SUPPLEMENTAL REMEDIAL INVESTIGATION/INTERIM REMEDIAL MEASURE/ALTERNATIVES ANALYSIS REPORT AND REMEDIAL WORK PLAN
FORMER SIGNORE
BROWNFIELD CLEANUP PROGRAM
SITE NUMBER C905034
55 -57 JEFFERSON STREET
ELLICOTTVILLE, NEW YORK

Prepared For:
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Williamsville, New York

Prepared By:
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CERTIFICATION

I, Bart A. Klettke, P.E., certify that I am currently a NYS registered professional engineer and that this Remedial Work Plan (RWP) was prepared in accordance with all applicable statutes and regulations and in substantial conformance with the DER Technical Guidance for Site Investigation and Remediation (DER-I0).

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March 2015

SUPPLEMENTAL REMEDIAL INVESTIGATION/INTERIM REMEDIAL MEASURE/ALTERNATIVES ANALYSIS REPORT & REMEDIAL WORK PLAN
BROWNFIELD CLEANUP PROGRAM
FORMER SIGNORE INC. MANUFACTURING
55 -57 JEFFERSON STREET
ELLICOTTVILLE, NEW YORK

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1.0 INTRODUCTION

This Supplemental Remedial Investigation/Interim Remedial Measures/Alternatives Analysis Report (SRI/IRM/AAR) and Remedial Action Plan (RAP) has been prepared on behalf of Iskalo Ellicottville Holdings LLC (Iskalo) for a portion of the Former Signore property in Ellicottville, New York. This work was completed under the New York State Department of Environmental Conservation (NYSDEC) Brownfield Cleanup Program (BCP) and the executed Brownfield Cleanup Agreement (BCA) in January 2011 (BCP Site No. C905034).

The Former Signore property is located at 55 - 57 Jefferson Street, in the Town and Village of Ellicottville, in Cattaraugus County, New York. A Locus Plan is included as Figure 1. This property is approximately 55 acres in size and has tax identification number 55.043-1-3.1. For discussion in this report, the larger 55-acre parcel will be referred to as the Signore Property. A Site Plan is included as Figure 2. NYSDEC only accepted 8.43 acres of the approximately 55-acre Signore Property into the BCP. The 8.43 acres was the focus of the on-site activities completed and has been designated the Signore BCP Site for discussion in this report.

At the request of the NYSDEC, an initial Site Investigation/Alternative Analysis Report/Remedial Action Plan[1] (SI/AAR/RAP) was prepared pursuant to the BCA execution. The initial SI/AAR/RAP presented the results of previous site investigations completed by GZA (2007) and other consultants (early 1990s), and provided alternative assessments for two remedial options, as discussed with NYSDEC, based on the previous site investigation activities. The RAP was developed for implementation at the Site while participating in the BCP. Since the submittal of the SI/AAR/RAP in October 2011, NYSDEC has provided comments[2] on the SI/AAR/RAP and a Supplemental Remedial Investigation has been completed, which have been addressed in this SRI/IRM/AAR/RAP. This report also discuss the two (2) Interim Remedial Measures (IRMs) completed and data generated during those activities.

The two (2) Interim Remedial Measures (IRMs) and Supplemental Remedial Investigation (SRI) activities discussed in this report were completed with approved NYSDEC work plans and GZA GeoEnvironmental of New York (GZA) field oversight. The first IRM Work Plan[3] was approved on January 10, 2011 and the IRM activities were performed between October 2011 and December 2011. The second IRM Work Plan[4] was approved on July 22, 2013 and

[1] "Former Signore Inc. Manufacturing, 55 – 57 Jefferson Street, Ellicottville, New York, Brownfield Cleanup Program, Site Investigation/Alternative Analysis Report/Remedial Action Plan". Prepared for NYSDEC by GZA, dated October 2010.

[2] Letter from Mr. Chad Staniszewski, P.E., (NYSDEC Region 9) to Mr. Christopher Boron (GZA) dated March 3, 2011 regarding Former Signore, Site No. C905034, Olean, Cattaraugus County, RI/AAR.

[3] "Interim Remedial Measures Work Plan, Former Signore Facility, Ellicottville, New York, Brownfield Cleanup Program, Site No. C905034". Prepared for NYSDEC, Region 9, Buffalo New York by GZA, dated July 2011.

[4] "Second Interim Remedial Measures Work Plan, Former Signore Facility, Ellicottville, New York, Brownfield Cleanup Program, Site No. C905034". Prepared for NYSDEC, Region 9, Buffalo New York by GZA, dated July 2011.

the IRM activities were performed between August 2013 and October 2013. The SRI Work Plan[5] was approved on January 10, 2011 and the SRI activities were performed between January 2012 and January 2013.

Interpretations presented within this report are based on the previous investigations completed prior to entering into the BCP, the IRM and SRI activities. Previous data generated by GZA and other consultants have been included within this report and compared to the current applicable cleanup regulations (i.e., NYCRR 6 Part 375 Restricted Residential Soil Cleanup Objectives and groundwater standards provided in Division of Water, Technical and Operational Guidance Series (TOGS 1.1.1), June 1998, amended April 2000).

1.1 PURPOSE

This SRI/IRM/AAR/RAP has been prepared on behalf of Iskalo to describe and present the findings of:

1. site investigation activities completed prior to entering the BCP;
2. IRM activities;
3. on and off-site SRI activities;
4. evaluation of the remedial alternatives; and
5. implementation of the remedial strategy selected to address the contamination remaining at the Site.

The SRI/IRM/AAR/RAP contains the following sections.

Section 1.0 Introduction: This section presents the purpose of the SRI/AAR report, the Site background including Site description, Site history and previous relevant studies, scope of work, and report organization.

Section 2.0 Interim Remedial Measures: This section summarizes the fieldwork completed as part of the two IRMs.

Section 3.0 Site Investigation: This section summarizes the fieldwork completed as part of the Supplemental Remedial Investigation (SRI).

Section 4.0 Physical Characteristics of the Study Area: This section presents and interprets the various data collected and evaluates Site conditions (e.g., hydrogeology, geology, hydrology, etc.).

Section 5.0 Nature and Extent of Contamination: The types and concentrations of detected chemical compounds in the various environmental media are discussed. The section is

[5] "Revised Supplemental Investigation Work Plan, Former Signore Facility, Ellicottville, New York, Brownfield Cleanup Program, Site No. C905034". Prepared for NYSDEC, Region 9, Buffalo New York by GZA, dated October 2011.

divided by types of samples collected that include: surface soil, subsurface soil, groundwater and air samples (indoor, outdoor and sub-slab).

Section 6.0 Contaminant Fate and Transport: An evaluation of potential migration pathways and contaminant persistence is presented.

Section 7.0 Qualitative Exposure Assessment: This section presents the results of a general qualitative exposure assessment for the Site. The assessment includes an estimation of exposure point concentrations and a comparison of this data with published New York State standards, criteria and guidance values (SCGs).

Section 8.0 Identification of Standards, Criteria & Guidelines and Remedial Action Objectives: This section identifies the standards, criteria and guidelines for the Signore BCP Site and discusses the remedial action objectives.

Section 9.0 Development of Remedial Alternatives: This section presents the list of developed remedial alternatives for detailed screening that were evaluated on the basis of: short-term impacts and effectiveness; long-term effectiveness and permanence; reduction of toxicity, mobility and volume; implementability; compliance with applicable or relevant and appropriate SCGs and Site remediation goals; overall protection of human health and the environment; and cost.

Section 10.0 Detailed Analysis of Remedial Alternatives: Presents a detailed analysis of remedial action alternatives established in Section 9.0. The alternatives are compared on the basis of environmental benefits and costs using the eight criteria established in DER-10. Each alternative is assessed and an appropriate remedy is selected that satisfies the remedial action objectives.

Section 11.0 Comparative Analysis of Remedial Alternatives: Provides a comparative analysis of the alternatives on the basis of the seven criteria, based on the detailed analysis provided in Section 10.0.

Section 12.0 Remedial Action Plan: Provides the work plan for the selected remedial action to be completed at the Signore BCP Site based on the evaluation of the remedial alternatives discussed in Section 11.0.

1.2 SITE AND SURROUNDING AREA DESCRIPTION

The Signore Property is an approximate 55-acre parcel located on the west side of Jefferson Street (Route 219 South), in both the Village and Town of Ellicottville, New York (see Figure 2). The Signore BCP Site is about 8.43 acres of the approximate +/- 55 acre parcel. The area surrounding the Signore BCP Site is a mix of residential, recreational, and community facilities (cemetery) properties. Residential dwellings and a cemetery are adjacent to the north, south and east of the Signore Property and vacant land is to the west. Property owned by the Holimont Ski Resort is also located to the west.

Ellicottville is a popular ski-resort area with retail properties in Downtown Ellicottville, which is located about ¼ mile to the north-northeast.

Plum Creek, a tributary to Great Valley Creek, flows into the Signore Property from the north and flows through the central portion of the Site. It forms the western and southern boundary of the Signore BCP Site and flows off the property on the east towards Great Valley Creek, located about 250 feet east of the Signore BCP Site.

1.3 SITE HISTORY

Prior to closing in 2007, the Signore BCP Site had been used for manufacturing purposes for over 50 years. It is reported that a tool and die operation occupied a garage associated with the residential dwelling that was formerly present on the property. The Signore BCP Site was primarily used for the manufacturing of metal products (i.e., file cabinets, lockers, desks and computer furniture). The Signore building, once present on the Site, had undergone various expansions since 1952. The actual development date for the property is unknown, but occurred sometime between the 1940s and 1952 as the property was identified as vacant woodland between 1922 and 1939.

The property was occupied by Signore until May 2007, when operations ceased. Iskalo took ownership of the property on February 11, 2008. The entire property is approximately 55 acres, the majority of which is hillside and undeveloped. The 8.43 acre Signore BCP Site was occupied by the former building (168,000 square feet), other smaller ancillary buildings and parking areas. The main building was demolished by Iskalo in July and August 2012. The small ancillary buildings and the main building concrete-slab remain.

1.4 PREVIOUS INVESTIGATIONS

REMEDIAL INVESTIGATIONS ASSOCIATED WITH SITE LISTING AS CLASS 4 SITE #905023 – APRIL 1991-2006

The Signore Property is currently listed as Site #905023, a Class 4 Site on the NYSDEC's Registry of Inactive Hazardous Waste Site (IHWS). The following historic documents are available for the Site and have been previously submitted to NYSDEC.

1. "Remedial Investigation Report for Signore, Inc. Facility, Ellicottville, NY Volume 1 of 2," 4/91, by Groundwater Associates, Inc.
2. "Remedial Investigation Report for Signore, Inc. Facility, Ellicottville, NY Volume 2 of 2," 4/91, by Groundwater Associates, Inc.
3. "Feasibility Study Report for Signore, Inc. Facility, Ellicottville, NY," 12/91
4. Order On Consent, Index # B9-0258-89-03
5. "Comprehensive Monitoring Report, Remediation System Monitoring, Signore, Inc., Ellicottville, NY," 1/96 by Groundwater Associates, Inc.

6. Various historic reports completed prior to Remedial Investigation in 1991.
7. "Phase I Environmental Site Assessment, Signore, Inc. Facility," dated 12/95, by Niagara Frontier Consulting Services, Inc.
8. Sampling data/results from 1993 to 2006

The Remedial Investigation (RI) consisted of sampling a variety of media at the Signore Property. A summary of the work contained in the RI report follows. As requested by NYSDEC, GZA compared the previous investigation results to the current applicable cleanup regulations (i.e., NYCRR 6 Part 375 Restricted Residential Soil Cleanup Objectives and Division of Water, Technical and Operational Guidance Series (TOGS 1.1.1), June 1998, amended April 2000).

- Thirteen (13) monitoring wells (see Plate 2 in Appendix A) were installed to define the site geology, evaluate the aquifer characteristics and collect groundwater samples to evaluate the horizontal and vertical extent of contamination on and downgradient from the Signore Property and Signore BCP Site.
- Groundwater samples were collected from the monitoring wells to characterize the groundwater quality at and downgradient of the Signore Property.
    - Groundwater sample results from the on-site monitoring wells that were sampled six (6) times from 1986 to 1989 generally detected total chlorinated volatile organic compounds (cVOCs) at concentrations that ranged up to approximately 1 part per million (ppm) at MW-5S (see Plate 1 in Appendix A). *[MW-5S was sampled in October 2012 as part of Iskalo's requirement to continue semi-annual sampling from the Record of Decision issued by NYSDEC for the Signore Property. Total VOCs were identified at 0.006 ppm. Trichloroethylene (TCE) concentrations decreased from 680 parts per billion (ppb) to 3.1 ppb]*. For the most part, VOCs were identified in monitoring wells in the southern, downgradient part of the property.
    - Twelve (12) groundwater samples were collected from on-site wells (see Plate 1 in Appendix A) in 1990 and analyzed for target compound list (TCL) volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), pesticides/ polychlorinated biphenyls (PCBs), target analyte list (TAL) metals and cyanide.
    - Total VOCs ranged from non-detect (MW-2S and MW-9S) to 231 ppb (MW-5S) (see Table 16 in Appendix A). The RI results were consistent with historic data from these well locations.
    - Bis (2-ethylhexyl) phthalate was the only SVOCs detected and at a concentration of 1 ppb (MW-6D (see Table 16 in Appendix A).
    - No pesticides or PCBs were detected in the on-site monitoring wells sampled.
    - A number of metals were detected in the unfiltered samples at concentrations exceeding their respective NYSDEC Class GA criteria as follows: (see Table 17 in Appendix A).
        - Barium exceeded at two (2) locations (MW-1D and MW-2S).
        - Beryllium exceeded at one (1) location (MW-2S).

        - Chromium exceeded at one (1) location (MW-2S).
        - Iron exceeded at the 12 locations.
        - Lead exceeded at five (5) locations (MW-1S, -1D, -2S, -6S, -9I).
        - Manganese exceeded at 11 locations.
        - Nickel exceeded at one (1) location (MW-2S).
        - Sodium exceeded at nine (9) locations.
        - The samples were collected from unfiltered samples and may represent materials in the soil particles that are part of the sample (due to high turbidity).

- Two (2) soil gas surveys (see Plate 6 in Appendix A) were conducted to evaluate the presence of VOCs in the interstitial soil gas and as a screening tool to determine potential areas of subsurface contamination.
    - The greatest VOC concentrations in the soil gas survey were outside the northwest corner of the building, where cVOCs were identified in the survey. The area of cVOCs appeared to extend under the western portion of the building.
    - cVOCs were also detected in the soil gas outside and south of the building.
    - Benzene, toluene, ethylbenzene and total xylenes (BTEX) constituents were detected in the soil gas northwest of the building and extended from the northwest corner to under a significant portion of the building.

- Fourteen (14) soil borings (see Plate 7 in Appendix A) were completed to characterize the subsurface stratigraphy and collect soil samples to evaluate the vertical and horizontal extent of potential soil contamination. The soil boring locations were based on the soil gas survey results. A total of thirty-one (31) soil samples were submitted for laboratory analysis. Fourteen (14) soil samples were submitted for TCL VOC analysis and 17 were submitted for the complete target analyte list (TAL).
    - Total VOC concentrations in the 31 samples were generally non-detect to less than 25 ppb. *None of the VOCs detected exceeded their respective Part 375 Restricted Residential SCOs (see Table 13 in Appendix A).*
    - SVOC concentrations were generally non-detect or at concentrations slightly greater than the laboratory detection limit. *None of the SVOCs detected exceeded their respective Part 375 Restricted Residential SCOs (see Table 14 in Appendix A).*
    - Metal concentrations of interest are as follows.
        - Arsenic was detected at two (2) locations (BH-8 (20 ppm) and BH-9 (16.9 ppm)), located on the west side and in the driveway area of the former building) that slightly exceeded the Restricted Residential SCO (16 ppm). Both detected concentrations were flagged with a "J" qualifier indicating an estimated concentration. These detections are not considered to be significant (see Table 15 in Appendix A).

        - Cyanide was detected at 27.5 ppm in the duplicate sample from BH-2 and was flagged with a "J" qualifier indicating an estimated concentration (see Table 15 in Appendix A). This slightly exceeds its Restricted Residential SCO of 27 ppm. However, cyanide was detected only in the duplicate sample, and not in the main sample; therefore, cyanide is not considered to be a concern.

- The RI concluded that soil results do not indicate any new sources of contamination. Only minimal concentrations of VOCs were detected in the soil samples and no significant impact of SVOC or metals was identified.

- Six (6) upgradient and downgradient surface water and sediment samples (see Plate 8 in Appendix A) were collected from Plum Creek and three downgradient surface water and sediment samples were collected from Great Valley Creek to evaluate surface water quality impacts. Surface water and sediment samples were analyzed for TCL VOCs, SVOCs, pesticides/PCBs and TAL metals and cyanide (see Tables 20 through Table 23 in Appendix A).
    - No VOCs, SVOCs, pesticides or PCBs were detected in the surface water samples.
    - Iron was detected at concentrations greater than the NYSDEC drinking water standards at an upstream location and at the furthest downstream location.
    - Sediment samples identified four (4) VOCs, eighteen (18) SVOCs and one (1) pesticide at concentrations greater than the analytical method detection limit. These compounds were also detected in the upstream samples.
    - Metals were detected in the sediment sampled, both in the downstream and upstream locations.

- Four (4) samples were collected from the sewer water.
    - Sewer water samples were analyzed for TCL VOCs, SVOCs, pesticides/PCBs and TAL metals and cyanide.
    - The RI indicated that it does not appear that the sewer contains organic or inorganic constituents indicative of impact from the Site.

Additional subsurface investigation work, other than the Record of Decision (ROD) requiring semi-annual sampling, was not completed after the RI work in the early 1990s until the Phase II Environmental Site Assessment (ESA) performed in 2007, as discussed later in this section.

PHASE I ENVIRONMENTAL SITE ASSESSMENT – NOVEMBER 2007

A Phase I ESA was completed in November 2007 by Lender Consulting Services (LCS). The Phase I ESA reportedly was done in general accordance with the American Society for

Testing and Materials (ASTM) E1527-05. The following Recognized Environmental Conditions (RECs) were identified:

- Signore was identified as a NYSDEC listed IHWS.
- Several monitoring wells were located on the Site.
- The Site had previously sustained environmental contamination events that were subject to intervention by the NYSDEC. Due to this contamination, monitoring wells, both on- and off-Site are in place to monitor groundwater conditions.
- The Site has been utilized as a metal manufacturing facility since 1960 or earlier.

The following de minimus conditions were also noted.

- The Site was identified as a RCRA small quantity generator of hazardous waste with violations. Compliance has been achieved for the violations. The Site was also listed for registrations on other state and federal databases.
- Staining was noted on the floor in the paint room and paint mixing rooms within the main manufacturing building.
- Staining was noted on the soil beneath a degreaser unit in a former wall cavity outside the main manufacturing area.
- Radon concentrations in the area have been reported to be slightly greater than the United States Environmental Protection Agency (USEPA) recommendations.
- A portion of the undeveloped property along and west of Plum Creek lies within the 100-year flood zone with most of this within the flood plain "fringe".
- Mapped soil units, Chanakoin Channery, Holderton silt and Ischua Channery reportedly present on the Signore Property, are classified as hydric soils, suggesting the potential for presence of on-site wetlands. The majority of the flat land area of the Signore Property is improved and/or disturbed. Hence, prior to any future development of the Site, a wetland delineation survey should be completed in the undeveloped portions of the subject property (referenced above to be mostly west of Plum Creek) to assess whether regulatory wetlands exist.
- Approximately two-hundred 55-gallon drums of paint sludge and approximately ten drums of waste and new oil are located on the property. Evidence of releases was noted in the area of these materials. At the time of the Phase I ESA report, the purchaser of the property reported that the previous property owner was in the process of removing the drums and containers. An inspection of the property was to be conducted prior to the closing on the purchase to verify this.

PHASE II ENVIRONMENTAL SITE ASSESSMENT – DECEMBER 2007

GZA completed a Phase II ESA at the Site for due diligence purposes on behalf of Iskalo. A description of the field explorations conducted is presented in the following subsections. A copy of this complete report is included in Appendix B.

