they have the appropriate medications with them?	☐ Y ☐ N ☒ NA	Click here to enter text.
10	If a team member is allergic to any natural agents, are other team members aware of the allergy and knowledgeable about the location and application of appropriate medications?	☐ Y ☐ N ☒ NA	Click here to enter text.
11	Has the team addressed the need for periodic clothing and body inspection to note the presence of disease-bearing insects/arachnids?	☒ Y ☐ N ☐ NA	Click here to enter text.

	Applicability:	Guideline	Document Number:	Version:
	North America		S3-NAM-029-GU1	1
	Title:	**Project Manager H&S Checklist**	**Last Revision Date:**	3/26/15

Project Name:	Fulton Ave
Project Manager:	Chris Wenczel
Start/End Date:	Ongoing for 2017
Project PIC:	Jim Perazzo
Project Field Safety Officer:	Brice Lynch

This document can be used by the Project Manager to identify project health and safety requirements for project planning, project site work, and project closeout. It can also serve as guideline to give to project team members to inform the team of health and safety planning undertaken and team efforts required.

Project Planning		
Applicable?	**Description**	**Details**
☒ Y ☐ N	Level of health and safety plan (HASP) has been determined (Email, Level 1, Level 2, or Level 3 HASP)	L2
☐ Y ☐ N	Risks of travel have been identified (Travel Risk Assessment or Journey Management Plan)?	N/A
☒ Y ☐ N	H&S team has reviewed Level 2 or Level 3 HASPs	Click here to enter text.
☐ Y ☐ N	For all levels of HASP, the project PIC has given written approval	Click here to enter text.
☐ Y ☐ N	For projects that must undergo PLAN analysis, risk review is provided to H&S team during HASP review	N/A
☐ Y ☒ N	Job Hazard Analyses (JHAs) s obtained from contractors and provided to H&S team during HASP review	Click here to enter text.
☒ Y ☐ N	Personal protective equipment (PPE) requirements have been determined for each task	Click here to enter text.
☐ Y ☐ N	Real-time/industrial hygiene/noise monitoring requirements have been determined based on chemical exposure potential at the site	N/A
☒ Y ☐ N	Contractors utilized for the project are green-flagged in PICS	Click here to enter text.
☐ Y ☐ N	Medical surveillance requirements for ERM and contractor employees have been determined	N/A
☒ Y ☐ N	Training requirement, including client-specific HS requirements, for ERM and subcontractor employees have been determined	Click here to enter text.
☒ Y ☐ N	Applicable permits, notifications, and registrations have been identified	Click here to enter text.
☒ Y ☐ N	ERM personnel identified and assigned to the project meet training/medical requirements	Click here to enter text.
☒ Y ☐ N	Trained and qualified ERM Field Safety Officer (FSO) has been identified and assigned to the project (as applicable)	Click here to enter text.
☒ Y ☐ N	SNAP Cards (M1-ERM-004-FM1) will be used on the project and procedures for using have been explained to ERM and contractors employees	Click here to enter text.

☒ Y ☐ N	ERM HASP provided to each contractor firm involved in the project along with minimum health and safety requirements each firm must meet	Click here to enter text.
Project Work		
Applicable?	**Description**	**Details**
☒ Y ☐ N	ERM personnel and FSO have not changed since project planning phase, or new personnel meet training and medical surveillance requirements?	Click here to enter text.
☒ Y ☐ N	Health and safety included in initial project kickoff meeting or separate health and safety kickoff meeting has been planned	Click here to enter text.
☒ Y ☐ N	Site Safety Meeting Form (*S3-NAM-029-FM5*) is at the project site and used to discuss safety each day with ERM and contractor employees onsite	Click here to enter text.
☒ Y ☐ N	Everyone on site informed that any change to work scope (weather conditions, personnel, timing, etc.) require short meeting to determine if the change compromises personnel safety	Click here to enter text.
☒ Y ☐ N	All PPE and emergency equipment identified in the HASP and JHAs is present at the project site	Click here to enter text.
☒ Y ☐ N	Emergency contact information, emergency evacuation/assembly point and route to nearest medical facility are included in HASP and posted at the site	Click here to enter text.
☒ Y ☐ N	Guidance on how to handle a regulatory inspection (*S3-NAM-024-PR*) is at the project site	Click here to enter text.
☒ Y ☐ N	Training/medical surveillance documents are collected by PM for each contractor employee	Click here to enter text.
☒ Y ☐ N	Safety Data Sheets (SDS) are located at the project site for each chemical ERM or contractor brings to the site	Click here to enter text.
☒ Y ☐ N	Method to keep site visitors out of ERM work areas has been determined and managed by FSO	Click here to enter text.
☒ Y ☐ N	For project work lasting longer than one week, a Field Safety Audit will be conducted, kept with project files, and forwarded to the Division H&S Leader	Click here to enter text.
Project Closeout		
Applicable?	**Description**	**Details**
☐ Y ☐ N	Project HASP, JHAs, PM H&S Checklist, subcontractor training/medical documentation, daily Site Safety Meeting Forms, work permits, air and/or noise monitoring and calibration results are placed in project file	Click here to enter text.
☐ Y ☐ N	Project team has performed a post-project brainstorming session to close any ECS events and determine any lessons learned	Click here to enter text.

	Applicability:	Guideline	Document Number:	Version:
	North America		S3-NAM-029-GU2	1
	Title: **Project Health, Safety, Security, and Environmental (HSSE) Checklist**		**Last Revision Date:**	3/26/15

Project Name:	Fulton Ave
Project Manager:	Chris Wenczel
Partner-in-Charge (PIC):	Jim Perazzo
Start/End Date:	Click here to enter text.

Part I: Project Scope and Team

1. What is the general scope of work for this project?

Click here to enter text.

2. Who are the key ERM members of the envisioned project team?

Role	Assigned
Partner-in-Charge	Jim Perazzo
Project Manager	Chris Wenczel
Field Safety Officer	Brice Lynch
Construction Manager	Click here to enter text.
Subject Matter Expert	
Other: Click here to enter text.	Click here to enter text.
Other: Click here to enter text.	Click here to enter text.

3. Who are ERM's direct contractors for this project? Ensure that all contractors are green-flagged in PICS prior to work start.

Contractor	Task
Eastern Environmetal Solutions	Well installation
Click here to enter text.	Click here to enter text.
Click here to enter text.	Click here to enter text.
Click here to enter text.	Click here to enter text.
Click here to enter text.	Click here to enter text.
Click here to enter text.	Click here to enter text.

Part I Completed: *PM Initials:* Click here to enter text. *Date:* Click here to enter a date.

Part II: Project Security Issues

4. Is full-time security needed/required?

No, but there will be an povernight watch during well installation tasks

5. Who controls site access?

Well installation and monitoring are variously on public and private property. ERM will coordinate with drilling contractor to assure site and equipment security.

6. How is site access controlled?

ERM field team will monitor security.

7. What site constituents pose special security risks (e.g., highly toxic chemicals or very valuable materials)?

Drill rigs and support vans need be secured against vandalism.

8. Are there hazardous materials (e.g., drill cuttings or other wastes) that will be shipped from the site?

Soil cuttings and purge water will be drummed and stored in a secured cage for disposal at client approved facility.

9. Are there community issues that may impact safety?

The SOW provides for community feedback. Impact to public activities and safety should be minimal during remedial activities.

10. If work will affect local traffic patterns, are plans in place to contact authorities for specific local requirements?

NA

Part II Completed: *PM Initials:* Click here to enter text. *Date:* Click here to enter a date.

Part III: Project Environmental Issues

11. Where is the site located (provide address)?

Site is 150 Fulton Ave, Garden City NY and environs.

12. What regulations will apply to the work (e.g., EPA, State or local regulations, building codes, etc.)?

Nassau County, US EPA, NYS DEC

13. What aspects of the work will require specific professional training, certification, or licenses (e.g., State contractor's license, Professional Engineer seal, etc.)?

PE

Part III Completed: *PM Initials:* Click here to enter text. *Date:* Click here to enter a date.

Part IV: Client-Specific Requirements

14. What general, client-specific HSSE requirements (i.e., those above and beyond what would normally be specified in the ERM health and safety plan (HASP) will impact the work? Examples may include site-specific training, use of client-specific incident reporting procedures, loss prevention training, and permit-to-work policies.

N/A

Part IV Completed: *PM Initials:* Click here to enter text. *Date:* Click here to enter a date.

PART V: Project Health and Safety Planning/Execution Checklist		
Item	**PM Initials**	**Date Complete**
Draft HASP Preparation		
Applicable HASP documents completed.	CW	7/14/2017
Approximate scope of work and tasks developed.	CW	7/14/2017
Applicable procedures from the Global Safety Management System (SMS) identified.	CW	7/14/2017
Site constituents identified; appropriate informational sheets on each collected.	CW	7/14/2017
Safety Data Sheets (SDS) acquired for chemicals/materials that will be used to help complete the work.	CW	7/14/2017
Personal protective equipment (PPE) and respiratory protection assessment has been performed.	CW	7/14/2017
Medical surveillance requirements have been determined.	CW	7/14/2017
Draft Job Hazard Analyses (JHAs) have been prepared for envisioned work tasks.	CW	7/14/2017
Client approval prior to issuing draft HASP for bid.	N/A	N/A
HASP Finalization and Pre-mobilization		
Contractors' means and methods understood.	yes	Click here to enter a date.
Final JHAs prepared with input of contractors.	Click here to enter text.	Click here to enter a date.
HASP reviewed by member of ERM North America HASP review team.	yes	Click here to enter a date.
HASP signed by ERM Project Team.	Click here to enter text.	Click here to enter a date.
Project FSO appointed and made familiar with the HASP.	yes	Click here to enter a date.
Subcontractor personnel training documentation received and verified.	Click here to enter text.	Click here to enter a date.
First Day on Site		
All site personnel read and sign the HASP. Note that subsequently arriving site personnel must also read and sign the HASP prior to initiating site work.	Click here to enter text.	Click here to enter a date.
All site personnel training requirements verified. Note that subsequently arriving site personnel must also provide ERM with appropriate training documentation.	Click here to enter text.	Click here to enter a date.
All "first day" HASP review and training completed at the site.	Click here to enter text.	Click here to enter a date.
Project Close Out		
Ensure that all medical monitoring requirements have been met.	Click here to enter text.	Click here to enter a date.
Ensure that all ECS entries have been finalized.	Click here to enter text.	Click here to enter a date.
Ensure that all action items, if any, from any incident, near miss, unsafe act, or unsafe condition ECS reports have been completed.	Click here to enter text.	Click here to enter a date.
Ensure that all subcontractor safety performance information has been obtained and the performance evaluation has been conducted.	Click here to enter text.	Click here to enter a date.
Transfer site health and safety files to the office.	Click here to enter text.	Click here to enter a date.
Consolidate project health and safety files.	Click here to enter text.	Click here to enter a date.

1. Purpose and Scope

This procedure describes:

- Contractor health, safety, security, and environmental (HSSE) performance expectations;
- The pre-evaluation process for approval of contractors, their safety programs, and their insurance documents;
- The evaluation of contractor safety performance while working for ERM; and
- The responsibilities of the ERM project team with respect to implementation of this program and oversight of contractor safety.

The procedure applies to all ERM work activities which are contracted to an outside firm, except those specifically excluded elsewhere in this document. This procedure does not apply to third party contractors which may be working on the same site as ERM, but do not have a contractual relationship with ERM.

2. Roles and Responsibilities

Partner in Charge (PIC): Responsible for the following elements:

- Ensure a contractor management program is implemented, understood, and followed by employees under their charge and working on their projects;
- Appoint a Project Manager/Supervisor who will manage all aspects of conformance with the procedure;
- Approve and execute contractor agreements for each contractor working on ERM projects/sites and may participate in negotiations, as necessary;
- Assess, in conjunction with the Project Manager/Supervisor, the performance of ERM contractors based on observations and assessments in the field;
- Correct, in conjunction with the Project Manager/Supervisor, any observed deficiencies in the performance of the ERM contractor; and
- Correct any deficiencies in the implementation of the program as identified by the Division HSSE Leader.

Project Manager/Supervisor: Responsible for the following elements:

- Perform observations of contractor work processes to assess whether or not the contractor is operating in accordance with applicable health and safety requirements;

- Verify contractors are approved to provide services to ERM as established by ERM's Global Contractor Management Program.;
- Communicate ERM and client driven HSE requirements to project contractors by providing the standard contractor agreement or a project- or client-specific contractor agreement during project planning or scoping;
- Understand and confirm the competency of ERM contractor staff who will be providing field project support;
- Request required documentation from contractors as defined in any project-specific agreements (i.e., Contractor Health and Safety Plans, Job Hazard Analyses (JHAs), work procedures, etc.);
- Interact with and mentor contractors during the working relationship;
- Evaluate best practices provided by contractor personnel for potential inclusion in project work planning;
- Stop work where deviations from accepted health and safety requirements are observed;
- Correct, in conjunction with the PIC and the Division HSSE Leader, any observed deficiencies in the performance of the contractor;
- Work with the contractor to complete incident investigations and, where needed, root cause evaluations, for incidents and high-value near misses which occur on ERM job sites; and
- Contact ERM Legal in the event of serious or repeated breaches of health and safety requirements and assess whether action is warranted under the contract.

Division HSSE Leader: Responsible for the following elements:

- Evaluate implementation of these policies during health and safety plan reviews and project audits; and
- Communicate identified deficiencies to the PIC.

ERM Staff: Responsible for the following elements:

- Attend and interact with contractors during safety meetings to ensure that the scope of work, risks and precautions are understood by all project participants;
- Raise any concerns of job performance with the project management and contractors as established in the project communications plan, including implementing stop work authority if there is an imminent risk of injury or property damage; and
- Utilize the Event Communication System (ECS) to report any incidents, near misses, unsafe acts and conditions and remarkable safe behaviors observed during work with contractors.

3. Definitions

A contractor is defined as a person or company engaged by ERM for work or services billed to a project, or work or services for ERM in an ERM office. The term "contractor" may include contractors, subcontractors, consultants, sub-consultants, vendors, and suppliers.

Companies that provide a professional service to ERM such as accounting, legal or professional services, travel planning, taxis, etc., or who provide a supply service to ERM offices, such as non-operated equipment rental, coffee vending, food vending, water cooler vending, etc. are not considered contractors under this procedure.

4. Procedure

4.1 Contractor Prequalification and Selection

Contractors desiring to perform work for ERM shall be required to be pre-qualified in accordance with ERM's Global Contractor Management Program. In the USA, Pacific Industrial Contractor Screening (PICS), a third-party service provider, qualifies and maintains updated information about suppliers and contractors based on the requirements of its clients. Contractors will submit a variety of information to PICS, including insurance limits, OSHA logs, safety and training programs, bonding capability, and diversity information. Potential contractors also have to agree to adhere to ERM's policies, including our Anti-Bribery and Corruption (ABC) Policy and Business Conduct and Ethics Agreement, and Subsurface Clearance Program (as applicable).

PICS shall evaluate the information provided by the proposed contractor and compares it to a detailed list of requirements provided by ERM. Information submitted by the contractor must be updated at least annually.

ERM's minimum safety criteria for US firms are as follows:

- No fatalities in the past 5 years;
- A Total Recordable Incidence Rate (TRIR) at or below the industry average for the past 3 years based on North American Industrial Classification System (NAICS) code;
- A Days Away/Restricted/Transfer (DART) rate at or below the industry average for the past 3 years based on NAICS code;
- An Experience Modification Rate (EMR) at or below 1.0 for the past 3 years; and
- No open or unresolved regulatory citations within the past 3 years.

Companies that service ERM offices such as coffee vendors, vending machine companies, water cooler vendors, etc. do not have to be qualified under this procedure. Additionally, retailers providing point-of-sale purchases (e.g., purchase of a tool from Home Depot) do not have to be qualified under this procedure.

Further information on prequalification can be found on the Contractor Prequalification Health and Safety Prequalification Process section of the Americas Health and Safety page on Minerva.

4.2 Contractor Interactions/Expectations

The Project Manager/Supervisor must ensure that the contractor is provided with necessary information to work safely, including, but not limited to:

- ERM contact name and phone number;
- ERM health and safety requirements;
- Client health and safety requirements (including any drug and alcohol policies);
- Site-specific emergency action plans; and
- Safety information from other ERM contractors or third-party contractors at the site.

The Project Manager/Supervisor must ensure that contractor personnel participate in site-related safety meetings, including pre-job meetings, safety orientations, daily tailgate safety meetings, and any job-related safety inspections.

Contractors must conform to all regulatory and policy driven HSSE requirements. Contractors are contractually and legally responsible for providing personnel who are qualified to meet or exceed the expectations of ERM and customer work scopes. Contractor agreements are used to clearly define contractor accountabilities and responsibilities.

Contractors are expected to conform to their internal HSE policies and requirements as well as those of ERM and ERM clients. Where conflicts exist between these policies and requirements, contractors must adhere to the most stringent policy and requirement. Where needed, the contractor should have the capability to develop additional safety procedures or hazard assessments for work that is performed exclusively by their employees and for which they may have superior knowledge.

Contractors will provide, upon request and at the time of proposing services, a description of their HSSE system, as well as resumes, training certificates, course rosters, and other documents confirming contractor employee qualifications and competencies. ERM or our selected pre-qualification vendors may audit these systems and documentation for conformance with defined expectations. Contractors will be provided the opportunity to close any gaps identified during this evaluation and Project Managers/Supervisors will ensure gaps are closed before work begins.

4.3 Assessment of Contractor Performance

The Project Manager/Supervisor should regularly assess the contractor's operations to determine their level of compliance with applicable health and safety requirements. This should also include a review of required health and safety documentation. Assessment can be performed directly by the Project Manager/Supervisor or delegated to appropriate field staff. ERM's Health and Safety Guidance Document #33 (Health and Safety Audits) or equivalent must be used to conduct and document contractor operations.

Where ERM personnel observe safety events (i.e., incidents, near misses, unsafe acts/conditions) related to contractor operations, they should bring the events to the attention of ERM's Project

Manager/Supervisor as well as the contractor management team for immediate resolution. Events should also be posted in ERM's Event Communication System (ECS). Staff shall take the opportunity to also note remarkable safe behaviors to leverage positive activities for continuous improvement in projects.

The Project Manager/Supervisor will evaluate the contractor's performance following completion of the contracted work activities. If a contractor's performance is such that the PIC or the Project Manager/Supervisor feels that they should be barred from further use by ERM, a formal variance should be sent to the Division Managing Director (DMD) providing the reasons for the request. The DMD will make a decision regarding the contractor after consultation with appropriate ERM team members and can decide to change the contractor's approval flag status in ERM's Global Contractor Management System.

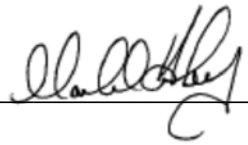
5. References

- PICS – www.picsauditing.com/
- ERM PICS Representative – Angela Wittman (awittman@picsauditing.com; 832-547-2710)
- ERM Health and Safety Guidance Document 33 (Health and Safety Audits)
- ERM Master Contractor Selection Flowchart
- ERM Variance Request Flowchart
- ERM Contractor Management Program Frequently Asked Questions (FAQs) Document

Document Control Information

Original Effective Date: 8/1/14

Policy Approval by: Mark Hickey

Approval Signature: 

Revision History

Section	Reason for Revision	Date
All	New document	3/6/14
All	Revised format to meet new Global SMS requirements	7/3/14
All	Changed “subcontractor” to “contractor” throughout; addressed comments of Regional H&S Director	8/1/14
4.2	Updated to include transmission of client’s drug and alcohol policies	5/19/15

1. Purpose and Scope

This document discusses methods for ensuring ERM maintains compliance with regulatory health and safety matters. This document applies to all ERM field and office locations.

2. Roles and Responsibilities

Partner in Charge (PIC): Responsible for the following elements:

- Ensuring the portions of this procedure relating to the development of health and safety plans (HASPs) are implemented, understood, and followed by employees under their charge and working on their projects; and
- Correcting any deficiencies in the implementation as identified by the Division Health and Safety (H&S) Leader.

Regional H&S Leader: Responsible for interacting with ERM's internal Legal Department to receive and interpret regulatory updates/changes which impact the H&S practice.

Division H&S Leader: Responsible for the following elements:

- Evaluating implementation of this procedure during health and safety plan reviews and project audits; and
- Communicating identified deficiencies to the PIC.

3. Definitions

None.

4. Procedure

4.1 Information Sources

Relevant information sources are used to determine regulatory requirements and changes that affect ERM's business. These information sources are consulted regularly to review full-text regulations. Changes affecting ERM operations are then included in formalized ERM health and safety procedures and loaded into the ERM's Document Control System (DCS).

4.2 Legal and Regulatory Compliance

ERM's Health and Safety team and Legal Department work closely together to check particular issues for legality and regulatory compliance and to receive updates or changes in laws that affect H&S practices.

4.3 Health and Safety Plans

Health and safety plans are developed for all ERM activities that require work outside an ERM setting. ERM HASP formats are regularly reviewed and updated to incorporate changes in regulations. Once a HASP has been developed it goes through an internal review by a health and safety professional that provides input to the ERM PIC. The PIC is responsible for ensuring these comments are incorporated into the HASP and for issuing final approval of the HASP.

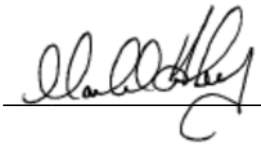
5. References

None.

Document Control Information

Original Effective Date: January 26, 2015

Policy Approval by: Mark Hickey on 1/26/15

Approval Signature: 

Revision History

Section	Reason for Revision	Date
All	New document.	1/26/15
All	Reformatted to meet new Global documentation requirements.	7/21/15

1. Purpose and Scope

This procedure establishes minimum requirements for work with hand tools and portable powered equipment. The purpose of this procedure is to ensure that hand tools and portable power equipment meet minimum safety requirements, are used in a the manner for which they are intended, and are maintained in a safe condition. This procedure is applicable to all North American operations.

2. Roles and Responsibilities

Partner in Charge (PIC): Responsible for the following elements:

- Ensure this procedure is implemented, understood, and followed by employees under their charge and working on their projects; and
- Correct any deficiencies in the implementation of this procedure as identified by the Division Health and Safety (H&S) Leader or other staff member.

Project Manager: Responsible for the following elements:

- Perform observations of ERM work processes to assess employee compliance with this
- procedure;
- Stop work where deviations from this procedure are observed; and
- Correct, in conjunction with the PIC and the Division H&S Leader, any observed deficiencies in the implementation of this procedure.

Division H&S Leader: Responsible for the following elements:

- Evaluate implementation of this procedure during project audits; and
- Communicate identified deficiencies to the PIC..

3. Definitions

Portable Power Equipment: Electric, pneumatic, gasoline or explosive-actuated hand tools.