GZA was retained to evaluate the potential presence of an on-Site cVOC contaminant source. GZA's work included observing soil probes at 29 locations and test pit

excavations at eight (8) locations (see Figure 2 in Appendix B). Soil samples collected during soil probes and test pit activities were screened for total volatile organics with an organic vapor meter (OVM) equipped with 10.6eV photoionization detector (PID). Thirty (30) subsurface soil samples and sixteen (16) groundwater samples were submitted for chemical analysis.

Soil Probe Exploration

Soil probe explorations were completed at twenty-nine (SP-1 through SP-29) on-site locations in October 2007 as shown on Figure 2 in Appendix B. The soil probes were completed using direct-push technology and were advanced using a 2-inch-diameter, 48-inch-long macrocore sampler that was driven continuously at 48-inch intervals. A dedicated acetate sample liner was used between sampling intervals. Representative portions of the recovered soils were placed in plastic zip-lock bags for further classification and headspace screening using an organic vapor meter (OVM), as discussed in Section 2.3. The soil probe logs are included in Appendix B.

The soil probe location rationale is as follows.

- SP-2, 3, 4, 8 and 17 were located in the proximity of former septic tanks.
- SP-1, 5, 6, 7, 9, 10 and 16 were performed to evaluate soil gas detections identified within the 1991 Remedial Investigation.
- SP-11 and 12 were located in the proximity of the drain/pit room.
- SP-13 and 14 were performed in the proximity of the spray booth room.
- SP-15 was located in proximity to a drain filled with sludge.
- SP-18, 28 and 29 were performed to further delineate subsurface conditions associated with the former septic tank area found near SP-4.
- SP-19, 20, 21 and 22 were performed to further delineate subsurface conditions associated with three 1,000-gallon petroleum USTs, on the east side of the Main Building.
- SP-23, 24, 25, and 26 were performed to further delineate subsurface conditions associated with a 1,000-gallon UST south of the Spray Booth Area, southwest of the Main Building.
- SP-27 was located in the proximity of Maintenance Building #1.

The twenty-nine soil probes were advanced through fill material (1 to 2 feet thick) and into native overburden soils to depths ranging from approximately 10 to 20 feet bgs. Groundwater was generally encountered at depths ranging from approximately 9 to 12 feet bgs at the probe locations. Temporary 1-inch-diameter PVC micro-wells were installed at 13 soil probe locations (SP-2, -3, -4, -5, -8, -10, -13, -15, -18, -22, -23, -27 and -28) as shown on Figure 2 in Appendix B.

Various soil samples were collected for analysis from the twenty-nine soil probes. A summary of the samples collected and the analysis performed is shown on Table 2 in

Appendix B. Analytical test results of the soil samples and groundwater samples are summarized on Table 3 and Table 4, respectively in Appendix B.

Exceedences of VOC Restricted Residential SCOs were detected in samples from locations SP-4, SP-13, and SP-28. Exceedences of VOC Commercial SCOs were detected a sample from SP-28; and exceedences of VOC Industrial SCOs were detected at SP-4. However, these locations were located within AOC-3, and were subject to the 2nd IRM activities conducted by GZA in fall 2013 which resulted in the removal of these impacted soils from the Site. Analytical results for the remaining soil probes were below Restricted Residential SCOs. Refer to Section 2 for additional information.

Test Pit Explorations

Test pits explorations were completed at eight (8) on-Site locations in October 2007, as shown on Figure 2 in Appendix B. The test pits are designated as TP-1/TP-1A, and TP-2 through TP-8. GZA prepared a table that summarizes the general subsurface conditions that were observed at each test pit. This table is included as Table 1 in Appendix B.

The test pit location rationale is as follows.

- TP-1/TP-1A was completed near a 6,000-gallon UST that was closed on December 8, 1987. The test pits at this location were extended to 11 and 9 feet bgs, respectively. The 6,000-gallon UST was identified and exposed. OVM readings were non-detect during completion of the test pits and groundwater was not encountered.
- TP-2 was completed near a suspected 500-gallon UST and excavated to a depth of 7 feet bgs. An OVM reading of 12 ppm was detected from 3 to 5 feet bgs. GZA complete two additional shallow test pits to a depth of approximately 4 feet bgs in an attempt to locate the UST. The UST was not encountered.
- TP-3 was completed near a suspected 1,000-gallon UST. GZA did not identify an access port associated with the UST. One manhole identified as "sanitary" was present in the area of the reported UST. The manhole was opened and confirmed to be a sanitary sewer line. The UST was not encountered. OVM readings were non-detect during the completion of the test pit.
- TP-4 was completed near an identified 1,520-gallon UST – GZA opened the access to the UST, which appeared to be filled with concrete. Approximately 8 inches of liquid was present in this UST that appeared to be water with an apparent sheen. The test pit was extended to approximately 12 feet bgs. OVM readings were non-detect during completion of the test pit. Groundwater was not encountered.
- TP-5 was completed near an identified 1,000-gallon UST (Area of Concern 2 (AOC-2)) to a depth of approximately 12 feet bgs and the UST was

exposed. OVM readings were obtained at concentrations of 36 ppm and increased with depth to 4,000 ppm. Groundwater was not encountered.

- TP-6, 7 and 8 were completed near three 1,000-gallon petroleum USTs closed in place in December 1986 (AOC-1). The test pits were extended from 8 to 8.5 feet bgs which identified and exposed the USTs. OVM readings ranged from non-detect to 2,000 ppm. Groundwater was encountered at TP-7 only, where petroleum sheen was observed on the groundwater.

Various soil analytical samples were collected from the eight test pits. A summary of the soil samples collected and the analysis performed is shown on Table 2 in Appendix B. Analytical test results of the soil samples from the test pits are summarized on Table 3 in Appendix B.

Exceedences of VOC Restricted Residential SCOs were detected in samples from locations TP-5 and TP-7. However, these locations were located within AOC-1 (TP-7) and AOC-2 (TP-5), and were subject to the two IRM activities conducted by GZA in 2011 and 2013 which resulted in the removal of these impacted soils from the Site. Analytical results for the remaining test pits were below Restricted Residential SCOs. Refer to Section 2 for additional information.

Headspace Screening

Representative portions of the soils encountered during the soil probe and test pit explorations were placed in plastic baggies for headspace screening. Headspace screening was done using an OVM equipped with a PID. The OVM was calibrated daily during its use, in accordance to manufacturer's requirements, using a standard gas (isobutylene). Prior to screening, the samples were allowed to equilibrate to room temperature. The tip of the OVM was placed inside the plastic baggie to withdraw air from the headspace within the baggie. The peak response was recorded. Headspace screening results for the soil probes and test pits are included on the respective logs in Appendix B.

Groundwater Sampling

Existing Monitoring Wells

Groundwater samples were collected from six (6) existing monitoring wells (MW-1I, -4S, -5S, -5I, -9I, and EW-1.25; see Figure 2 in Appendix B), using low-flow sampling techniques as part of the Phase II ESA. A peristaltic pump, disposable polyethylene tubing and a water quality meter with flow through cell were used to collect water quality readings, including temperature, specific conductance, pH, turbidity, and dissolved oxygen (DO).

Groundwater pumping rates used during the monitoring/sampling varied at each monitoring location in order to establish a relatively constant head within the

sampling location. Once a constant head was established within the monitoring well, the flow rate was maintained during the monitoring/sampling period to purge about three well volumes of groundwater. Samples were collected for analysis when water quality readings stabilized.

Temporary Micro-Wells

Groundwater samples were collected from ten (10) of the 13 micro-well locations installed (SP-3, -4, -5, -8, -10, -15, -22, -23, -27 and -28); see Figure 2 in Appendix B). The remaining temporary well locations did not produce sufficient groundwater to collect samples. Groundwater samples were collected using a stainless steel bailer that was cleaned with Alconox between micro-well locations, with the exception of SP-4, where a disposable polyethylene bailer was used to collect the sample. Samples were placed in laboratory supplied analytical containers. Temporary micro-wells installed at SP-10 and SP-11 were removed. The remaining micro-wells were left in place.

A summary of the groundwater samples collected from the existing monitoring wells, temporary micro-wells and the analysis performed is provided shown on Table 2 in Appendix B. Analytical test results of the groundwater samples are summarized on Table 4 in Appendix B. Below is a summary of our conclusions.

During the Phase II activities, significant VOC contamination and separate phase petroleum (SPP) product impacting soil and groundwater at the Site was identified. Three areas of concern (AOC) were identified where the soil contaminant concentrations were greater than the NYSDEC Part 375 criteria. After completion of the Phase II activities, a groundwater remediation pilot study was performed involving injection of electron donor product in the area of most concentrated groundwater contamination. Figures 3 and 4 identify the three AOCs and areas of pilot study injections.

1. AOC-1 – Petroleum underground storage tank (UST) Area – Three 1,000-gallon USTs, located on the eastern portion of the Site, were closed in-place in December 1986. SPP product and petroleum impacted soil was identified during test pit completion. GZA contacted NYSDEC and Spill #707350 was assigned to the Site.

2. AOC-2 – One 1,000-gallon UST Area – The historic contents of an UST identified on the southwest side of the main building are unknown. The UST was reportedly closed in the late 1980s. Separate phase petroleum product (SPPP) was identified during the test pit completed in this area.

3. AOC-3 – Paint Kitchen Area – VOC impacted soil was identified in the area within the main building identified as the paint kitchen and spray booth area. Additionally, a former septic system was also present in the area. “Product” was identified during the soil probe investigation.

In addition to the three identified AOCs, impacted subsurface soil and groundwater was detected at a location south of a floor drain that contained sludge. Groundwater impacts from the identified VOCs in AOC-1, -2 and -3 appeared to be present at the Site at approximately 10 to 12 feet below ground surface (bgs). The detected compounds in AOC-2 and AOC-3 included toluene, ethylbenzene, TMBs, and xylenes.

Semi-Annual Groundwater Monitoring Well Sampling (April 2009 through October 2014)

The Signore Property is listed as Site #905023, a Class 4 Site on the NYSDEC's IHWS listing. As part of the Record of Decision (ROD) issued, numerous monitoring wells were to be sampled on a semi-annual basis. Currently, twelve monitoring wells, Main School well and one town well are required to be sampled. The locations of the monitoring wells are included on Figure 2 in Appendix C.

The monitoring wells were last sampled by Signore, the former property owner and operator, in October 2006. Iskalo has been completing the semi-annual sampling in accordance with the ROD and has completed ten (10) semi-annual sampling events since April 2009, the most recent being October 2014.

The following wells are included as part of the semi-annual sampling program according to the ROD:

On-Site Wells

- MW-2I, MW-5S, MW-1I, MW-9I, EW-1.25, EW-1.5, and EW-2.5.

Off-Site Wells

- MW-4S, EW-3.5, EW-4.5, IRM-1, IRM-2, Town Well, and Main School Well.

At Iskalo's request, and to comply with NYSDEC's recommendations and requirements identified in the ROD, GZA developed a scope of work to collect groundwater samples from the twelve (12) previously sampled on- and off-Site monitoring wells, School Well and Town Well.

Prior to the first sampling event by Iskalo in April 2009, GZA met with Mr. Chad Staniszewski and Mr. David Szymanski of NYSDEC at the Signore BCP Site to discuss the project scope and to perform an on- and off-Site reconnaissance of existing wells. During the reconnaissance, off-Site monitoring well locations EW-3.5 and the Main School Well could not be located. NYSDEC did not know the locations of the wells and Signore did not provide well information. GZA and NYSDEC discussed the possibility that EW-3.5 may have been removed during construction activities in that area. The decision to determine whether extending the effort to locate the Main School Well was a worthwhile pursuit depended on the sample results from sampling of monitoring well locations IRM-1, IRM-2 and the Town Well. Therefore, the two monitoring wells that

could not be located, EW-3.5 and the Main School Well, have not been sampled during the semi-annual sampling events.

The summary provided below is from the most recent sampling event completed in October 2014. The complete report is included in Appendix C.

- Static groundwater level measurements indicate that groundwater flows in a south to southeasterly direction at the Site, consistent with previous monitoring events (see Figure 2 in Appendix C).

- VOCs were detected at concentrations above NYSDEC Class GA criteria in the groundwater samples collected from two on-site wells (EW-1.25 and EW-1.5). VOCs were not detected above NYSDEC Class GA criteria in any of the remaining six on-Site wells sampled.

- TCE (5.4 ppb) was detected at one off-site monitoring well EW-4.5, which is located approximately 800 feet south of the BCP Site, but is located on the Signore site property. TCE concentrations have generally fluctuated between 5 and 10 ppb at this monitoring location since October 2004. (see Table 3 in Appendix C).

- A downward trend in VOC concentrations since 2009 is noted in monitoring wells EW-1.25, EW-1.5, MW-1I, MW-5S and MW-9I.

- In general, the concentrations of VOCs at monitoring wells EW-2.5, MW-1I, MW-2I, MW-4S, and MW-9I have predominantly been below NYSDEC Class GA criteria.

- Off-site groundwater monitoring results at locations, IRM-1, IRM-2 and the Town Well, have consistently been non-detect or at concentrations below Class GA criteria since 1994.

Based on our review of the current and historic analytical data, the October 2014 results are generally consistent with findings since 2009.

1.5 PREVIOUS INTERIM REMEDIAL MEASURES

In August 1989, Signore entered into an Administrative Order of Consent (#89-258-89-03) to perform a Remedial Investigation/Feasibility Study at the Site and three Interim Remedial Measures (IRMs). The three IRMs included the following:

- Installation of an interceptor well upgradient of the Town drinking water well;
- Connection of 34 residential properties to the municipal water supply source; and
- Installation of an interceptor well on the downgradient portion of the Signore Property.

The above referenced IRM activities were completed by others and put into operation by January 1992. We note that, based on the Phase II ESA completed in December 2007 and the presence of USTs at the Site, additional IRM activities were completed under the BCP, as discussed in Section 2.0 below.

2.0 INTERIM REMEDIAL MEASURES

This section describes the two (2) IRMs completed at the Signore BCP Site during two separate events in 2011 and 2013 under the BCP.

IRM activities in 2011 included the removal of six (6) USTs and related petroleum impacted soil (see Figure 3). TREC Environmental Inc. (TREC) was the earthwork contractor hired by Iskalo to perform these remedial activities and GZA provided the environmental oversight for the project.

IRM activities in 2013 included the removal of two (2) closed-in place septic tanks and impacted soils located in the vicinity of AOC-2 and AOC-3 (see Figure 3); and the completion of a pilot test to assess the viability of chlorinated volatile organic compound (cVOC) groundwater contamination treatment. Matrix Environmental Technologies, Inc. (Matrix) was the earthwork contractor hired by Iskalo to perform these remedial activities and GZA provided the environmental oversight for the project.

2011 IRM Activities

The first IRM work was completed in general accordance with the NYSDEC-approved IRM Work Plan, dated July 2011. The objective of the IRM was to remove underground storage tanks (USTs) and accessible petroleum impacted soils at the two (2) accessible exterior areas of AOC-1 and AOC-2 (see Figure 3). Three (3) USTs were present within AOC-1 and one (1) UST within AOC-2. Figure 3 identifies the location of the six (6) USTs removed.

In addition to the four (4) USTs identified above within AOC-1 and AOC-2, two additional USTs were also present and removed during the IRM activities as follows;

> A 6,000-gallon steel UST was identified on the north side of the Paint Storage building (see Figure 3). This UST was an emergency dump tank used to temporarily store flammable liquids underground if a fire occurred at the facility. It is reported that this UST was closed-in-place in December 1987 by removing the contents and sludge, cleaning the inside of the tank and filling it with concrete

A 1,520-gallon concrete UST was located along the western side of the building and used as an emergency dump tank to temporarily store flammable liquids underground if a fire occurred at the facility.

In addition to the two USTs discussed above that were located outside of an AOC, two additional USTs were reportedly[5] present and investigated as part of the Phase II ESA, as follows.

A 500-gallon UST was reportedly located on the western side of the Maintenance building and used to temporarily store liquids spilled in the maintenance building. Three test pits completed in the vicinity of this UST, did not identify the presence of a tank. Analytical results of a soil sample collected from 6 to 7 feet bgs identified four (4) VOCs below their respective Unrestricted SCOs. Therefore, no additional work was completed in this vicinity as part of the IRM.

A 1,000-gallon UST was reportedly located between the Paint Storage and Maintenance Buildings and used as an emergency dump tank to temporarily store flammable liquids underground if a fire occurred at the facility. A test pit completed to approximately 6 feet bgs in the vicinity of this UST did not identify the presence of a tank. Field observations and field screening with an organic vapor meter (OVM) did not identify impacted soil at this location. Therefore, no additional work was completed in this vicinity as part of the IRM.

As stated earlier, the first IRM activities were completed at exterior accessible locations. The Site building was still present; therefore, a portion of AOC-2 and all of AOC-3 was present beneath the building. After the building was demolished, the second IRM activities were completed, as discussed below.

2013 IRM Work

The 2013 IRM work was completed in general accordance with the NYSDEC-approved IRM Work Plan, dated July 2013. The objective of this IRM work included:

- removal of remaining soil contamination associated with AOC-2 and AOC-3;
- removal of two (2) closed-in-place concrete septic tanks (see Figure 3).
- Implementation of a pilot test for treatment of cVOC contaminated groundwater in the vicinity of the former septic tanks in the central portion of the Site. This area of the site was found to contain groundwater with total cVOC concentrations in

5 "Remedial Investigation Report, Signore Facility, Ellicottville, New York, Volume 1 of 2" dated April 1991. Prepared by Lozier/Groundwater Associates for Signore, Inc.

excess of 200 ppb. The pilot test technology involved the injection of an electron donor compound (EDC) into the groundwater.

We note that a third septic tank was encountered during the AOC-3 soil removal activities, which was not closed-in-place. This tank and its contents were removed as part of the AOC-3 activities.

2.1 IRM FIELD ACTIVITIES

2.1.1 AIR MONITORING

Air surveillance monitoring for total organic vapors and particulates was performed during excavation activities. The monitoring was conducted in accordance with Section 5.0 (Air Monitoring) of the Health and Safety Plan[6].

Total organic vapors were monitored with a portable MiniRae 3000 OVM with a photoionization detector (PID) equipped with 11.7 electron volt (eV) bulb. A gas standard of isobutylene at a concentration of 100 ppm was used to check the calibration of the OVM daily. Ambient air at the Site was used to establish background organic vapor concentrations.

The OVM was used to monitor the work zone (i.e. perimeter of the excavation and work locations of field staff) and at downwind locations near the property boundary. Sustained readings (considered to be 1 minute or greater) above 1 part per million (ppm) were not observed during the excavation activities, in the work zone or downgradient monitoring locations.

Three (3) particulate monitors were used to measure airborne particles (i.e. dust) less than 10 micrometers in diameter (PM-10) and integrate the measurements over a 15-minute time period. The monitors were equipped with an audible alarm which would sound if the particulate measurements exceeded 150 micrograms per cubic meter (mg/m3) during a 15-minute period. Thermo MIE DR-400 RAM Real-time Aerosol Monitors were used during the 2011 IRM activities and TSI 8530 Dust Trak II Particulate Monitors were used during the 2013 IRM activities.

One monitor was placed in the upwind location each day to establish background particulate conditions. The other two monitors were placed downwind of IRM excavation activities, near the property boundaries. The locations were selected daily, based on the wind direction and location of the IRM activities. When wind direction changed during the course of a day, the particulate monitors were moved.

6 "Health and Safety Plan, Former Signore Facility, Ellicottville, New York, Brownfield Cleanup Program, Site Number C905034" dated July 2011, prepared by GZA GeoEnvironmental of New York.

Particulates measurements did not exceed the 150 mg/m^3 threshold for a 15-minute monitoring period during 2011 IRM activities.

Particulates measurements exceeded the 150 mg/m^3 threshold on three (3) days during the 2013 IRM activities, August 14, 15, and 21, 2013. Particulates measurements did not exceed the 150 mg/m^3 threshold for a 15-minute monitoring period for the other 11 days of the 2013 IRM activities

When the audible alarm sounded indicating an exceedance, GZA/Matrix stopped work and implemented dust suppression corrective actions (i.e. sprayed water on the concrete pad and swept up work area), which suppressed the particulates to acceptable levels. Particulate exceedances did not occur for more than one consecutive measurement (15-minute monitoring period). The daily monitoring data and graphs from each of the dust monitors are included in Appendix D.

2.1.2 EXCAVATION ACTIVITIES

2011 IRM Excavation Activities

Excavated soils were field screened by GZA for total organic vapors with an OVM equipped with an 11.7 eV bulb. These field screening results, along with visual observations and olfactory senses were used to assess soil removed from the excavation. A track excavator (Deere 200-C LC) was used to excavate and place soil into the bucket of a front loader (Deere 644H). The front loader would transport the soil to the soil stockpile staging area located on the northwestern side of the former building. The soils were staged on an existing concrete slab covered with polyethylene sheeting. At the end of each day, the soil pile was covered with polyethylene sheeting.

AOC-1 Excavation

AOC-1 excavation work was conducted from October 31 through November 4th and November 8th through November 11, 2011. Backfilling occurred throughout excavation activities in order to access impacted materials to be removed, due to the size of the excavation and presence of the former building. Backfilling was completed on November 14, 2011.

Three (3) steel USTs filled with concrete and approximately 858 tons of petroleum impacted soil was removed from AOC-1 for disposal. The steel walls were peeled away from the concrete fill. No product was observed. One (1) UST measured 12 feet long by 5 feet in diameter and the other two (2) USTs both measured 12 feet long by 4 feet in diameter. Some areas of rusted holes were observed in the side walls of the USTs.

The steel USTs were crushed using the excavator bucket and taken via trailer to Archie Nichols Inc. (Archie Nichols) located in Frewsburg, New York as scrap metal to be recycled. The concrete from within the USTs was broken into manageable pieces, stockpiled and taken to Swift River Associates, Inc. (Swift River) located in Tonawanda, New York to be recycled. The impacted soil was taken to Hyland Facility Associates Landfill located in Angelica, New York.

The AOC-1 excavation was approximately 70 feet long (north/south) by 30 feet wide (east/west) with depths ranging from 11 feet (eastern portion of AOC-1) to 15 feet (western portion of AOC-1), as shown on Figure 4. Petroleum impacted soil was encountered from ground surface to approximately 9.5 feet bgs (eastern portion of AOC-1) and from 9 to 14 feet bgs (western portion of AOC-1). Approximately 858 tons of petroleum impacted soils were removed from the AOC-1 excavation and stockpiled for off-site landfill disposal.

Based on field screening and observations, the top 9 feet of soil in the western portion of the AOC-1 excavation area was not impacted with petroleum contamination. Therefore, soil from ground surface to 9 feet bgs in this area was staged on polyethylene sheeting and used to backfill the excavation.

During excavation activities, a 4-inch diameter plastic water line from the Site sprinkler system was punctured and approximately 200 gallons of water were released into the excavation. GZA notified Iskalo, and the Village of Ellicottville Department of Public Works (DPW) concerning the pipe. Mr. Harold Morton, Ellicottville DPW Supervisor, visited the Site and indicated that this water line had been shut down and could be removed. Iskalo gave authorization to excavate the line within the limits of the excavation. Two wooden stakes were placed at each end of the pipe, to mark its location.

GZA collected a total of 15 confirmatory soil samples, of which, 14 were analyzed. Nine (9) were from the sidewalls and five (5) were from the bottom of the excavation. A duplicate sample from AOC-1-Bottom-Center-15' and the matrix spike/matrix spike duplicate (MS/MSD) sample was collected from AOC-1-W-Wall 9-11'.

Figure 4 identifies the location of eleven (11) confirmatory samples. Two (2) sample locations (AOC-1-Bottom-SW-12.5' and AOC-1-Bottom-Center-12') were excavated due to the high petroleum VOCs detected in the initial confirmatory results and grossly contaminated soils (e.g., stained soil exhibiting a strong petroleum odor and evidence of petroleum product trapped in the soil matrix) in the southwestern portion of the excavation. The excavation in the southwestern portion of the AOC-1 continued until the grossly contaminated soil was excavated. Sample locations, AOC-1-Bottom-SW-12.5' and AOC-1-Bottom-Center-12', are not shown on Figure 4 as they were excavated. Confirmatory samples were re-

collected after the grossly contaminated soil was removed and field screening indicated the limits of the excavation had been reached.

One sample (AOC-1-W-Wall 5-7') was collected and placed on hold at the laboratory. This sample was not analyzed as the required number of confirmatory samples had been collected for the size of the excavation.

The side wall samples from the AOC-1 excavation were composite samples of individual locations collected vertically varying in depths ranging from 5 to 11 feet bgs from each sidewall. The bottom of excavation samples were collected at the bottom of excavation depths, ranging from 7 to 15 feet bgs across the excavation. The confirmatory soil samples were collected and analyzed for VOCs via EPA Method 8260 TCL and SVOCs via EPA Method 8270 STARS. A summary of sample information is included on Table 1. Results are further discussed in Section 2.40.1.

Due to the puncture of the sprinkler line, approximately 200 gallons of water accumulated in the bottom of AOC-1. A sheen and some residual product were observed on the water that accumulated in the southern and western portions of the AOC-1. Additional excavation activities occurred in these areas to remove the grossly contaminated soil present in the southern and western portions of the excavation. Groundwater was encountered at approximately 12 feet bgs. The excavation in the southern and western portions of AOC-1 continued to a depth of 15 feet bgs about 3 feet below the groundwater table.

GZA collected one (1) groundwater sample from the AOC-1 excavation. The sample was collected by lowering a bailer into the excavation and then filling the appropriate laboratory supplied sample jars. The groundwater sample was analyzed for VOCs via EPA Method 8260 TCL. A summary of sample information is included on Table 1 and the sample location is shown on Figure 4. Results are discussed in Section 2.50.1.

Prior to backfilling the AOC-1 excavation, a three foot thick layer of pea stone was placed in the bottom of the excavation to approximately 6 inches above the estimated top of groundwater observed within the excavation, to an approximate depth of 12 feet bgs. A 35-foot length of 2-inch diameter polyvinyl chlorinated (PVC) perforated pipe was installed on top of the pea stone (see Figure 4) for use as a remedial injection system, if eventually determined necessary. The perforated pipe was installed in the western part of the excavation in a northeast-southwest orientation. Two (2) solid 2-inch diameter PVC riser pipes were attached to each end of the perforated pipe and extended to ground surface. Approximately one foot of additional pea stone was also placed over the top of the injection piping prior to backfilling. The excavation was then backfilled using the clean soil removed from AOC-1 and #2 crusher run stone from the Mapes-Machias Mine located in Cuba,

New York. The bucket of the excavator was used to compact the backfill materials placed into the excavation, with backfill placed up to existing ground surface.

AOC-2 Excavation

AOC-2 excavation activities started on October 24 and were completed by October 25, 2011. The excavation remained open until confirmatory sample results were received. Backfilling occurred on November 7, 2011.

The concrete tank present and approximately 350 tons of petroleum impacted soil was removed from AOC-2. The UST had been previously closed in place by filling with sand and gravel. No product was observed within the tank. The tank measured approximately 12 feet in length by 5 feet in diameter and was orientated vertically. The concrete UST was broken into manageable pieces and stockpiled for disposal with the impacted soil.

The excavation was approximately 45 feet long (east/west) by 30 feet wide (north/south) with a depth ranging from 13 to 15 feet bgs as shown on Figure 5. Impacted soil was encountered at depths ranging from 4 bgs to a depth of approximately 13 feet bgs. A total of approximately 350 tons of impacted soil was removed from the AOC-2 excavation for disposal.

Based on field screening and observations, the top 4 feet of soil present in the excavation was not impacted with petroleum contamination. Therefore, soil from ground surface to 4 feet bgs in this area was separated from soils located below 4 feet bgs, staged on polyethylene sheeting in the vicinity of the excavation and later used for backfill within the excavation.

GZA collected a total of nine (9) confirmatory soil samples from the sidewalls and bottom of the excavation including one duplicate sample (EXC-2-E-Wall 8-10') and a MS/MSD sample was collected from EXC-2-E-Wall 8-10'. The side wall samples from the AOC-2 excavation were composite samples of individual locations collected vertically from 8 to 10 feet bgs from each sidewall. The bottom of excavation samples were collected from 14 to 15 feet bgs. The nine (9) soil samples were collected and analyzed for VOCs via EPA Method 8260 TCL and SVOCs via EPA Method 8270 STARS. A summary of sample information is included on Table 1 and the sample locations are shown on Figure 5. Results are discussed in Section 2.40.2.

GZA collected two (2) groundwater samples from one (1) location within the AOC-2 excavation, which included a duplicate sample. Groundwater was encountered at approximately 11 feet bgs. The samples were collected by lowering a bailer into the excavation and filling the appropriate laboratory-supplied sample jars. The groundwater samples were analyzed for VOCs via EPA Method 8260

TCL and SVOCs via EPA Method 8270 STARS. A summary of sample information is included on Table 1 and the sample location is shown on Figure 5. Results are discussed in Section 2.50.2.

Prior to backfilling the AOC-2 excavation, a two foot thick layer of pea stone was placed in the bottom of the excavation to approximately 6 inches above the apparent top of groundwater within the excavation to approximately 11 feet bgs. A 25-foot length of 2-inch diameter PVC perforated pipe was installed on top of the pea stone (see Figure 5) for use as a remedial injection system, if eventually determined necessary. The perforated pipe was installed in a northeast-southwest orientation. Two (2) solid 2-inch diameter PVC riser pipes were attached to each end of the perforated pipe and extended to ground surface. Approximately one foot of additional pea stone was placed over the top of the injection piping prior to backfilling. The excavation was then backfilled using the clean soil removed from AOC-2 and #2 crusher run stone from the Mapes-Machias Mine. The bucket of the excavator was used to compact the backfill materials placed into the excavation.

We note that the AOC-2 excavation activities occurred on the exterior of the former building. Additional AOC-2 activities were conducted after the building was demolished as part of the 2013 IRM activities, as discussed later in the 2013 IRM Activities.

6,000 Gallon Steel UST Excavation

6,000-Gallon UST excavation work started on October 25 and was completed by October 28, 2011. The excavation remained open until confirmatory sample results were received. Backfilling occurred on November 7, 2011.

One (1), 6,000-gallon steel UST filled with concrete and approximately 25 tons of petroleum-impacted soil was removed from the excavation. The steel walls were peeled away from the concrete fill. No product was observed. TREC was unable to remove the concrete in one piece from the excavation, therefore a backhoe (TX760 Terex) equipped with a jackhammer was used to break up the concrete into manageable pieces for removal from the excavation. The steel tank measured approximately 14 feet in length by 8 feet in diameter. The UST appeared to be in good condition with no areas of rust or holes observed.

The steel USTs were crushed using the excavator bucket and taken via trailer to Valley Recycling, LLC (Valley Recycling) located in Allegany, New York as scrap metal to be recycled. The concrete from within the USTs was broken into manageable pieces, stockpiled and taken to Swift River to be recycled. The impacted soil was taken to Hyland Facility Associates Landfill located in Angelica, New York.

The excavation was approximately 30 feet long (east/west) by 17 feet wide (north/south) with a depth ranging from 5 to 9 feet bgs as shown on Figure 5. Impacted soil was encountered in two limited areas within the excavation: on the north side of the UST prior to its removal above the spring line of the UST, and directly below the middle of the UST, after its removal. A total of approximately 25 tons of impacted soil was removed, for disposal, from the 6,000-Gallon UST excavation.

Based on field observations the top approximately 5 feet of soil present in the excavation was not impacted with petroleum contamination. Therefore soil from 0 to 5 feet bgs in this area was separated from the limited amount of impacted soils located on the north side of the UST. It was staged on-Site atop polyethylene sheeting to be later used for backfill within the excavation.

GZA collected a total of five (5) confirmatory soil samples from the sidewalls and bottom of the excavation. The side wall samples from the excavation were composite samples of individual locations collected vertically from 5 to 7 feet bgs from each sidewall. The bottom of excavation sample was collected from 9 to 9.5 feet bgs. The five (5) soil samples were collected and analyzed for VOCs via EPA Method 8260 TCL and SVOCs via EPA Method 8270 STARS. A summary of sample information is included on Table 1 and the sample locations are shown on Figure 5. Groundwater was not encountered during excavation activities. Results are discussed in Section 2.4.3.

The excavation was then backfilled on November 7, 2011 using the clean soil removed from the 6,000-Gallon UST excavation and #2 crusher run stone from the Mapes-Machias Mine. The bucket of the excavator was used to compact the backfill materials placed into the excavation.

1,520 Gallon Concrete UST Excavation

The 1,520-Gallon Concrete UST excavation work was started and completed on November 1, 2011. The excavation remained open until stone for backfilling activities was delivered to the Site on November 7, 2011 when it was backfilled.

The concrete tank was filled with approximately 800 gallons of water. A water sample was collected from the water and submitted for analysis for VOCs via EPA Method 8260 TCL, SVOCs via EPA Method 8270 Base-Neutrals, metals via EPA Method 6010/7471 and polychlorinated biphenyls (PCBs) via EPA Method 8082. The results were provided to the Town of Ellicottville Engineer (Nussbaumer and Clark, Inc.) and approval was given (see Appendix D) to discharge the water to the Town of Ellicottville sanitary sewer system. A Village of Ellicottville Wastewater Treatment representative was on-site during the start of the discharge event.

Once the tank was emptied, the rectangular concrete UST was excavated. It measured approximately 8 feet long, by 6 feet wide, by 8 feet deep. The concrete UST was broken into manageable pieces and stockpiled for disposal with impacted soil from the other excavations.

The excavation was approximately 14 feet long (north/south) by 10 feet wide (east/west) with a depth of 6 feet bgs as shown on Figure 5. The readings from the PID along with visual/olfactory senses were used to detect impacted soils. The screened soils around the area of excavation showed non-detect concentrations. The clean soil excavated was staged on poly next to the excavation to later be used for backfill within the excavation.

The excavation was then backfilled on November 7, 2011 using the clean soil removed from the 1,520-Gallon Concrete UST excavation and #2 crusher run stone from the Mapes-Machias Mine. The bucket of the excavator was used to compact the backfill materials placed into the excavation.

GZA did not collect any confirmatory soil or groundwater samples from the 1,520-gallon concrete UST excavation. Impacted soil was not identified during the UST removal or during the previous Phase II ESA activities. GZA field screened the sidewalls and bottom soils of this excavation using an OVM which indicated non-detect concentrations from the soil. Groundwater was not encountered during this excavation.

2013 Excavation Activities

Excavated soils were field screened by GZA for total organic vapors with an OVM equipped with an 11.7 eV bulb. These field screening results, along with visual and olfactory observations were used to assess excavated soil. A track excavator (Kobelco SK 210LC) was used to excavate the soil associated with AOC-2 and AOC-3. Apparent non-impacted soils were screened with the OVM and placed on polyethylene sheeting in the proximity of the excavations for subsequent use as backfill.

Impacted and non-saturated soils were directly loaded into trucks for off-site disposal. Impacted and saturated soils encountered were placed on soil benches/areas within the excavation and were allowed to decant within the excavation limits. The benches/areas contained impacted soil that would be removed at a later time. Decanting did not occur over non-impacted soil. The decanted impacted soils were then moved from within the excavation limits onto polyethylene sheeting for staging and further drying. When the impacted material was sufficiently dry for transport, it was loaded onto dump trucks via a front loader, for off-Site disposal. The soil pile was covered with polyethylene sheeting when

rain was forecasted. The soil pile and open excavations were secured with snow fencing along their perimeters when GZA/Matrix were off-Site.

Additional AOC-2 Excavation

A concrete UST and associated impacted soil were removed as part of the IRM activities in 2011. However, due to the presence of the former building at the time of the work in 2012, some impacted material was left along the building foundation and presumably under the concrete floor slab. The building was demolished in the summer of 2013 and removed. With the building now gone, AOC-2 excavation activities were completed on August 12, 2013.

An area north of the foundation wall (approximate 20 feet long (north/south) by 12 feet wide (east/west)) was excavated to about 14 feet bgs. These soils were observed to be apparently non-impacted as the OVM readings from the soil on the north side of the building foundation wall were less than 1 ppm. No visual or olfactory evidence of impacts were noted.

Therefore, the excavation to remove the remaining impacted soil associated with AOC-2 was south and adjacent to the building foundation wall to a depth of 15 feet bgs (see Figure 6). The additional excavation removed soil where contaminants were identified by the 2011 AOC-2 IRM sample results (EXC-2-NW-Wall (8 to 10 feet bgs) and EXC-2-Bottom-N (14 to 15 feet bgs)).

The excavation was an irregular shape, approximately 40 feet long (north/south) by 35 feet wide (east/west) with a depth ranging from 14 to 15 feet bgs as shown on Figure 6. Impacted soil was encountered south of the foundation wall at depths ranging from 5 bgs to 15 feet bgs. A total of approximately 128 tons of impacted soil was removed from the AOC-2 excavation for disposal in 2013.

Based on field screening and observations, the uppermost 5 feet of soil present in the excavation south of the foundation wall was not impacted. Therefore, soil from ground surface to 5 feet bgs in this area was separated from soils located below 5 feet bgs, staged on polyethylene sheeting in the vicinity of the excavation and later used for backfill of the same excavation. The excavation remained open until confirmatory sample results were received. Backfilling occurred on August 29, 2013.

GZA collected a total of four (4) confirmatory soil samples from the additional AOC-2 excavation, one sidewall sample and three bottom samples of the excavation. The side wall sample (EXC-2-NW Wall-5) was a discrete sample collected from 5 feet bgs, which was the depth with the highest OVM field screening result. The bottom of excavation samples were collected from 14 to 15 feet bgs. The four (4) soil samples were collected and analyzed for VOCs via EPA

Method 8260 TCL. A summary of sample information is included on Table 1 and the sample locations are shown on Figure 6. Results are discussed in Section 2.40.2.

AOC-3 Excavation

AOC-3 consisted of petroleum-based VOC impacted soil which was identified during the previous Phase II ESA as discussed in Section 1.4. It was identified in an area under the former main building identified as the paint kitchen and spray booth area. We note that a concrete septic tank was identified during the AOC-3 excavation activities, which was removed along with its contents.

AOC-3 excavation activities occurred between August 13 through August 23, 2013. The excavation remained open until confirmatory sample results were received. Backfilling occurred between August 27 and August 30, 2013.

The excavation was generally rectangular in shape and approximately 92 feet long (north/south) by 72 feet wide (east/west) with a depth ranging from 4 to 15 feet bgs as shown on Figure 6. Impacted soil was encountered at depths ranging from just below the concrete slab to approximately 15 feet bgs. A total of approximately 4,173 tons of impacted soil was removed from the AOC-3 excavation for disposal.

Soils observed below the groundwater table in the open excavation (approximately 11 feet bgs) were generally observed to be visually impacted (i.e., gray stained). Apparently non-impacted soils excavated from AOC-3 were screened and segregated from impacted soils. The non-impacted material was staged on polyethylene sheeting in the vicinity of the excavation and later used for backfill within the excavation.

GZA collected 18 confirmatory soil samples from the sidewalls and bottom of the excavation. The sidewall samples from the AOC-3 excavation were discrete samples collected from the depth that exhibited the highest OVM reading when screened. The bottom of excavation samples were collected at 15 feet bgs. The 18 soil samples were collected and analyzed for VOCs via EPA Method 8260 TCL. A summary of sample information is included on Table 1 and the sample locations are shown on Figure 6. Results are discussed in Section 2.40.5.