Ground Fault Circuit interrupters (GFCI): A device that shuts off an electric power circuit when it detects that current is flowing along an unintended path, such as through water or a person.

Underwriters Laboratories (UL): A global product safety testing and certification organization.

4. Procedure

4.1 General Equipment Requirements

- All hand and portable power tools shall be maintained in safe working order and used only for the task for which they were designed.
- Hand and portable power tools, power supplies, and flexible cord sets (extension cords) shall be inspected prior to each use to identify any defects. Damaged or defective tools shall be immediately removed from service and identified through tagging or lockout of controls.
- Tool surfaces and handles shall be kept clean and free of dirt, grime, and excess oil to prevent slipping.
- Tools shall be cleaned and properly stored when not in use to prevent possible injuries and tool damage.
- Non-sparking tools shall be used in atmospheres with fire or explosive characteristics.
- Eye protection shall be used at all times during tool operation. Additional personal protective equipment (PPE) appropriate to the tool operation or work task shall be required and used, including face shields, hearing protection, respiratory protection and protective gloves.

4.2 Hand Tool Use

- Do not force tools beyond their capacity or use cheater bars or other instruments to increase their capacity.
- Do not use hand tools as pry bars.
- Do not throw tools from place to place or person to person.
- Do not drop tools from heights.
- Ensure that hands, fingers, and other body parts are out of the line of fire during tool usage.
- Brace yourself when using the tool in case the tool slips.

4.2 Portable Power Tool Use

- Loose clothing, long hair, loose jewelry, rings and chains are not allowed while working with power tools.
- Hands shall be kept clear of all cutting, rotating, or moving parts of powered tools.

- Portable power tools shall be safety tested and certified by Underwriters Laboratories (UL) or an equivalent authority.
- Electric power tools must be either double-insulated or equipped with a 3-wire grounded wiring and plug.
- Adapters which interrupt the continuity of the equipment grounding connection shall not be used.
- Tools shall only be used with a GFCI or a GFCI adapter. Do not handle wet cords and power tools unless they have been deenergized.
- Guards and safety devices provided by tool manufacturers shall not be removed or modified in any way which may interfere with their intended function.
- Portable equipment shall be handled in a manner which will not cause damage. Flexible electric cords shall not be used for raising or lowering the equipment and cords should not be fastened in any way that potentially damages the outer jacket or insulation.

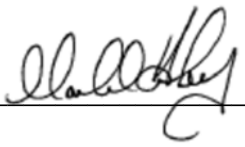
5. References

- Occupational Health and Safety Adminsitration (OSHA) Regulation 29 CFR 1910 Subpart P (Hand and Portable Powered Tools and Other Hand-Held Equipment)
- OSHA Regulation 29 CFR 1926 Subpart I (Tools – Hand and Power)

Document Control Information

Original Effective Date: 6/29/15

Policy Approval by: Mark Hickey

Approval Signature: 

Revision History

Section	Reason for Revision	Date
All	New document.	6/29/2015

1. Purpose and Scope

This document establishes procedures for the protection of personnel working on field projects with the potential for exposure to insect and arachnid bites, including mosquitoes and ticks. The standard applies to all North America operations where these hazards have been identified.

2. Roles and Responsibilities

Partner in Charge (PIC): Responsible for the following elements:

- Ensuring this procedure is implemented, understood, and followed by employees under their charge and working on their projects; and
- Correcting any deficiencies in the implementation of this procedure as identified by the Division Safety Leader.

Project Manager (PM)/Supervisor: Responsible for the following elements:

- Performing observations of ERM work processes to assess whether or not employees are operating in accordance with this procedure;
- Pausing or stopping work where deviations from this procedure are observed; and
- Correcting, in conjunction with the PIC and the Division Safety Leader, any observed deficiencies in the implementation of this procedure.

Division Safety Leader: Responsible for the following elements:

- Evaluating implementation of this procedure during health and safety plan reviews and project audits; and
- Communicating identified deficiencies to the PIC.

3. Definitions

Babesiosis: A rare, severe and sometimes fatal tick-borne disease caused by various types of ***Babesia***, a microscopic parasite that infects red blood cells. It is transmitted by the bite of an infected ***Ixodes*** tick (e.g., deer ticks).

DEET: A synonym of N,N-dimethyl-meta-toluamide. It is the most common active ingredient in insect repellents, providing protection against mosquitoes, ticks, fleas, chiggers, and many other biting insects.

Lyme disease: An infectious disease caused by the ***Borrelia*** bacteria, it is transmitted to humans by the bite of infected ***Ixodes*** ticks (e.g., deer ticks). Signs of infection may include a red rash

(sometimes seen as a bulls-eye), fever, headache, weariness, joint pains, heart palpitations, and memory loss.

Permethrin: A chemical belonging to the pyrethroid family which is widely used as an insecticide and insect repellent.

Picardin: A synthetic compound resembling the natural compound piperine, found in the plants which are used to produce black pepper. It is used an insect repellent for insects, ticks, and chiggers.

Rocky Mountain spotted fever: An infectious disease caused by the ***Rickettsia*** bacteria; it is transmitted to humans by the bite of infected ***Dermacentor*** ticks, a type of hard shelled tick (e.g., dog ticks). Initial signs and symptoms include sudden onset of fever, headache, and muscle pain, followed by development of a substantial rash. The disease is fatal in 3 to 5% of those who contract it.

West Nile virus: A member of the virus family ***Flaviviridae*** spread by various species of mosquitoes. Most infections (~80%) cause no symptoms. In less than 1% of cases, severe infection occurs which may result in neurological disease affecting the central nervous system, including encephalitis (inflammation of the brain) and meningitis (inflammation of the membranes covering the brain and spinal cord).

Zika virus: A member of the virus family ***Flaviviridae*** spread by the daytime-active ***Aedes*** mosquitoes. Zika virus is related to dengue, yellow fever, Japanese encephalitis, and West Nile viruses. It typically causes no or only mild symptoms, although it may spread from a pregnant woman to the baby, potentially resulting in microencephaly and other severe brain problems. Zika infections in adults can result in Guillain-Barre syndrome.

4. Standard

4.1 Hazard Assessment and Project Planning

Prior to the initiation of field work, the project team is required to perform a hazard assessment of the planned scope of work. This is done to identify any hazards that may impact project operations and the safety of ERM staff, as well as to identify the appropriate methods for mitigation. Mosquitos have the potential to transmit the West Nile or Zika Virus and ticks can transmit various tick-borne diseases such as Lyme disease, Rocky Mountain spotted fever, and ***Babesiosis***. Therefore, if it is determined that any member of the project field team is likely to be exposed to mosquito or tick prone environments, the following measures must be incorporated in the development of the project health and safety plan (HASP).

4.2 Mitigation Measures

4.2.1 Avoidance Measures

Avoidance of the exposure must be considered as first priority before entering the field. An effort should be made to schedule work to avoid hours of peak mosquito activity, which are during the early morning and evening hours. Additionally, the identification of biting insect habitats such as grasslands, prairies, woodlands, and wetlands should also be identified, communicated to the field staff, and avoided to the extent practical.

The following measures must be implemented while out in the field:

- Avoid sitting on the ground.
- Wear long-sleeved, light colored garments.
- Tuck in shirts and tuck pants into socks or boots.
- Scan clothes, exposed skin, and equipment for ticks frequently. Ticks will climb upward in search of exposed skin, so check frequently.
- Shake off clothing and examine equipment before entering vehicles.
- Check vehicle for ticks. Placing a white or light colored cover over vehicle seats will aid with visual identification of ticks on the seats after the completion of field work.
- Conduct tick checks frequently, on self and on each other. At a minimum this should be done during breaks and before entering vehicles.

The following measures must be implemented when returning home or to the hotel at the end of the day:

- Shower as soon as you return to your room from the field. Showering should take place before doing any other activity.
- Wash and dry clothes in dryer for 20 minutes if possible; and
- Conduct a full body tick check using a mirror. Attached ticks generally climb upward until they reach a protected or creased area, often the back of the knee, groin, navel, armpit, ears, or nape of the neck.

4.2.2 Application of Topical Insect Repellent

While in the field, project team members are required to carry and periodically apply repellent containing DEET or an effective DEET alternative (e.g., Picaridin). Follow the product label application instructions printed on the bottle by the manufacturer.

Application tips and suggestions:

- Apply repellents only to exposed skin or clothing, as directed on the product label. Do not apply repellents under clothing.
- Repellents should be applied to field gear (e.g., backpacks) for additional protection.
- If wearing flame resistant clothing (FRC), make sure the repellent is safe to use with FRC. Some repellents can damage FRC.
- Never use repellents over cuts, wounds, or irritated skin.
- When using sprays, do not spray directly on face—spray on hands first and then apply to face. Do not apply repellents directly to eyes or mouth, and apply sparingly around ears.
- Wash hands after application to avoid accidental exposure to eyes or ingestion.
- Use enough repellent to cover exposed skin and clothing. If biting insects do not respond to applied repellents, apply a second application.
- After returning indoors, wash repellent-treated skin.

Repellant product specific Safety Data Sheets (SDS) should be obtained and kept with the project HASP.

4.2.3 Field Clothing and Pretreatment

In addition to the application of topical repellent, team members working in project environments that present a high risk of staff exposure to biting insects (as determined by the project team) are required to use treated clothing.

The cost of clothing treatment is considered a personal protective equipment expense and should be budgeted by the project team. There are two options for clothing treatment:

- **Factory-Applied Clothing Treatment:** Factory applied insect repellent to apparel has been proven to be the most effective option available to prevent exposure to mosquitos and ticks. There are several clothing brands (including, but not limited to, InsectShield®, ExOfficio®, and Columbia®) that sell garments treated with permethrin that can minimize exposure to biting insects. Costs of these garments vary and can range from $50 to $100 USD for a shirt or pants.

  For untreated garments owned by staff that are more adapted to heavy field use (i.e., jeans, high-vis shirts, or Carhartts®), Insect Shield® offers a service to treat garments with a formulation of permethrin. The garments to be treated are mailed to InsectShield® and returned within a week. The product is United States Environmental Protection Agency (USEPA) registered, which is designed to evaluate a proposed product to ensure it will not have adverse effects on people or the environment. InsectShield® states that the treatment can last up to 70 washes. A "how-to" video, shipping details, and pricing guide can be found on their website (www.insectshield.com). The standard cost to treat clothing is $10 USD per garment. Cost options should be factored into project budgets.

- **Self-Applied Clothing Treatment:** Insect repellent that is applied to field clothing by the employee is also an effective method of bite prevention. Several types of repellents are available on the market that can be applied to clothing in either a spray or a liquid soak method. These products are available from retailers, including but not limited to, Walmart, Bass Pro Shop, and Cabelas.
  - Permethrin Spray – Non-aerosol and aerosol spray treatments can be effective against ticks, chiggers, and mosquitoes. Typically, one bottle contains enough spray to treat up to two outfits. One treatment will last up to six washings or six weeks. Permethrin should never be applied to skin but only to clothing, gear, or other fabrics as directed on the product label.
  - Sawyer Permethrin Soak Treatment - This kit provides the same protection for clothing as the Permethrin spray, but in a soak treatment that is effective for six washings or six weeks. Soak your items in the solution for two hours and hang to dry.

  It is important to note that due to the shorter effective duration for self-applied clothing treatments, an employee-maintained schedule for reapplication of the product should be implemented through the duration of the field season

4.2.4 Employee Reaction to Repellents/Treatments

ERM recommends that the employee "test" repellents and treated clothing prior to field use. If an employee experiences a rash or other reaction, such as itching or swelling, from an insect repellent, the repellent should be washed off with mild soap and water and its use discontinued. If a severe reaction has occurred, WorkCare should be called for further guidance.

4.2.5 Staff Substitutions

ERM will not require staff to use chemically treated clothing or repellents if they have health concerns. However, when the project HASP identifies a reasonable potential for ERM staff to be exposed to biting insects, the PM and PIC are responsible to ensure that field staff are properly equipped, educated, and willing to apply topical insect repellent and utilize pretreated clothing. In the event that an employee is not willing to wear treated clothing, apply insect repellent, or identify an effective alternative to either, then their role in the field effort should be reconsidered by the project management.

For more information regarding bite prevention strategies and clothing treatment options, contact your Division Safety Leader.

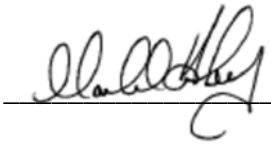
5. References

- ERM Procedure S3-NAM-021-PR (***Personal Protective Equipment***)
- ERM Procedure S3-NAM-029-PR (***Project Health and Safety***)

Document Control Information

Original Effective Date: 4/29/16

Policy Approval by: Mark Hickey

Approval Signature: 

Revision History

Section	Reason for Revision	Date
All	New document.	4/29/16

1. Purpose and Scope

This document establishes the procedures for implementing ERM's incident management strategy in the event of an injury or illness. Developing a strong incident management process is an essential part of promptly responding to occupational injuries and illnesses. This document applies to all ERM field and office locations.

2. Roles and Responsibilities

Partner in Charge (PIC): Responsible for the following elements:

- Ensure the procedure is implemented, understood, and followed by employees under their charge and working on their projects; and
- Correct deficiencies in the implementation of the procedure as identified by the Division Health, Safety, Security, and Environment (HSSE) Leader.

Project Manager (PM)/Supervisor/Branch Manager (BM): Responsible for the following elements:

- Perform observations of ERM work processes to assess whether or not employees are operating in accordance with the procedure; and
- Correct, in conjunction with the PIC and the Division HSSE Leader, any observed deficiencies in the implementation of the procedure.

Division HSSE Leader: Responsible for the following elements:

- Evaluate implementation of the procedure by Division personnel during ECS reviews; and
- Communicate identified deficiencies to the PIC and Divisional management teams.

Employee: Responsible for the following elements:

- Report work-related injuries/illnesses as soon as possible to their PM/Supervisor/BM;
- Comply with the requirements of the procedure during response to injury/illness events;
- Work with the ERM management, HSSE, and Human Resources (HR) teams to ensure the best outcome for the employee; and
- Notify the ERM management, HSSE, and HR teams of any change in injury/illness status, as well as providing copies of any appropriate paperwork supporting these changes from medical professionals.

3. Definitions

- Work-related injury/illness – An injury or illness that arises out of and in the course of employment.
- Injury – A wound caused by an external force that affects a specific part of function of the body and has an identifiable time and place.
- Illness – Systemic infections, exposure to hazardous materials, repeated stress and strain, and/or other repeated exposures to conditions that result in harm or loss of function, but do not meet the definition of an injury.

4. Procedure

4.1 Pre-Injury Management

4.1.1 Work Site Evaluation

Project sites and offices shall evaluate a location for the potential to cause an injury or illness. This evaluation must consider the following, at a minimum:

- The types of injury or illness that could reasonably occur under given site conditions;
- The location of emergency and non-emergency medical centers;
- The anticipated response time for local emergency services (e.g., ambulance, paramedics, site emergency teams, etc.);
- The presence of hazardous materials or conditions;
- The types of training needed for employees to respond to identified hazards;
- The type of training needed for first aid responders; and
- The type of first aid supplies required for potential response to site hazards.

4.1.2 Risk Assessment

A written Work Activity Risk Assessment (WARN) health and safety plan (HASP) must be prepared for all field projects. The HASP must contain contact information, including maps and phone numbers, for the nearest emergency medical services/hospital location, as well as for potentially needed emergency services (e.g., fire department, police, ambulance) and for Workcare, ERM's medical services provider. Advance contact with ambulance services to ensure they are familiar with location, access routes, and hospital locations is advised in remote or new locations.

An Emergency Action Plan (EAP) must be prepared for all ERM office locations. Since ERM offices are typically located in well-populated urban centers, the location of specific emergency medical services locations are not required to be posted in the EAP; however, emergency contact

information for potentially needed emergency services, building management staff, and Workcare must be provided.

4.1.3 First Aid Services

The availability and application of first aid services, including first aid kits, is discussed in Section 4.1 of ERM H&S Procedure S3-NAM-019-PR (***Medical Services***).

4.1.4 First Aid Responders

Expectations regarding the availability of first aid responders in both field and office settings are discussed in Section 4.1.1 of ERM Procedure S3-NAM-019-PR (***Medical Services***). Trained first aid responders should be designated in such a fashion that employees know who they are and how to contact them.

4.1.5 Eyewash Facilities

If corrosive materials are used, eyewash and body flush facilities must be provided. Where possible, these should provide large quantities of clean water. The water source must be pressure controlled and clearly identified.

4.2 Post-Injury Management

4.2.1 Transportation

When employees require urgent medical attention as the result of a work-related injury/illness, transportation shall be provided to the urgent care facility via ambulance or similar method (if a critical condition) or ERM vehicle. Employees should not be permitted to drive themselves unless safe to do so.

4.2.2 Treatment of Critical Injury/Illness

In the event of a critical injury or illness, employees must be seen by a medical professional as quickly as possible. For purposes of this procedure, critical injuries shall include, but not be limited to:

- Uncontrolled bleeding or significant blood loss;
- Chest pains;
- Breathing difficulty;
- Known or suspected bone fractures;
- Known or suspected internal injuries;
- Known or suspected overexposure to chemical, biological, or radiological hazards;
- Severe electric shock or electrocution;
- Second, third, or fourth degree thermal, chemical, electrical, or radiation burns;
- Loss of consciousness; or

- Sudden behavioral changes, including confusion, disorientation, or aggression.

In these situations, an ERM employee should always accompany the injured or ill employee to medical care. The accompanying employee should contact Workcare, ERM's medical consultant, as soon as possible to alert them to the injury. Where necessary, Workcare's occupational physicians will provide peer-to-peer interaction with emergency room physicians to ensure appropriate care is provided to our employees. The accompanying employee shall also be responsible for maintaining contact with appropriate ERM management and H&S team members to alert them to issues relating to the injured/ill employee and their condition.

4.2.3 Treatment of Non-critical Injury/Illness

In the event of a non-critical injury or illness, employees must call Workcare's Incident Intervention service (available 24 hours per day, 7 days per week). When contacted, an occupational nurse or physician provides medical advice to the injured or ill employee, which may include a referral to a medical clinic. If referral is required, Workcare's occupational physicians will provide peer-to-peer interaction with medical clinic physicians to ensure the level of care and treatment is appropriate to the symptoms presented. The employee is also responsible for maintaining contact with appropriate ERM management and H&S team members to alert them to issues relating to their condition.

4.2.4 Workers' Compensation

A workers' compensation claim will be filed for each instance where work-related medical treatment is provided to ERM employees. The HR team will be responsible for filing these claims, and will be informed by Workcare whenever a referral to a medical clinic is made for an ERM employee. Additionally, HR staff will:

- Serve as a point of contact for the workers' compensation insurance carrier adjuster; and
- Work with ERM providers to coordinate disability benefits associated with work-related injury/illness.

4.2.5 Return to Work

Employee supervisors, after consultation with the Division HSSE Leader and the HR team, may assign an employee who is recovering from a work-related injury or illness transitional employment during their recovery period, if such employment exists. Transitional employment includes temporary modified, restricted, or light duty work covering the time from the injury/illness until the release to full duty by the doctor. Each case will be evaluated individually.

Application of any transitional employment must be documented in writing and signed by a medical doctor before any action can be taken. The change in status will only be allowed for the period of time designated by the doctor. The employee must continue to comply with all doctor-mandated appointments and treatment during this time. Any changes in duty status as a result of an appointment or treatment visit must be provided to the employee supervisor in writing.

At a minimum, and regardless of the employee's current case status (i.e., lost time, restricted duty, etc.), the employee's supervisor will maintain contact with the employee on a weekly basis

A written work release for full and unrestricted duty from a medical doctor is required before the injured/ill employee may return to their original job duties.

5. References

- ERM Work Instruction S3-NAM-037-WI1 (***Injury/Illness Management Flow Chart***)

Document Control Information

Original Effective Date: 8/5/14

Policy Approval by: Mark Hickey

Approval Signature: 

Revision History

Section	Reason for Revision	Date
All	Revised and edited to meet new Global SMS requirements and update procedures	8/5/14
All	Changed "Case Management" to "Injury/Illness Management".	12/30/14
Intro, 4, 5	Updated Applicability. Updated references in Sections 4 and 5.	1/12/16

	Applicability:	Form	Document Number:	Version:
	North America		S3-NAM-038-FM1	2
	Title: **Pre-Mobilization Activities**		**Last Revision Date:**	6/25/15

		Date Completed	Completed By	Applicable Regulatory References
General				
1	Estimate the expected quantities of each different waste type that may be generated during the job.			
2	Evaluate the potential for recycling/reuse of any wastes generated, as well as any requirements for such.			
3	Determine containment/cover/storage requirements for each type of waste.			
4	Verify which wastes will be placed in client-provided containers for management by the client and which waste ERM will need to containerize.			
5	Develop plan for segregating wastes as needed to facilitate proper handling and ultimate disposal or recycling.			
6	Instruct members of the project team that will be responsible for waste management activities on the requirements for proper waste handling and disposal as established in the project-specific waste management plan.			
Transport				
1	Verify if the waste material is hazardous or nonhazardous. If you are unsure how to make this determination, consult an ERM waste characterization expert.			
2	Verify that all analytical data needed to properly characterize each waste type has been collected.			
3	Verify waste shipment origin, destination, and transit route are within the country of origin only.			
4	Verify proposed disposal facility is on client-approved waste site list (if applicable) and qualified for type of waste.			
5	Verify transporter is licensed to haul the waste and that they have the correct State and Federal numbers.			
6	Verify who will sign the waste profiles and manifest prior to submittal to disposal facility.			
7	If client is not signing profiles or manifest, verify that a "Letter of Authorization" from the client has been completed and signed, identifying ERM as the authorized entity for the manifesting.			
8	If ERM is authorized to sign manifests for the project, and any of the waste are classified as hazardous, identify specific personnel with proper DOT (or other) training.			

	Applicability:	Form	Document Number:	Version:
	North America		S3-NAM-038-FM2	2
	Title: **Project Execution Activities**		**Last Revision Date:**	6/25/15

		Date Completed	Completed By	Applicable Regulatory References
Profile: To be completed when a new waste profile is prepared.				
1	Verify waste profile exists and proposed disposal facility has accepted profile. If not, prepare profile as indicated.			
2	Obtain waste profile form from selected waste disposal facility.			
3	Determine/obtain waste code(s).			
4	If requested by disposal facility, assemble analytical and/or TCLP data characterizing the constituent makeup of the waste (to be submitted with final profile).			
5	Verify waste profile will be signed by a DOT HM 126-trained and client-authorized employee or representative.			
6	If client is not signing profile, verify "Authorized Agent on behalf of" is written on the signature line on the profile.			
7	ERM Project Manager has reviewed the profile.			
8	ERM Partner-In-Charge has reviewed the profile.			
9	Submit profile to disposal facility for review and approval.			
Transport: To be completed in the field at the time of transport for disposal or recycling.				
1	Verify waste manifest is prepared correctly:			
	• Use Federal Uniform Hazardous Waste Manifest for hazardous waste and the disposal facilities' approved manifest for nonhazardous waste.			
	• Verify manifest will be signed by a DOT HM 126 trained and client-authorized employee representative.			
	• Verify "Authorized Agent on behalf of" is written on the signature line of the manifest.			
2	Verify that appropriate labels have been placed on the waste containers prior to transport.			
3	Verify correct quantity for disposal is written on manifest.			
4	Verify transporter signed and dated manifest.			
5	Verify that an authorized signature and current dates are on the manifest.			
6	Verify you have the generator's copy of the manifest with the transporter's signature.			

1. Purpose and Scope

This procedure outlines general planning steps that should be followed on projects where ERM's activities (or those of ERM's contractors) are likely to create wastes or where ERM has taken some contractual responsibility for handling waste for the client. ERM generally does not generate significant hazardous or non-hazardous waste as part of its operations, since ERM's role is typically limited to supporting waste management activities of the client (owner or responsible party). In those situations, ERM does not direct or control waste management activities, but will use the waste management plan developed by the client.

This procedure is not intended to address all possible waste management situations. Project-specific adjustments may need to be made as appropriate depending on specific circumstances.

2. Roles and Responsibilities

Partner in Charge (PIC): Responsible for the following elements:

- Ensure this procedure is implemented, understood, and followed by employees under their charge and working on their projects; and
- Correct any deficiencies in the implementation of this procedure.

Project Manager: Responsible for the following elements:

- Perform observations of ERM work processes to assess employee compliance with this procedure;
- Stop work where deviations from this procedure are observed; and
- Correct, in conjunction with the PIC, any observed deficiencies in the implementation of this procedure.

3. Definitions

None.

4. Procedure

For projects described in Section 1, a waste management plan specific to the project activities should be developed. The plan should address the following basic elements:

- Assessment of the nature and type of waste;
- Estimate of the amount of each waste that may be created;

- Evaluation of the proper handling, storage, transportation and disposal methods appropriate to manage the various wastes;
- Sampling, analysis, and proper characterization of any wastes and interface with the client to confirm storage, transportation, and disposal requirements; and
- Arrangement for proper manifesting and transportation of the materials.

The waste management plan will be reviewed and approved by the PIC and, where necessary, the client prior to execution.

4.1 Pre-Mobilization

Prior to mobilizing to the field, a project health and safety plan (HASP) must be developed, in accordance with S3-NAM-029-PR (***Project Health and Safety***) to assess the potential hazards associated with the operations that will be undertaken during the project. As part of the review of project hazards, the ERM Project Manager and PIC will evaluate the project scope to assess whether the project will likely involve waste generation by ERM or if ERM will be directly responsible for managing wastes.

If the evaluation indicates that ERM or its contractors will be generating wastes or will be responsible for waste management, the applicable portions of S3-NAM-038-FM1 (***Pre-Mobilization Activities***) will be factored into the project-specific waste management plan. The form provides guidance on the subtasks that generally should be followed during the pre-mobilization phase of the project to address waste management requirements.

Depending on the complexity of the project and client requirements, S3-NAM-038-FM1 may be replaced with a more detailed document that addresses each element in S3-NAM-038-FM1, as needed. The documentation will then be combined with the project execution phase (Section 4.2) to complete the project-specific waste management plan.

4.2 Project Execution

The waste management plan must anticipate activities to be conducted in project execution and set the stage for carrying them out within the framework of the overall plan. A general proposed format for including the necessary components in the plan to address such activities is presented in S3-NAM-038-FM3 (***Project Execution Activities***).

Following the project execution phase and depending on the nature of the project, it may be appropriate to prepare a waste management report. Such a report would provide a discussion on the types, amounts, and disposition of wastes that were handled during the work. The specific format and content of such a report should be discussed with and approved by the client.

5. References

- ERM Form S3-NAM-038-FM1 – ***Pre-Mobilization Activities***
- ERM Form S3-NAM-038-FM2 – ***Project Execution Activities***
- ERM Procedure S3-NAM-029-PR – ***Project Health and Safety***

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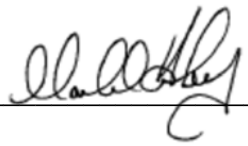
Approval Signature: 

Revision History

Section	Reason for Revision	Date
All	New document.	6/9/11
All	Reformatted document. Revision of document language in several areas.	6/25/15

1. Purpose and Scope

This document provides information on the calibrating and testing of direct-reading portable monitors. These instruments are designed to alert employees to the presence of toxic gases, vapors, and particulates; oxygen-deficient atmospheres; and combustible atmospheres. Examples may include photoionization detectors (PIDs), single gas monitors, multi-gas meters, particulate/handheld aerosol monitors, etc. Inaccuracies in the instrument due to improper maintenance and calibration can lead to hazardous atmospheric conditions which may cause serious injuries, illnesses, or death.

2. Definitions

Calibration – A test measuring an instrument's accuracy relative to a known traceable standard.

Bump test – Qualitative check in which a challenge agent is passed over an instrument's sensors at a concentration and exposure time sufficient to active all alarm settings. The purpose of the bump test is to confirm that the test gas can get to the sensor(s) and that the instrument's alarms are functional. The bump test does not does not provide a measure of the instrument's accuracy.

Response Time – The amount of elapsed time between the exposure of an instrument to the atmosphere and the corresponding display of the final observed value based on conditions at the time of measurement.

Zeroing – A procedure which resets the instrument's reference points. Depending on the instrument, this may require either introduction of a zero air gas (gas containing no or minimal traces of the gas or vapor the instrument is designed to detect) or installation of a zero air filter (a filter designed to remove all particulate from the measured atmosphere).

3. Calibration Procedures

There are two methods for verifying the accuracy of a direct read instrument – a calibration check and a full calibration. Each of these methods is appropriate in certain situations.

The employee should begin by zeroing the instrument. The process of zeroing should be described in the instrument manufacturer's calibration instructions. This helps to ensure that the calibration is accurate.

A calibration check verifies that the sensor(s) and alarms respond within the manufacturer's acceptable limits by exposing the instrument to a test gas. The employee conducting the calibration check compares the instrument reading to the concentrations indicated on the test gas cylinder. If the instrument's response is within the acceptable range of the test gas concentration, then the calibration check has verified the instrument's accuracy. The acceptable range is typically ± 10-20% of the test-gas concentration; however, this range is set by the instrument manufacturer and the manufacturer's guidelines should be reviewed prior to the calibration check.

If the calibration check results are not within the acceptable range, the employee should perform a full calibration. A full calibration adjusts the instrument's reading to coincide with a known concentration (i.e., certified standard) of test gas.

In all cases, employees performing instrument calibration must follow the manufacturer's guidelines for the specific instrument involved. This would include using the type and concentration of test gas, flow regulators, flow tubing, and calibration adapters (if needed) mandated by the manufacturer. It would also include allowing for the appropriate response time for the instrument to reach the values anticipated by the calibration gas.

Note that certain instruments cannot be field calibrated (e.g., handheld aerosol monitors). Follow manufacturer's guidelines for setting up these instruments for field use and performing factory calibrations at required frequencies.

4. Bump Tests

At a minimum, bump tests should be conducted each day prior to use of a calibrated instrument. The bump test may be replaced with a calibration check where warranted. If an instrument fails a bump test, a full calibration should be performed.

5. Additional Information

- Sensor responsiveness may vary with workplace environmental conditions, such as temperature and humidity. Where possible, operators should calibrate sensors in environmental conditions that are similar to the actual workplace conditions. Follow the manufacturer's guidelines for proper calibration.
- Test gas used for calibration gas should always be certified using a standard traceable to the National Institute of Standards and Technology (NIST). The provider of the test gas should be able to provide a certificate of analysis for every cylinder of test gas.
- Calibration test gases may remain stable for only a limited amount of time. Look for an expiration date on any test gas used. Never use a test gas after its expiration date.
- Instruments may experience calibration drift as the sensors age. This means that the sensor can still detect the calibration gas, but may not be able to do so accurately. This problem can be exacerbated by exposure to extreme environmental conditions, elevated concentrations of airborne contaminants, or heavy shock or vibration. It can also occur through harsh storage or operating conditions or gradual degradation of internal components. Frequently, this condition will cause failure messages to appear or will limit the ability of the employee to accurately adjust the sensor readings. If at any time the employee suspects the instrument is experiencing calibration drift, it should be returned for service by qualified personnel.

1. Purpose and Scope

This document establishes procedures to assist in reducing the potential for ERM employee fatigue by providing criteria for anticipation, recognition, treatment, and management. This document applies to all ERM employees and covers all ERM work activities.

2. Roles and Responsibilities

Partner in Charge (PIC): Responsible for the following elements:

- Ensure this program is implemented, understood, and followed by employees under their charge and working on their projects;
- Ensure, in conjunction with the Project Manager/Supervisor, that employees are properly trained in fatigue management and monitored for fatigue and fatigue-producing factors in their assigned tasks; and
- Correct any deficiencies in the implementation of this program as identified by the Division Health, Safety, Security, and Environment (HSSE) Leader.

Project Manager/Supervisor: Responsible for the following elements:

- Monitor the performance and behavior of the employees they supervise;
- Work with the Division HSSE Leader to develop project-specific fatigue management guidelines for inclusion in site-specific health and safety plans where significant fatigue-producing activities may occur, including work days in excess of 14 hours and work weeks in excess of 60 hours;
- Contact the PIC and the Division HSSE Leader if presented with information that indicates an employee may be fatigued; and
- Keep information related to an employee's medical condition confidential at all times.

Division HSSE Leader: Responsible for the following elements:

- Monitor new employees for completion of appropriate training;
- Review safety observations, near misses, injuries, and incidents that have occurred which may have occurred as a result of fatigue and use as opportunities to revise project-specific fatigue management procedures;
- Work with the Project Manager/Supervisor to develop project specific fatigue management guidelines for inclusion in site-specific health and safety plans where significant fatigue-producing activities may occur, including work days in excess of 14 hours and work weeks in excess of 60 hours; and

- Assist PICs and Project Managers/Supervisors in the implementation of this program, as needed.

Employee: Responsible for the following elements:

- Maintain a safe working environment in accordance with ERM and client-specific polices (as warranted);
- Complete all ERM and client-required initial and annual training to perform their specific work assignments;
- Manage their health in a manner that allows them to perform their work assignments safely;
- Arrive to work fit for duty and ready to complete their work assignments following established safe working practices and procedures and in a safe and effective manner throughout their scheduled work hours;
- Alert their Project Manager/Supervisor if they are not fit for duty or if their fitness for duty deteriorates during the course of their work hours due to fatigue; and
- Notify their Project Manager/Supervisor or appropriate Human Resources (HR) Manager if they observe a co-worker acting in a manner that indicates the coworker may be unfit for duty.

3. Definitions

Fatigue includes mental and/or physical exhaustion which prevents a person from being able to function normally. It is typically caused by a lack of restful sleep, but may also be associated with prolonged periods of physical and/or mental exertion without sufficient time to recover.

Fatigue can be caused by work-related stresses, non-work related stresses, or a combination of both. ERM impacts work-related fatigue, as it determines the type of work, the number of work hours and the number of employees assigned to a task, and the work environment. The employee has control over non-work related fatigue including their health, family responsibilities, and lifestyle.

Fatigue, and the level to which it impacts an employee, is associated with a number of factors. These include:

- The quantity and quality of rest obtained before and after a working day;
- The time of day in which work takes place;
- The amount of time spent in work-related activities;
- The type of work and the environment in which it is performed;

- The physical and mental demands of work;
- Extended travel and travel across time zones;
- Personal activities away from work, such as sports, family commitments, or second jobs;
- Disruption of normal circadian rhythms (daily rhythmic activity cycles);
- Individual factors, including existing medical conditions, illnesses, or sleep disorders; and
- Extreme alcohol intake or sleep deprivation

4. Procedure

4.1 Fatigue Recognition

Employees are expected to carry out their work activities in a manner that does not risk the health and safety of themselves, their fellow employees, or any other personnel on the site (e.g., contractors, clients, the public, etc.). If an employee feels that they are unable to perform their work activities safely due to the effects of fatigue, they are required to stop work immediately and notify their supervisor.

Similarly, if an employee suspects a co-worker (including contractors or clients working with the employee) of suffering from the effects of fatigue, they are required to intervene on behalf of the affected person, stopping work and notifying their supervisor.

Characteristics that may assist in the identification of fatigue may include, but are not limited to:

1. Physical Symptoms
    a. Bloodshot eyes
    b. Poor coordination
    c. Slower movements
    d. Slower than normal response to verbal queries/commands or radio communications
2. Cognitive Function Symptoms
    a. Distraction from task
    b. Poor or lapsed concentration
    c. Inability to complete tasks
    d. Short-term memory loss

e. Nodding off momentarily

f. Fixed gaze

g. Reports of blurred vision

3. Emotional/Behavioral Symptoms

a. Appears depressed

b. Does not care about work

c. Easily frustrated with task/irritability

d. Increased or noticeable level of unexplained or unusual absente

4.2 Fatigue Treatment

Where fatigue has been identified, employees are suggested to take action to treat the underlying causes of the fatigue. Suggestions include:

1. Getting adequate, regular and consistent amounts of sleep each night. A minimum of seven hours is recommended.
2. Eating well-balanced and healthy meals.
3. Ensuring adequate consumption of water throughout the day.
4. Exercising regularly.
5. Maintaining a reasonable work and personal schedule.
6. Avoiding alcohol, smoking, and drugs. Note that stimulants, including caffeine, may provide temporary relief from certain types of fatigue, but can increase the problem when the effect wears off.
7. Changing stressful circumstances through vacation or personal leave.
8. Contacting ERM's Employee Assistance Program (EAP) for fatigue-related issues beyond normal personal health care (e.g., addictive issues, family concerns, etc.).

When driving, employees should follow the fatigue avoidance techniques identified in Section 4.2 of ERM Procedure S1-ERM-008-PR (***Driver and Vehicle Safety***)..

4.3 Fatigue Management

4.3.1 Project Manager/Supervisor Responsibilities

Project Managers/Supervisors are responsible for managing fatigue in the work place. They are expected to:

1. Identify potential fatigue-producing factors at work and inform employees how they will be managed;
2. Monitor employees for signs of fatigue;
3. Provide employees with sufficient breaks for food, water, and rest;
4. Consult with employees regarding fatigue factors when extended work periods or shift work is anticipated;
5. Minimize early morning starts before 6:00 AM local time (except where shift work is required), as early start times give employees less time to get adequate sleep;
6. Minimize late evening work after 8:00 PM local time (except where shift work is required), as employee alertness tends to wane after these hours;
7. Attempt to limit extended work days to a maximum of 14 hours and extended work weeks to 60 hours;
8. Schedule work such that employees are given sufficient time to get a continuous 7 to 8 hour period of sleep in each 24 hours, and at least 50 hours every seven days, where shift work is required;
9. Supply adequate supervision for jobs that are physically or mentally demanding, repetitive, or require high vigilance;
10. Remove obviously fatigued workers from activities where there is a risk to safety and health; and
11. After providing an adequate rest break, consider rotating obviously fatigued workers to tasks that create a much lower immediate risk or advise them to go home (note that if driving home presents a further fatigue risk, the Project Manager/Supervisor should provide transportation to ensure the employee reaches home safely).

4.3.2 Employee Responsibilities

Employees are responsible for managing personal fatigue in the work place. Employees are expected to:

1. Report to work well-rested and mentally alert;
2. Manage personal lifestyle decisions in a manner that enables fitness for duty, including getting sufficient rest and sleep to recover from prior work duties, and managing personal, commuting, medical, and health issues;
3. Manage use of any drugs, including over-the-counter medications or prescriptions, which may affect their ability to perform work safely;
4. Seek medical advice for personal conditions affecting sleep, such as apnea or insomnia;
5. Notify your manager or supervisor when you are feeling fatigued;
6. Take adequate rest breaks for the working conditions;
7. Contact ERM's EAP if you need additional assistance for fatigue-related issues; and
8. Inform Project Manager/Supervisor when you suspect a co-worker of being fatigued.

4.4 Recordkeeping

Copies of any Project Manager/Supervisor notes and any documentation completed as part of a fatigue-based fitness for duty investigation will be maintained by the Division HR Manager.

5. References

- ERM Procedure S1-ERM-008-PR (***Driver and Vehicle Safety***)

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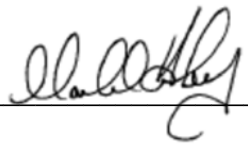
Approval Signature: 

Revision History

Section	Reason for Revision	Date
All	New document.	3/3/15

1. Purpose and Scope

This document establishes a system to effectively manage compliance across North America with United States (US) and Canadian regulations enforced by the Department of Transportation (DOT) and the Canadian Provincial Ministries of Transportation (MTO). This program is applicable to all ERM locations within the United States and Canada that operate a commercial motor vehicle (CMV) and/or transport placardable amounts of a hazardous material. It pertains to all ERM employees and CMV owner-operators operating under ERM authority, and provides a global approach that consolidates federal, provincial, state, and local requirements to achieve consistency throughout the North American region.

Where this document references Ontario requirements, they are intended to apply to all provinces, except in those circumstances where a more stringent requirement exists. This document has been prepared on the understanding that Ontario requirements are generally at least as stringent as those of other provinces

2. Roles and Responsibilities

Division Managing Director (DMD). Responsible for the establishment, implementation and maintenance of the program. Ensure supervisors and employees are trained according to the program. Provide constructive feedback for program modification and improvement.

BU Managing Partner (BU MP). Ensure implementation and adherence to the program in their area of responsibility. Ensure driver training requirements are met and that all required equipment / material are available. Ensure compliance with provisions of the program. Provide constructive feedback for program modification and improvement.

Regional H&S Director. Ensure management is updated regarding regulatory changes. Assess the impact of regulatory changes and provide feasible solutions. Provide constructive feedback for program modification and improvement.

Human Resources. Ensure management is updated regarding regulatory changes to the Driver Qualification (DQ) file process. Assess the impact of regulatory changes and provide feasible solutions. Provide constructive feedback for program modification and improvement.

Professional Driver. Ensure compliance with the provisions of the program, reporting violations of the program, and ensuring the safety of self and others in the workplace.

3. Definitions

Accident. An occurrence involving a CMV operating on a highway in interstate or intrastate commerce which results in:

- A fatality;
- Bodily injury to a person who, as a result of the injury, immediately receives medical treatment away from the scene of the accident; or
- One or more motor vehicles incurring disabling damage as a result of the accident, requiring the motor vehicles to be transported away from the scene by a tow truck or other motor vehicle.

The term "accident" does not include:

- An occurrence involving only boarding and alighting from a stationary motor vehicle; or
- An occurrence involving only the loading or unloading of cargo.

Commercial Driver's License (CDL): A document required for a professional driver to operate a motor vehicle according to the following license classifications:

US Requirements

- Any combination of vehicles with a gross combination weight rating (GCWR) of 26,001 or more pounds provided the gross vehicle weight rating (GVWR) of the vehicle(s) being towed is in excess of 10,000 pounds.
- Any single vehicle with a GVWR of 26,001 or more pounds, or any such vehicle towing a vehicle not in excess of 10,000 pounds GVWR.
- Any single vehicle, or combination of vehicles, that does not meet the definition of the first two bullets, but is either designed to transport 16 or more passengers, including the driver, or is placarded for hazardous materials.

Canada Requirements

- Ontario A – Any combination of a motor vehicle and towed vehicles where the towed vehicles exceed a total gross weight of 4,600 kilograms.
- Ontario D – Any motor vehicle exceeding 11,000 kilograms gross weight or registered gross weight, and any combination of a motor vehicle exceeding a total gross weight or registered gross weight of 11,000 kilograms and towed vehicles not exceeding a total gross weight of 4,600 kilograms.

Commercial Motor Vehicle (CMV): Self-propelled or towed motor vehicle used on a highway in interstate commerce to transport passengers or property when the vehicle meets the following parameters:

- Has a GVWR or GCWR of 4,536 kg (10,001 pounds) or more, whichever is greater; or

- Is used in transporting material found by the Secretary of Transportation to be hazardous under 49 U.S.C. 5103 and transported in a quantity requiring placarding.

Contract Carrier: A company that operates under his or her own authority/DOT number and insurance.

CVOR/MVR: Commercial Vehicle Operator Registration/Motor Vehicle Record are a record of licensing and compliance data (e.g., accidents, convictions, inspections) for a professional driver that must be renewed annually.

Disabling Damage: Damage which precludes departure of a motor vehicle from the scene of the accident in its usual manner in daylight after simple repairs.

Inclusions

- Damage to motor vehicles that could have been driven, but would have been further damaged if so driven.

Exclusions

- Damage which can be remedied temporarily at the scene of the accident without special tools or parts.
- Tire disablement without other damage even if no spare tire is available.
- Headlamp or tail light damage.
- Damage to turn signals, horn, or windshield wipers which make them inoperative.

DOT: Department of Transportation is the regulatory agency for a CMV operator in the United States.

Driver Qualification (DQ) File: A file maintained by an employer on each employee to prove a driver is qualified to operate a CMV. The information managed in a DQ file is regulated by the DOT/MTO.

Employee: Any individual employed by ERM who in the course of his or her employment directly affects commercial motor vehicle safety. Such terms include:

- Driver of a commercial motor vehicle (including an independent contractor while in the course of operating a commercial motor vehicle), and
- Mechanic.

Employer: Any person engaged in a business affecting interstate commerce that owns or leases a commercial motor vehicle in connection with that business, or assigns an employee to operate a commercial motor vehicle.

Hazmat Employee: A person who is:

- Employed on a full-time, part time, or temporary basis by a hazmat employer and who in the course of such full time, part time or temporary employment directly affects hazardous materials transportation safety;
- Self-employed (including an owner-operator of a motor vehicle) transporting hazardous materials in commerce who in the course of such self-employment directly affects hazardous materials transportation safety;
- An individual, employed on a full time, part time, or temporary basis by a hazmat employer who loads, unloads, or handles hazardous materials;
- Designs, manufactures, fabricates, inspects, marks, maintains, reconditions, repairs, or tests a package, container or packaging component that is represented, marked, certified, or sold as qualified for use in transporting hazardous material in commerce;
- Prepares hazardous materials for transportation;
- Is responsible for safety of transporting hazardous materials; and/or
- Operates a vehicle used to transport hazardous materials.

Interstate Commerce: Trade, traffic, or transportation in the United States:

- Between a place in a State and a place outside of such State (including a place outside of the United States);
- Between two places in a State through another State or a place outside of the United States; or
- Between two places in a State as part of trade, traffic, or transportation originating or terminating outside the State or the United States.

Intrastate Commerce: Any trade, traffic, or transportation in any State which is not described in the term "interstate commerce".