Prior to backfilling the excavation, absorbent booms were used to remove the sheen that was observed on the standing water within the excavation. The absorbent booms were placed in the impacted soil stockpile after use and were taken to the landfill for disposal with the soil. An approximate four foot thick layer of bank run gravel and previously stockpiled coarse non-impacted material was placed in the bottom of AOC-3 to the apparent top of groundwater table (11 feet bgs). Two (2) lengths of 50-foot long 4-inch diameter HDPE perforated pipe were installed within

AOC-3 (see Figure 6) for use as a remedial injection system, if deemed necessary. One (1) 50-foot length was installed in the southern portion of the excavation in an east-west orientation at approximately 12 feet bgs. The other 50-foot length installed in the northern portion of the excavation in an east-west orientation at approximately 11 feet bgs (see Figure 6). A non-perforated 4-inch diameter HDPE riser pipe was attached to one end of the perforated pipes installed and extended to ground surface. The excavation was then backfilled using the apparently non-impacted soil removed from AOC-2 and AOC-3 and brown silty clays derived from the NYSDEC approved (see approval letter in Appendix D) borrow source area (see Figure 3) located north of the Signore BCP Site. The bucket of the excavator was used to compact the backfill materials placed into the excavation. The riser pipe associated with the southern injection location was observed to be collapsed at approximately 5.5 feet bgs after the completion of backfilling the AOC-3 excavation. Matrix excavated soils around the riser pipe to address the collapse; however, Matrix was unable to repair the pipe due to depth and the high moisture of the backfilled material, which was non-cohesive and runny. It was also uncertain whether the pipe had collapsed locally at 5.5 feet bgs, or at depth throughout the length of the pipe. Further investigation of this pipe will be completed if the pipe is to be used for remedial injection purposes.

Septic Tank Removals

Two (2) closed-in place septic tanks were located in the central portion of the Signore BCP Site under the concrete slab (see Figure 3). These tanks were reportedly cleaned and filled with concrete. The septic tank removals were completed on August 12 and the excavations backfilled on August 13 and August 30, 2013. The soils in the septic tank excavations were apparently non-impacted, with no visual or olfactory evidence of contamination observed. Soils excavated during the septic tank removals were non-detect on the OVM equipped with a 11.7 eV bulb. NYSDEC indicated via e-mail that confirmatory analytical samples of the septic tank excavations were not required due to the non-detect OVM soil screening. The apparent non-impacted soil was staged on polyethylene sheeting south of the excavations and was used as backfill.

West Septic Tank Removal

The approximate 550-gallon hexagonal concrete septic tank was removed and broken into manageable fragments for disposal at the Swift River Associates Landfill. The septic tank was observed to be filled with concrete. The excavation was approximately 11 feet long (north/south) by 8 feet wide (east/west) with a depth of 7 feet bgs. The excavation was partially backfilled with the non-impacted material from the excavation on August 13, 2013. Backfilling was completed on August 30, 2013 with bank run gravel also utilized in AOC-3 (top approximate 1 to 2 feet). The bucket

of the excavator was used to compact the backfill materials placed into the excavation.

East Septic Tank Removal

The approximate 550-gallon hexagonal concrete septic tank was removed and broken into manageable fragments for disposal at the Swift River Associates Landfill. The septic tank was observed to be filled with concrete. The excavation was approximately 9 feet long (north/south) by 8 feet wide (east/west) with a depth of 7 feet bgs. The excavation was partially backfilled with the non-impacted material from the excavation on August 13, 2013. Backfilling was completed on August 30, 2013 with bank run gravel also utilized in AOC-3 (top approximate 1 to 2 feet). The bucket of the excavator was used to compact the backfill materials placed into the excavation.

2.2 DISPOSAL DOCUMENTATION

2011 IRM Activities

The total volume of petroleum- and VOC-impacted soil excavated from the Signore BCP Site during the 2011 IRM was approximately 1,233 tons. The soil was removed from the polyethylene sheeting lined soil stockpiles located in the northeastern portion of the Signore BCP Area and loaded into dump trucks for disposal at Hyland Facility Associates Landfill located in Angelica, New York. The concrete was taken to be recycled at Swift River. The steel USTs were crushed and taken to be recycled at Valley Recycling and Archie Nichols. The soil and concrete removal was completed from January 9 through January 16, 2012. See Appendix D for disposal documentation.

2013 IRM Work

The total volume of petroleum- and VOC-impacted soil excavated from the Signore BCP Site during the second IRM was approximately 4,301 tons. The soil was either directly loaded or removed from the polyethylene sheet lined soil stockpiles located east of AOC-2 and AOC-3 and loaded into dump trucks for disposal at the Hyland Facility Associates Landfill located in Angelica, New York. The concrete from the three (3) septic tanks was taken to Tonawanda Landfill in Tonawanda, New York for disposal. The soil and concrete removal was conducted from August 13 through August 28, 2013. See Appendix D for disposal documentation.

2.3 ELECTRON DONOR COMPOUND INJECTION PILOT TEST

The groundwater data from the SRI, as discussed in Section 5.5, indicates that the cVOC plume (cVOC concentrations greater than 200 ppb) may be originating in the vicinity of

the former septic tanks in the central portion of the Signore BCP Site (see Figure 7). Prior to implementing a full-scale in-situ groundwater treatment program, a pilot test was initiated in September 2013, as discussed below, to assess the effectiveness of the remedial alternative and collect pre-design data.

The EDC[7] material enhances the anaerobic breakdown of the "parent" cVOCs present at the Signore BCP Site (trichloroethene (TCE), tetrachloroethene (PCE) and 1,1,1-trichloroethane (1,1,1-TCA)) via reductive dechlorination to the "daughter" breakdown products (cis-dichloroethene (cis-DCE), vinyl chloride (VC), 1,1-dichloroethane (1,1,-DCA), and chloroethane (CA)). The daughter products can continue to degrade anaerobically, or will readily degrade under aerobic conditions.

Reductive dechlorination is the biologically- or chemically-mediated replacement of chlorine (as chloride) on a chlorinated organic compound with elemental hydrogen, in the presence of a suitable electron donor. This causes transformation of the cVOC to a less chlorinated product. An electron donor is a compound capable of supplying electrons during oxidation-reduction reactions. In biological reductive dechlorination, microorganisms obtain energy by transferring electrons from electron donors to electron acceptors. Electron donors are chemically-reduced materials such as fuel hydrocarbons, naturally-occurring organic carbon, or organic carbon-based remedial additives. Electron donors become chemically oxidized during cVOC transformation. Electron acceptors include oxygen, nitrate, ferric iron, sulfate, and cVOCs.

For example, reductive dechlorination of chlorinated VOCs typically occurs sequentially from PCE to TCE, TCE to DCE, DCE to VC, and VC to ethene and chloride, and ultimately ethene to carbon dioxide and water.

The pilot test consisted of the injection of approximately 1,775 pounds of EDC material in the vicinity of SP-3 and the 200 ppb contour, 500 pounds of EDC in the vicinity of 100 ppb contour near SP-32 (see Figure 7), and monitoring the groundwater conditions in the areas of the injections. The EDC material was composed of food-grade vegetable oils and surfactants. A safety data sheet (SDS) for the material has been included in Appendix D.

The EDC material was mixed into slurry and injected into the subsurface groundwater. The following injection methodology was implemented for the two (2) pilot test areas, identified by nearby soil probe locations.

SP-3 Area

EDC injections were conducted in this area on September 6, 9, and 10, 2013. A direct push soil probe unit was used to advance the probe of the injection equipment. Injection points were completed in an approximate 15-foot horizontal

7 EDC, manufactured by EcoCycle of Toyama, Japan, was used as a remedial additive to drive the reductive dechlorination of cVOCs.

spacing, over a 40 foot by 30 foot area, for a total of nine (9) injection points (see Figure 7).

Injections occurred in two (2) intervals below the groundwater table at each injection location. The shallow injection intervals were conducted approximately five feet below the groundwater table at 15 feet bgs. The deeper injection intervals were conducted approximately 10 feet below the groundwater table at 20 feet bgs. Injections were completed by advancing the probe to the first depth injection interval, injecting the required quantity of EDC material, and then advancing the probe deeper to the next injection interval and injecting the required quantity of EDC material using a top-down approach.

A total of 1,775 pounds of material was used in this injection area. The 1,775 pounds of material was mixed with about 1,800 gallons of water to create an injectable slurry. The EDC material and water was mixed on-site in tanks until the EDC material dissolved into solution. The EDC material was observed to dissolve into solution easily. Once dissolved, the slurry was injected into the subsurface under pressure using a grout pump. The injection rate was limited to the rate at which the formation accepted the slurry material. The injection pressure was regulated and monitored to avoid “blow-back” up the sides of the injection rods or up previously completed injection points.

The injection quantities were approximately 195 pounds of EDC material per injection location (97.5 pounds per injection interval) using approximately 200 gallons of water per injection location (100 gallons per injection interval).

Water levels were monitored from wells in the proximity of this area (SP-37, SP-38, SP-42, SP-43, and SP-45) periodically during the injections to potentially monitor material infiltration. Water levels generally remained static during the injections, except at SP-38 and SP-43, which are most proximate to the injection area. The water level at SP-38 was 9.50 feet from the top of well riser prior to the initiation of injections on September 6, 2013. The water level was measured to fluctuate during the injections from 8.83 to 9.81 feet from the top of well riser. The water level at SP-43 was 9.91 feet from the top of well riser prior to the initiation of injections on September 6, 2013. The water level was measured to fluctuate during the injections from 9.05 to 10.30 feet from the top of well riser. GZA placed a micro-bailer into well SP-38 to observe the groundwater during injections. Evidence of the EDC material was not observed from the groundwater at this location during injections; however, GZA notes that this location is upgradient from the injection area.

SP-32 Area

EDC injections were conducted in this area on September 5, 2013. A direct push soil probe unit was used to advance the probe of the injection equipment. Injection points were completed in an approximate 10-foot horizontal spacing, over a 20 foot by 20 foot area, for a total of five (5) injection points.

Injections occurred in two (2) intervals below the groundwater table at each injection location. The shallow injection intervals were conducted approximately five feet below the groundwater table at 14 feet bgs. The deeper injection intervals were conducted approximately ten feet below the groundwater table at 19 feet bgs. Injections were completed by advancing the probe to the first depth injection interval, injecting the required quantity of EDC material, and then advancing the probe deeper to the next injection interval and injecting the required quantity of EDC material using a top-down approach.

A total of 500 pounds of material were used in this injection area. The 500 pounds of material was mixed with about 550 gallons of water to create an injectable slurry. The EDC material and water was mixed on-site in tanks until the EDC material dissolved into solution. The EDC material was observed to dissolve into solution easily. Once dissolved, the slurry was injected into the subsurface under pressure. The injection rate was limited to the rate at which the formation accepted the slurry material. The injection pressure was regulated and monitored to avoid "blow-back" up the sides of the injection rods or up previously completed injection points.

The injection quantities were approximately 100 pounds of EDC material per injection location (50 pounds per injection interval) using approximately 110 gallons of water per injection location (55 gallons per injection interval).

Water levels were monitored from wells in the proximity of this area (SP-32, SP-35, SP-37, SP-38, and SP-43) periodically during the injections to potentially monitor material infiltration. Water levels generally remained static during the injections, except at SP-32, which is approximately centrally located within the injection area. The water level at SP-32 was 8.92 feet from the top of well riser prior to the initiation of injections. The water level was measured to fluctuate during the injections from 6.62 to 7.88 feet from the top of well riser. GZA placed a micro-bailer into well SP-32 to observe the groundwater during injections. Visual (light brown color) and olfactory (characteristic sewage-like odor) evidence of the EDC material was observed from the groundwater at this location during injections on September 5, 2013.

EDC Pilot Test Groundwater Sampling

Two (2) groundwater sampling events were conducted to assess the effectiveness of the EDC injections. The initial groundwater samples were collected on October 17, 2013, approximately 6 weeks after the EDC pilot test injections were implemented. The second round of groundwater samples were collected on June 10, 2014, approximately 9 months after the injections.

Groundwater samples were collected from six (6) locations (EW-1.25, SP-32, SP-37, SP-38, SP-43, and SP-45) shown in red on Figure 7 for the following analytical methodologies.

VOC:	SW-846, 8260C
Methane:	RSK175
TOC:	SM5310B
Chloride:	EPA 300.0
Nitrate:	EPA 300.0
Sulfate:	EPA 300.0
Ethane:	RSK-175
Ethene:	RSK-175
Dissolved Iron:	SW-846, 6010C
Dissolved Manganese:	SW-846, 6010C

For the sampling events, a water quality meter and flow-through cell is used to collect field measurements for pH, specific conductance, dissolved oxygen (DO), turbidity, oxygen reduction potential (ORP) and temperature. Disposable polyethylene tubing and a variable speed low-flow sampling pump is utilized during the sampling events.

We note that during the October 17, 2013 sampling event olfactory evidence (characteristic sewage-like odor) of the EDC material was observed at SP-32 and SP-43 (see Figure 7).

2.4 IRM SOIL ANALYTICAL RESULTS

2011 IRM Activities

Analytical results of IRM confirmatory soil samples are presented below. The analytical laboratory reports are provided in Appendix D in electronic format (compact disc). The analytical results for the soil samples from AOC-1, AOC-2 and the 6,000-gallon UST excavations are summarized on Tables 2, 3, and 4 respectively. The groundwater sample results for samples collected from AOC-1 and AOC-2 are summarized on Table 5.

The analytical test results were compared to:

- Soils results were compared to 6 New York Code Rules and Regulation (6 NYCRR) Part 375 Environmental Remediation Programs, Subparts 375-12 to 375-4 & 375-6, effective December 14, 2006, Protection of Groundwater Restricted Use Soil Cleanup Objectives (PGWSCOs) and Restricted Residential Use Soil Cleanup Objectives (RRSCOs)

- Groundwater results were compared to NYSDEC Class GA criteria presented in the Division of Water Technical and Operational Guidance Series (TOGS 1.1.1.), dated October 1993, revised June 1998, errata January 1999 and amended April 2000 (Class GA Criteria).

2.4.1 AOC-1 Confirmation Sample Results

Volatile Organic Compounds

VOCs were detected above method detection limits in ten (10) of the eleven (11) confirmatory samples collected from the AOC-1 Excavation. Two (2) confirmatory bottom sample locations collected from approximately 12 feet bgs (AOC-1-Bottom-SW (12.5') and AOC-1-Bottom-Center (12') were excavated due to elevated levels of VOCs detected. AOC-1-Bottom-SW (12.5') had a total VOC concentration of about 494,000 ppb and AOC-1-Bottom-Center (12) had a total VOC concentration of about 396,000 ppb. These results are not further discussed as the soil from which these samples were collected was excavated and disposed.

No VOCs were detected in sample AOC-1-SE-Wall.

The VOCs detected in ten (10) of the eleven (11) confirmatory samples from AOC-1 were below both the PGWSCOs and RRSCOs with the exception of one (1) sample location, AOC-1-Bottom-Center (15') (see Figure 4). Six (6) of the 12 VOCs detected at this location were at concentrations above their respective PGWSCOs, but below RRSCOs (see Table 3). These VOCs include acetone, benzene, toluene, m- & p-xylene, o-xylene and 1, 2, 4-trimethylbenzene.

The total VOC concentrations detected above method detection limits for the eleven (11) samples from AOC-1 are provided below.

AOC-1-E-Wall (5-7'):	48.7 ppb
AOC-1-NE-Wall (5-7'):	2.4 ppb
AOC-1-Bottom-E (10.5-11'):	2.3 ppb
AOC-1-NW-Wall (6-10'):	93.1 ppb
AOC-1-Bottom-W (7-8'):	1.9 ppb
AOC-1-SW-Wall (7-10'):	537.2 ppb

AOC-1-Bottom-Center (15’):	18,439.6 ppb
AOC-1-Bottom-SW (15’):	235.4 ppb
AOC-1-Bottom-W (15’):	20.3 ppb
AOC-1-W-Wall (9-11’):	2.3 ppb

Semi-Volatile Organic Compounds

SVOCs were detected above method detection limits in four (4) of the eleven (11) samples collected from AOC-1. Seven (7) samples did not have concentrations of SVOCs above method detection limits. None of the SVOCs detected in the four (4) samples exceeded the PGWSCOs or RRSCOs. (see Table 3).

The total SVOC concentrations detected above method detection limits for the four samples with SVOC detections from AOC-1 are provided below.

AOC-1-NE-Wall (5-7’):	110 ppb
AOC-1-Bottom-W (7-8’):	858 ppb
AOC-1-Bottom-Center (15’):	130 ppb
AOC-1-Bottom-W (15’):	197 ppb

2.4.2 AOC-2 Confirmation Sample Results

2011 IRM Volatile Organic Compound Results

The sample results from the 2011 IRM activities indicated that VOCs were detected above method detection limits in the eight (8) confirmatory samples collected from AOC-2 (see Table 3). VOCs detected were at concentrations above their PGWSCOs or RRSCOs in two (2) of the eight (8) confirmatory samples, EXC-2-NW-Wall (8 to 10 feet bgs) and EXC-2-Bottom-N (14 to 15 feet bgs). Four (4) of the seven (7) VOCs detected in the sample, EXC-2-NW-Wall (8 to 10 feet bgs), were above both the PGWSCOs and RRSCOs. Four (4) of the eleven (11) VOCs detected in the sample, EXC-2-Bottom-N (14 to 15 feet bgs) were above the PGWSCOs but were below the RRSCOs. At the time of the 2011 IRM, additional soil could not be removed in the vicinity of these locations due to the presence of the former building foundation and the potential for side wall collapse. These locations were addressed as part of the 2013 IRM activities.

The total VOC concentration detected above method detection limits for the samples collected from the AOC-2 are provided below.

EXC-2-NE-Wall (8-10’):	15.9 ppb
EXC-2-NW-Wall (8-10’):	887,300 ppb – Removed in 2013 IRM
EXC-2-Bottom-N (14-15’):	10,570 ppb – Removed in 2013 IRM
EXC-2-Bottom-S (14-15’):	13.8 ppb

EXC-2-SW-Wall (8-10'):	3.7 ppb
EXC-2-S-Wall (8-10'):	19.5 ppb
EXC-2-E-Wall (8-10'):	22.8 ppb
EXC-2-SE-Wall (8-10'):	12.3 ppb

2013 IRM Volatile Organic Compound Results

VOCs were detected above method detection limits in two (2) of the four (4) confirmatory samples collected from the 2013 IRM AOC-2 Excavation at EXC-2-BOTT-SWWALL (14 feet bgs) and EXC-2-BOTT-SEWALL (15 feet bgs). No VOCs were detected in samples EXC-2-BOTT-NWALL (14 feet bgs) and EXC-2-NWWALL-5 (5 feet bgs). The VOCs detected in two (2) of the four (4) confirmatory samples from AOC-2 were below both the PGWSCOs and RRSCOs (see Table 3).

The total VOC concentrations detected above method detection limits for the two (2) samples from 2013 IRM AOC-2 confirmation samples are provided below.

EXC-2-BOTT-SWWALL (14'):	5.5 ppb
EXC-2-BOTT-SEWALL (15'):	39.7 ppb

2011 IRM Semi-Volatile Organic Compound Results

No SVOCs were detected above method detection limits in the eight (8) confirmatory samples collected from the AOC-2 Excavation.

Due to the lack of detections above method detection limits in the 2011 IRM AOC-2 results, no SVOCs confirmatory samples were collected during the 2013 IRM activities.

2.4.3 6,000-Gallon Steel UST Confirmation Sample Results

Volatile Organic Compounds

VOCs were detected above method detection limits in two (2) of the five (5) confirmatory samples collected from the 6,000-gallon steel UST excavation (see Table 4). The concentrations of the VOCs detected did not exceed their respective PGWSCOS or RRSCOs.

The total VOC concentrations detected above method detection limits for the two (2) samples with VOC detections from the 6,000-Gallon UST excavation are provided below.

UST-EXC-E-Wall (5-7’):	26.6 ppb
UST-EXC-Bottom (9-9.5’):	33.2 ppb

Semi-Volatile Organic Compounds

No SVOCs were detected above method detection limits in the five (5) confirmatory samples collected from the 6,000-gallon steel UST excavation.

2.4.4 1,520-Gallon Concrete UST Confirmation Sample Results

No confirmatory samples were collected from this excavation.

2.4.5 AOC-3 Confirmation Sample Results

Volatile Organic Compounds

No VOCs were detected above method detection limits in two (2) samples, AOC-3-WWall-1 and AOC-3-WWall-3. VOCs were detected above method detection limits in 14 of the 16 confirmatory samples collected from AOC-3 (see Table 3). The VOCs detected in the fourteen (14) of the sixteen (16) confirmatory samples were below both the PGWSCOs and RRSCOs.

The total VOC concentration detected above method detection limits for the 14 samples are provided below.