MCS 90: This is the "Endorsement for Motor Carrier Policies of Insurance for Public Liability." The endorsement assures that the commercial motor vehicle operator utilizes insurance to comply with the financial responsibility requirements of the regulations. Renewal of this form is required annually on April 1st.

MCS 150: This is the form known as the Motor Carrier Identification Report. It is collection of information that is mandatory and is required by US 49 CFR Part 385. The form must be filed by all motor carriers operating in interstate or foreign commerce. A new motor carrier must file MCS-150 before beginning operations. The operator must update information at least every two years.

Exceptions

- A CMV operator that has received notification of a safety rating from the Federal Motor Carrier Safety Administration (FMCSA) need not file the report.
- If you are a hazardous materials shipper, but not a CMV operator, you are not required to file this report. This information will be used to identify motor carriers subject to the Federal Motor Carrier Safety and Hazardous Materials Regulations.

Medical Review Officer (MRO): A person who is a licensed physician and who is responsible for receiving and reviewing laboratory results generated by an employer's drug testing program and evaluating medical explanations for certain drug test results.

Motor Vehicle: Any vehicle, machine, tractor, trailer, or semi-trailer propelled or drawn by mechanical power and used upon the highways in the transportation of passengers or property, or any combination thereof.

MTO: The Ministry of Transportation which is the regulatory agency for a CMV operator in Canada.

Owner/Operator: A company that may operate under ERM's authority/DOT number and insurance. An owner/operator operating under ERM's authority/DOT number makes ERM responsible just as if they were an employee (from the DOT standpoint only).

Previous Employer: Any DOT regulated person who employed the driver in the preceding 3 years, including any possible current employer.

Professional Driver: An employee that operates or might operate a CMV based upon their job description that has successfully completed appropriate training. To be considered an ERM Professional Driver, a person must meet the following criteria:

- Be in good health and physically able to perform all duties of a driver;
- Be at least 18 years of age;
- Speak and read English well enough to converse with the general public, understand highway traffic and signals, respond to official questions, and be able to make legible entries on reports and records;
- Be able to drive the vehicle safely;
- Know how to safely load and properly block, brace, and secure the cargo; and
- Have only one valid commercial motor vehicle operator's license.

Substance Abuse Professional (SAP): A qualified professional by a combination of education and/or expertise that can provide substance abuse counseling to a professional driver according to the ERM Employee Assistance Program and DOT/MTO regulations.

4. Procedure

4.1 DOT/MTO Registry Number Management Strategy

The strategy is to structure a DOT/MTO registry number in a manner that maximizes the value of a multi-locale organization while leveraging the ability to operate the business with a simple compliance model. Based on the strategy, the goal is to minimize the number of DOT/MTO registry numbers while maximizing the regulatory exemptions to create a competitive business advantage. A DOT/MTO number shall be acquired and maintained in accordance with all Federal, Provincial, State and local requirements.

For a new business acquisition that will require a DOT/MTO registry number, the following considerations will be made in the listed order of preference:

- Include DOT/MTO number from business to be purchased in the final purchase agreement;
- Roll newly acquired operation into an existing ERM DOT/MTO number; or
- Apply for a new DOT/MTO number.

An incorporated business entity that does not already have a DOT number assigned to the name will either adopt the existing ERM DOT number or apply for a new DOT if determined to be appropriate by the ERM management team.

4.2 Driver Qualification File

ERM and any entity operating under the authority of ERM will maintain a DQ file on every professional driver. The file will be developed and maintained as per DOT/MTO regulations and must be populated before a professional driver can operate a CMV.

The following documents will be required as part of the ERM DQ File. If a driver does not hold a CDL, but operates a CMV only for intrastate commerce, the driver must verify state-specific regulations to determine applicability and content of the DQ file.

Human Resources (HR) shall be responsible for acquiring all pertinent information for a new hire employee in order to establish a DQ file. Ongoing daily management of DQ file information shall be the responsibility of HR personnel at the ERM office to which the CMV is assigned.

US Requirements

The following list details the information to be maintained in a DQ file for a CMV operator in the U.S. involved in interstate commerce:

1. Employment Application – DOT approved
2. 3 year employment verification/3 year drug and alcohol verification

3. Driver's Right to review
4. Medical Certificate
5. Record of Road Test
6. Certification of Compliance
7. Motor Vehicle Record
8. Annual Reviews and Motor Vehicle Records
9. Copy of Driver's License
10. Drug and Alcohol Policy Statements
11. Signed Drug Verification Release
12. Driver's Drug and Alcohol Questionnaire
13. Written test (drivers prior to 1986)
14. Confidential Envelope containing Long Form Physicals

Canada Requirements

The following details the information to be maintained in a DQ file for a CMV operator in Canada:

1. Employment Application – MTO approved
2. 3 year employment verification
3. Driver's Right to Review
4. Record of Road Test
5. Certification of Compliance
6. Motor Vehicle Record
7. Annual Reviews and Motor Vehicle Records
8. Copy of Driver's License

Canadian CMV operators working in the United States only need comply with Canadian MTO regulations as a provision of North American Free Trade Agreement (NAFTA).

4.3 Past Employment Verification

US Requirements

Outgoing Information Requests: ERM and any entities operating under the authority of ERM will complete a 3-year past employment and drug/alcohol verification of any past employers in which the prospective professional driver was regulated by the DOT. Business

Unit HR groups shall be responsible for managing the process. This verification must be completed within 30 days from the date the professional driver is employed. HR will ensure that the DOT has been notified when any past employer operating under the DOT regulations fails to respond to a "good faith" effort to obtain a past employment verification within 30 days from the date of request.

The information past employers are required to release is:

1. Driver basic identification
2. Dates of employment
3. Accident elements as detailed in the DOT regulations for the previous three years
4. If the employee was subject to drug and alcohol regulations
5. If in the previous three years the employee violated the drug and alcohol prohibitions under the DOT
6. If the employee completed a rehabilitation program prescribed by a substance abuse professional (SAP) pursuant to DOT regulations
7. If the employee had subsequent violations of the drug and alcohol regulations following completion of a rehabilitation program

Incoming Information Requests: ERM and any entities operating under the authority of ERM will forward incoming past employment verification requests for employment as well as drug and alcohol on any professional driver to the HR department, who will respond to the request within 30 days of receipt of request. Information released will be limited to:

1. Driver basic information
2. Dates of employment
3. Accident history for the dates of employment
4. A "yes" or "no" response to the question of whether the employee was subject to drug and alcohol regulations
5. A "yes" or "no" response to the question of whether the employee violated the regulatory drug and alcohol prohibitions in the previous three years
6. A "yes" or "no" response to the question of whether the employee completed a rehabilitation program as prescribed by an SAP

The incoming request for verification must be accompanied by a written consent signed by the previous employee. Information will not be released without a signed consent form.

<u>Canada Requirements</u>

The information Canadian past employers are required to release are listed below. MTO regulations do not require the tracking of incoming information requests.

1. Driver basic identification
2. Dates of employment
3. Accident elements as detailed in the MTO regulations for the previous three years
4. If the employee was subject to drug and alcohol regulations

4.4 Physical

ERM and any entities operating under the authority of ERM will ensure that a professional driver is medically qualified and has been issued the required credentials as per DOT/MTO regulations. ERM will consult with Workcare, its medical surveillance provider, on appropriate elements to be included in the physical examination. HR must monitor physical information and expiration dates to ensure that at no time does a professional driver operate a CMV without a valid physical. The US requires that a medical certificate is to be kept for three years from the date of execution. Canada requires the medical certificate be attached as a condition of license issue; Canadian privacy acts only allow voluntary disclosure of information.

4.5 Drug Screen Program

ERM and any entities operating under the authority of ERM will perform drug and alcohol testing of all professional drivers in accordance with the appropriate local, state, provincial, and federal regulations.

US Requirements

Drug screening shall be administered at the following intervals according to DOT regulation:

- Pre-employment
- Random
- Post Accident
- Reasonable Suspicion
- Return to Duty
- Follow-up

Canada Requirements

Drug screening will be administered according to MTO regulation.

4.6 Maintenance

ERM and any entities operating under the authority of ERM will mark, decal, maintain and inspect all regulated CMVs as per DOT/MTO regulations. This applies to any CMV that is owned, leased or rented, and operated by ERM for 30 consecutive days or more. Specific

provincial, state, and local statutes may also apply. The Project Manager and Partner-in-Charge (PIC) shall be responsible for the managing the process.

A vehicle inspection form must be completed by each professional driver on each piece of equipment operated daily. The driver must sign the form as the "Reporting Driver". If a defect was noted a, mechanic must sign off on the form showing the defect was repaired or sign off saying that the defects do not need to be corrected for safe operation. If no defects are found, a mechanic's signature is not required.

At the beginning of the next shift, the driver is to review the previous form as part of the pre-trip CMV evaluation and sign-off on the form as the "Reviewing Driver". All signatures must be on the original copy of the document.

The vehicle inspection book is assigned to the piece of equipment and must remain in the cab of the equipment until the end of each month. The completed book must be kept on file for 90 days. The forms must be organized by unit number, then numerical by day of month, and stored at the ERM office to which the CMV is assigned.

4.7 Hours of Service

ERM and any entities operating under the authority of ERM are responsible to ensure professional drivers of a CMV do so within the regulatory guidance set forth in the DOT/MTO regulations. Provincial and state statutes and exemptions to the hours of service regulations may apply. It is the responsibility of each BU to define the exemptions that will be honored. A Fleet Manager shall be responsible for the managing the process.

A time card or a log book can be utilized to track hours of service for a professional driver. ERM operates on the principal professional drivers can work 60 hours in a 7 day period, with a minimum of 24 hours off duty before the hours clock can be reset.

In the event a log book is utilized to manage hours of service for a professional driver, the completed forms should be maintained by the local Fleet Manager. The completed forms must be organized by driver name, then numerical by day of the month, and kept for a period of six months at the ERM office to which the CMV is assigned.

4.8 Hazardous Materials

ERM and any entities operating under the authority of ERM shall not transport or ship hazardous materials as defined by DOT/MTO. ERM and any entities shall not have personal perform any activity so as to meet the definition of a Hazmat employee as defined in this document.

4.9 Insurance and Financial Liability

ERM and any entities operating under the authority of ERM must not operate any CMV until such time the responsible party has ensured that the required insurance's Federal, Provincial, State and/or local statutes are in place and valid.

US Requirements

This document is required DOT regulations and must be renewed April 1st of each year. Each ERM office to which a CMV is assigned is responsible for obtaining an MCS-90 form.

4.10 Accident Register

ERM and any entities operating under the authority of ERM must maintain an accident register for each DOT/MTO operating authority number. All accidents that meet the definition of an "Accident" as defined by this program must be recorded. The record must maintain a three year history. The DQ File Administrator shall be responsible for maintaining a master accident register list for each DOT/MTO number.

The register must contain the following information:

- Date of the accident;
- City or town where the accident occurred, as well as the Province of State;
- Driver name;
- Number of injuries (if any);
- Number of fatalities (if any); and
- Whether hazmat or fuel is spilled.

Copies of accident reports required by the Province, State, or other governmental entities or insurers must be available.

4.11 Training

Every professional driver and / or person responsible for managing a piece of the CMV program shall be given adequate training to ensure compliance with applicable DOT/MTO regulations at least annually. This training must be given by a competent person, defined as a person with expert knowledge, training, and experience. Training shall be conducted by a consultant or BU staff member competent in the ERM program and a person with expert knowledge of DOT and/or MTO regulations. All training documentation must be maintained on ERM's Academy Learning Management System (LMS).

Training shall include the following topics:

- DQ file information and management;
- Hours of service;
- Vehicle pre/post-trip inspection;

- Hazardous materials;
- Accident reporting and accident register management;
- Insurance requirements;
- DOT/MTO regulatory changes; and
- How to respond in the event of a DOT/MTO audit.

4.12 Program Audit/Revision

The program shall be reviewed after annually to ensure continued compliance with the regulations.

4.13 Record Retention

All records pertaining compliance with DOT/MTO regulations shall be maintained for the time periods stipulated in the applicable federal, provincial, state, and local regulations at the BU office to which the CMV is assigned.

5. References

- Federal Motor Carrier Safety Administration Regulations – 49 CFR Parts 300-399
- Ministry of Transportation Ontario Commercial Motor Vehicle Regulations

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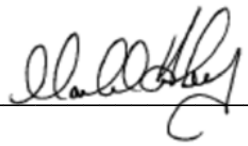
Approval Signature: 

Revision History

Section	Reason for Revision	Date
All	New document.	3/4/15

1. Purpose and Scope

This procedure describes the requirements for responding to an emergency situation when dealing with hazardous wastes. This procedure is applicable to all North American operations, and will be made available to employees at the work site upon request.

2. Roles and Responsibilities

Partner in Charge (PIC): Responsible for the following elements:

- Ensure this procedure is implemented, understood, and followed by employees under their charge and working on their projects; and
- Correct any deficiencies in the implementation of this procedure as identified by the Division Health and Safety (H&S) Leader or other staff member.

Project Manager: Responsible for the following elements:

- Perform observations of ERM work processes to assess employee compliance with this procedure;
- Stop work where deviations from this procedure are observed; and
- Correct, in conjunction with the PIC and the Division H&S Leader, any observed deficiencies in the implementation of this procedure.

Division H&S Leader: Responsible for the following elements:

- Evaluate implementation of this procedure during health and safety plan reviews and project audits; and
- Communicate identified deficiencies to the PIC.

3. Definitions

- **Emergency Response:** A response effort by employees from outside the immediate release area or by other designated responders (i.e., mutual aid groups, local fire departments, etc.) to an occurrence which results, or is likely to result, in an uncontrolled release of a hazardous substance.

4. Procedure

4.1 Classification and Prevention

A written emergency response plan (EAP) shall be developed and implemented prior to the commencement of any emergency response activities. The plan shall be made available for review and copying by employees and any applicable regulatory personnel.

If the hazards associated with the project would be such that ERM employees would be evacuated from the area when an emergency situation occurs and none of the employees would assist in the emergency response, no additional EAP is required, provided basic emergency response procedures (e.g., fire response, emergency egress, etc.) are provided in the project health and safety plan (HASP).

If an EAP for release of a hazardous substance is developed, it shall address the following items, at a minimum:

- Pre-planning;
- Coordination with outside parties;
- Personnel roles;
- Lines of authority;
- Required training;
- Communications procedures;
- Emergency recognition/prevention;
- Evacuation routes and procedures to include safe distances and places of refuge;
- Site security and control;
- Decontamination procedures;
- Emergency medical treatment;
- Emergency alerts and response;
- Available personal protective equipment (PPE) and emergency equipment; and
- Follow-up on response actions.

Where feasible or practical, local or state emergency response plans may be used to eliminate duplication of effort.

4.2 Emergency Response Procedures

The following response procedures will be followed in the event of an uncontrolled release of a hazardous substance:

- The senior employee responding to the emergency response event will inherit the role of incident commander and shall assume charge of the incident command system (ICS). All responders and their communications will be controlled through that individual. If more senior employees respond to the event, the position of incident commander will be passed to them.
- The incident commander will identify, where possible, all hazardous substances and conditions creating the emergency response event.
- The incident commander will design and implement appropriate emergency response operations.
- The incident commander will ensure appropriate personal protective equipment (PPE) is selected and worn for the hazards identified.
- Employees exposed to potential inhalation hazards from the release of hazardous substances will wear positive pressure self-contained breathing apparatus (SCBA) until such time as monitoring of the atmosphere indicates that downgrading of respiratory protection is acceptable.
- The incident commander will limit the number of personnel at the site to those who are actively engaged in emergency operations.
- Employees engaged in the response operations will ensure that the buddy system is followed.
- Back-up response personnel will be available to provide relief, assistance, or rescue. This shall include medical assistance and transport.
- The incident commander will designate a safety officer who will assist in the identification and evaluation of the site hazards and provide direction in the safe completion of the emergency operations.
- The safety officer will have the authority to alter, suspend, or terminate any site actions which are deemed to be immediately dangerous to life or health or involve an imminent danger condition. Any change in site actions will be immediately communicated to the incident commander.
- The incident commander will implement appropriate decontamination activities.

4.3 Initial Training

Training of emergency responders will be based on those duties and functions provided by the responder. Employees who are anticipated to participate in an emergency response operation will be trained as follows:

First responder awareness level: This includes any employee who would likely witness or identify a hazardous substance release and would initiate the emergency response. Typically these employees would take no action beyond notification of appropriate authorities. These employees shall be trained to:

- Understand what hazardous substances are and the risks associated with them;
- Understand the potential outcomes of a hazardous substance release;
- Recognize hazardous substances in an emergency;
- Identify, where possible, the hazardous substances involved in the emergency; and
- Identify when additional resources are needed to respond to the emergency.

First responder operations level: This includes any employee who would respond to releases or potential releases of hazardous substances as part of the initial response effort. Typically these employees would respond defensively, preventing the spread of a release without actually stopping it and limiting exposures to persons, property, and the environment. These employees shall receive a minimum of eight hours of certified training in the following areas:

- Hazard and risk assessment techniques;
- Selection of appropriate PPE;
- Hazardous material terminology;
- Control and containment operations;
- Decontamination procedures; and
- Standard operating and project termination procedures.

Hazardous materials technician: This includes employees who would respond to releases or potential releases with the purpose of stopping the event. These employees assume a more involved role in the process, as they approach the point of release to control or stop the release. These employees shall receive a minimum of 24 hours of certified training in the following areas:

- Implementation of the emergency response plan;
- Classification, identification, and verification of unknown materials through the use of field instruments and survey equipment;

- Functioning within assigned roles within the ICS established for the management response of the emergency event;
- Selecting and using proper PPE for the materials released;
- Understanding and implementing decontamination procedures;
- Understanding project termination procedures; and
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Hazardous materials specialist: This includes employees who provide support to the hazardous materials technicians. These employees' duties would be similar to those of the technicians, but with a more specific knowledge of particular substances. Specialists may be called upon to interact with governmental authorities with regards to site activities. These employees will receive a minimum of 24 hours of certified training equal to the technician level, with additional training and competency in the following areas:

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- Selecting and using specialized PPE;
- Understanding detailed and in-depth hazard and risk techniques;
- Performing specialized release controls and containment operations within the limitations of provided resources and PPE;
- Selecting and implementing decontamination procedures;
- Developing site safety and control plans; and
- Understanding chemical, radiological and toxicological terminology.

On-scene incident commander: These employees will assume control of the incident scene beyond the first responder level. They will receive at least 24 hours of certified training equal to the first responder level, with additional training and competency in the following areas:

- Implementation of ICS established for the management response of the emergency event;
- Implementation of appropriate emergency response plans;
- Knowledge of hazards and risks associated with chemical protective clothing;

- Knowledge of local, state, and federal emergency response plans/teams; and
- Knowledge of decontamination procedures.

4.4 Refresher Training

All employees who receive training identified in Section 4.3 must either:

- Receive annual training of sufficient duration and content (as defined by the training provider) so as to maintain the necessary competency in their disciplines, or
- Demonstrate competency in those areas at least yearly.

A statement of training or competency must be made by the training provider. If a statement of competency is made, a record of the methodology used to demonstrate competency must be provided.

4.5 Training Providers

Training providers who teach any of the employees identified in Section 4.3 must either:

- Have successfully completed a training course for the subjects they are teaching, or
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4.6 Medical Surveillance

Personnel responding to emergency response events related to the release of hazardous substances will be included in ERM's medical surveillance program, which includes baseline physicals and regular follow-ups. Any employee involved in an emergency response event who exhibits signs or symptoms of overexposure to a hazardous substance will be provided with immediate medical assessment and consultation.

5. References

- US Occupational Safety and Health Administration (OSHA) regulations – 29 CFR 1910.120(l); ***Emergency response by employees at uncontrolled hazardous waste sites***

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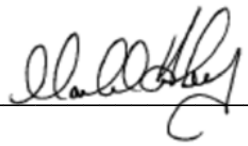
Approval Signature: 

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All	New document.	3/20/14
All	Reformatted document. Minor language changes for clarity.	6/8/15

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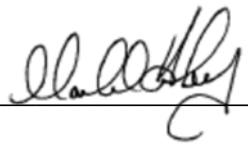
Approval Signature: 

Revision History

Section	Reason for Revision	Date
All	New document.	3/20/14
All	Reformatted document. Minor language changes for clarity.	6/8/15

1. Purpose and Scope

This procedure is designed to ensure that ERM employees have formally considered the potential risks associated with the use of cutting tools, including but not limited to knives, shears, snips, scissors, core sleeves, tubing cutters, pruning tools, paper cutters, and hand-held electric saws. The procedure applies to all ERM work activities which involve the use of these tools within offices, equipment storage areas, or field trailers as used by ERM employees, contractors, and consultants.

2. Roles and Responsibilities

Partner in Charge (PIC): Responsible for the following elements:

- Ensure this procedure is implemented, understood, and followed by employees under their charge and working on their projects;
- See to the performance of periodic inspections in the office and at projects to identify appropriate tools and procedures; and
- Correct any deficiencies in the implementation of this procedure as identified by the Division Health and Safety (H&S) Leader or other staff member.

Project Manager/Branch Manager: Responsible for the following elements:

- Perform observations of ERM work processes to assess employee compliance with this procedure;
- Stop work where deviations from this procedure are observed; and
- Correct, in conjunction with the PIC and the Division H&S Leader, any observed deficiencies in the implementation of this procedure.

Employees: Responsible for the following elements:

- Perform all work in accordance with this procedure; and
- Formally assess risks from use of cutting tools and take actions to effectively manage identified hazards prior to starting work.

Division H&S Leader: Responsible for the following elements:

- Evaluate implementation of this procedure during health and safety plan reviews and project audits; and
- Communicate identified deficiencies to the PIC.

3. Definitions

Fixed open bladed knife: Any knife where the normal use and position of the tool creates an unguarded knife or razor edge.

4. Procedure

4.1 Hazard Assessment

ERM requires that hazard assessments be performed for all activities, including those that involve the use of cutting tools. A Job Hazard Analysis form (S1-ERM-002-FM4) should be used to identify and document the hazards and associated control measures, including selection of the most appropriate cutting tool(s) to be used. When considering how to manage cut/puncture hazards associated with cutting tool use, a recommended best practice is to apply the following control measures listed in order of priority:

- Eliminate or avoid the hazard.
- Reduce the hazard by using safer cutting tool(s)/equipment or other engineering controls.
- Limit who is permitted to use cutting tools and/or locations they are sued, and train those employees only.
- Train all employees on the proper use of cutting tools.
- Utilize personal protective equipment (PPE) such as cut-resistant gloves. This should be considered the last line of defense and used in conjunction with other control measures.