AOC-3-WWALL-2 (14’):	1,633 ppb
AOC-3-NWALL-1 (12’):	405 ppb
AOC-3-NWALL-2 (14’):	13.8 ppb
AOC-3-SWALL-1 (12’):	26.5 ppb
AOC-3-SWALL-2 (12’):	5.6 ppb
AOC-3-EWALL-1 (12’):	3 ppb
AOC-3-EWALL-2 (12’):	5.7 ppb
AOC-3-BOTT-SW (15’):	5.7 ppb
AOC-3-BOTT-NW (15’):	7.3 ppb
AOC-3-BOTT-3 (15’):	6,467 ppb
AOC-3-BOTT-4 (15’):	1,351 ppb
AOC-3-BOTT-5 (15’):	6,176 ppb
AOC-3-BOTT-6 (15’):	78.7 ppb
AOC-3-EWALL-3 (15’):	8.4 ppb

2.5 IRM GROUNDWATER ANALYTICAL RESULTS

2.5.1 AOC-1 Excavation

Volatile Organic Compounds

Fourteen (14) VOCs were detected above method detection limits in the groundwater sample collected from AOC-1 (see Table 5). Of these 14 VOCs, nine (9) were detected above their respective NYSDEC Class GA groundwater criteria, including trichloroethene, benzene, toluene, ethylbenzene, m- & p-xylene, o-xylene, n-propylbenzene, 1, 3, 5-trimethylbenzene and 1, 2, 4-trimethylbenzene. The total VOC concentration for the groundwater sample (AOC-1-GW) collected from the AOC-1 excavation was 271.2 ppb.

2.5.2 AOC-2 Excavation

Volatile Organic Compounds

Nine (9) VOCs were detected above method detection limits in the groundwater sample collected from AOC-2 (see Table 5). Of these nine (9) VOCs, six (6) were detected above their respective NYSDEC Class GA groundwater criteria, including toluene, ethylbenzene, m- & p-xylene, o-xylene, isopropylbenzene and 1, 2, 4-trimethylbenzene. The total VOC concentration for the groundwater sample (EXC-2-GW) collected from the AOC-2 excavation was 2,060 ppb.

Semi-Volatile Organic Compounds

No SVOCs were detected above method detection limits for groundwater sample (EXC-2-GW) collected from the AOC-2 excavation.

2.5.3 AOC-3 Excavation

GZA collected two (2) groundwater samples from the AOC-3 excavation during the 2013 IRM activities; designated as AOC-3-GW and AOC-3-GW-2. These two (2) samples were analyzed for VOCs via EPA Method 8260 TCL, only. The samples were collected by lowering bailers into the excavation and then filling the appropriate laboratory supplied sample jars.

AOC-3-GW

Fifteen (15) VOCs were detected above method detection limits in groundwater sample AOC-3-GW (see Table 5). Of these fifteen (15) VOCs, nine (9) were detected above their respective NYSDEC Class GA groundwater criteria, including 1,1-dichloroethane, trichloroethene,

ethylbenzene, m- & p-xylene, o-xylene, isopropylbenzene, n-propylbenzene, 1,3,5-trimethylbenzene, and 1,2,4-trimethylbenzene. The total VOC concentration for the groundwater sample AOC-3-GW excavation was 507 ppb.

AOC-3-GW-2

Thirteen (13) VOCs were detected above method detection limits in groundwater sample AOC-3-GW-2 (see Table 5). Of these thirteen (13) VOCs, ten (10) were detected above their respective NYSDEC Class GA groundwater criteria, including toluene, trichloroethene, ethylbenzene, m- & p-xylene, o-xylene, isopropylbenzene, n-propylbenzene, 1,3,5-trimethylbenzene, 1, 2, 4-trimethylbenzene, and naphthalene. The total VOC concentration for the groundwater sample AOC-3-GW-2 excavation was 6,251 ppb.

2.5.4 EDC Pilot Test Groundwater Sampling Results

Groundwater samples were collected from six (6) well locations (EW-1.25, SP-32, SP-37, SP-38, SP-43, and SP-45) shown in red on Figure 7. The IRM Pilot Test analytical results are summarized in Table 6. The results of the SRI groundwater data from these six (6) locations were also included on Table 6 for comparative purposes. The results of the 9 month sampling event are as follows:

- There was a decrease in parent compound concentrations at four (4) of the six (6) sampling locations: EW-1.25, SP-32, SP-43 and SP-45.

- There was a slight increase in parent compound concentrations at SP-38. We believe the slight increase in PCE and TCE concentrations (0.2 and 2.0 µg/L, respectively) is not a concern at this time and may be due to sample variability for this particular sample event. SP-37 is at a cross gradient location. At the 6 week sampling event, PCE and TCE concentrations at SP-37 were slightly elevated. At this 9 month sampling event, PCE and TCE concentrations are trending downward, with the TCE concentration reduced 45% compared to pre-pilot concentrations, and PCE, although it exceeds the pre-pilot concentration by 3.4 µg/L, is reduced 46% from its concentration at the 6 week sampling event.

The pilot test groundwater sampling results appear favorable, as there is a decrease in parent compound concentrations at four (4) of the six (6) sampling locations within nine months of the injections. At the 6 week post-injection sampling event, we noted that at two (2) locations, SP-32 and SP-43, acetone and 2-butanone were detected for the first time. Acetone and 2-butanone (2-butanone is also known as methyl ethyl ketone, or MEK) are short-lived chemical intermediates typically generated during the initial stages of cVOC bioremediation. These intermediate compounds are likely due to degradation pathways of

the EDC organic carbon amendment. In agreement with our experience at other sites, acetone and MEK intermediates were quickly attenuated and are now non-detect at all six pilot test sampling locations.

2.6 PHOTOGRAPHIC DOCUMENTATION

Photographic documentation of the IRM excavation activities is included in Appendix D.

2.7 IRM CONCLUSIONS & RECOMMENDATIONS

AOC-1

Of the eleven (11) confirmatory soil samples collected from the sidewalls and bottom of the excavation, one (1) location (AOC-1-Bottom-Center), contained VOCs above their respective PGWSCOs but below the RRSCOs. Additional soil was not removed from within the vicinity of this sample location as the groundwater table had been encountered and due to the size of the excavation, the excavator could not effectively reach the location. The remaining confirmatory results were below the PGWSCOs and RRSCOs.

The results of the groundwater sample collected from AOC-1 indicated that 14 VOCs were detected above method detection limits; of which nine (9) were detected above their respective NYSDEC Class GA groundwater criteria, with a total VOC concentration of 271 ppb.

The analytical results of both the soil and groundwater indicate that residual contamination was present in the vicinity of AOC-1 at the time that the IRM work was completed, but the majority of the contamination was removed. A remedial injection system was installed within the limits of the excavation, prior to backfill, if eventually determined necessary.

The SRI (further discussed in Section 3.00) involved the collection of a groundwater sample from a microwell installed at TP-10, approximately 80 feet downgradient (south) of AOC-1 to assess the presence of VOCs in the groundwater related to AOC-1. The results of the SRI groundwater sampling are provided in Table 11. No petroleum related VOC were detected above method detection limits. Therefore, no additional remedial actions are required at AOC-1.

AOC-2

Based on the nine (9) 2011 IRM confirmatory soil samples collected from the sidewalls and bottom of the excavation, two (2) locations, EXC-2-NW-Wall (8 to 10 feet bgs) and EXC-2-Bottom-N (14 to 15 feet bgs), contained VOCs above their respective PGWSCOs and RRSCOs. The additional remedial activities completed as part of the 2013 IRM removed the additional soil contamination associated with AOC-2. Therefore, no

additional remedial work will be required in the vicinity of the northwestern corner of AOC-2.

The results of the groundwater sample collected from AOC-2, indicated nine (9) VOCs were detected above method detection limits, of which six (6) were detected above their respective NYSDEC Class GA groundwater criteria, with a total VOC concentration of 2,060 ppb. However, monitoring well MW-5S (sampled semi-annually as part of on-going groundwater monitoring (see Figure 6), is located about 25 feet south and hydraulically downgradient of AOC-2. The monitoring well screen zone of MW-5S is from approximately 7.5 to 17.5 feet bgs, which screens across the bottom of AOC-2 excavation depth. The groundwater analytical results from the seven (7) semi-annual sampling events conducted from April 2009 through October 2013 did not indicate the presence of similar VOCs detected in the groundwater sample collected from AOC-2. Therefore, it does not appear that the VOCs associated with AOC-2 are migrating from this area.

6,000-gallon UST Excavation

Analytical results of the five (5) confirmatory soil samples collected from the side walls and bottom of the excavation indicate no contamination is present above the PGWSCOs or RRSCOs. No additional remedial action is needed related to this UST.

1,520-gallon UST Excavation

Based on the field screening results and olfactory observations of the sidewalls and bottom soils of this excavation, no impacted soil was identified during the UST removal or during the previous Phase II ESA activities. No additional remedial action is needed related to this UST.

AOC-3

Analytical results of the sixteen (16) confirmatory soil samples collected from the side walls and bottom of the excavation were below the PGWSCOs and RRSCOs.

The analytical results of groundwater sample AOC-3-GW included 15 VOCs detected above method detection limits of which nine (9) were detected above their respective NYSDEC Class GA groundwater criteria with a total VOC concentration of 507 ppb. The analytical results of groundwater sample AOC-3-GW-2 included 13 VOCs at concentrations above method detection limits of which ten (10) were detected above their respective NYSDEC Class GA groundwater criteria with a total VOC concentration of 6,251 ppb.

Monitoring well MW-5S (sampled semi-annually as part of on-going groundwater monitoring, see Figure 6) is located about 100 feet south and hydraulically downgradient of AOC-3. The monitoring well screen zone of MW-5S is from approximately 7.5 to 17.5

feet bgs, which screens across the bottom of AOC-3 excavation depth. The groundwater analytical results from the nine (9) semi-annual sampling events conducted from April 2009 through October 2013 did not indicate the presence of similar VOCs detected in the groundwater sample collected from AOC-3. It does not appear that the VOCs associated with AOC-3 are migrating from this area. Therefore, no additional remedial actions are required at AOC-3.

The analytical results of both the soil and groundwater indicate that residual contamination was present in the vicinity of AOC-3 at the time the IRM work. However, the majority of the contamination was removed. Two (2) remedial injection systems were installed within the limits of the excavation, prior to backfill, if deemed necessary.

Septic Tank Removals

Based on the field screening results and olfactory observations made of the material removed from the two (2) septic tank excavations, no impacted soil was identified. No additional remedial action is needed related to the soil associated with these two (2) former septic tank locations.

As part of the post-injection monitoring associated with the groundwater pilot study, five groundwater sample points were sampled for VOCs along with geochemical parameters associated with natural attenuation. The results of these groundwater samples are summarized in Table 6 and discussed in Section 2.5.4. The pilot test groundwater sampling results appear favorable, as there is a decrease in PCE and TCE concentrations at four of the six sampling locations within nine months of the EDC injections. The EDC material used in the pilot test contained a surfactant additive. The surfactant aids in cVOC dissolution, and serves as an additional organic carbon electron donor. During the initial, conditioning stages of cVOC bioremediation, indigenous bacteria consume naturally occurring electron acceptors in groundwater that interfere with cVOC dechlorination. The indigenous bacteria produce biosurfactants which help them form colonies called biofilms. The biosurfactants also increase cVOC dissolution. Additionally, the EDC material and its degradation products provide a co-solvent effect, further solubilizing cVOCs. This increased cVOC solubility is desirable, since only dissolved cVOCs are available to dechlorinating bacteria. However, as seen in the early pilot test results, these surfactant and co-solvent effects can create higher groundwater concentrations of cVOCs in the initial stages of bioremediation. For example, pilot treatment area monitoring well SP-37 showed elevated PCE and TCE concentrations at 6 weeks after the pilot EDC injections. At 9 months after the pilot injections, PCE and TCE concentrations at SP-37 were decreasing.

As part of the post-injection monitoring associated with the groundwater pilot study, five groundwater sample points were analyzed for geochemical parameters associated with reductive dechlorination. Values for these geochemical parameters that favor continued reductive dechlorination of cVOCs include dissolved oxygen (DO) below 0.5 mg/L, oxidation-reduction potential (ORP) below 50 mV, ferrous iron (Fe(II)) above 1 mg/L,

methane above 500 µg/L, total organic carbon (TOC) above 20 mg/L, nitrate below 1 mg/L, and sulfate below 20 mg/L. The results, summarized in Table 6, are as follows:

- At SP-32 and EW-1.25, most of the geochemical parameters are within the range of values the favor reductive dechlorination.

- At SP-37, SP-38, SP-43, and SP-45, geochemical parameters are outside the range of values the favor reductive dechlorination, with the exception of SP-38, which still has acceptable concentrations of Fe(II) and sulfate. However, these two parameters are not sufficient to suggest continued reductive dechlorination, especially considering SP-38's elevated DO (4.65 mg/L) and nitrate (3.3) levels, and high ORP (136 mV).

Based on the results of the AOC-4 pilot study, GZA recommends implementing a full scale injection program to enhance and accelerate natural attenuation of cVOCs at the BCP site. The full scale in-situ groundwater treatment would involve injecting an organic carbon (OC) electron donor material into the cVOC-impacted groundwater via direct-push technology. Natural attenuation could then further reduce the concentrations at downgradient locations. As degradation of the remaining source of cVOCs would be enhanced by the in-situ treatment, this should help achieve the groundwater SCOs more quickly.

3.0 SITE INVESTIGATION

The Supplemental Remedial Investigation (SRI) field explorations were performed in general accordance with the NYSDEC-approved Work Plans to obtain and evaluate site-specific data, nature and extent of contamination and the degree to which releases and contamination pose a threat to human health and the environment.

The following tasks, as described in this report, were completed.

- Test pit excavations;
- Soil probes & microwell installation; and
- Soil, groundwater and off-site vapor intrusion sampling.

The SRI and report were completed in general accordance with the following.

- "Revised Supplemental Remedial Investigation Work Plan, Former Signore Facility, Ellicottville, New York, Brownfield Cleanup Program Site No. C905034" dated October 2011;

- "Quality Assurance Project Plan, Former Signore Facility, Ellicottville, New York, Brownfield Cleanup Program Site No. C905034" dated May 2011;

- "Site Health and Safety Plan, Former Signore Facility, Ellicottville, New York, Brownfield Cleanup Program Site No. C905034" dated May 2011;

- "Brownfield Cleanup Program, Citizen Participation Plan, Former Signore Facility, 55 Jefferson Street, Ellicottville, New York, Brownfield Cleanup Program Site No. C905034" dated March 2011;

- NYSDEC Division of Environmental Remediation DER-10, "Technical Guidance for Site Investigation and Remediation", dated May 2010.

A description of the field explorations conducted during this SRI is presented in the following subsections. The scope of work of the SRI was intended to supplement the investigation activities previously completed by GZA and others.

3.1 TEST PIT EXPLORATION

GZA subcontracted with TREC to complete ten (10) test pit explorations at the Signore BCP Site to evaluate the subsurface conditions and potential contamination outside of the remaining concrete slab-on-grade floor. The building was demolished in Fall 2012 prior to the start of the on-site SRI activities, but the concrete slab-on-grade floor and building footers remained in-place. The test pits were completed on September 25 and 26, 2012.

The test pits are identified as TP-9 through TP-18 and are shown on Figure 8. The test pit logs are included in Appendix E. Note that test pits, TP-1 through TP-8 were completed by GZA in 2007 as part of the Phase II ESA discussed in Section 1.4.

The test pits were excavated using a track mounted backhoe equipped with an approximate 0.5 cubic yard bucket. The test pits completed were typically 10 feet in length and 3 feet in width. The depths of the test pits varied depending on the subsurface conditions encountered, but at a minimum were excavated until native soil was encountered. Soils removed from the test pits were placed on the ground, adjacent to the test pits. Soils were screened in the field using an organic vapor meter (OVM) and collected in 2-foot intervals to the bottom of the test pits. Upon completion, soils were placed back into the test pits in 2 to 3 foot lifts, generally in the order in which they were removed and compacted with the excavator bucket.

GZA was present during the excavation of test pits to make observations on the subsurface conditions encountered, field screen soils removed from the test pits, document findings, take photographic documentation and collect subsurface soil samples.

Subsurface soil samples were collected from the test pits and submitted for chemical analysis. A summary of the samples collected, the sampled intervals and the analyses performed are shown on Table 7. Analytical test results from the test pit soil samples are summarized on Table 8 and the results are further discussed in Section 5.4.

3.2 SOIL PROBE EXPLORATION

GZA's subcontractor, TREC, completed twenty-one (21) soil probes at the Signore BCP Site to evaluate the subsurface conditions, potential contamination within former building footprint and to install microwells. The soil probes were completed between September 26 and October 1, 2012.

The soil probes are designated SP-30 through SP-50 and are shown on Figure 8. The soil probe logs are contained in Appendix E. Note that soil probes, SP-1 through SP-29 were completed by GZA in 2007 as part of the Phase II ESA discussed in Section 1.4.

Five (5) soil probes, SP-46 through SP-50 (see Figure 8), were completed in the northern portion of the property, outside the BCP footprint area at Iskalo's request. The additional soil probes were completed to assess the soil present in this area, as the ground surface is about 4 feet higher than the BCP area and to install an upgradient microwell (previously installed monitoring well MW-12S, as part of 1991 investigation activities, could not be located and sampled).

Soil probes were advanced using direct push methodology via hydraulic hammer on a track mounted probe rig. Soil samples were collected with a macrocore sampler which contained a 2-inch outer diameter by 48-inch long acetate liner. A new acetate liner was used for each 4-foot sample run. Probes were pushed through fill material and into native overburden soils to 20 feet bgs, unless refusal was encountered (SP-45, 19.2 feet bgs).

Seventeen (17) soil samples were collected for analysis, at least one sample from each soil probe, SP-30 through SP-45, and two samples were collected from SP-37. Soil samples were analyzed for VOCs. A summary of the samples collected, the sampled interval and the analysis performed are shown in Table 7. Analytical test results from the soil probe soil samples are summarized on Table 9 and the results are further discussed in Section 5.4.

3.3 SURFACE SOIL SAMPLING

Surface soil samples were collected on September 27, 2012 from four (4) on-Site locations shown on Figure 8. These samples were collected and analyzed to assess if contamination is present in surface soils. Surface soil samples were collected using a stainless steel spoon from the 2-inches of soil below the vegetative cover present at the sampling locations. A summary of the surface soil samples collected and the analysis performed is shown on Table 7. Analytical test results are summarized in Table 10.

3.4 FIELD SCREENING

The soil samples retrieved from the test pit and soil probes were field screened for total volatile organics using an organic vapor meter (OVM) equipped with a photoionization

detector and 11.7 eV bulb. The OVM was calibrated daily during its use, in accordance with manufacturer's requirements, using a gas standard (Isobutylene). The splitspoon sampler and/or acetate liner were opened and the soil samples retrieved were screened immediately with the OVM by running the OVM over the top of the retrieved samples and splitting the sample cores open every 4 inches. The peak response, per 2 foot screening interval, was recorded on the test pit and soil probe logs in Appendix E.

3.5 SOIL VAPOR INTRUSION SAMPLING

Soil vapor intrusion (SVI) sampling was completed at nine (9) off-site locations during the heating season from January 2012 through April 2012. One location, House 3 was also tested in January 2013. Five (5) of the locations were upgradient (north of the Signore BCP Site) and four (4) locations were downgradient (south of the Signore BCP Site). These locations are as follows.

Upgradient	*Downgradient*
House 1	House 6
House 2	House 7
House 3	House 8
House 4	House 9
House 5	

The purpose of this vapor intrusion air sampling was to assess off-site residential dwellings along Jefferson Street for potential soil vapor intrusion, due to the detections of chlorinated solvents in groundwater at the Site. Figure 9 identifies the two sampling zones selected by the NYSDEC/NYSDOH located north and south of the Signore BCP Site. The actual addresses and sample locations were provided to NYSDEC/NYSDOH in an Off-Site Soil Vapor Intrusion Key Document. This information was not included in this report for home owner confidentiality.

Air sampling was done in general accordance with the October 2006 New York State Department of Health (NYSDOH) Final “Guidance for Evaluating Soil Vapor Intrusion in the State of New York” (SVI Guidance Document). The following scope of work was completed to assess for SVI at the nine residential structures.