4.2 Cutting Tool Selection

- Use the cutting tools designed for the job.
- Do not use inadequate, inappropriate, or unsafe tools simply because they are available. Take the time to acquire the correct tool for the job.
- Use scissors/snips, safety cutters with guarded, concealed, or self-retracting blades; or other safety cutting devices without open or exposed blades whenever possible. Examples include the following:

Safety cutter for opening packages

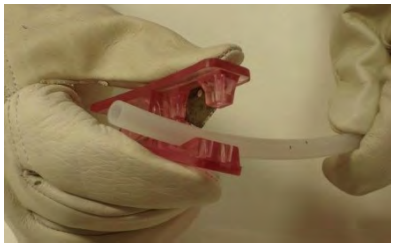
Snips

Guarded utility knife

Concealed blade cutters

Sheet cutter/letter opener

Core sleeve cutters



Tubing cutter

- Fixed open-bladed knives (FOBKs) are dangerous tools, but they are used so routinely that their hazards are often underestimated or ignored. Examples include pocket knives (including Leatherman and similar multi-tools), utility knives, box cutters (including cutters with spring loaded blades), and X-acto knives.

The uncontrolled and unsafe use of FOBKs is a common factor in hand injuries (lacerations) reported within our industry. **For this reason, FOBKs are prohibited from being used unless they are determined to be the safest tool for the task**. This determination should be made in consultation with the PIC, Project Manager/Branch Manager, and Division H&S Leader. Note that some clients prohibit the use of FOBKs altogether; therefore, client expectations must be clearly known and understood.

- If FOBKs are to be used, their safe use must be documented in written job procedures (e.g. JHA), the blade must be locked when in use and protected when not in use, personnel must have received training on how to correctly and safely use the tool, and cut-resistant gloves must be worn during use. FOBKs that cannot be locked in the open position shall not be used.
- Kitchen knives used in designated kitchen areas for food preparation may be used without the requirement to document in a written job procedure or provide formal training; however their use should be consistent with other guidance outlined in Section 4.3.
- Paper shears pose a significant hazard and should only be used if no practicable alternative exists; a JHA has been prepared and reviewed by the H&S team; and only trained employees are permitted to use it. The procedure must include locking the shear in the closed position when not in active use, and preferably includes the use of cut-resistant gloves unless safety interlocks are incorporated into the design. Options to purchase shears with safety interlocks must be considered at the first available opportunity

4.3 Safe Cutting Tool Use

- Train personnel in the correct way to use cutting tools prior to use.
- Use the designated safest cutting tool for the task and ensure it is sharp.
- Inspect cutting tools prior to use to confirm they are in good condition and safe to sue.
- **Always cut away from your hands and body**, keeping all body parts behind the blade and out of the "line of fire".
- Ensure you and other people in the area are out of the “line of fire” of the cutting tool’s path/potential path (in event of tool slippage, etc.).
- Put the object to be cut in a vise or on a flat surface, or use another tool to hold the object instead of holding in your hand or against your body (e.g., do not hold the object to be cut against your thigh).

- If the cutting tool is designed to be used with two hands, then it must be held with two hands. Saws-alls and drills are designed to be held with two hands, but are commonly incorrectly held with one hand during use.
- Use the buddy system. Utilizing a co-worker to assist in cutting activities can often reduce hazards associated with cutting lumber, tubing, and piping.
- Always return cutting tools to an appropriate storage location. **Do not place cutting tools on the ground!**

4.4 Personal Protective Equipment

Gloves that are appropriate for specific task hazards and, in good condition, can prevent some injuries; however, gloves (and all PPE) are considered as a final barrier against potential injury. Gloves must be used in conjunction with other control mechanisms (see Section 4.1) as well as the appropriate cutting tool for the job.

Specific glove requirements for tasks to be performed on site must be stated in the JHA or equivalent written job procedure. Common glove types and levels of protection are as follows:

Glove Type	Protects From	Common Uses
Cotton, canvas cloth	Minor abrasions, chafing	Light duty (e.g., sweeping)
Leather, Aramid fiber, HexArmor™	Abrasions, punctures, minor lacerations	Handling rough, rigid or abrasive materials; working with hand and power tools (unless they may get caught)
Leather reinforced with metal or metal stitching	Abrasions, lacerations	Handling sharp-edged tools/equipment
Metal mesh, Stainless Core (stainless steel woven into material), Kevlar, HexArmor™	Lacerations and abrasions associated with glancing/slicing cuts	Using cutting tools; handling sharp/jagged tools and materials.
Nitrile-coated knit gloves	Chemicals, punctures	Clearing demolition and other uncontrolled debris

More information may be obtained from our internal PPE provider Northern Safety and Industrial (www.northernsafety.com). Cut-resistant gloves must be worn when using FOBKs, at a minimum.

When several hazards are encountered that one glove will not provide adequate protection against, gloves should be layered accordingly. For example, when handling contaminated materials with sharp edges, inner nitrile gloves may be worn to protect against chemical hazards with outer cut-resistant gloves to protect against cuts and abrasions.

Protective gloves must be inspected before each use to ensure that they are not torn, punctured, or made ineffective in any way (e.g., wet/water soaked or dirty gloves can become slippery).

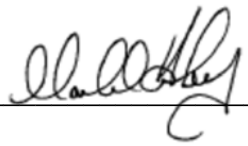
5. References

- ERM Form S1-ERM-002-FM4 (Job Hazard Analysis)

Document Control Information

Original Effective Date: 10/23/13

Policy Approval by: Mark Hickey

Approval Signature: 

Revision History

Section	Reason for Revision	Date
All	New document.	10/23/13
All	Reformatted document. Minor edits for clarity.	6/1/15
4.4	Updated section to refer to Northern Safety	9/1/16

1. Purpose and Scope

This document supports the Management System and establishes procedures for the proper storage, handling, and use of compressed gas cylinders. This procedure is applicable to ERM field and office operations.

2. Roles and Responsibilities

Partner in Charge (PIC): Responsible for the following elements:

- Ensure this program is implemented, understood, and followed by employees under their charge; and
- Correct any deficiencies in the implementation of this procedure as identified by the Division Health, Safety, Security, and Environment (HSSE) Leader.

Project Manager/Supervisor: Responsible for the following elements:

- Implement program during project or office activities involving the use of compressed gas cylinders;
- Perform observations of ERM work processes to assess whether or not employees are operating in accordance with this procedure; and
- Correct, in conjunction with the PIC and the Division HSSE Leader, any observed deficiencies in the implementation of this procedure.

Division HSSE Leader: Responsible for the following elements:

- Evaluate implementation of SSE policies during health and safety plan reviews and project audits; and
- Communicate identified deficiencies to the PIC.

Employee: Responsible for complying with the requirements stated within the procedure.

3. Definitions

Not applicable.

4. Procedure

4.1 Identification

The contents of a compressed gas cylinder should be readily identified by stencil, stamp or label affixed to the cylinder. No compressed gas cylinder should be used or accepted for use that does not legibly identify the contents of the cylinder.

A copy of the Safety Data Sheet (SDS) for the compressed gas contained in the cylinder must be acquired, maintained on-site, and available for immediate review.

Cylinders which are empty must be labeled as such ("Empty" or "MT"). Empty cylinders must be segregated from full cylinders as indicated in Section 4.3.

4.2 Handling

Use the following procedures when handling a compressed gas cylinder:

- Move cylinders in a vertical position using a suitable hand truck or cart. If cylinders need to be raised, use a cylinder cage or cradle. Secure the cylinder to the handling equipment using straps or other appropriate securing methods. Never lift a cylinder by the valve cap.
- Never roll, drag, or slide cylinders. Do not drop them or allow them to strike each other.
- Ensure the valve cap and any valve seals are in place and remain in place until cylinders have been secured in position and are ready to use.
- Wear the appropriate personal protective equipment when handling cylinders. This should include, at a minimum, safety glasses, leather gloves, and steel-toed boots.

4.3 Storage

Use the following procedures when storing compressed gas cylinders:

- Store cylinders in a dry, cool, well-ventilated, fire-resistant, and secured area designated specifically for that purpose. Avoid storage in very low or very high temperatures. Do not place cylinders adjacent heat sources.
- Storage location shall be protected from weather and wet or damp grounds, and placed away from combustible or corrosive materials, heavily traveled areas, and emergency exits. Ensure storage areas provide sufficient access for cylinder handling.
- Store cylinders upright with valve caps and any valve seals in place. Use brackets, chains, or straps around the upper third of the cylinder to secure cylinders in storage.
- Group stored cylinders based their hazard class. Post conspicuous signage that identifies the gas or hazard class.

- Provide adequate space between groups of cylinders or segregate by partition. A minimum of 20 feet must be maintained between oxidizers and flammable gases. A firewall five feet high with a 30 minute fire rating can be substituted.
- Segregate full and empty cylinders. Designated areas for separate storage should be labeled. Note that empty cylinders may have residual pressure and should be handled as though they were full.
- Hoses, connectors, gauges, cylinder valves, regulators, and other appliances used with compressed gas cylinders shall be stored when not in use. Storage should be in a cool, dry area which can protect the appliances from damage.

4.4 Inspection

Cylinder suppliers have the responsibility for complete inspection of compressed gas cylinders prior to delivery. ERM employees shall perform daily visual inspections of cylinders in use.

The following visual criteria will be used assessed during inspection:

- Dents
- Cuts or gouges
- Corrosion
- Pitting
- Bulges
- Burned spots
- Damage to valve threads and/or cylinder neck

If damage to the cylinder is identified or the cylinder is thought to be deficient in any manner, the cylinder shall be removed from service. The supplier will be notified and requested to inspect and, if necessary, repair or replace the cylinder.

Prior to use, hoses, connectors, gauges, cylinders valves, regulators and other appliances will be inspected for the presence of damage, grease, oil, dirt, solvents, or any other suspected concerns or substances. If appliances are left connected to the cylinder for more than 24 hours, they will also be inspected as part of the daily visual inspections of cylinder itself.

4.5 Usage

The following procedures apply to the usage of cylinders:

- Leave valve protection caps in place and hand tighten until cylinders are secure and either in use or connected for use. Replace caps when removing a cylinder from use, placing in storage, and/or returning to the supplier. Valve caps shall remain in place when cylinders are in storage.
- If a cylinder cap cannot be removed by hand, tag the cylinder “Do Not Use”. Return the cylinder to storage and alert the supplier to replace the cylinder.

- Only tools supplied and/or approved by the cylinder supplier shall be used to open and close cylinder valves. Do not tighten connections or attempt repairs while the system is under pressure.
- Cylinders must be equipped with the appropriate regulator. Consult the cylinder supplier for information on the correct regulator type, as needed.
- Keep cylinder valves closed except when the cylinder is being used.
- When opening a cylinder valve, stand to the side of the regulator and open slowly.
- Transfer of compressed gases from one container to another shall only be performed by properly trained and qualified personnel provided by the supplier. ERM personnel are not allowed to attempt transfer operations.

4.6 Leaking Cylinders

Cylinder leaks are most likely to be found in one of four locations:

- Valve threads
- Pressure relief devices
- Valve stems
- Valve outlets

When assembling cylinders and appliances, and before using, perform a leak check at the points indicated above. Leak checks can be performed using soapy water.

If a cylinder is found to be leaking, identify the type of gas contained within the cylinder and determine if the leaking cylinder can be safely moved to a well-ventilated location. Additional safe handling procedures are dependent upon the cylinder contents.

- For inert gases, contact the supplier for assistance.
- For flammable or oxidizers, post signs in the area warning of potential fire hazards. Eliminate any ignition sources in the area. If ignition should take place, do not attempt to extinguish the flame unless the gas supply can also be stopped, as this may lead to an accumulation of gas and a possible explosion. Contact the local fire department and cylinder supplier immediately. If safe to do so, take action to cool and protect nearby cylinders from the fire.
- For corrosives and toxics, secure the area and evacuate all personnel. Contact the local fire department or hazmat team, as well as the cylinder supplier immediately. Personnel attempting to contain the leak should only do if they have the appropriate training and personal protective equipment to do so.

4.7 Training

ERM employees required to work with compressed gas cylinders will complete training in their use, handling and storage. Training will be documented through ERM's Academy Learning Management System.

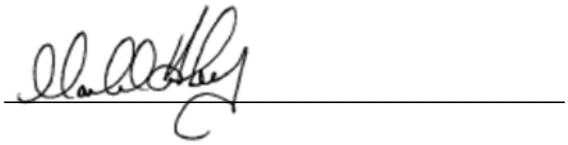
5. References

- Compressed Gas Association – Pamphlet P1, "Safe Handling of Compressed Gases in Containers"
- ISO Standard 11625 – "Gas Cylinders – Safe Handling"

Document Control Information

Original Effective Date: 2/3/15

Policy Approval by: Mark Hickey

Approval Signature: 

Revision History

Section	Reason for Revision	Date
All	New document.	2/3/15
Header	Revised Applicability.	1/12/16

Colonial Chemical Solutions, Inc.

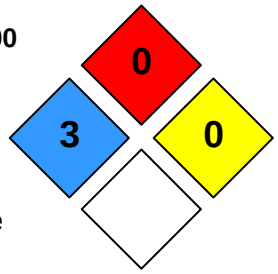
Material Safety Data Sheet – Perchloroethylene

SECTION I · PRODUCT IDENTIFICATION

CHEMTREC – 24HR Emergency Telephone 1-800-424-9300

Manufacturers Address:
916 West Lathrop Avenue
Savannah, Georgia 31415

Information Phone: (912) 443-6702
Date Prepared: 26 Sept 08
Preparer: F.Spaeth



NFPA Rating

0- Minimal 1- Slight 2- Moderate
3- Serious 4- Extreme

Synonym: PERC, Tetrachloroethylene
Chemical Family: Chlorinated Aliphatic

SECTION II · HAZARDOUS INGREDIENTS

CHEMICAL NAME	CAS Number	%WT	TLV	PEL
Tetrachloroethylene	127-18-4	100	25ppm	100 ppm

SECTION III · HAZARDOUS IDENTIFICATION

Potential Acute Health Effects: Irritating to skin and eye tissue. Slightly toxic by inhalation.
Potential Chronic Health Effects: Repeated abuse of high levels produces adverse effects on the liver and to a lesser extent on the kidneys

SECTION IV · PHYSICAL and CHEMICAL PROPERTIES

Boiling Point Range: 250°F
pH: NA
Solubility In Water: Insoluble
Appearance/Odor: Clear colorless liquid with sweet odor.
Melting Point/Freezing Point: No available data.

Vapor Density (Air=1): 5.8
Vapor Pressure (mmHg): 14
VOC %: No available data.
Specific Gravity (H_2O=1): 1.46

SECTION V · FIRE FIGHTING MEASURES

Flash Point: None
Auto Ignition: No Data
Extinguishing Media: As apparent to surrounding fire.
Flammable Limits: Lower: None Upper: None
Fire Fighting Procedures: Evacuate the area and fight from a safe distance. Cool fire-exposed containers with water spray to prevent container weakening and possible rupture. Do not enter fire zone without self-contained breathing apparatus (SCBA) and structural firefighter's protective clothing.
Unusual Fire and Explosion Hazards: Explosive mixtures of tetrachloroethylene and air can be formed, but are difficult to ignite and require high intensity sources of heat.

SECTION VI · STABILITY AND REACTIVITY

Stability: Stable.
Conditions to Avoid: Red hot surfaces and Open Flames
Incompatibility: Avoid contact with powdered metals and strong alkalis.
Hazardous Decomposition Products: Oxides of Carbon, hydrogen chloride and phosgene.
Hazardous Polymerization: Will not occur.

SECTION VII · STORAGE AND HANDLING

Precautions To Be Taken In Handling and Storage: Do not use in confined spaces. Always store in tightly sealed, properly labeled, original container. Store in a cool, dry well ventilated area.
Other Precautions: DO NOT get in eyes, on skin, or on clothing. DO NOT breath vapors, mist, or fumes. DO NOT swallow. May be aspirated into the lungs which could be fatal.

SECTION VIII · HEALTH AND FIRST AID

Skin: Slight/Mildly irritating. Can be absorbed through the skin.
Eyes: Vapors may be irritating. Irritation accompanied by redness.
Inhalation: High vapor concentrations may be irritating to respiratory system. Breathing of vapor may cause headaches, irritation of throat and may cause central nervous system depression.
Ingestion: May cause gastric distress, diarrhea and vomiting.

FIRST AID PROCEDURES:
Eyes: Flush with large amounts of cool running water for at least 15 minutes. If irritation persists get medical attention.
Skin: Wash skin with soap and water. If irritation persists seek medical attention.
Inhalation: For excessive inhalation remove to fresh air. If breathing is difficult seek medical attention.
Ingestion: DO NOT induce vomiting. Drink large amounts of water or milk. Seek medical attention immediately.

SECTION IX · EXPOSURE CONTROLS / PERSONAL PROTECTION

Eye Protection: Eye Protection when pouring. Goggles, safety glasses with side shields are recommended.
Respiratory Protection: Where adequate ventilation is not available an approved NIOSH respirator must be worn. In confined areas, use a self-contained breathing apparatus.
Skin Protection: Use suitable chemically resistant gloves, and clothing.
Ventilation: General Mechanical ventilation to prevent TLV from exceeding control limits.
Protective Clothing: Selection of protective clothing depends on potential exposure conditions and may include gloves, and other protective items.
Other Equipment: Eye wash station and shower in close proximity to use are advised

SECTION X · ACCIDENTAL RELEASE MEASURES

Small Spill: Isolate and stop source of spill provided it is safe to do so. Absorb on inert media and collect into suitable container. Wear necessary PPE.
Large Spill: Shut off or plug source of spill provided it is safe to do sol. Dike area to contain spill. Salvage as much liquid as possible into a suitable container. Absorb residual on inert media and collect into suitable container. Do not allow material to enter drains, sewers or waterways.
Personal Protection in Case of Large Spill: Wear protective equipment and/or garments as described in Section IX as conditions warrant.

SECTION XI · DISPOSAL CONSIDERATIONS

Waste Disposal Method: Dispose of in accordance with U.S. EPA 40 CFR 262 for concentrations at or above 0.7 mg/L. Avoid contaminating ground and surface water. Do not flush to drain.
Follow local, state and federal applicable regulations for disposal.

SECTION XII · TRANSPORTAION

Proper Shipping Name: Tetrachloroethylene
Hazard Class: 6.1
UN Number: 1879
Packaging Group: III

SECTION XIII · TOXICOLOGY

Carcinogenicity: Tetrachloroethylene is listed by NTP as 'reasonably anticipated to be a human carcinogen' and by IARC as a Group 2A carcinogen.
Mutagenicity: Data suggest this to be a Mutagenic.
Reproductive: Data suggest this to have reproductive effects.
Sensitization: No sensitizer data found.

SECTION XIV · REGULATORY

RMP/PSM: Not Listed
CERCLA-RQ: 100 LBS
EPCRA 311/312: Yes, See Sections III and VIII
EPCRA 313: Yes
FIFRA: No documented information available.
RCRA-CODE: U210; D039
TSCA: Listed

SECTION XV · OTHER INFORMATION

The information contained on this Material Safety Data Sheet is considered accurate as of the date of publication. It is not necessarily all inclusive nor fully adequate in every circumstance. The suggestions should not be confused with, nor followed in violation of applicable laws, regulations, rules or insurance requirements. No warranty, express or implied, of merchantability, fitness, accuracy of data, or the results to be obtained from the use thereof is made. The vendor assumes no responsibility for injury or damages resulting from the inappropriate use of this product.

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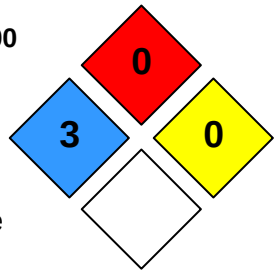

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pH: NA
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Appearance/Odor: Clear colorless liquid with sweet odor.
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Flash Point: None
Auto Ignition: No Data
Extinguishing Media: As apparent to surrounding fire.
Flammable Limits: Lower: None Upper: None
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Sensitization: No sensitizer data found.

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SAFETY DATA SHEET

SECTION 1: PRODUCT AND COMPANY IDENTIFICATION

Hydrochloric Acid, 31 – 36.7%

Product Name: Hydrochloric Acid, 31 – 36.7%

Identified Uses: acid etching, steel pickling, oil and gas, ore and mineral, food processing, pharmaceutical, organic chemical synthesis

Company Information:
ASHTA Chemicals Inc.
P.O. Box 858
Ashtabula Ohio 44005
Phone: (440) 997-5221
Fax: (440) 998-0286
24-hour Emergency Phone: CHEMTREC: (800) 424-9300

SECTION 2: HAZARDS IDENTIFICATION

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

GHS label elements, including precautionary statements:

Signal Word: **Danger**

Pictogram(s):

Hazard Statements	
H290	May be corrosive to metals.
H314	Causes severe skin burns and eye damage.
H318	Causes serious eye damage.
H335	May cause respiratory irritation.

Precautionary Statements	
P234	Keep only in original container.
P261	Avoid breathing dust/ fume/ mist/ vapors/ spray.
P264	Wash skin thoroughly after handling.
P271	Use only outdoors or in a well-ventilated area.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P301 + P330 + P331	IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
P303 + P361 + P353	IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water. Shower.

P304 + P340 + P310	IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Immediately call a POISON CENTER or doctor/ physician.
P305 + P351 + P338 + P310	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER or doctor/ physician.
P363	Wash contaminated clothing before reuse.
P390	Absorb spillage to prevent material damage.
P403 + P233	Store in a well-ventilated place. Keep container with a resistant inner liner.
P405	Store locked up.
P406	Store in corrosive resistant stainless steel container with a resistant inner liner.
P501	Dispose of contents/ container to an approved waste disposal plant.

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

Synonyms:

CHEMICAL NAME:	Hydrochloric acid
TRADE NAME:	Hydrochloric acid, 31 – 36.7%
SYNONYMS:	Muriatic acid, Chlorohydric acid, Hydrogen Chloride
C.A.S:	7647-01-0
EC:	231-595-7
WHMIS:	D2A, E
CHEMICAL FORMULA:	HCl (in aqueous solution)
CHEMICAL FAMILY:	Inorganic Acid

SECTION 4 FIRST AID MEASURES

Description of first aid measures:
Consult a physician. Show this safety data sheet to the doctor in attendance.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. If breathing is difficult, give humidified air. Give oxygen, but only by a certified physician. Consult a physician.

In case of skin contact
Immediately flush with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician. Remove contact lenses if present and easy to do. Continue rinsing eyes during transport to medical facility.

If swallowed
Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth thoroughly with water. If vomiting occurs, keep head low so that stomach content doesn't get into the lungs. Consult a physician.