Product Inventory Review

Prior to initiating air sampling, GZA visited the residential structures to complete an indoor air quality questionnaire and survey of each building for an inventory of various chemicals and products used within the respective structures. The indoor air quality questionnaire and surveys were provided to NYSDEC/NYSDOH in the Off-Site Soil Vapor Intrusion Key Document and not included with this document as they contain home owner information that is to be kept confidential. The purpose of the survey was to determine if products containing contaminants of concern (e.g., chlorinated solvent compounds) are currently used and/or stored at the sampling locations and could have the

potential to create an interference affecting the air sampling results. If such chemical or products were found they were removed from the respective structure at least 24 hours prior to initiating the sampling.

Soil Vapor Intrusion Sampling

Two (2) types of air samples were collected from within each of the residential structures: a sub-slab sample and an indoor air sample. Sub-slab samples were collected from beneath the concrete basement floors through an approximate ½-inch diameter hole drilled in a competent portion of the floor away from cracks or drains with the exception of one location [House 2 had an earthen basement, so the sample was collected from the basement]. Clean, dedicated polyethylene tubing was placed into the hole in the concrete floor to the bottom of the slab and sealed at the floor surface with modeling clay. The modeling clay used was non-toxic and did not contain VOCs.

Prior to starting the sub-slab sampling, a helium tracer gas was released under an enclosure (i.e., 5-gallon bucket modified to allow injection of helium and subsurface tubing to pass through the top) placed over the top of the sealed sub-slab sampling tubing setup to check for surface infiltration into the subsurface. A helium detector (i.e., Mark Model 9822 Helium Detector or equivalent) was used to determine if helium released inside the enclosure was drawn into the subsurface past the surface seal. Results of the test are provided in Appendix F. Once it was determined that the sampling system was sufficiently sealed, the sub-slab tubing was connected to the sampling container. SVI Guidance allows for up to 10 percent helium to be detected within the sub-slab sampling system and it is considered acceptable for sampling.

Indoor air samples were collected from the breathing zone (approximately 4 to 5 feet above the slab-on-grade floor) in the basement within the immediate vicinity of the sub-slab samples, with one exception: House 2 had an earthen basement and the air sample was collected from the basement, therefore the indoor air sample was collected from the 1st floor of the home. The air sampling was completed for an approximate 24-hour duration at each location, in accordance with NYSDOH guidance.

Ambient outdoor air samples were also collected during the sampling events to develop background data, for comparative purposes, from exterior upwind locations of the sampling area each day that SVI samples were collected with one exception. No background sample was collected when the SVI sampling was conducted at House 4, as this was the only sampling location completed during this mobilization. Other sampling mobilizations conducted consisted of multiple sampling locations and had a common ambient outdoor air sample.

The outdoor air samples were collected from the breathing zone (approximately 4 to 5 feet above the ground surface). Four (4) ambient outdoor air samples were collected from upwind locations the day of the sampling event.

Each air sample collected was analyzed for VOCs via Method TO-15. The analytical methodologies used for the indoor air samples resulted in reporting limits of 0.25 µg/m^3 for trichloroethylene (TCE), carbon tetrachloride and vinyl chloride to and reporting limits of 1 µg/m^3 for tetrachloroethylene (PCE), 1,1,1-trichloroethane (1,1,1-TCA), 1,1-dichloroethene (1,1-DCE) and cis-dichloroethene (cis-DCE) to 1 µg/m^3. The ambient outdoor air and sub-slab samples had reporting limits of 1 µg/m^3.

We note that one sampling event was conducted at each address mentioned above, except House 3. Three (3) sampling events were conducted at this location (March 2012, April 2012 and January 2013). The rationale is explained in Section 5.6 with the discussion of the analytical results.

3.6 GROUNDWATER SAMPLING

Groundwater sampling consisted of existing monitoring wells and newly installed microwells. The well sampling was conducted utilizing low-flow sampling techniques using a water quality meter, disposable polyethylene tubing and a variable speed pump. A summary of the sampling locations associated with the Signore BCP Site and the analysis performed is shown on Table 7. Analytical test results from the groundwater samples collected are summarized on Table 11 and discussed in Section 5.5. Groundwater generated during the well purging was containerized, run through granular activated carbon and discharged to the ground at the Site.

3.7 ENVIRONMENTAL SAMPLING

The various environmental samples collected as part of the SRI were submitted to the following laboratories.

- Spectrum Analytical, Inc., Warwick, Rhode Island – Soil and groundwater samples.
- Enalytic LLC, Syracuse, New York – SVI air samples.

The analytical data packages were submitted to Data Validation Services (DVS) for review and development of data usability summary reports (DUSRs) in Appendix G. The DUSRs are further discussed in Section 5.0.

3.7.1 Surface Soil Samples

Four (4) surface soil samples (excluding QC duplicate and a matrix spike/matrix spike duplicate (MS/MSD) samples) were collected from four (4) surface soil locations as part of the SRI. A duplicate soil sample was collected from SS-3 and a MS/MSD soil sample was collected from SS-1. A summary of samples collected for analytical testing and the parameters is presented in Table 7 and the results are presented in Tables 10.

3.7.2 Subsurface Soil Samples

Twenty-one (21) subsurface soil samples (excluding QC duplicate and a matrix spike/matrix spike duplicate (MS/MSD) samples) were collected from the ten (10) test pits and 21 soil probes completed as part of the SRI. A duplicate soil sample was collected from SP-33, 2 to 4 feet below ground surface (bgs) and a MS/MSD soil sample was collected from SP-45, 4 to 6 feet. A summary of samples collected for analytical testing and the parameters is presented in Table 7 and the results are presented in Tables 8 and 9.

3.7.3 Groundwater Samples

Nineteen (19) groundwater samples (excluding duplicate and MS/MSD samples) were collected from the 14 microwells installed as part of the SRI and five (5) existing wells at the Signore BCP Site. A duplicate groundwater sample was collected from SP-38 and a MS/MSD was collected from SP-42. A summary of samples collected for analytical testing and the parameters is presented in Table 7 and the results are presented in Table 11.

3.7.4 Vapor Intrusion Samples

Twenty-four (24) SVI air samples (excluding duplicate samples) were collected as part of the SRI. Ten (10) of the samples were IA samples, ten (10) of the samples were SS, and four (4) samples was an ambient outdoor air sample collected from exterior upwind locations during the various sample mobilizations. Two (2) duplicate air samples were collected from the IA samples at sample locations DG-1IA and UG-3BF. A summary of samples collected for analytical testing and the parameters is presented in Table 7 and the results are presented in Table 12.

3.8 SURVEY

A survey was completed for the ten (10) test pit and 21 soil probe (which include 14 microwells) locations completed as part of the SRI, by a licensed land surveyor (McIntosh & McIntosh, PC). The ground surface, road box and monitoring point elevations of the microwells were measured and referenced to the National Geodetic Vertical Datum (NGVD). The test pit and soil probes were also measured horizontally and referenced to the NAD83/96, New York State Plane Coordinates, West Zone.

4.0 PHYSICAL CHARACTERISTICS OF THE STUDY AREA

The following sections discuss surface features, meteorology, surface water hydrology, regional and Site geology, regional and Site hydrogeology, land use, and demography.

4.1 SURFACE FEATURES

The Signore Property is approximately 55 acres, located within the Village and Town of Ellicottville, Cattaraugus County, New York. The property is located on the west side of a steep sided, flat bottom valley that is drained by Great Valley Creek, flowing to the southeast, south of the Village of Ellicottville. Flowing through both the Signore Property and forming the western and southern boundary of the Signore BCP Site is Plum Creek, which is a tributary to Great Valley Creek.

Surrounding properties consist primarily of residential, some recreational, vacant land and a cemetery (east). The elevation at the Signore Property ranges from approximately 1540 (eastern side) to 2040 (western side) feet above mean sea level, based on the National Geodetic Vertical Datum (NGVD) of 1929. The majority of the Signore BCP Site is flat and located at an elevation of approximately 1540 feet above mean sea level.

The Signore BCP Site was occupied by one large main building, with an approximate 168,000 square-foot footprint, which was demolished in Fall 2012. There are also three (3) smaller auxiliary buildings which remain. Areas not occupied by the former building include a paved parking area along the eastern side of the building, gravel and short vegetative cover surrounding the building on the north, south and western side. The slab-on-grade concrete floor and building foundations of the former building remain in place. The Signore Property is vacant with heavy vegetation located along the steep sided slope along the western portion of the property.

4.2 METEOROLOGY

Ellicottville is typified by moderately warm summers and cold winters with about 144 inches of snowfall per year. The proximity to Lake Erie and the higher elevations for the area has an effect on the temperature and amount of snowfall. The average yearly precipitation is about 48 inches with an average yearly temperature of 48 degrees Fahrenheit.

4.3 SURFACE WATER HYDROLOGY

4.3.1 Regional Surface Water Hydrology

Great Valley Creek is the largest flowing surface water body and receives a significant portion of runoff from the hillsides surrounding Ellicottville. Great Valley Creek flows into Ellicottville from the northeast and out to the southeast, coming within about 250 feet of the Signore BCP Site. Great Valley Creek continues to flow in a southerly direction and eventually discharges to the Allegheny River.

4.3.2 Site Surface Water Hydrology

Site surface water drains from the Site via sheet flow or ponds at low points where infiltration and/or evaporation occur. There are no drainage structures on the Signore Property and ground surface topography or surface cover dictate surface water drainage direction or retention.

4.4 REGIONAL GEOLOGY

The topography and geology in the area were drastically altered by glaciation. Rivers in the area, prior to the Pleistocene aged glacial period, flowed north towards Lake Erie and the St. Lawrence River. Southern glacial advancement were halted near Salamanca, located approximately 9 miles south of Ellicottville, by the north flowing Allegheny River. The glacial advancement and eventual glacial melt waters altered the river flow patterns to the south as they exist today. This area of the Site consists of glacial outwash from the melting glaciers that were deposited in the surrounding valleys. On top of the glacial outwash are river derived alluvial deposits, from rivers and stream flowing along or into the valleys. Below the glacial outwash deposits is Devonian aged bedrock (350 million years old).

4.5 SITE GEOLOGY

4.5.1 Overburden

The overburden consists of three stratigraphic units; an upper alluvial deposits (10 to 30 feet thick and consists of sandy silt with some clay and gravel), middle outwash deposits (20 to 50 feet thick and consists of fine to coarse sand and gravel with a little silt) and lower variability unit consisting of outwash, glacial till and lake deposits.

The SRI and Phase II ESA investigations completed by GZA (soil probes and test pits) did not extend past a depth of about 20 feet bgs, and information from previous reports prepared by other consultants were used to supplement the description on the overburden geology.

4.5.2 Bedrock

Bedrock was encountered at one location, MW-10VD, at a depth of about 89 feet bgs. This well was completed as part of the RI in 1991. The bedrock investigation did not exceed 99 feet bgs and the bedrock encountered consisted of limestone with inter-bedded clay and shale.

4.6 REGIONAL HYDROGEOLOGY

Groundwater flow directions measured during the seven (7) semi-annual groundwater monitoring events conducted from 2009 through 2012 (as discussed in Section 1.4) show a southeasterly flow direction similar to the flow direction of Great Valley Creek.

4.7 SITE HYDROGEOLOGY

Groundwater was measured during the SRI from the fourteen (14) microwells installed Groundwater levels in these 14 wells range from about 7.5 feet bgs (TP-15) to 17.6 feet bgs (SP-47). Groundwater flow direction was determined to be in a southeasterly direction, similar to the regional flow direction as shown on Figure 10.

4.8 LAND USE AND DEMOGRAPHY

The Signore Property is located in the southern portion of both the Village and the Town of Ellicottville, which is located in Cattaraugus County, New York. However, the Signore BCP Site is entirely in the Village of Ellicottville. The Town of Ellicottville is bordered by the Town of Manfield to the west, the Towns of East Otto, Ashford and Machias to the north, the Town of Franklinville to the east, and the Town of Great Valley to the south.

As of the 2000 census, there are 1,738 people, 770 households and 462 families residing in the Town of Ellicottville. There are 2,097 housing units at an average density of 17.9/km² (46.5/mi²). The racial makeup of the town is 98.16% White, 0.17% Black or African American, 0.69% Native American, 0.35% Asian, 0.86% Hispanic or Latino, 0.23% from other races, and 0.40% from two or more races.

4.9 FISH & WILDLIFE RESOURCES IMPACT ANALYSIS

No fish and wildlife resource impact analysis (FWRIA) Will be required as part of the SRI. The FWRIA Decision Key in Appendix 3C of NYSDEC DER-10 was used to come to this conclusion, as follows.

Step 1: Is the site or area of concern a discharge or spill event? *Yes (Go to Step 13)*

Step 13: Does the contamination at the site or area of concern have the potential to migrate to, erode into or otherwise impact any on-site or off-site habitat of endangered, threatened or special concern species or other fish and wildlife resource? (See #9 for a list of potential resources.

The Signore BCP Site is in an area of mixed residential, recreational and commercial area in the Town and Village of Ellicottville. There is a limited wildlife population within a ¼ mile radius of the Signore BCP Site due to the use of the surrounding area (see Figure 11).

Step #9 identified the following resources:

- Any endangered, threatened or special concern species or rare pants or their habitat; - *Not Applicable (NA)*
- Any DEC designated significant habitats or rare NYS Ecological Communities; *NA*

- Tidal or Freshwater wetlands; *State wetlands are present within the ¼ radius of the Signore BCP Site (see Figure 11). No surface soil contamination was identified; therefore, surface soil run-off or contaminated dust migration is not expected. The depth of groundwater in the southern portion of the Site is approximately 11 to 12 feet bgs and not expected to impact the wetlands.*
- Stream, creek or river; *NA*
  Plum Creek (tributary to Great Valley Creek) is adjacent to the west and southern boundaries of the Signore BCP Site. Previous investigation activities, as discussed in Section 1.4, did not find that the Signore Facility has impacted Plum Creek or Great Valley Creek.
- Pond, lake, lagoon;
  A pond is present within the ¼ radius of the Signore BCP Site (see Figure 11). No surface soil contamination was identified; therefore, surface soil run-off or contaminated dust migration is not expected. The depth of groundwater in the southern portion of the Site is approximately 11 to 12 feet bgs and not expected to impact the ponds.
- Drainage ditch or channel; *NA*
- Other surface water feature; *NA*
- Other marine or freshwater habitat; *NA*
- Forest; *NA*
- Grassland or grassy field; *NA*
  Grassland is present west and south of the Signore BCP Site which is separated from the Site by Plum Creek. Groundwater contamination has been identified off-site to the south but at depths greater than 10 to 12 feet bgs and will not impact the grasslands.
- Parkland or woodland; *NA*
- Shrubby area; *NA*
  Shrubby area is present west and south of the Signore BCP Site which is separated from the Site by Plum Creek. Groundwater contamination has been identified at offsite to the south but at depths greater than 10 to 12 feet bgs and will not impact the shrubby area.
- Urban wildlife habitat; *NA*
- Other terrestrial habitat. *NA*
  The Signore BCP Site is void of vegetation that would provide for terrestrial habitat. Grassland and shrubby areas are present west and south of the Signore BCP Site. Groundwater contamination has been identified at offsite but at depths greater than 10 to 12 feet bgs and will not impact the grasslands or shrubby areas.

Additionally, the NYSDEC Natural Heritage Unit was contacted to review their files to determine if there are ecological concerns or habitats for endangered, threatened or special concern species in the vicinity of the Site (see Appendix H for letter to NYSDEC). A response for NYSDEC Natural Heritage Unit indicating that "We have no records of rare or state-listed animals or plants, significant natural communities, or other significant habitats, on or in the immediate vicinity of your site" (see Appendix H).

As "No" was the answer to Step 13, follow to Step #14.

Step #14: No FWRIA needed.

5.0 NATURE AND EXTENT OF CONTAMINATION

This section discusses the nature and extent of contamination at the Signore BCP Site and its vicinity. This discussion will include data generated as part of the previous investigation (discussed in Section 1.4) and the data collected as part of the BCP SRI. Figure 8 identifies the locations of the various test pits, soil probes and well locations that were completed during GZA's SRI and will be used for the discussion of the nature and extent of contamination.

Spectrum Analytical, Inc. (Spectrum) provided analytical laboratory services for the soil and groundwater samples for this project (see Appendix G for Spectrum's ELAP certifications). Enalytic, LLC provided analytical laboratory services for the soil vapor intrusion (air) samples for this project (see Appendix G for Enalytics ELAP certifications). Data Validation Services provided the DUSR for the data generated (see Appendix F). Validated analytical data along with data qualifiers, their definitions, as defined by Data Validation Services, are included in Appendix G. The DUSRs indicates that the analytical data from the laboratories were usable as reported or with minor qualification. The qualifications made in the DUSRs were reflected in the tables used in this report to present the analytical results. No analytical data was rejected.

Our presentation and discussion of analytical test results within the text does not include data qualifiers.

The comparative criteria used for assessment of the various media samples to determine if a potential threat to human health or the environment exists were as follows.

<u>Surface and Subsurface Soil</u>

- Soil Cleanup Objectives established in 6 New York Code Rules and Regulation (6 NYCRR) Part 375 Environmental Remediation Programs, Subparts 375-12 to 375-4 & 375-6, effective December 14, 2006.

  The initial objective for the Signore BCP Site remedial activities was to achieve the Commercial Soil Cleanup Objectives (CSCOs). However, IRM activities have achieved the Restricted Residential Soil Cleanup Objectives (RRSCOs).

<u>Groundwater</u>

- Glass GA criteria per NYSDEC's Division of Water, Technical and Operational Guidance Series (TOGS 1.1.1), June 1998, amended April 2000.

Soil Vapor Intrusion Air Samples

- NYSDOH's "Final Guidance for Evaluating Soil Vapor Intrusion in the State New York" dated October 2006 (NYSDOH SVI Guidance).

5.1 CONTAMINANT TYPES

Discussions of laboratory analytical results are presented below by chemical classes. The various environmental media sampled as part of the SRI included surface soil, subsurface soil, groundwater and air (sub-slab, indoor and outdoor).

Based on the results of the analytical testing results from previous studies (see Section 1.4), the primary contaminants of concern are VOCs.

The soil, groundwater and air samples collected as part of the SRI were analyzed for VOCs, at a minimum. Surface soil samples collected as part of the SRI included VOCs, SVOCS, metals PCBs and pesticides. Confirmatory soil samples and one groundwater sample were also collected as part of the IRM and included SVOCs STARS compounds.

5.2 SOURCE AREAS

The investigation activities completed as part of the SRI did not identify additional source areas as discussed previously in Section 1.4. No VOCs were detected in the soil samples analyzed as part of the SRI above their respective Part 375 Unrestricted SCOs.

As discussed in Section 1.4, during the Phase II ESA activities in 2007, significant VOC contamination and SPPP were identified within soil and groundwater at three locations identified at AOCs 1, 2 and 3 within the Signore BCP Site. The IRM activities conducted in 2011 and 2013, as discussed in Section 2.00, addressed the contamination at the three (3) AOCs.

Groundwater impacts from the identified PSPP and VOCs in the vicinity of AOC-1, -2 and -3 appear to be within the upper groundwater zone, present at approximately 10 to 12 feet bgs. Groundwater samples collected from downgradient monitoring locations from these AOCs do not contain similar VOCs to those detected within the soil samples that identified these locations as a concern.

For example, elevated levels of petroleum related VOCs (benzene, toluene, ethylbenzene, xylenes, 1,3,5-trimethylbenzene and 1,2,4-trimethylbenzene) were detected in soil samples collected from AOC-1 and 2 prior to IRM activities and in the groundwater samples collected from the excavations completed in these two (2) areas. A groundwater sample was collected as part of the SRI from a microwell (TP-10) installed about 80 feet downgradient of AOC-1. The screened interval of TP-10 was from 4 to 19 feet bgs which intersects the AOC-1 bottom of excavation and depth of the groundwater sample collected from that location. No petroleum related VOCs were detected above method detection limits. Therefore, it does not appear that the VOCs associated with AOC-1 are migrating from this area and appear present in the upper groundwater in the vicinity of AOC-1.