SECTION 5 FIRE FIGHTING MEASURES

Flash Point (Method):	Non-combustible.
Extinguishing Media:	Use extinguishing agents compatible with acid and appropriate for the burning material. Use water spray to keep fire-exposed containers cool.
Auto Ignition Temp:	Non-combustible.
Special Fire Fighting Procedures:	Wear self-contained breathing apparatus and full protective clothing. In case of fire and/or explosion do not breathe fumes. Use standard firefighting procedures and consider the hazards of other involved materials.
Unusual Fire/Explosion Hazards:	Releases flammable hydrogen gas when reacting with metals.

SECTION 6 ACCIDENTAL RELEASE MEASURES

Environmental Precautions:
Use closed systems when possible. Provide local exhaust ventilation where vapor or mist may be generated. Avoid discharge into drains, water courses or onto the ground.

Containment and Cleaning:
Follow preplanned emergency procedures. Only properly equipped, trained, functional personnel should attempt to contain a leak. All other personnel should be evacuated from the danger area. Using full protective equipment, apply appropriate emergency device or other securement technology to stop the leak if possible.

Small Spill:	Dilute with water and mop up, or absorb with an inert dry material and place in an appropriate waste disposal container. If necessary: neutralize the residue with a dilute solution of sodium carbonate.
Large Spill:	Corrosive liquid. Stop leak if without risk. Do not touch spilled material. Use water spray curtain to knock down vapor drift. Prevent entry into sewers, basements or confined areas; dike if needed. Call for assistance on disposal. Neutralize the residue with a dilute solution of sodium carbonate. Be careful that vapor is not present at a concentration level above TLV.

SECTION 7: HANDLING AND STORAGE

Precautions to be taken for handling and storage:
Wear appropriate personal protective equipment. Do not get in eyes, on skin, on clothing. Do not breathe mist or vapor. Observe good industrial hygiene practices. Do not empty into drains. Use caution when combining with water; DO NOT add water to acid, ALWAYS add acid to water while stirring to prevent release of heat, steam and fumes. Store in a well-ventilated place. Store away from incompatible materials. Store closed containers in a clean, cool, open or well ventilated area. Keep out of sun.

SECTION 8: EXPOSURE CONTROL/PERSONAL PROTECTION

Principal Component: Hydrochloric Acid
Occupational Exposure Limits:
Regulatory Limits:

Component	OSHA Final PEL TWA	OSHA Final PEL STEL	OSHA Final PEL Ceiling
Hydrochloric Acid Mixture	---	---	5 ppm 7.59 mg/m^3

ACGIH TLV = 5 ppm (7.59 mg/m^3) TWA

NIOSH IDLH = 50 ppm (as HCl, 2010)

Exposure Controls:

Eye Protection: Tightly fitting safety goggles. Face shield (8-inch minimum). Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Respiratory Protection: Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multipurpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Other Protection: Complete suit protecting against chemicals. The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Ventilation Recommended: Exhaust ventilation is required to meet PEL limits.

Glove Type Recommended: Wear neoprene, nitrile, butyl rubber or PVC gloves to prevent exposure.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties:

Appearance	Colorless to light yellow liquid
Odor	Pungent (irritating/strong)
Odor Threshold	0.3ppm (can cause olfactory fatigue)
pH	<1 (in aqueous solution)
Melting point/freezing point	-30°C (-22°F)
Initial boiling point	>100°C (>212°F)
Flash point	Not applicable
Auto-ignition Temp	Not applicable
Evaporation rate	No data available

Decomposition temperature	No data available
Flammability (solid, gas)	Not combustible
Upper/lower flammability or explosive limits	Not combustible
Water solubility	100%
Molecular Weight	36.46
Relative Density (Specific Gravity)	1.16 (32% HCl solution) 1.19 (36.5% HCl solution)
Bulk Density	8.75 lbs/gal (32% HCl solution) 9.83 lbs/gal (36.5% HCl solution)
Vapor Density (air = 1)	1.267 at 20 °C
Vapor Pressure	84 mm Hg @ 20°C
Partition Coefficient: n-octanol/water	No data available

SECTION 10: STABILITY AND REACTIVITY

Stability: Hydrochloric acid is stable under normal conditions and pressures.

Conditions to avoid: Incompatible materials, metals, excess heat, bases.

Incompatibility: Bases, amines, metals, permanganates, (e.g. potassium permanganate), fluorine, metal acetylides, hexalithium disilicide.

Hazardous decomposition products: Hydrogen chloride, chlorine, hydrogen gas.

Polymerization: Hazardous polymerization WILL NOT occur.

SECTION 11: TOXICOGICAL INFORMATION

Information on likely routes of exposure:

Inhalation: Vapors and mist will irritate throat and respiratory system and cause coughing.

Skin contact: Causes skin burns.

Eye contact: Causes eye burns.

Ingestion: Harmful if swallowed. Causes digestive tract burns. Ingestion may produce burns to the lips, oral cavity, upper airway, esophagus and possibly the digestive tract.

Symptoms related to the physical, chemical and toxicological characteristics:

Contact with this material will cause burns to the skin, eyes and mucous membranes. Permanent eye damage including blindness could result.

Information on toxicological effects:

Acute toxicity: Harmful if swallowed.

Skin corrosion/irritation: Causes severe skin burns and eye damage.

Serious eye damage/eye Irritation: Causes serious eye damage.

Respiratory sensitization: Not available.

Skin sensitization:	No data available.
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.
Reproductive toxicity:	This product is not expected to cause reproductive or developmental effects.
Specific target organ toxicity - single exposure:	May cause respiratory irritation.
Specific target organ toxicity - repeated exposure:	No data available.
Aspiration hazard:	Not available.
Chronic effects:	Prolonged inhalation may be harmful.

Components Species Test Results:
Hydrochloric acid (CAS# 7647-01-0)

Rat - Inhalation LC_{50}:	3124 ppm, (1 hour)
Rabbit - Dermal LD_{50}:	5010 mg/kg

SECTION 12: ECOLOGICAL INFORMATION

Ecotoxicity:	Because of the low pH of this product, it would be expected produce significant ecotoxicity upon exposure to aquatic organisms and aquatic systems.
Aquatic Toxicity:	This material is toxic to fish and aquatic organisms. Most aquatic species do not tolerate pH lower than 5.5 for any extended period.
Fish Toxicity:	Fish LC_{50} Mosquito fish: 282 mg/l, 96 hours Fish LC_{50} Bluegill: 3.6 mg/l, 48 hours
Persistence and degradability:	Not biodegradable. Hydrochloric acid will likely be neutralized to chloride by alkalinity present in natural environment..
Bioaccumulative Potential:	No data available.
Mobility in soil:	Hydrochloric acid will be neutralized by naturally occurring alkalinity. The acid will permeate soil, dissolving some soil material and will then neutralize.
Other adverse effects:	No other adverse environmental effects (e.g. ozone depletion, photochemical ozone creation

SECTION 13: DISPOSAL CONSIDERATIONS

Collect and reclaim or dispose in sealed containers at a properly licensed waste disposal site. This material , if not neutralized, must be disposed of as hazardous waste. Do not allow this material to drain into sewers/water supplies. Do not contaminate ponds, waterways or ditches with chemical or used container. Dispose of contents/container in accordance with local/regional/national or international regulations.

SECTION 14: TRANSPORT INFORMATION

Shipping:

Usual Shipping Containers:	Tank cars, bulk tankers.
Usual Shelf Life:	Indefinite (life of containers).
Storage/Transport Temperatures:	Ambient.

Suitable Storage:

Materials/Coatings:	Teflon, Tygon, Rubber, PVC and polypropylene materials.

D.O.T. Information:

Labeling:	Corrosive
D.O.T. Identification Number	UN 1789
D.O.T. Shipping Name:	Hydrochloric Acid
Hazard Class:	8
Packing Group:	II
Hazard Guide:	157
Placard:	UN 1789

SECTION 15 REGULATORY INFORMATION

SARA 302 Components
No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
The following components are subject to reporting levels established by SARA Title III, Section 313:
Hydrochloric Acid CAS#: 7647-01-0

SARA 311/312 Hazards
Acute health hazard, reactive hazard.

Massachusetts Right To Know Components
Hydrochloric Acid CAS#: 7647-01-0
Pennsylvania Right To Know Components
Hydrochloric Acid CAS#: 7647-01-0
New Jersey Right To Know Components
Hydrochloric Acid CAS#: 7647-01-0

California Prop. 65 Components
This product does not contain any chemicals known to State of California to cause cancer, birth defects or any other reproductive harm.

OSHA PSM TPQ:
CAS# 7647-01-0 is regulated under OSHA PSM ***only*** if anhydrous or >37% HCl.

Toxic Substances Control Act (TSCA):
Hydrochloric Acid CAS#: 7647-01-0

Comprehensive Environmental Response Compensation Liability Act: (CERCLA)
Hydrochloric Acid CAS#: 7647-01-0

SECTION 16 OTHER INFORMATION

NFPA Rating:
Health hazard: 3
Fire Hazard: 0
Reactivity Hazard: 1

This information is drawn from recognized sources believed to be reliable. ASHTA Chemicals, Inc. Makes no guarantees or assumes any liability in connection with this information. The user should be aware of changing technology, research, regulations, and analytical procedures that may require changes herein. The above data is supplied upon the condition that persons will evaluate this information and then determine its suitability for their use. Only U.S.A regulations apply to the above.

Version 1.0	For the new GHS SDS Standard	Revision Date: 12/31/2014
Version 1.1	Graphics updated	Revision Date: 3/9/2015
Version 1.2	Title updated	Revision Date: 6/2/2015
Version 1.3	Section 9 changes	Revision Date: 7/30/2015

Precision Gas Products Inc.
2455 Cawthra Road, Unit 21 Mississauga, Ontario L5A 3P1
Tel: (905)-949-2626/1-888-730-8196 Fax: (905)-949-2688
Emergency Contact: Chemtrec (800) 424-9300

Isobutylene in Air
0.0001% to 0.9%

MATERIAL SAFETY DATA SHEET

Identification

Revision Date 01-01-15

Products Name: ISOBUTYLENE IN AIR 0.0001% TO 0.9%
CAS Number: N/A
Chemical Family: Gas Mixture
Chemical formula: C4H8 in Air
MSDS identification Code/ Number: MSDS 113

Composition/ Information on Ingredients

Ingredient Name		Concentration Percent by W eight
ISOBUTYLENE CAS Number: 115-11-7		0.0001 to 0.9
Exposure Limits Simple Asphyxiant – Maintain oxygen levels above 19.5%		
AIR CAS Number: 25635-88-5	None	99.1 to 99.999

Hazard Identification

No data given

First Aid Measures

Eyes

Never introduce oil or ointment into the eyes without medical advice! In case of freezing or cryogenic “burns” by rapidly evaporating liquid, do not wash the eyes with hot or even tepid water! Remove victim from the source of contamination. Open eyelids wide to allow liquid to evaporate. If pain is present, refer the victim to an ophthalmologist for further treatment and follow-up. If the victim cannot tolerate light, protect eyes with a light bandage or handkerchief.

Skin

Remove contaminated clothing and flush affected area with cold water and soap. *Do not use hot water.* A physician should see the patient promptly if the cryogenic “burn” has resulted in blistering of the skin or deep tissue freezing or if frostbite has occurred. Treat the “burn” in a similar manner as a thermal burn.

Ingestion

Keep victim calm and warm. Notify physician and inform of nature of material, the state of the victim and any observed signs or symptoms.
Conscious persons should be assisted to an uncontaminated area and inhale fresh air. Quick removal from the contaminated area is most important. Unconscious persons should be moved to an uncontaminated area, and if breathing has stopped, administer artificial resuscitation and supplemental oxygen. Further treatment should be symptomatic and supportive.

Fire Fighting Measures

Flammable Properties

Flash Point: Gas

Lower Explosive Limit (%): 1.8 (Isobutylene)
Upper Explosive Limit (%): 9.6 (Isobutylene)

- Fire and Explosion Hazards: Isobutylene is heavier than air and may travel a considerable distance to an ignition source. Isobutylene is a flammable gas! Keep away from open flame and other sources of ignition. Do not allow smoking in storage area or when handling.

- Extinguishing Media: Water, carbon dioxide, dry chemical

- Fire Fighting Instructions: If possible, stop flow of gas mixture. Use water spray to cool surrounding containers. If fire is extinguished and flow of gas is continued, increase ventilation to prevent a buildup of flammable/explosive atmosphere. Extinguish sources of ignition.

Accidental Release Measures

Evacuate all personnel from affected areas. Use appropriate protective equipment. If leak is in user's equipment, be certain to purge piping with an inert gas prior to attempting repairs. If leak is in container or container valve, contact CHEMTREC location for emergency assistance.

Handling and Storage

- **Handling and Storage Precautions**

Use only in well – ventilated areas. Valve protection caps must remain in place unless container is secured with valve outlet piped to use point. Do not drag, slide or roll cylinders. Use a suitable hand truck for cylinder movement. Use a pressure-reducing regulator when connecting cylinder to lower pressure (<3000 psig) piping or systems. Do not heat cylinder by any means to increase the discharge rate of product from the cylinder. Use a check valve or trap in the discharge line to prevent hazardous backflow into the system**.**

Protect cylinders from physical damage. Store in cool, dry, well – ventilated area of noncombustible construction away from heavily trafficked areas and emergency exits. Do not allow the temperature where cylinders are stored to exceed 130°F (54°C). Cylinders should be stored upright and firmly secured to prevent falling or being knocked over. Use a "first in, first out" inventory system to prevent full cylinders being stored for excessive periods of time. For additional recommendations consult Compressed Gas Association Pamphlet P-1. Post "NO SMOKING" signs in the storage area or use area.

Never carry a compressed gas cylinder or a container of a gas in cryogenic liquid form in an enclosed space such as a car trunk, van or station wagon. A leak can result in a fire, asphyxiation or toxic exposure.

Exposure Controls/Personal Protection

Engineering Controls: Use local exhaust to prevent accumulation. Use general ventilation to prevent buildup of flammable concentrations. May use hood with forced ventilation when handling small quantities. If product is handled routinely where the potential for leaks exists, all electrical equipment must be rated for use in potentially flammable atmospheres. Consult the National Electrical code for details.

Eye/Face Protection: Safety goggles or glasses.

Skin Protection: Plastic or rubber gloves.

Respiratory Protection: Positive pressure air lines with mask or self-contained breathing apparatus should be available for emergency use. A chemical cartridge respirator with organic vapor cartridges may be used for low concentrations when adequate oxygen is present, however product does not have adequate warning properties.

Other/General Protection: Safety shoes, safety shower, eyewash.

Physical & Chemical Properties

Appearance: A colorless gas.
Odor: Unpleasant odor similar to that of burning coal.

Basic Physical Properties
Solubility (H20): Insoluble
Present Volatiles: 100

Stability & Reactivity

Stability: Stable
Incompatible Materials: Oxidizers
Hazardous Decomposition Products: Carbon Monoxide
Hazardous Polymerization: Will not occur

Toxicological Information

- Eye Effects: Contact with evaporating liquid may cause frostbite or cryogenic "burns". Irritation may also occur.
- Skin Effect: Contact with liquefied product may cause frostbite or cryogenic "burns" upon evaporation. Frostbite effects are a change in color of the skin to gray or white, possibly followed by blistering. Skin may become inflamed and painful.
- Acute Oral Effects: Ingestion is unlikely. The effects of ingestion are unknown, however minimal health effects are anticipated. Consult a physician for treatment or contact the local poison control center.
- Acute Inhalation Effects: In moderate concentrations, product may exclude an adequate supply and may cause dizziness, drowsiness and eventual unconsciousness. Product may also act as an anesthetic on the central nervous system, causing a slight anesthetic effect. Symptoms may include dizziness, euphoria and headache in higher concentrations. Asphyxiation due to exclusion of oxygen is possible. Maintain oxygen levels above 19.5% at sea level.

  Carcinogenicity – NTP: No IARC: No OSHA: No

Ecological Information

No data given

Disposal Considerations

Do not attempt to dispose of waste or unused quantities. Return in the shipping container properly labeled, with any valve outlet plugs or caps secure and valve protection cap in place to Precision Gas Products for proper disposal.

Transport Information

Proper Shipping Name: Compressed Gas, N.O.S., (Air, Isobutylene)
Hazardous Class: 2.2
CT (DOT) Identification Number: UN 1956
CT (DOT) Shipping Label: Nonflammable Gas

Regulatory Information

SARA Title III Notifications and Information
SARA Title III – Hazard Class: Sudden Release of Pressure Hazard
Fire hazard
Acute Heath hazard

Other Information

Hazard Rating	Health:	1 Slight
	Fire:	0 Negligible
	Reactivity :	0 Negligible

MSDS Identification Code/Number: MSDS 113

Reference Documentation

Compressed gas cylinders should not be refilled except by qualified producers of compressed gases. Shipments of a compressed gas cylinder, which has not been filled by the owner or with his (written) consent is a violation of Federal Law (49CFR).

Disclaimer of Expressed & Implied Warranties

Although responsible care has been taken in the preparation of the document, we extend no warranties and make no representations as to the accuracy or completeness of the information contained therein, and assume no responsibility regarding the suitability of this information for the user's intended purposes or for the consequences of this use. Each individual should make a determination as to the suitability of the information for their particular purpose(s).

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Ottawa	Nepean	Tel : 613-226-4228	Fax : 613-226-4229
Quebec	Quebec	Tel : 418-834-7447	Fax : 418-834-3774

TRICHLOROETHYLENE- MATERIAL SAFETY DATA SHEET

TABLE OF CONTENTS:

1. Chemical Product and Company Identification
2. Composition, Information on Ingredients
3. Hazards Identification
4. First Aid Measures
5. Fire Fighting Measures
6. Accidental Release Measures
7. Handling and Storage
8. Exposure Controls, Personal Protection
9. Physical and Chemical Properties
10. Stability and Reactivity
11. Toxicological Information
12. Ecological Information
13. Disposal Considerations
14. Transport Information
15. Regulatory Information
16. Other Information

24 Hour EMERGENCY CONTACT

U.S- CHEMTREC 1-800-424-9300

CANADA- CANUTEC 613-996-6666

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

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Matheson Tri-Gas, Inc.

The telephone numbers listed below are emergency numbers, please contact your local branch for routine inquiries.

USA	CANADA
959 Route 46 East	530 Watson Street
Parsippany, New Jersey	Whitby, Ontario
07054-0624 USA	L1N 5R9 Canada
Phone: 973-257-1100	**Phone:** 905-668-3570

SUBSTANCE: TRICHLOROETHYLENE

SYMBOL: C_2HCl_3

TRADE NAMES/SYNONYMS:
ACETYLENE TRICHLORIDE; ETHYLENE TRICHLORIDE; ALGYLEN; 1-CHLORO-2,2-DICHLOROETHYLENE; 1,1-DICHLORO-2-CHLOROETHYLENE; TCE; ANAMENTH; ETHINYL TRICHLORIDE; TRICHLOROETHENE; 1,1,2-TRICHLOROETHYLENE; ETHYLENE, TRICHLORO-; CHLORYLEN; 1,1,2-TRICHLOROETHENE; ETHENE, TRICHLORO-; CHLORILEN; TRILEN; UN 1710; RCRA U228; STCC 4941171; C2HCL3; MAT23850; RTECS KX4550000

CHEMICAL FAMILY: halogenated, aliphatic

CREATION DATE: Jan 24 1989
REVISION DATE: Mar 16 1999

2. COMPOSITION, INFORMATION ON INGREDIENTS

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COMPONENT: TRICHLOROETHYLENE

CAS NUMBER: 79-01-6

EC NUMBER (EINECS): 201-167-4

PERCENTAGE: >99

COMPONENT: INHIBITORS

CAS NUMBER: Not assigned.

EC NUMBER: Not assigned.

PERCENTAGE: <0.1

COMPONENT: AMINES

CAS NUMBER: Not assigned.

EC NUMBER: Not assigned.

PERCENTAGE: <0.1

3. HAZARDS IDENTIFICATION

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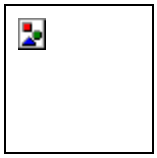
NFPA RATINGS (SCALE 0-4): HEALTH=2 FIRE=1 REACTIVITY=0

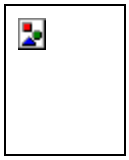


WHMIS CLASSIFICATION: D2

EC CLASSIFICATION (ASSIGNED):
Carcinogen Category 3

R 40-52/53

EC Classification may be inconsistent with independently-researched data.



EMERGENCY OVERVIEW:

Color: colorless

Physical Form: liquid

Odor: sweet odor

Major Health Hazards: respiratory tract irritation, skin irritation, eye irritation, central nervous system depression, allergic reactions

Physical Hazards: May polymerize. Containers may rupture or explode. May decompose on contact with air, light, moisture, heat or storage and use above room temperature. Releases toxic, corrosive, flammable or explosive gases.

POTENTIAL HEALTH EFFECTS:

INHALATION:
Short Term Exposure: irritation, nausea, vomiting, stomach pain, difficulty breathing, headache, drowsiness, symptoms of drunkenness, disorientation, visual disturbances, bluish skin color, lung congestion, kidney damage, liver damage, nerve damage, coma
Long Term Exposure: wheezing, irregular heartbeat, liver damage, brain damage

SKIN CONTACT:
Short Term Exposure: irritation, allergic reactions, blisters
Long Term Exposure: nausea, wheezing, joint pain, paralysis

EYE CONTACT:
Short Term Exposure: irritation (possibly severe), tearing, blurred vision
Long Term Exposure: blindness

INGESTION:
Short Term Exposure: nausea, vomiting, diarrhea, irregular heartbeat, headache, symptoms of drunkenness, kidney damage, paralysis, convulsions, coma
Long Term Exposure: drowsiness

CARCINOGEN STATUS:
OSHA: N

NTP: N
IARC: Y

4. FIRST AID MEASURES

Up to Table of Contents

INHALATION:
Remove from exposure immediately. Use a bag valve mask or similar device to perform artificial respiration (rescue breathing) if needed. Get medical attention.

SKIN CONTACT:
Remove contaminated clothing, jewelry, and shoes immediately. Wash with soap or mild detergent and large amounts of water until no evidence of chemical remains (at least 15-20 minutes). Get medical attention, if needed.

EYE CONTACT:
Wash eyes immediately with large amounts of water or normal saline, occasionally lifting upper and lower lids, until no evidence of chemical remains. Get medical attention immediately.

INGESTION:
If vomiting occurs, keep head lower than hips to help prevent aspiration. If person is unconscious, turn head to side. Get medical attention immediately.

NOTE TO PHYSICIAN:
For ingestion, consider gastric lavage. Consider oxygen.

5. FIRE FIGHTING MEASURES

Up to Table of Contents

FIRE AND EXPLOSION HAZARDS:
Slight fire hazard.

EXTINGUISHING MEDIA:
carbon dioxide, regular dry chemical

Large fires: Use regular foam or flood with fine water spray.

FIRE FIGHTING:
Cool containers with water spray until well after the fire is out. Stay away from the ends of tanks. For tank, rail car or tank truck, evacuation radius: 800 meters (1/2 mile).