Additionally, monitoring well MW-5S, (sampled semi-annually as part of on-going groundwater monitoring) is located about 25 feet south and 100 feet south and hydraulically downgradient of AOC-2 and AOC-3, respectively. The monitoring well screen zone of MW-5S is from approximately 7.5 to 17.5 feet bgs, which screens across the bottom of AOC-2 and AOC-3 excavation depths. The groundwater analytical results from the ten (10) semi-annual sampling events conducted from April 2009 through June 2014 did not indicate the presence of similar petroleum related VOCs detected in the groundwater sample collected from AOC-2 or AOC-3. Therefore, it does not appear that the petroleum–related VOCs associated with AOC-2 and AOC-3 are migrating from these areas and appear limited to the upper groundwater in the vicinity of AOC-2 and AOC-3.

Groundwater contamination is present within the BCP Site limits, but a specific source of the contamination was not identified. Figure 13 depicts concentration isopleths that were developed using total chlorinated VOCs (cVOCs) data from groundwater samples collected from the SRI, previous Phase II ESA (2007) and the October 2012 semi-annual sampling event. There appear to be two areas were cVOCs are greater than 100 ppb and may be migrating from. These two areas are in the vicinity of SP-3 and SP-32. SP-3 is located in the central portion of the Signore BCP Site in the vicinity of a former septic tank which was removed during the 2013 IRM activities. There was no olfactory evidence or field screening measurements indicating soil contamination was present in the area of the former septic tank in this area. SP-32 is located in the northern central portion of the Signore BCP Site.

5.3 SRI SURFACE SOIL ANALYTICAL RESULTS

Four (4) surface soil samples were from four (4) discrete locations selected in consultation with NYSDEC (see Figure 8) as part of the SRI. The four (4) surface soil samples were analyzed for VOCs, SVOCs, PCBs, pesticides and metal parameters. A summary of samples collected for analytical testing and parameters is presented in Table 7 and the results are summarized on Table 10.

5.3.1 Volatile Organic Compounds

Four (4) surface soil samples were analyzed for VOCs via EPA Method 8260 from the four (4) surface soil sample locations. No VOCs were detected in the four (4) sample locations at concentrations above the method detection limits.

5.3.2 Semi-Volatile Organic Compounds

Four (4) surface soil samples were analyzed for SVOCs via EPA Method 8270 from the four (4) surface soil sample locations. A total of thirteen (13) different SVOCs were detected in the four (4) sample locations at concentrations above method detection limits but below their respective Unrestricted SCOs and RRSCOs (see Table 10).

5.3.3 PCBs

Four (4) surface soil samples were analyzed for PCBs via EPA Method 8082 from the four (4) surface soil sample locations. No PCBs were detected above method detection limits.

5.3.4 Pesticides

Four (4) surface soil samples were analyzed for pesticides via EPA Method 8081 from the four (4) surface soil sample locations. No pesticides were detected above method detection limits.

5.3.5 Metals

Four subsurface soil samples were analyzed for metals via EPA Method 6010/7471 from the four (4) surface soil sample locations. From these four soil samples, a total of 20 different metals were detected at concentrations above method detection limits. Zinc was the only metal analyte detected at two (2) locations above its respective Part 375 Unrestricted SCO but below its RRSCO. None of the other metal analytes detected exceeded their respective Part 375 Unrestricted SCOs or RRSCOs (see Table 10).

5.4 SRI SUBSURFACE SOIL ANALYTICAL RESULTS

Twenty-one (21) subsurface soil samples were analyzed from the ten (10) test pits and 21 soil probes completed as part of the SRI. Twenty (20) of the 21 subsurface soil samples collected were analyzed for VOCs only. One soil sample, collected from TP-18, 2 to 3 feet bgs, was analyzed for SVOCs, PCBs and metals at NYSDEC request due to its proximity of a former transformer that was located in the immediate vicinity of the test pit location.

A summary of subsurface soil samples collected for analytical testing and parameters is presented in Table 7.

5.4.1 Volatile Organic Compounds

Twenty (20) subsurface soil samples were analyzed for VOCs via EPA Method 8260. From these 20 soil samples, a total of six (6) different VOCs were detected at concentrations greater than method detection limits. None of the VOCs detected were at concentrations exceeding their respective Unrestricted SCOs or RRSCOs. See Tables 8 and 9 for a summary of the soil analytical results.

5.4.2 Semi-Volatile Organic Compounds

One (1) subsurface soil sample was analyzed for SVOCs via EPA Method 8270 from test pit, TP-18. Two SVOCs were detected at concentrations greater than method detection limits but below their respective Part 375 Unrestricted SCOs and RRSCOs. See Table 8 for a summary of the soil analytical results.

5.4.3 PCBs

One (1) subsurface soil sample was analyzed for PCBs via EPA Method 8082 from test pit TP-18. No PCBs were detected above method detection limits.

5.4.4 Metals

One (1) subsurface soil sample was analyzed for PCBs via EPA Method 8082 from test pit TP-18. Twenty-one (21) different metals were detected at concentrations greater than method detection limits. Arsenic was the only metal analyte detected above its respective Part 375 Unrestricted SCO but below its RRSCO. None of the other metal analytes detected exceeded their respective Part 375 Unrestricted SCOs or RRSCOs (see Table 8).

5.5 SRI GROUNDWATER ANALYTICAL RESULTS

A total of 19 groundwater samples were collected from 14 microwells installed as part of the SRI and five (5) existing monitoring wells (MW-1S, -1I, -1D, -4I and 5I; see Figure 8). The 19 groundwater samples were analyzed for VOCs and analytical test results are summarized on Table 11.

5.5.1 Volatile Organic Compounds

Nineteen (19) groundwater samples collected from 19 different monitoring points were analyzed for VOCs via EPA Method 8260. Nine (9) different VOCs were detected at concentrations greater than method detection limits, of which four (4)

compounds were detected above their respective NYSDEC Class GA criteria from eleven (11) different locations.

Based on the findings of the Phase II ESA (2007), the recent semi-annual groundwater monitoring (October 2014) both discussed in Section 1.4 and the SRI, groundwater contamination is present on-site and downgradient (south) of the Site.

5.6 SRI SOIL VAPOR ANALYTICAL RESULTS

A SVI investigation was conducted at four (4) downgradient and five (5) upgradient residential locations at the request of NYSDEC as part of the SRI. A total of eleven (11) indoor air samples, eleven (11) subslab samples (House 3 was sampled three times), and four (4) ambient outdoor air samples were collected as part of the SVI assessment. The SVI samples were analyzed for VOCs via Method TO-15. A summary of the analytical samples collected is shown on Table 7 and the results are presented in Table 12.

The results of the SVI sampling identified 42 different VOCs detected in the various air samples collected above method detection limits (see Table 12). The results of the indoor air samples and the subslab air samples were compared to the two (2) decision matrices in the NYSDOH SVI Guidance. There are seven (7) VOCs that are governed under the two (2) decision matrices and will be considered the SVI compounds of interest for this discussion. The remaining 35 VOCs detected will not be discussed.

Matrix 1: carbon tetrachloride (CT), trichloroethene (TCE), vinyl chloride (VC)

Matrix 2: 1,1-dichloroethene (1,1-DCE), cis-1,2-dichloroethene (cis-DCE), tetrachloroethene (PCE), 1,1,1-trichloroethane (1,1,1-TCA)

The following is a summary of the results discussed by residential sampling location.

Hydraulically Downgradient Locations

House 6: PCE (3.4 micrograms per cubic meter ($\mu g/m^3$)) was the only SVI compound of interest detected in the subslab air sample at this sampling location. None of the SVI compounds of interest were detected in the indoor air samples. According to the decision matrix, No Further Action was required.

House 7: PCE (1.6 $\mu g/m^3$) was the only SVI compound of interest detected in the subslab air sample only at this sampling location. None of the SVI compounds of interest were detected in the indoor air samples. According to the decision matrix, No Further Action was required.

House 8: None of the SVI compounds of interest were detected above method detection limits in the SVI samples collected at this sampling location. None of the SVI compounds of interest were detected in the indoor air samples. According to the decision matrix, No Further Action was required.

House 9: 1,1,1-TCA (11 µg/m^3), CT (1.0 µg/m^3), PCE (1.9 µg/m^3) and TCE (1.3 µg/m^3) were the SVI compounds of interest detected in the subslab air sample at this sampling location. None of the SVI compounds of interest were detected in the indoor air samples. According to the decision matrix, No Further Action was required.

Hydraulically Upgradient Locations

House 5: CT was detected in both the indoor air (0.96 µg/m^3) and subslab air (1.0 µg/m^3) samples and cis-DCE (0.6 µg/m^3) and PCE (1.9 µg/m^3) were detected in the subslab air sample at this sample location. According to the decision matrix, No Further Action was required.

House 4: PCE was the only SVI compound of interest detected in both the indoor air (1.0 µg/m^3) and subslab air (2.8 µg/m^3) samples. According to the decision matrix, No Further Action was required.

House 3: This location was sampled three (3) times as part of the SVI assessment. The first sample event was in March 2012, the second event was in April 2012, and the third event was in March 2013.

The results from Sampling Event #1 indicated the presence of tetrachloroethene (PCE) in the basement indoor air sample at a concentration of 1.2 microgram per cubic meter (µg/m3) and sub-slab sample at a concentration of 660 µg/m3. These results, when compared to the New York State Department of Health (NYDSOH) Soil Vapor Intrusion Guidance document, result in a “Monitoring” action.

Sampling Event #2 was completed to verify the results of Sampling Event #1. The results from Sampling Event #2 did not detect the presence of PCE in the basement indoor air sample and the sub-slab sample result for PCE was 7.9 µg/m3. These results, when compared to the NYDSOH Soil

Vapor Intrusion Guidance document results in "No Further Action" to be taken. Due to the variability of sub-slab PCE concentrations detected in Sampling Event #1 and Sampling Event #2, an additional round of sampling was recommended.

The results of Sampling Event #3 did not detect the presence of PCE in the basement indoor air sample and the sub-slab sample result for PCE was 4.9 $\mu g/m^3$, which are consistent with Sampling Event #2. Results from Sampling Event #2 did not detect the presence of PCE in the basement indoor air sample and the sub-slab sample result for PCE was 7.9 $\mu g/m^3$. Results from Sampling Event #3, when compared to the New York State Department of Health (NYDSOH) Soil Vapor Intrusion Guidance document indicate "No Further Action" to be taken.

House 2: This sample location did not have a slab-on-grade concrete floor, but rather an earthen basement. Therefore, a subslab sample could not be collected. A basement air sample and a first floor air sample were collected. The basement air sample was considered the subslab and the first floor air sample was considered the indoor air for comparing the results to the decision matrices.

The seven (7) SVI compounds of interest were detected in the basement air samples and six (6) of the seven (7) SVI compounds of interest were detected in the first floor air samples (TCE was not detected). According to the decision matrix, No Further Action was required.

House 1: CT (0.8 $\mu g/m^3$) and PCE (0.8 $\mu g/m^3$) were the SVI compounds of interest detected in the subslab air sample and PCE (0.8 $\mu g/m^3$) was the only SVI compounds of interest detected in the indoor air sample at this sampling location. According to the decision matrix, No Further Action was required.

In summary, there were low concentrations of the seven (7) compounds of interest detected at the off-site sampling locations. However, the detected concentrations were consistent with concentrations normally found in homes in New York State and did not require further actions according to the NYSDOH SVI Guidance document.

5.7 SUMMARY OF PRIOR INVESTIGATION RESULTS

Previous Site investigations and remedial work have identified residual impacts to Site groundwater; and potential resultant impact to soil vapor. These media are proposed to be addressed by the in-situ groundwater treatment remedy as discussed in Section 12. Site soils exceeding RRSCOs were present in the former AOCs -1, -2, and -3; and were removed by IRM activities conducted in 2011 and 2013. Analytical results for Site surface and subsurface soils are below RRSCOs in accordance with the proposed Track 2 Cleanup under the BCP. Previous investigation results are compared to the current applicable cleanup regulations below (i.e., NYCRR 6 Part 375 Restricted Residential Soil Cleanup Objectives and Division of Water, Technical and Operational Guidance Series (TOGS 1.1.1), June 1998, amended April 2000).

REMEDIAL INVESTIGATION

The Remedial Investigation (RI) conducted by others in 1991 consisted of sampling a variety of media at the Signore Property.

- Thirteen (13) monitoring wells (see Plate 2 in Appendix A) were installed to define the site geology, evaluate the aquifer characteristics and collect groundwater samples to evaluate the horizontal and vertical extent of contamination on and downgradient from the Signore Property and Signore current BCP Site.
- Groundwater samples were collected from the monitoring wells to characterize the groundwater quality at and downgradient of the Signore Property.
    - Groundwater sample results from the on-site monitoring wells that were sampled six (6) times from 1986 to 1989 generally detected total chlorinated volatile organic compounds (cVOCs) at concentrations that ranged up to approximately 1 part per million (ppm) at MW-5S (see Plate 1 in Appendix A). For the most part, VOCs were identified in monitoring wells in the southern, downgradient part of the property.
    - Twelve (12) groundwater samples were collected from on-site wells (see Plate 1 in Appendix A) in 1990 and analyzed for target compound list (TCL) volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), pesticides/polychlorinated biphenyls (PCBs), target analyte list (TAL) metals and cyanide.
    - Total VOCs ranged from non-detect (MW-2S and MW-9S) to 231 ppb (MW-5S) (see RI Table 16 below and in Appendix A). The RI results were consistent with historic data from these well locations.

TABLE 16

GROUND WATER ORGANIC ANALYTICAL RESULTS
ON-SITE MONITORING WELLS

SIGNORE REMEDIAL INVESTIGATION REPORT
ELLICOTTVILLE, NEW YORK

	VOLATILES													SEMI-VOLATILES
WELL	METHYLENE CHLORIDE	VINYL CHLORIDE	CHLORO-ETHANE	1,1,1-TCA	TCE	PCE	1,1-DCE	ACETONE	1,2-DCE	1,1-DCA	BENZENE	TOLUENE	2-BUTANONE	BIS (2-ETHYL HEXYL PHTHALATE)
MW-1S	1 B	--	--	--	1 J	--	--	--	2	100 J	--	--	--	--
MW-1I	2 B	2 J	2 J	6	55	2 J	0.7 J	--	79 J	73 J	--	--	--	--
MW-1D	5 B	--	--	38 J	25	1 J	--	--	2 J	9	--	--	--	--
MW-2S	0.8 B	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-4S	5 B	--	--	10	27	3	--	--	3	1 J	--	--	--	--
MW-5S	3 B	--	2 J	99 J	100 J	1 J	1 J	--	20	8	--	--	--	--
MW-5D	5 B	--	--	--	--	--	--	6 B	--	1 J	1 J	1 J	--	--
MW-6S	2 B	--	--	--	--	--	--	5 B	--	--	--	--	--	--
MW-6D	4 B	--	--	--	--	--	--	2 B	--	--	--	--	--	1 J
MW-8S	3 B	--	--	5	19	3	--	--	1 J	--	--	--	--	--
DUP 4 (8S)	2 B	--	--	5	18	3	--	--	1 J	--	--	--	--	--
MW-9S	0.8 B	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-9I	14 B	--	--	10	28	2 J	1 J	--	--	--	--	--	--	--
DUP 3 (9I)	4 B	--	--	--	30	2 J	1 J	--	--	--	--	--	10 J	--

All results in ug/L
B=Compound was also detected in blank
J=Estimated Value
--=Not Detected
Samples collected on 6/28/90 and 6/29/90

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- Bis (2-ethylhexyl) phthalate was the only SVOC detected and at a concentration of 1 ppb (MW-6D (see RI Table 16 above and in Appendix A).
- No pesticides or PCBs were detected in the on-site monitoring wells sampled.
- A number of metals were detected in the unfiltered samples at concentrations exceeding their respective NYSDEC Class GA criteria as follows: (see RI Table 17 below and in Appendix A).

TABLE 17

GROUND WATER INORGANIC ANALYTICAL RESULTS
ON-SITE MONITORING WELLS

SIGNORE REMEDIAL INVESTIGATION REPORT
ELLICOTTVILLE, NEW YORK

ANALYSIS	MW-1S	MW-1I	MW-1D	MW-2S	MW-4S	MW-5S	MW-5D	MW-6S	MW-6D	MW-8S	(MW-8S) DUP 4	MW-9S	MW-9I	(MW-9I) DUP 3	NYSDEC Class GA
ALUMINUM	12.3 J	0.23 B	4.82 J	36.8 J	4.73 J	2.22 J	0.326 B	5.9 J	3.25 J	3.34 J	0.948 J	1.15 J	4.21 J	0.324 B	NV
ANTIMONY	--	--	--	--	--	--	--	--	--	--	--	--	--	--	.003
ARSENIC	0.006 J	0.0164	0.0043 J	--	--	--	--	0.0043	0.0032	--	--	--	0.0022 J	--	.025
BARIUM	0.859	0.689	1.39	2.58	0.552	0.387	0.166	0.735	0.337	0.543 J	0.304 J	0.152	0.511 J	0.238 J	1
BERYLLIUM	0.001	--	--	0.0038	--	--	--	--	--	--	--	--	--	--	.003
CADMIUM	--	--	--	--	--	--	--	--	--	--	--	--	--	--	.005
CALCIUM	127	104	90.9	50.3	53.4	58.9	23.9	110	70.8	142	116	77.6	106	76	NV
CHROMIUM	0.0231	--	0.0115	0.053	--	--	--	0.0134	--	0.0076	--	--	0.0106 J	--	.05
COBALT	0.0421	--	0.0093	0.0726	0.0075	0.0043	--	0.0169	0.005	0.006	--	0.0087	0.0127 J	--	NV
COPPER	0.0867 J	--	0.0346 J	0.203	0.0261 J	0.0301 J	--	0.0403 J	0.026 J	0.0284 J	0.0184 J	0.0111 J	0.0341 J	--	.2
IRON	84.7	30.2	14.1	60.3	7.63	1.54	0.826	25	7.08	5.81 J	1.63 J	5.05	11.7 J	0.759 J	.3
LEAD	0.0894 J	0.0023 J	0.0344 J	0.148 J	0.0177 J	0.0092 J	0.0042 J	0.0296 J	0.0112 J	0.0059 J	--	0.0071 J	0.0295 J	0.0021 J	.025
MAGNESIUM	19.2	8.86	9.68	12	8.95	5.24	0.912	22.6	8.2	17.4	13.7	15.7	15.3 J	9.5 J	35
MANGANESE	8.3	1.87	1.74	19	1.05	0.852	0.0754	12.6	0.386	2.16 J	0.688 J	1.62	2.35 J	0.21 J	.3
MERCURY	--	--	--	--	--	--	--	--	--	--	--	--	--	--	.0007
NICKEL	--	--	--	0.107	--	--	--	--	--	--	--	--	--	--	.1
POTASSIUM	--	--	3.430	4.1	12.5	--	10.6	--	4.670	--	3.010	3.180	--	--	NV
SELENIUM	--	--	--	--	--	--	--	--	--	--	--	--	--	--	.01
SILVER	--	--	--	--	--	--	--	--	--	--	--	--	--	--	.05
SODIUM	29.9	8.1	24.8	3.48 B	43.7	26.3	19.5	33.7	15.4	26.4	21.3	31.2	13.3	13.3	20
THALLIUM	--	--	--	--	--	--	--	--	--	--	--	--	--	--	.0005
VANADIUM	0.027	--	0.0098	0.0588	--	--	--	0.0086	0.0056	--	--	--	0.0063	--	NV
ZINC	0.259	0.0135 B	0.145	0.64	0.122	0.135	0.156	0.148	0.058	0.148 J	0.0509 B	0.0236 B	0.14 J	0.0123 B	2
CYANIDE	--	--	--	--	--	--	--	--	--	--	--	0.0351	--	--	.2

ALL RESULTS IN MG/L
B=Compound was also detected in blank
J=Estimated Value
--=Not detected
Samples collected on 6/28/90 and 6/29/90

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- Barium exceeded at two (2) locations (MW-1D and MW-2S).
- Beryllium exceeded at one (1) location (MW-2S).
- Chromium exceeded at one (1) location (MW-2S).
- Iron exceeded at the 12 locations.
- Lead exceeded at five (5) locations (MW-1S, -1D, -2S, -6S, -9I).
- Manganese exceeded at 11 locations.
- Nickel exceeded at one (1) location (MW-2S).
- Sodium exceeded at nine (9) locations.
- The samples were collected from unfiltered samples and may represent materials in the soil particles that are part of the sample (due to high turbidity).

- Two (2) soil gas surveys (see Plate 6 in Appendix A) were conducted to evaluate the presence of VOCs in the interstitial soil gas and as a screening tool to determine potential areas of subsurface contamination.
    - The greatest VOC concentrations in the soil gas survey were outside the northwest corner of the building, where cVOCs were identified in the survey. The area of cVOCs appeared to extend under the western portion of the building.
    - cVOCs were also detected in the soil gas outside and south of the building.
    - Benzene, toluene, ethylbenzene and total xylenes (BTEX) constituents were detected in the soil gas northwest of the building and extended from the northwest corner to under a significant portion of the building.

- Fourteen (14) soil borings (see Plate 7 in Appendix A) were completed to characterize the subsurface stratigraphy and collect soil samples to evaluate the vertical and horizontal extent of potential soil contamination. The soil boring locations were based on the soil gas survey results. A total of thirty-one (31) soil samples were submitted for laboratory analysis. Fourteen (14) soil samples were submitted for TCL VOC analysis and 17 were submitted for the complete target analyte list (TAL).
    - Total VOC concentrations in the 31 samples were generally non-detect to less than 25 ppb. *None of the VOCs detected exceeded their respective Part 375 Restricted Residential SCOs (see RI Table 13 below and in Appendix A).*

TABLE 13

SOIL SAMPLE VOC ANALYTICAL RESULTS

SIGNORE REMEDIAL INVESTIGATION REPORT
ELLICOTTVILLE, NEW YORK

SOIL BORING	METHYLENE CHLORIDE	ACETONE	2-BUTANONE	TOLUENE	ETHYL-BENZENE	XYLENE	1,1,1-TCA	PCE	1,2-DCE	TCE	1,1,2-TCA
BH-1 4-6	17 B	13 B	--	--	--	--	--	--	--	--	--
BH-2 2-4	23 B	72 B	17 B	--	--	--	--	--	--	--	--
BH-2 6-8	38 B	120 B	16 B	3 J	--	--	--	--	--	--	--
DUP 8 (BH-2 6-8)	18 B	46 B	18 B	--	--	--	--	--	--	--	--
BH-3 2-4	38 B	35 B	6 B	--	3 J	73	--	--	--	--	--
BH-3 4-6	42 B	100 B	7 B	6 J	--	--	--	--	--	--	--
BH-3 6-8	23 B	63 B	6 B	5 J	2 J	11	--	--	--	--	--
BH-4 6-8	9 B	20 B	2 B	--	--	--	--	--	--	--	--
BH-4 8-10	21 B	38 B	5 B	--	--	--	--	--	--	--	--
BH-4 10-12	8 B	17 B	3 B	--	--	--	--	--	--	--	--
BH-4 12-14	5 B	11 B	--	--	--	--	--	--	--	--	--
BH-5 4-6	22 B	50 B	6 B	1 B	--	--	--	--	--	--	--
BH-6 6-8	19 B	30 B	5 B	--	--	--	--	--	--	--	--
BH-6 10-12	19 B	67 B	24 B	--	--	--	--	--	--	--	--
BH-7 2-4	58 B	43 B	8 B	--	12	4 J	--	--	1 J	9	--
BH-7 4-6	22 B	43 B	6 B	--	2 J	--	--	--	2 J	15	--
BH-7 6-8	16 B	41 B	5 B	--	--	--	--	--	--	10 J	--
BH-8 4-6	36 B	30 B	5 B	--	--	--	--	--	--	--	--
BH-8 8-10	22 B	49 B	4 B	--	--	--	--	--	--	--	--
BH-9 0-2	19 B	66 B	8 B	--	--	--	3 J	--	--	--	--
BH-9 6-8	17 B	47 B	4 B	--	--	--	--	--	--	--	--
BH-9 8-10	23 B	24 B	3 B	--	--	--	--	--	--	--	--
BH-10 2-4	43 B	24 B	2 B	--	--	--	--	--	--	--	--
BH-10 4-6	23 B	26 B	3 B	--	--	--	1 J	--	--	--	--
DUP 11(BH-10 4-6)	27 B	31 B	--	--	--	--	--	--	--	--	--
BH-10 6-8	26 B	49 B	7 B	--	--	--	8	--	--	--	--
BH-11 4-6	17 B	50 B	4 B	--	--	--	--	--	--	--	--
BH-12 10-12	15 B	40 B	3 B	--	--	--	--	--	--	--	--
DUP 10(BH-12 10-12)	16 B	39 B	7 B	--	--	--	--	--	--	--	--
BH-13 8-10	26 B	28 B	5 B	--	--	--	--	--	--	--	--
BH-14 0-2	25 B	41 B	6 B	--	--	--	--	--	--	--	6 J
BH-14 2-4	12 B	19 B	2 B	--	--	--	--	--	--	2 J	6 J
BH-14 4-6	16 B	42 B	6 B	--	--	--	--	--	--	--	--
DUP 9 (BH-14 4-6)	10 B	15 B	1 B	--	--	--	--	--	--	--	--
BH-14 6-8	32 B	24 B	2 B	--	--	--	5	5 J	--	24	--
PART 375 Commercial SCOs	500,000	500,000	500,000	500,000	310,000	500,000	500,000	150,000	500,000	200,000	NV

All Results in ug/kg
J=Estimated Value
B=Compound was also detected in blank
--=Not Detected
Samples collected on 7/30/90 through 8/3/90

PART 375 Restricted Residential SCOs	100,000	100,000	100,000	10,000	41,000	100,000	100,000	19,000	3,100	21,000	NV

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(Rev. 4/91)

- SVOC concentrations were generally non-detect or at concentrations slightly greater than the laboratory detection limit. *None of the SVOCs*

detected exceeded their respective Part 375 Restricted Residential SCOs (see RI Table14 below and in Appendix A).

TABLE 14

SOIL SAMPLE SEMI-VOLATILE ANALYTICAL RESULTS

SIGNORE REMEDIAL INVESTIGATION REPORT
ELLICOTTVILLE, NEW YORK

	BIS(2-ETHYL HEXYL PHTHALATE)	PHENAN-THRENE	FLUORAN-THENE	PYRENE	BENZO(A) ANTHRACENE	CHRYSENE	BENZO(B)FLUOR-ANTHENE	BENZO(K)FLUOR-ANTHENE	BENZO(A) PYRENE	ANTHRACENE	INDENO (1,2,3) CD PYRENE	BENZO (G,H,I) PERYLENE
BH-2 6-8	130 B	--	--	--	--	--	--	--	--	--	--	--
DUP 8 (BH-2 6-8)	110 B	--	--	--	--	--	--	--	--	--	--	--
BH-3 2-4	470 B	--	--	--	--	--	--	--	--	--	--	--
BH-4 8-10	160 J	--	--	--	--	--	--	--	--	--	--	--
BH-6 6-8	--	220 J	290 J	350 J	110 J	140 J	210 J	210 J	96 J	--	--	--
BH-7 4-6	--	--	--	--	--	--	--	--	--	--	--	--
BH-7 6-8	--	--	--	--	--	--	--	--	--	--	--	--
BH-8 4-6	--	--	--	--	--	--	--	--	--	--	--	--
BH-9 0-2	--	--	--	--	--	--	--	--	--	--	--	--
BH-9 6-8	--	--	--	--	--	--	--	--	--	--	--	--
BH-10 4-6	--	--	--	--	--	--	--	--	--	--	--	--
BH-11 4-6	--	--	--	--	--	--	--	--	--	--	--	--
BH-14 0-2	46 J	--	--	--	--	--	--	--	--	--	--	--
BH-14 4-6	110 J	--	48 J	47 J	--	--	--	--	--	--	--	--
DUP 9 (BH-14 4-6)	200 J	600	1200	970	430	580	440	550	400	98 J	170 J	220 J
PART 375 Commercial SCO	NV	500,000	500,000	500,000	5,600	56,000	5,600	56,000	1,000	500,000	5,600	500,000

All Results in ug/kg

J=Estimated Value

B=Compound was also detected in blank

--=Not Detected

Samples collected on 7/30/90 through 8/3/90

PART 375 Restricted Residential SCO	NV	100,000	100,000	100,000	1,000	3,900	1,000	3,900	1,000	100,000	500	100,000

4-23

(Rev. 4/91)

- Metal concentrations of interest are as follows.
  - Arsenic was detected at two (2) locations (BH-8 (20 ppm) and BH-9 (16.9 ppm)), located on the west side and in the driveway area of the former building) that slightly exceeded the Restricted Residential SCO (16 ppm). Both detected concentrations were flagged with a "J" qualifier indicating an estimated concentration. These detections are not considered to be significant (see RI Table 15 below and in Appendix A).

- Cyanide was detected at 27.5 ppm in the duplicate sample from BH-2 and was flagged with a "J" qualifier indicating an estimated concentration (see RI Table 15 below and in Appendix A). This slightly exceeds its Restricted Residential SCO of 27 ppm. However, cyanide was detected only in the duplicate sample, and not in the main sample; therefore, cyanide is not considered to be a concern.

TABLE 15

SOIL SAMPLE INORGANIC ANALYTICAL RESULTS

SIGNORE REMEDIAL INVESTIGATION REPORT
ELLICOTTVILLE, NEW YORK

ANALYSIS	BH-2 6'-8'	DUP 8 BH-2 6'-8'	BH-3 2'-4'	BH-4 8'-10'	BH-6 6'-8'	BH-7 4'-6'	BH-7 6'-8'	BH-8 4'-6'	BH-9 0'-2'	BH-9 6'-8'	BH-10 4'-6'	BH-11 4'-6'	BH-14 0'-2'	BH-14 4'-6'	DUP 9 BH-14 4'-6'	PART 375 Commercial SCOs	Part 375 Restricted Residential SCOs
ALUMINUM	12300	9280	14300	8130	5650	11200	9100	13300	14300	6370	8890	14100	13200	10700	10800	NV	NV
ANTIMONY	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	NV	NV
ARSENIC	1.4 J	8.9 J	8.6 J	8.9 J	6.6 J	13.1 J	10.10 J	20 J	16.9 J	5.4 J	8.3 J	2.4 J	14.7 J	10.5 J	8.4 J	16	16
BARIUM	360	333	214	94	99.6	124	88.4	172	199	99.8	111	153	137	160	174	400	400
BERYLLIUM	0.84 J	0.87 J	0.95 J	0.43 J	--	0.60 J	0.31 J	0.50 J	0.74 J	0.29 J	0.44 J	0.66 J	0.58 J	0.75 J	0.57 J	590	72
CADMIUM	--	--	--	1.2 B	--	--	--	--	--	--	--	1.3	--	--	--	9.3	4.3
CALCIUM	2200 J	3520 J	3870 J	3140 J	16200 J	1270 J	1720 J	2190 J	4470 J	1360 J	1660 J	1930 J	1460 J	1180 J	1430 J	NV	NV
CHROMIUM	15.6	14.1	17.8	17.2	6.2	14.8	12.5	15.6	16.7	8	11.7	18.7	14.3	13.1	12.7	1,500	180
COBALT	8.5 B	6.5 B	13.2 J	6.8 B	5.2 J	11.2 J	8.3 J	9.4 J	15.5 J	6.5 J	9.4 J	9.8 J	9.6 J	16.9 J	12.7 J	NV	NV
COPPER	19.6 B	30.5 B	13.2 B	15.9 B	18.2 J	19.6 J	24.2 J	22.4 J	21.3 J	28.8	19.0 J	17 J	13.2 J	16.5 J	16.2 J	270	270
IRON	17100	14600	25400	19100	14800	35500	26000	26000	35900	17200	20900	26200	26400	26200	25300	NV	NV
LEAD	12.7 J	11.7 J	25.5 J	34.8	15.8 J	15.4 J	15.8 J	16.3 J	17.1 J	33.1 J	12 J	9.4 J	17 J	16.1 J	16.1 J	1,000	400
MAGNESIUM	2970	2090	3440	2620	10100	3600	3080	4060	4230	2240	2790	3750	3240	3250	3140	NV	NV
MANGANESE	163 B	215 J	350 B	270 B	1410 J	231 J	358 J	806 J	1240 J	1110 J	489 J	307 J	483 J	975 J	678 J	10,000	2,000
MERCURY	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2.8	0.81
NICKEL	23.7	20.4	29.3	19.6	19.4	26.7	21.4	30.7	28.2	18	21	23.4	23.1	23	25.5	310	310
POTASSIUM	--	--	857	--	--	856	763	991	729	--	713	926	--	--	--	NV	NV
SELENIUM	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1,500	180
SILVER	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1,500	180
SODIUM	165	229	167	180	105	140	106	152	151	--	142	179	338	116	113	NV	NV
THALLIUM	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	NV	NV
VANADIUM	19.6	19.6	21.1	12.3	7.5	19.0	13.9	17.2	21.1	9.2	13.6	24.8	20.4	18	17.1	NV	NV
ZINC	60.9 J	46.5 J	70.6 J	97.9 J	92.8 J	122 J	115 J	168 J	85.9 J	84.4 J	62.7 J	60.2 J	65.8 J	53.9 J	56.6 J	10,000	10,000
CYANIDE	--	27.5 J	--	1.7	--	--	--	--	--	--	--	--	2.6	--	--	27	27

All concentrations in mg/kg
B=Compound was detected in blank
J=Estimated Value
--=Not Detected
Samples collected on 7/30/90 through 8/3/90

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(Rev. 4/91)

- The RI concluded that soil results do not indicate any new sources of contamination. Only minimal concentrations of VOCs were detected in the soil samples and no significant impact of SVOC or metals was identified.

- Six (6) upgradient and downgradient surface water and sediment samples (see Plate 8 in Appendix A) were collected from Plum Creek and three downgradient surface water and sediment samples were collected from Great Valley Creek to evaluate surface water quality impacts. Surface water and sediment samples were analyzed for TCL VOCs, SVOCs, pesticides/PCBs and TAL metals and cyanide (see RI Tables 20 through Table 23 below and in Appendix A).

TABLE 20

SURFACE WATER ORGANIC ANALYTICAL RESULTS

SIGNORE REMEDIAL INVESTIGATION REPORT
ELLICOTTVILLE, NEW YORK

SAMPLE NO.	ACETONE	METHYLENE CHLORIDE	CHLOROFORM
SW-GV-1	--	2 B	--
SW-GV-2	--	2 B	--
SW-GV-3	--	3 B	0.6 J
DUP 5 (GV-3)	--	1 B	--
SW-PC-1	--	1 B	--
SW-PC-2	--	0.8 B	--
SW-PC-3	--	--	--
SW-PC-4	--	2 B	--
SW-PC-5	--	--	--
SW-PC-6	--	1 B	--

All results in ug/L
J=Estimated Value
B=Compound was also detected in blank
--=Not Detected
Samples collected on 7/11/90

TABLE 21

SURFACE WATER INORGANIC ANALYTICAL RESULTS

SIGNORE REMEDIAL INVESTIGATION REPORT
ELLICOTTVILLE, NEW YORK

ANALYSIS	SW-GV-1	SW-GV-2	SW-GV-3	DUP 5 SW-GV-3	SW-PC-1	SW-PC-2	SW-PC-3	SW-PC-4	SW-PC-5	SW-PC-6
ALUMINUM	0.127 B	0.132 B	0.192 B	0.425 B	0.128 B	0.334 B	0.124 B	0.109 B	0.0866 B	0.124 B
ANTIMONY	--	--	--	--	--	--	--	--	--	--
ARSENIC	--	--	--	--	--	--	--	--	--	--
BARIUM	0.0608 B	0.0657 B	0.0664 B	0.072 B	0.0783 B	0.0823 B	0.0749 B	0.0696 B	0.0679 B	0.068 B
BERYLLIUM	--	--	--	0.001 J	0.0012 J	--	0.0012 J	0.001 J	--	--
CADMIUM	--	--	--	--	--	--	--	--	--	--
CALCIUM	30	30.4	29.9	31.3	30.4	30.3	30.6	29.1	28.7	30.1
CHROMIUM	--	--	--	0.0085 J	--	--	--	--	--	0.0111 J
COBALT	--	--	--	--	--	--	--	--	--	--
COPPER	0.0128 J	--	--	0.0107 J	0.0104 J	0.0081 J	--	--	--	0.012 J
IRON	0.292	0.251 B	0.372 J	0.856 J	0.2 B	0.515	0.118 B	0.14 B	0.105 B	0.0983 B
LEAD	--	--	--	--	--	--	--	--	--	--
MAGNESIUM	3.76	3.8	3.78	4.01	3.78	3.81	3.78	3.6	3.57	3.67
MANGANESE	0.0303 J	0.0232 J	0.04 J	0.0608 J	0.0195 J	0.0474 J	0.0076 J	0.0124 J	0.0111 J	0.0076 J
MERCURY	--	--	--	--	--	--	--	--	--	--
NICKEL	--	--	--	--	--	--	--	--	--	--
POTASSIUM	--	--	--	--	--	--	--	--	--	--
SELENIUM	--	--	--	--	--	--	--	--	--	--
SILVER	--	--	--	--	--	--	--	--	--	--
SODIUM	7	8.21	7.27	7.5	12.7	12.7	12.8	12.3	12	12.3
THALLIUM	--	--	--	--	--	--	--	--	--	--
VANADIUM	--	--	--	--	--	--	--	--	--	--
ZINC	0.0259 B	0.0126 B	0.019 B	0.0296 B	0.0218 B	0.0204 B	0.0138 B	0.0117 B	0.0131 B	0.0258 B
CYANIDE	--	--	--	--	--	--	--	--	--	--

J=Estimated Value
B=Compound was also detected in blank
--=Not Detected
ALL RESULTS IN MG/L
Samples collected on 7/11/90

TABLE 22

SURFACE WATER SEDIMENT ORGANIC ANALYTICAL RESULTS

SIGNORE REMEDIAL INVESTIGATION REPORT
ELLICOTTVILLE, NEW YORK

COMPOUND	SED-GV-1	SED-GV-2	DUP 7 (GV-2)	SED-GV-3	SED-PC-1	SED-PC-2	SED-PC-3	SED-PC-4	SED-PC-5	SED-PC-6
VOLATILES										
2-BUTANONE	4 B	4 B	--	2 B	--	--	5 B	--	--	3 B
METHYLENE CHLORIDE	25 B	34 B	21 B	43 B	18 B	28 B	47 B	15 B	28 B	41 B
ACETONE	54 B	41 B	36 B	52 B	37 B	34 B	29 B	45 B	24 B	27 B
CHLOROFORM	2 J	--	--	--	--	--	--	--	--	--
SEMI-VOLATILES										
PHENANTHRENE	2000	870	170 J	260 J	120 J	590	--	170 J	73 J	--
FLUORANTHENE	1500	210 J	200 J	230 J	68 J	--	47 J	--	89 J	--
PYRENE	1500	190 J	160 J	190 J	65 J	--	46 J	--	65 J	--
BENZO(A)ANTHRACENE	450	90 J	62 J	75 J	--	--	--	--	--	--
CHRYSENE	610	87 J	88 J	89 J	--	--	--	--	--	--
BENZO(B)FLUORANTHANE	1100 J	140 J	280 J	200 J	--	--	--	--	48 J	43 J
BENZO(K)FLUORANTHENE	1100 J	140 J	280 J	200 J	--	--	--	--	48 J	43 J
BENZO(A)PYRENE	310 J	54 J	63 J	79 J	--	--	--	--	--	--
NAPHTHALENE	130 J	--	--	--	--	--	--	--	--	--
2-METHYLNAPHTHALENE	62 J	--	--	--	--	--	--	--	--	--
ACENAPHTHENE	91 J	--	--	--	--	--	--	--	--	--
DIBENZOFURAN	94 J	--	--	--	--	--	--	--	--	--
FLUORENE	130 J	--	--	--	--	--	--	--	--	--
ANTHRACENE	200 J	57 J	--	--	--	--	--	--	--	--
BIS(2-ETHYLHEXYL) PHTHALATE	60 J	--	--	54 J	--	--	--	--	--	--
INDENO(1,2,3-CD)PYRENE	120 J	--	--	--	--	--	--	--	--	--
BENZO (G,H,I) PERYLENE	120 J	--	--	--	--	--	--	--	--	--