FLASH POINT:
No data available.

LOWER FLAMMABLE LIMIT:
7.8% @ 100 C

UPPER FLAMMABLE LIMIT:
52% @ 100 C

AUTOIGNITION:
770 F (410 C)

6. ACCIDENTAL RELEASE MEASURES

Up to Table of Contents

AIR RELEASE:
Reduce vapors with water spray. Collect runoff for disposal as potential hazardous waste.

SOIL RELEASE:
Dig holding area such as lagoon, pond or pit for containment. Dike for later disposal. Absorb with sand or other non-combustible material.

WATER RELEASE:
Absorb with activated carbon. Remove trapped material with suction hoses. Collect spilled material using mechanical equipment. Subject to California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65). Keep out of water supplies and sewers.

OCCUPATIONAL RELEASE:
Avoid heat, flames, sparks and other sources of ignition. Stop leak if possible without personal risk. Small liquid spills: Absorb with sand or other non-combustible material. Large spills: Dike for later disposal. Remove sources of ignition. Keep unnecessary people away, isolate hazard area and deny entry. Reportable Quantity (RQ): Notify Local Emergency Planning Committee and State Emergency Response Commission for release greater than or equal to RQ (U.S. SARA Section 304). If release occurs in the U.S. and is reportable under CERCLA Section 103, notify the National Response Center at (800)424-8802 (USA) or (202)426-2675 (USA).

7. HANDLING AND STORAGE

Up to Table of Contents

Store and handle in accordance with all current regulations and standards. Store in a cool, dry place. Store in a well-ventilated area. Avoid heat, flames, sparks and other sources of ignition. Keep separated from incompatible substances.

8. EXPOSURE CONTROLS, PERSONAL PROTECTION

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EXPOSURE LIMITS:

TRICHLOROETHYLENE:
100 ppm OSHA TWA
200 ppm OSHA ceiling
300 ppm OSHA peak 5 minute(s)/2 hour(s)
50 ppm (269 mg/m3) OSHA TWA (vacated by 58 FR 35338, June 30, 1993)
200 ppm (1070 mg/m3) OSHA STEL (vacated by 58 FR 35338, June 30, 1993)
50 ppm (269 mg/m3) ACGIH TWA
100 ppm (537 mg/m3) ACGIH STEL

VENTILATION: Provide local exhaust ventilation system. Ensure compliance with applicable exposure limits.

EYE PROTECTION: Wear splash resistant safety goggles. Provide an emergency eye wash fountain and quick drench shower in the immediate work area.

CLOTHING: Wear appropriate chemical resistant clothing.

GLOVES: Wear appropriate chemical resistant gloves.

RESPIRATOR: The following respirators and maximum use concentrations are drawn from

NIOSH and/or OSHA.
At any detectable concentration -
Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode.
Any supplied-air respirator with full facepiece and operated in a pressure-demand or other positive-pressure mode in combination with a separate escape supply.
Escape -
Any air-purifying respirator with a full facepiece and an organic vapor canister.
Any appropriate escape-type, self-contained breathing apparatus.
For Unknown Concentrations or Immediately Dangerous to Life or Health -
Any supplied-air respirator with full facepiece and operated in a pressure-demand or other positive-pressure mode in combination with a separate escape supply.
Any self-contained breathing apparatus with a full facepiece.

9. PHYSICAL AND CHEMICAL PROPERTIES

Up to Table of Contents

PHYSICAL STATE: liquid

COLOR: colorless

ODOR: sweet odor

MOLECULAR WEIGHT: 131.39

MOLECULAR FORMULA: CL-C-H-C-CL2

BOILING POINT: 189 F (87 C)

FREEZING POINT: -99 F (-73 C)

VAPOR PRESSURE: 58 mmHg @ 20 C

VAPOR DENSITY (air=1): 4.53

SPECIFIC GRAVITY (water=1): 1.4642

WATER SOLUBILITY: 0.1%

PH: Not available

VOLATILITY: Not available

ODOR THRESHOLD: 21 ppm

EVAPORATION RATE: 0.69 (carbon tetrachloride=1)

COEFFICIENT OF WATER/OIL DISTRIBUTION: Not available

SOLVENT SOLUBILITY:
Soluble: alcohol, ether, acetone, chloroform, benzene, vegetable oils

10. STABILITY AND REACTIVITY

Up to Table of Contents

REACTIVITY:
May decompose on contact with air, light, moisture, heat or storage and use above room temperature. Releases toxic, corrosive, flammable or explosive gases.

CONDITIONS TO AVOID:
Avoid heat, flames, sparks and other sources of ignition. Containers may rupture or explode if exposed to heat.

INCOMPATIBILITIES:
bases, metals, combustible materials, oxidizing materials

HAZARDOUS DECOMPOSITION:
Thermal decomposition products: phosgene, halogenated compounds, oxides of carbon

POLYMERIZATION:
May polymerize. Avoid contact with heat or light and monitor inhibitor content.

11. TOXICOLOGICAL INFORMATION

Up to Table of Contents

TRICHLOROETHYLENE:

IRRITATION DATA:
2 mg/24 hour(s) skin-rabbit severe; 20 mg/24 hour(s) eyes-rabbit moderate

TOXICITY DATA:
8450 ppm/4 hour(s) inhalation-mouse LC50; >20 gm/kg skin-rabbit LD50; 5650 mg/kg oral-rat LD50

CARCINOGEN STATUS:
IARC: Human Limited Evidence, Animal Sufficient Evidence, Group 2A; ACGIH: A5 -Not Suspected as a Human Carcinogen

LOCAL EFFECTS:
Irritant: inhalation, skin, eye

ACUTE TOXICITY LEVEL:
Slightly Toxic: inhalation, ingestion

TARGET ORGANS:
immune system (sensitizer), central nervous system

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE:
heart problems

TUMORIGENIC DATA:
Available.

MUTAGENIC DATA:
Available.

REPRODUCTIVE EFFECTS DATA:
Available.

ADDITIONAL DATA:
May cross the placenta. Stimulants such as epinephrine may induce ventricular fibrillation.

12. ECOLOGICAL INFORMATION

Up to Table of Contents

ECOTOXICITY DATA:

FISH TOXICITY:
3100 ug/L 96 hour(s) LC50 (Mortality) Flagfish (Jordanella floridae)

INVERTEBRATE TOXICITY:
1700 ug/L 7 hour(s) EC50 (Regeneration) Flatworm (Dugesia japonica)

OTHER TOXICITY:
45000 ug/L 48 week(s) LC50 (Mortality) Clawed toad (Xenopus laevis)

FATE AND TRANSPORT:

BIOCONCENTRATION:
17 ug/L 1-14 hour(s) BCF (Residue) Bluegill (Lepomis macrochirus) 8.23 ug/L

13. DISPOSAL CONSIDERATIONS

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Subject to disposal regulations: U.S. EPA 40 CFR 262. Hazardous Waste Number(s): U228. Hazardous Waste Number(s): D040. Dispose of in accordance with U.S. EPA 40 CFR 262 for concentrations at or above the Regulatory level. Regulatory level- 0.5 mg/L. Dispose in accordance with all applicable regulations.

14. TRANSPORT INFORMATION

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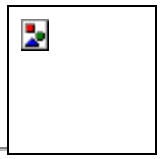
U.S. DOT 49 CFR 172.101. SHIPPING NAME-UN NUMBER; HAZARD CLASS; PACKING GROUP; LABEL:
Trichloroethylene-UN1710; 6.1; III; Keep away from food



15. REGULATORY INFORMATION

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U.S. REGULATIONS:
TSCA INVENTORY STATUS: Y

TSCA 12(b) EXPORT NOTIFICATION: Not listed.

CERCLA SECTION 103 (40CFR302.4): Y
Trichloroethylene: 100 LBS RQ

SARA SECTION 302 (40CFR355.30): N

SARA SECTION 304 (40CFR355.40): N

SARA SECTION 313 (40CFR372.65): Y
Trichloroethylene

SARA HAZARD CATEGORIES, SARA SECTIONS 311/312 (40CFR370.21):
ACUTE: Y
CHRONIC: Y

FIRE: N
REACTIVE: N
SUDDEN RELEASE: N

OSHA PROCESS SAFETY (29CFR1910.119): N

STATE REGULATIONS:
California Proposition 65:Y
Known to the state of California to cause the following:
Trichloroethylene
Cancer (Apr 01, 1988)

EUROPEAN REGULATIONS:

EC NUMBER (EINECS): 201-167-4

EC RISK AND SAFETY PHRASES:

R 40	Possible risks of irreversible effects.
R 52/53	Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
S 2	Keep out of reach of children.
S 23	Do not breathe gas, fumes, vapour, or spray.
S 36/37	Wear suitable protective clothing and gloves.
S 61	Avoid release to the environment. Refer to special instructions/Safety data sheets.

CONCENTRATION LIMITS:
C>=1% Xn R 40

16. OTHER INFORMATION

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Matheson Tri-Gas makes no express or implied warranties, guarantees or representations regarding the product or the information herein, including but not limited to any implied warranty of merchantability or fitness for use. Matheson Tri-Gas shall not be liable for any personal injury, property or other damages of any nature, whether compensatory, consequential, exemplary, or otherwise, resulting from any publication, use or reliance upon the information herein.

Material Safety Data Sheet
cis-1,2-Dichloroethylene, 97%

ACC# 97773

Section 1 - Chemical Product and Company Identification

MSDS Name: cis-1,2-Dichloroethylene, 97%
Catalog Numbers: AC113380000, AC113380025, AC113380100
Synonyms: cis-Acetylene dichloride.
Company Identification:

Acros Organics N.V.
One Reagent Lane
Fair Lawn, NJ 07410

For information in North America, call: 800-ACROS-01
For emergencies in the US, call CHEMTREC: 800-424-9300

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
156-59-2	cis-1,2-Dichloroethylene	97	205-859-7

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Appearance: Clear liquid. Flash Point: 6 deg C.
Warning! Flammable liquid and vapor. Harmful if inhaled. Unstabilized substance may polymerize. Causes eye and skin irritation. May be harmful if swallowed. May cause respiratory tract irritation.
Target Organs: Central nervous system, respiratory system, eyes, skin.

Potential Health Effects
Eye: Causes moderate eye irritation.
Skin: Causes moderate skin irritation. May cause dermatitis.
Ingestion: May cause gastrointestinal irritation with nausea, vomiting and diarrhea. May be harmful if swallowed. May cause central nervous system depression.
Inhalation: May cause respiratory tract irritation. May cause narcotic effects in high concentration. Eye irritation, vertigo, and nausea were reported in humans exposed at 2200 ppm.
Chronic: Not available. Some German investigators reported fatty degeneration of the liver upon repeated narcotic doses in rats and

Section 4 - First Aid Measures

Eyes: In case of contact, immediately flush eyes with plenty of water for a t least 15 minutes. Get medical aid.
Skin: In case of contact, flush skin with plenty of water. Remove contaminated clothing and shoes. Get medical aid if irritation develops and persists. Wash clothing before reuse.
Ingestion: If swallowed, do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Get medical aid.
Inhalation: If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.

Notes to Physician: Treat symptomatically and supportively.

Section 5 - Fire Fighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Vapors may form an explosive mixture with air. Use water spray to keep fire-exposed containers cool. Flammable liquid and vapor. Fire or excessive heat may result in violent rupture of the container due to bulk polymerization. Vapors are heavier than air and may travel to a source of ignition and flash back. Vapors can spread along the ground and collect in low or confined areas. Hazardous polymerization may occur under fire conditions.
Extinguishing Media: Use water fog, dry chemical, carbon dioxide, or regular foam.
Flash Point: 6 deg C (42.80 deg F)
Autoignition Temperature: 440 deg C (824.00 deg F)
Explosion Limits, Lower:9.70 vol %
Upper: 12.80 vol %
NFPA Rating: (estimated) Health: 2; Flammability: 3; Instability: 2

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.
Spills/Leaks: Absorb spill with inert material (e.g. vermiculite, sand or earth), then place in suitable container. Remove all sources of ignition. Use a spark-proof tool. Provide ventilation.

Section 7 - Handling and Storage

Handling: Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Ground and bond containers when transferring material. Use spark-proof tools and explosion proof equipment. Avoid contact with eyes, skin, and clothing. Empty containers retain product residue, (liquid and/or vapor), and can be dangerous. Avoid ingestion and inhalation. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose empty containers to heat, sparks or open flames. Use only with adequate ventilation. Pure vapor will be uninhibited and may polymerize in vents or other confined spaces.
Storage: Keep away from sources of ignition. Store in a tightly closed container. Flammables-area. Store protected from light and air.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls: Use process enclosure, local exhaust ventilation, or other engineering controls to control airborne levels below recommended exposure limits. Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower.
Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
cis-1,2-Dichloroethylene	200 ppm TWA	none listed	none listed

OSHA Vacated PELs: cis-1,2-Dichloroethylene: No OSHA Vacated PELs are listed for this chemical.
Personal Protective Equipment
Eyes: Wear chemical splash goggles.
Skin: Wear appropriate protective gloves to prevent skin exposure.
Clothing: Wear appropriate protective clothing to prevent skin exposure.
Respirators: Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or

other symptoms are experienced.

Section 9 - Physical and Chemical Properties

Physical State: Liquid
Appearance: Clear
Odor: Pleasant odor
pH: Not available.
Vapor Pressure: 201 mm Hg @ 25 deg C
Vapor Density: 3.34 (air=1)
Evaporation Rate: Not available.
Viscosity: Not available.
Boiling Point: 60 deg C @ 760 mm Hg
Freezing/Melting Point:-80 deg C
Decomposition Temperature: Not available.
Solubility: Insoluble.
Specific Gravity/Density:1.2800
Molecular Formula:C2H2Cl2
Molecular Weight:96.94

Section 10 - Stability and Reactivity

Chemical Stability: Stable under normal temperatures and pressures. This material is a monomer and may polymerize under certain conditions if the stabilizer is lost.
Conditions to Avoid: Light, ignition sources, exposure to air, excess heat.
Incompatibilities with Other Materials: Strong oxidizing agents, strong bases, copper.
Hazardous Decomposition Products: Hydrogen chloride, phosgene, carbon monoxide, carbon dioxide.
Hazardous Polymerization: May occur.

Section 11 - Toxicological Information

RTECS#:
CAS# 156-59-2: KV9420000
LD50/LC50:
CAS# 156-59-2:
Inhalation, rat: LC50 = 13700 ppm;
.

Carcinogenicity:
CAS# 156-59-2: Not listed by ACGIH, IARC, NTP, or CA Prop 65.

Epidemiology: No data available.
Teratogenicity: No data available.
Reproductive Effects: No data available.
Mutagenicity: No data available.
Neurotoxicity: No data available.
Other Studies:

Section 12 - Ecological Information

No information available.

Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.

RCRA P-Series: None listed.

RCRA U-Series: None listed.

Section 14 - Transport Information

	US DOT	Canada TDG
Shipping Name:	DOT regulated - small quantity provisions apply (see 49CFR173.4)	1,2-DICHLOROETHYLENE
Hazard Class:		3
UN Number:		UN1150
Packing Group:		II

Section 15 - Regulatory Information

US FEDERAL

TSCA

CAS# 156-59-2 is listed on the TSCA inventory.

Health & Safety Reporting List

None of the chemicals are on the Health & Safety Reporting List.

Chemical Test Rules

None of the chemicals in this product are under a Chemical Test Rule.

Section 12b

None of the chemicals are listed under TSCA Section 12b.

TSCA Significant New Use Rule

None of the chemicals in this material have a SNUR under TSCA.

CERCLA Hazardous Substances and corresponding RQs

None of the chemicals in this material have an RQ.

SARA Section 302 Extremely Hazardous Substances

None of the chemicals in this product have a TPQ.

Section 313 No chemicals are reportable under Section 313.

Clean Air Act:

This material does not contain any hazardous air pollutants.
This material does not contain any Class 1 Ozone depletors.
This material does not contain any Class 2 Ozone depletors.

Clean Water Act:

None of the chemicals in this product are listed as Hazardous Substances under the CWA.
None of the chemicals in this product are listed as Priority Pollutants under the CWA.
None of the chemicals in this product are listed as Toxic Pollutants under the CWA.

OSHA:

None of the chemicals in this product are considered highly hazardous by OSHA.

STATE

CAS# 156-59-2 can be found on the following state right to know lists: Pennsylvania, Massachusetts.

California Prop 65

California No Significant Risk Level: None of the chemicals in this product are listed.

European / International Regulations

European Labeling in Accordance with EC Directives

Hazard Symbols:

XN F

Risk Phrases:

R 11 Highly flammable.

R 20 Harmful by inhalation.

R 52/53 Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Safety Phrases:

S 16 Keep away from sources of ignition - No smoking.

S 29 Do not empty into drains.

S 7 Keep container tightly closed.

S 61 Avoid release to the environment. Refer to special instructions /safety data sheets.

WGK (Water Danger/Protection)

CAS# 156-59-2: No information available.

Canada - DSL/NDSL

CAS# 156-59-2 is listed on Canada's NDSL List.

Canada - WHMIS

WHMIS: Not available.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

Canadian Ingredient Disclosure List

Section 16 - Additional Information

MSDS Creation Date: 2/09/1998

Revision #5 Date: 3/16/2007

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall Fisher be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if Fisher has been advised of the possibility of such damages.

Safety Data Sheet

according to 1907/2006/EC (REACH), 1272/2008/EC (CLP), 29CFR1910/1200 and GHS Rev. 3

Effective date: 12.08.2015 **Revision** : 12.10.2015

Trade Name: Alconox

1 Identification of the substance/mixture and of the supplier

1.1 Product identifier

Trade Name: Alconox
Synonyms:
Product number: Alconox

1.2 Application of the substance / the mixture : Cleaning material/Detergent

1.3 Details of the supplier of the Safety Data Sheet

Manufacturer
Alconox, Inc.
30 Glenn Street
White Plains, NY 10603
1-914-948-4040

Supplier
Not Applicable

Emergency telephone number:
ChemTel Inc
North America: 1-800-255-3924
International: 01-813-248-0585

2 Hazards identification

2.1 Classification of the substance or mixture:

In compliance with EC regulation No. 1272/2008, 29CFR1910/1200 and GHS Rev. 3 and amendments.

Hazard-determining components of labeling:
Tetrasodium Pyrophosphate
Sodium tripolyphosphate
Sodium Alkylbenzene Sulfonate

2.2 Label elements:

Skin irritation, category 2.
Eye irritation, category 2A.

Hazard pictograms:

Signal word: Warning

Hazard statements:
H315 Causes skin irritation.
H319 Causes serious eye irritation.

Precautionary statements:
P264 Wash skin thoroughly after handling.
P280 Wear protective gloves/protective clothing/eye protection/face protection.
P302+P352 If on skin: Wash with soap and water.
P305+P351+P338 If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses if present and easy to do. Continue rinsing.
P321 Specific treatment (see supplemental first aid instructions on this label).
P332+P313 If skin irritation occurs: Get medical advice/attention.
P362 Take off contaminated clothing and wash before reuse.
P501 Dispose of contents and container as instructed in Section 13.

Safety Data Sheet

according to 1907/2006/EC (REACH), 1272/2008/EC (CLP), 29CFR1910/1200 and GHS Rev. 3

Effective date: 12.08.2015 **Revision** : 12.10.2015

Trade Name: Alconox

Additional information: None.

Hazard description

Hazards Not Otherwise Classified (HNOC): None

Information concerning particular hazards for humans and environment:

The product has to be labelled due to the calculation procedure of the "General Classification guideline for preparations of the EU" in the latest valid version.

Classification system:

The classification is according to EC regulation No. 1272/2008, 29CFR1910/1200 and GHS Rev. 3 and amendments, and extended by company and literature data. The classification is in accordance with the latest editions of international substances lists, and is supplemented by information from technical literature and by information provided by the company.

3 Composition/information on ingredients

3.1 Chemical characterization : None

3.2 Description : None

3.3 Hazardous components (percentages by weight)

Identification	Chemical Name	Classification	Wt. %
CAS number: 7758-29-4	Sodium tripolyphosphate	Skin Irrit. 2 ; H315 Eye Irrit. 2; H319	12-28
CAS number: 68081-81-2	Sodium Alkylbenzene Sulfonate	Acute Tox. 4; H303 Skin Irrit. 2 ; H315 Eye Irrit. 2; H319	8-22
CAS number: 7722-88-5	Tetrasodium Pyrophosphate	Skin Irrit. 2 ; H315 Eye Irrit. 2; H319	2-16

3.4 Additional Information : None.

4 First aid measures

4.1 Description of first aid measures

General information: None.

After inhalation:

Maintain an unobstructed airway.

Loosen clothing as necessary and position individual in a comfortable position.

After skin contact:

Wash affected area with soap and water.

Seek medical attention if symptoms develop or persist.

After eye contact:

Rinse/flush exposed eye(s) gently using water for 15-20 minutes.

Remove contact lens(es) if able to do so during rinsing.

Seek medical attention if irritation persists or if concerned.

After swallowing:

Rinse mouth thoroughly.

Seek medical attention if irritation, discomfort, or vomiting persists.

Safety Data Sheet

according to 1907/2006/EC (REACH), 1272/2008/EC (CLP), 29CFR1910/1200 and GHS Rev. 3

Effective date: 12.08.2015 **Revision** : 12.10.2015

Trade Name: Alconox

4.2 Most important symptoms and effects, both acute and delayed

None

4.3 Indication of any immediate medical attention and special treatment needed:

No additional information.

5 Firefighting measures

5.1 Extinguishing media

Suitable extinguishing agents:

Use appropriate fire suppression agents for adjacent combustible materials or sources of ignition.

For safety reasons unsuitable extinguishing agents : None

5.2 Special hazards arising from the substance or mixture :

Thermal decomposition can lead to release of irritating gases and vapors.

5.3 Advice for firefighters

Protective equipment:

Wear protective eye wear, gloves and clothing.
Refer to Section 8.

5.4 Additional information :

Avoid inhaling gases, fumes, dust, mist, vapor and aerosols.
Avoid contact with skin, eyes and clothing.

6 Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures :

Ensure adequate ventilation.
Ensure air handling systems are operational.

6.2 Environmental precautions :

Should not be released into the environment.
Prevent from reaching drains, sewer or waterway.

6.3 Methods and material for containment and cleaning up :

Wear protective eye wear, gloves and clothing.

6.4 Reference to other sections : None

7 Handling and storage

7.1 Precautions for safe handling :

Avoid breathing mist or vapor.
Do not eat, drink, smoke or use personal products when handling chemical substances.

7.2 Conditions for safe storage, including any incompatibilities :

Store in a cool, well-ventilated area.

7.3 Specific end use(s):

No additional information.

Safety Data Sheet

according to 1907/2006/EC (REACH), 1272/2008/EC (CLP), 29CFR1910/1200 and GHS Rev. 3

Effective date: 12.08.2015 **Revision** : 12.10.2015

Trade Name: Alconox

8 Exposure controls/personal protection

8.1 Control parameters :

7722-88-5, Tetrasodium Pyrophosphate, OSHA TWA 5 mg/m3.

8.2 Exposure controls

Appropriate engineering controls:

Emergency eye wash fountains and safety showers should be available in the immediate vicinity of use or handling.

Respiratory protection:

Not needed under normal conditions.

Protection of skin:

Select glove material impermeable and resistant to the substance.

Eye protection:

Safety goggles or glasses, or appropriate eye protection.

General hygienic measures:

Wash hands before breaks and at the end of work.
Avoid contact with skin, eyes and clothing.

9 Physical and chemical properties

Appearance (physical state, color):	White and cream colored flakes - powder	**Explosion limit lower**: **Explosion limit upper**:	Not determined or not available. Not determined or not available.
Odor:	Not determined or not available.	**Vapor pressure at 20°C**:	Not determined or not available.
Odor threshold:	Not determined or not available.	**Vapor density**:	Not determined or not available.
pH-value:	9.5 (aqueous solution)	**Relative density**:	Not determined or not available.
Melting/Freezing point:	Not determined or not available.	**Solubilities**:	Not determined or not available.
Boiling point/Boiling range:	Not determined or not available.	**Partition coefficient (n-octanol/water)**:	Not determined or not available.
Flash point (closed cup):	Not determined or not available.	**Auto/Self-ignition temperature**:	Not determined or not available.
Evaporation rate:	Not determined or not available.	**Decomposition temperature**:	Not determined or not available.

Safety Data Sheet

according to 1907/2006/EC (REACH), 1272/2008/EC (CLP), 29CFR1910/1200 and GHS Rev. 3

Effective date: 12.08.2015 **Revision** : 12.10.2015

Trade Name: Alconox

Flammability (solid, gaseous):	Not determined or not available.	**Viscosity**:	a. Kinematic: Not determined or not available. b. Dynamic: Not determined or not available.
Density at 20°C:	Not determined or not available.		

10 Stability and reactivity

10.1 Reactivity : None

10.2 Chemical stability : None

10.3 Possibility hazardous reactions : None

10.4 Conditions to avoid : None

10.5 Incompatible materials : None

10.6 Hazardous decomposition products : None

11 Toxicological information

11.1 Information on toxicological effects :

Acute Toxicity:

Oral:

: LD50 > 5000 mg/kg oral rat - Product .

Chronic Toxicity: No additional information.

Skin corrosion/irritation:

Sodium Alkylbenzene Sulfonate: Causes skin irritation. .

Serious eye damage/irritation:

Sodium Alkylbenzene Sulfonate: Causes serious eye irritation .

Tetrasodium Pyrophosphate: Rabbit - Risk of serious damage to eyes .

Respiratory or skin sensitization: No additional information.

Carcinogenicity: No additional information.

IARC (International Agency for Research on Cancer): None of the ingredients are listed.

NTP (National Toxicology Program): None of the ingredients are listed.

Germ cell mutagenicity: No additional information.

Reproductive toxicity: No additional information.

STOT-single and repeated exposure: No additional information.

Additional toxicological information: No additional information.

12 Ecological information

Safety Data Sheet

according to 1907/2006/EC (REACH), 1272/2008/EC (CLP), 29CFR1910/1200 and GHS Rev. 3

Effective date: 12.08.2015 **Revision** : 12.10.2015

Trade Name: Alconox

12.1 Toxicity:

Sodium Alkylbenzene Sulfonate: Fish, LC50 1.67 mg/l, 96 hours.
Sodium Alkylbenzene Sulfonate: Aquatic invertebrates, EC50 Daphnia 2.4 mg/l, 48 hours.
Sodium Alkylbenzene Sulfonate: Aquatic Plants, EC50 Algae 29 mg/l, 96 hours.
Tetrasodium Pyrophosphate: Fish, LC50 - other fish - 1,380 mg/l - 96 h.
Tetrasodium Pyrophosphate: Aquatic invertebrates, EC50 - Daphnia magna (Water flea) - 391 mg/l - 48 h.

12.2 Persistence and degradability: No additional information.

12.3 Bioaccumulative potential: No additional information.

12.4 Mobility in soil: No additional information.

General notes: No additional information.

12.5 Results of PBT and vPvB assessment:

PBT: No additional information.

vPvB: No additional information.

12.6 Other adverse effects: No additional information.

13 Disposal considerations

13.1 Waste treatment methods (consult local, regional and national authorities for proper disposal)

Relevant Information:

It is the responsibility of the waste generator to properly characterize all waste materials according to applicable regulatory entities. (US 40CFR262.11).

14 Transport information

14.1 UN Number: None
ADR, ADN, DOT, IMDG, IATA

14.2 UN Proper shipping name: None
ADR, ADN, DOT, IMDG, IATA

14.3 Transport hazard classes:
ADR, ADN, DOT, IMDG, IATA

Class: None
Label: None
LTD. QTY: None

US DOT
Limited Quantity Exception: None

Bulk:
RQ (if applicable): None
Proper shipping Name: None
Hazard Class: None
Packing Group: None
Marine Pollutant (if applicable): No additional information.

Non Bulk:
RQ (if applicable): None
Proper shipping Name: None
Hazard Class: None
Packing Group: None
Marine Pollutant (if applicable): No additional information.

Safety Data Sheet

according to 1907/2006/EC (REACH), 1272/2008/EC (CLP), 29CFR1910/1200 and GHS Rev. 3

Effective date: 12.08.2015 **Revision** : 12.10.2015

Trade Name: Alconox

	Comments: None	**Comments:** None
14.4	**Packing group:** ADR, ADN, DOT, IMDG, IATA	None
14.5	**Environmental hazards** :	None
14.6	**Special precautions for user:**	None
	Danger code (Kemler):	None
	EMS number:	None
	Segregation groups:	None
14.7	**Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code:** Not applicable.	
14.8	**Transport/Additional information:**	
	Transport category:	None
	Tunnel restriction code:	None
	UN "Model Regulation":	None

15 Regulatory information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture.

North American

SARA

Section 313 (specific toxic chemical listings): None of the ingredients are listed.
Section 302 (extremely hazardous substances): None of the ingredients are listed.

CERCLA (Comprehensive Environmental Response, Clean up and Liability Act) Reportable

Spill Quantity: None of the ingredients are listed.

TSCA (Toxic Substances Control Act):

Inventory: All ingredients are listed.
Rules and Orders: Not applicable.

Proposition 65 (California):

Chemicals known to cause cancer: None of the ingredients are listed.

Chemicals known to cause reproductive toxicity for females: None of the ingredients are listed.

Chemicals known to cause reproductive toxicity for males: None of the ingredients are listed.

Chemicals known to cause developmental toxicity: None of the ingredients are listed.

Canadian

Canadian Domestic Substances List (DSL):
All ingredients are listed.

EU

REACH Article 57 (SVHC): None of the ingredients are listed.

Safety Data Sheet

according to 1907/2006/EC (REACH), 1272/2008/EC (CLP), 29CFR1910/1200 and GHS Rev. 3

Effective date: 12.08.2015 **Revision** : 12.10.2015

Trade Name: Alconox

Germany MAK: Not classified.

Asia Pacific

Australia

Australian Inventory of Chemical Substances (AICS): All ingredients are listed.

China

Inventory of Existing Chemical Substances in China (IECSC): All ingredients are listed.

Japan

Inventory of Existing and New Chemical Substances (ENCS): All ingredients are listed.

Korea

Existing Chemicals List (ECL): All ingredients are listed.

New Zealand

New Zealand Inventory of Chemicals (NZOIC): All ingredients are listed.

Philippines

Philippine Inventory of Chemicals and Chemical Substances (PICCS): All ingredients are listed.

Taiwan

Taiwan Chemical Substance Inventory (TSCI): All ingredients are listed.

16 Other information

Abbreviations and Acronyms: None

Summary of Phrases

Hazard statements:

H315 Causes skin irritation.
H319 Causes serious eye irritation.

Precautionary statements:

P264 Wash skin thoroughly after handling.
P280 Wear protective gloves/protective clothing/eye protection/face protection.
P302+P352 If on skin: Wash with soap and water.
P305+P351+P338 If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses if present and easy to do. Continue rinsing.
P321 Specific treatment (see supplemental first aid instructions on this label).
P332+P313 If skin irritation occurs: Get medical advice/attention.
P362 Take off contaminated clothing and wash before reuse.
P501 Dispose of contents and container as instructed in Section 13.

Manufacturer Statement:

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

NFPA: 1-0-0

Safety Data Sheet

according to 1907/2006/EC (REACH), 1272/2008/EC (CLP), 29CFR1910/1200 and GHS Rev. 3

Effective date: 12.08.2015 **Revision** : 12.10.2015

Trade Name: Alconox

HMIS: 1-0-0

1. Purpose and Scope

This document establishes the procedure to provide a consistent approach for the internal investigation of health, safety and environmental events. This procedure is used when ERM is required by contract to investigate and report findings related to an event, or as required by the *Event and Non-Conformity Management* Procedure.

2. Roles and Responsibilities

Partner in Charge (PIC) or Office Head. Coordinate event investigation for Actual Severity 5 events or lower.

Regional CEO. Coordinate event investigation for Actual or Potential Severity 7 or 10 event.

Regional Legal. Direct the investigation of an Actual Severity 7 or 10 event.

3. Definitions

Event. Any occurrence, act, condition or observation which includes incidents, near misses, or hazardous condition which could impact our health, safety or environmental (HSE) performance.

Event Severity. A means of quantifying the seriousness of an actual incident based on criteria defined in the *Event and Non-Conformity Management* Procedure.

Event Potential. A means of assessing outcome of an incident or near miss that could have occurred, but did not, based on criteria defined in the *Event and Non-Conformity Management* Procedure.

4. Procedure

4.1 Establishing Event Severity

Based on the criteria presented in the *Event and Non-Conformity Management* Procedure, all actual events will be classified with an Actual and Potential Severity rating. The designation of severity governs the approach and rigor of the event investigation.

4.2 Investigation Team Selection

Based on the Actual Severity of an event, the investigations shall be coordinated by the individual designated in the *Event and Non-Conformity Management* Procedure. At the discretion of the responsible investigation coordinator, additional investigation team members may include:

- Project Manager;
- BU MP/Regional Practice Leader;
- Division Managing Director;
- Local/BU/Regional H&S Lead;
- Global H&S Director (GHSD);
- Other legally required local function(s); and
- Subject matter experts.

4.3 Investigation Process

4.3.1 All Investigations

The team will follow an appropriate investigation technique (as agreed to by the PIC/Office Head, Regional H&S Lead and Legal) to determine the following:

- Sequence of events leading up to the event and steps followed immediately following the event that may have had an impact on the final outcome.
- Identification of the People, Parts/Equipment, Position and Paper/Documentation and other factors involved in the event, as presented in *Event Investigation Considerations*.
- Determination of direct cause(s) and root causes using techniques agreed to by the lead investigator and H&S Lead. (Note: Example root cause investigation tools include “5 Why’s”, TapRoot, Fishbone Diagram, etc.).

4.3.2 Actual Severity 5 or Lower Investigations

The Investigation Team will summarize the investigation by completing the appropriate fields within ECS. All findings and recommended corrective actions will also be entered into the ECS. This information will be entered into ECS within 10 calendar days following the event unless otherwise agreed by the PIC/Office Head and Regional H&S Lead.

4.3.3 Actual Severity 7 or 10 Investigations

The Investigation Team will prepare a Preliminary Investigation Report, signed by the RCEO, documenting all findings and recommended corrective actions within 10 calendar days following the event unless otherwise agreed by the RCEO and GHSD. In addition to any event with an Actual Severity rated as 7 or 10, the GHSD and/or Global Programs Director may require any event, regardless of Actual Severity, to be escalated for investigation and review through a more senior, Global Review team.

The report format for all events classified as Actual or Potential Severity 7 or 10 shall follow the sample template provided in *Event Investigation Report*. All Actual Severity 7 or 10 communications and reports shall be prepared at the direction of Legal and shall be marked “Attorney Client Privileged Communication”.

All Actual Severity 7 or 10 investigations will involve a formal conference call to review the preliminary investigation report. The investigation review conference call will be arranged by the Regional CEO and shall occur no later than 5 calendar days following issuance of the Preliminary Investigation Report (unless otherwise directed by the ERM Chief Executive Office, Legal or GHSD).

Required participants for the conference call will include:

- Regional CEO, responsible Regional Practice Area Leader, responsible Division Managing Partner, responsible BU MP;
- Regional Legal;
- Responsible Line Manager (office-based) or PIC and Project Manager (project-based) of the injured/involved employee;
- Regional H&S Lead and
- GHSD.

Other participants may include, at the discretion of the Regional CEO and/or GHSD:

- Global/Regional HR
- Relevant subject matter experts; or
- Members of ERM Executive Committee (ExComm) or Senior Leadership Team (SLT).
- Direct participation by the employee(s) involved in the event is not necessary and requires prior approval from the Senior Manager assigned to the event review committee. Other members of the event review committee will be at the discretion of the most Senior Manager involved in the committee and Legal.

Following the investigation review conference call, the Regional CEO, under the direction of Legal, shall issue a final Investigation Report to the ERM Chief Executive Officer and GHSD. Corrective actions identified by the investigation process must be formally tracked to closure by the Regional H&S Lead; and the ECS event cannot be closed until approved by the GHSD.

4.4 Communication of Investigation Results

Any and all written investigation reports for Actual Severity 7 or 10 events (including drafts) must first be reviewed by Legal. All drafts shall include "Attorney-Client Work-Product Privilege" at the top of such reports.

Where appropriate based on the type, severity and/or scope of the event, a formal Alert should be prepared by the lead investigator and responsible Regional H&S Lead. The Alert will be communicated to the most appropriate audience (i.e., regional, national, practice area only, etc.).

Action items and corrective actions identified by the investigation teams will be tracked to completion by the responsible Regional H&S Lead. Additionally, the results will be utilized to

develop appropriate regional, national and practice area reports and to improve existing procedures.

Where required by local legislation and/or regulation or contract requirements, final event investigation reports shall be provided to the appropriate workplace safety committees.

4.4.1 Internal Communication Protocol for an Actual Severity 7 or 10 Event

It is important that communication within ERM be carefully managed following an Actual Severity 7 or 10 event.

It is preferable for any initial communications (i.e., communication which occurs within the first hour of an event occurring) from ERM employees be conducted by telephone, with Legal representatives on the line until such time as an ERM staff member is appointed as central point of contact to avoid confusion and unnecessary documentation.

In some cases, it will be appropriate for an Actual Severity 7 or 10 event response and investigation to be carried out under legal professional privilege. This will occur where ERM contemplates actual or anticipated legal proceedings arising from an event and is seeking legal advice on its position. Where an investigation is conducted under legal professional privilege, it is important to ensure that all communication is also copied to ERM internal and/or external legal and is marked “Attorney-Client Work-Product Privilege."

Before creating any written documentation relating to an Actual Severity 7 or 10 event, ERM employees should contact the ERM PIC or Line Manager to ascertain how communication should be handled in relation to that particular event.

ERM employees should be aware that all written communication (including emails) and documents created as a result of the event can likely be obtained by government agencies, as well as the client and injured third parties, and used to form part of an investigation into the event. For this reason, ERM employees should always record only factual information and avoid speculation as to the cause of an event in any documentation. Verbal communication related to the event should also be restricted to those persons who have a role related to the investigation and limited to the identification of facts, not speculation as to fault

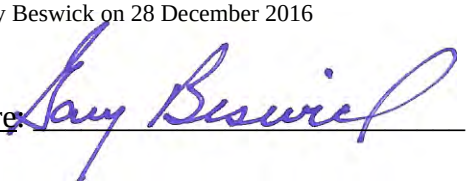
5. References

- ERM-1200-PR1 – Event and Non-Conformity Management Procedure
- ERM-1220-FM1 – Event Investigation Considerations
- ERM-1220-FM2 – Event Investigation Report

Document Control Information

Original Effective Date: 1 April 2015

Approved by: Gary Beswick on 28 December 2016

Approval Signature: 

Revision History

Section	Version: Reason for Revision	Date
All	1.0: New document.	29 Dec 2014
4.3.3	2:0 Added a sentence to allow the GHSD and/or Global Programs Director to require a Severity 7 / 10 level review for any event, regardless of Actual Severity.	20 Feb 2015
4.3.3	3.0:Modified Section title to remove “Potential”.	23 Sept 2015
All	3.1: Updated links, tagline, and document number	28 Dec 2016

This form is presented in English

Field Audit

ERM-1941-FM4

Remember: this form must be completed and submitted online in order to be counted in your Active Leadership Audit Dashboard

Auditor Information:		Audit Location:	
Enter GMS Number:		Default	

Recall: 'Safety' means the protection of our people, our stakeholders, and the environment in which we work.

1.0	Safety Planning	Yes / No / NA	Comments
1.1	All Safety planning documentation has been reviewed and signed by all personnel on site?	Yes / No / NA	
1.2	All Safety planning documentation is complete and readily available on site right now? *Do the planning documents reference applicable client procedures and policies that must be followed?*	Yes / No / NA	
1.3	JHA's are available for each activity being performed?	Yes / No / NA	
1.4	All relevant regulatory permits have been obtained and are complete for this work? (List permits in comments) *Also consider any client permits or authorizations that are required.*	Yes / No / NA	
1.5	Choose a random Job Hazard Analysis (JHA) from the Safety Planning documents: was the JHA completed by and/or reviewed with the employees undertaking the work? *Do the employees understand the requirements of the JHA? Ask questions to verify they know the risk mitigation measures.*	Yes / No / NA	

2.0	PPE, Equipment and Barricading	Yes / No / NA	Comments
2.1	All personnel have (and are correctly using) the appropriate required equipment? (In addition to being available, ensure that it is in good condition and within its designated lifespan)	Yes / No / NA	
2.2	PPE is identified in each JHA and is relevant and appropriate to the task being performed?	Yes / No / NA	
2.3	All client/industry required PPE policies are known and implemented? (Ask a random employee)	Yes / No / NA	
2.4	All equipment is guarded against entanglement, entrapment or dangerous contact?	Yes / No / NA	
2.5	No equipment has been modified/customized without an appropriate engineering certificate to verify it is safe to use and continues to meet the relevant legislation? (Ask the equipment operator)	Yes / No / NA	
2.6	All areas that present a risk of injury to personnel or third parties are appropriately barricaded?	Yes / No / NA	

3.0	Communication and Monitoring	Yes / No / NA	Comments
3.1	A daily site meeting occurred, and covered all activities on site that day, with the relevant personnel involved? (Including any other parties affected?)	Yes / No / NA	
3.2	Contractors are involved in all discussions on site? (Daily efforts are made to communicate project activities and changes with the contractor)	Yes / No / NA	
3.3	All persons temporarily accessing the work site have received a safety briefing informing them of applicable risks? (Did you receive a briefing when you arrived at the site?)	Yes / No / NA	
3.4	All monitoring equipment (such as PID, gas detectors, explosion meters) are present, well-maintained, calibrated, and used as required by HASP?	Yes / No / NA	
3.5	Vehicle inspection checklists have been completed for ERM-owned or long-term leased vehicles onsite?	Yes / No / NA	

4.0	General Work	Yes / No / NA	Comments
4.1	Chemical and/or waste areas have appropriate signage, waste disposal processes are understood and correctly implemented, and emergency response processes are place?	Yes / No / NA	
4.2	Utility mark-outs/notifications have been completed as appropriate for the work and following ERM's Subsurface Clearance Requirements, as applicable? (Consider completing an SSC audit of the site if subsurface work is occurring)	Yes / No / NA	
4.3	Work and equipment is positioned safely at appropriate distances from railroad tracks, traffic areas, and overhead power lines? Overhead obstructions / interference is considered in the safety planning documents?	Yes / No / NA	
4.4	General housekeeping at the site is appropriate? (Materials are stored/stacked safely and orderly; waste is collected and labelled; hygiene facilities are available and clean, etc.?)	Yes / No / NA	
4.5	Correct lifting and manual handling techniques are being used by all on site? (In your opinion - Stand back and observe)	Yes / No / NA	
4.6	Emergency response information and equipment defined in the Safety documentation is available and accessible? (Emergency phone numbers, spill response kits, first aid kit, fire extinguishers, safety shower/eye wash, etc.)	Yes / No / NA	

5.0	Safe Behaviors	Yes / No / NA	Comments
Randomly sample at least one employee, and at least one contractor where available			
5.1	**Ask: "What does stop work authority mean?"** Did all personnel sampled understand stop work authority? *You have the responsibility to stop work if you believe there is an imminent risk of injury. First you should ask a colleague to make sure you have risk assessed the potential risk correctly. If you are still not satisfied, or believe the risk is imminent you should call for a stop work immediately*	Yes / No / NA	
5.2	**Ask: "What incidents should I report and how do I report them"?** Did all personnel sampled understand the incident reporting requirements?	Yes / No / NA	

All incidents should be reported to the supervisor on site asap, and then an ECS record should be made within 24 hours. There may be client requirements for reporting as well.

5.3 **Ask: "In the activities you are performing today. What could cause you a manual handling or ergonomic injury? How are you ensuing this won't happen?**

Is the prevention of manual handling or overuse injuries adequate? Yes / No / NA

Look for understanding around how to carry or stand/bend/sit while performing the work. Sharing the work load or ideally using mechanical aids to prevent overuse injury or challenging postures.

6.0	Looking at Risks	Comments
6.1	Stand back and look around the work area. What hazard do you see right now? What situation/activity is the most likely to cause injury or accident today?	

If you see something and you are unsure if it is a hazard, ask a nearby employee what their opinion is. This may reveal an uncontrolled hazard, or you may have just not been aware of the controls in place.

Stand back and look around the work area for the specific hazards below. Are all of these hazards being adequately controlled (enter "No" if the hazard is present but not adequately controlled; enter "NA" if the hazard is not present)

		Yes / No / NA	Comments
6.2	Caught (On, in or under)	Yes / No / NA	
6.3	Hit by or against	Yes / No / NA	
6.4	Exertion or fatigue	Yes / No / NA	
6.5	Energy release (Heat, electricity)	Yes / No / NA	
6.6	Slip trip or fall	Yes / No / NA	
6.7	Exposure (Weather, plant or animal)	Yes / No / NA	
6.8	Breach of procedure	Yes / No / NA	
6.9	Security breach, actual or threatened violence	Yes / No / NA	
6.10	Release of hazardous material into the environment	Yes / No / NA	
6.11	Loss/damage of property	Yes / No / NA	
6.12	Work near overhead utility lines	Yes / No / NA	
6.13	Were all of the identified hazards mentioned in the available Safety documentation?	Yes / No / NA	

Include any additional information / comments about this audit below: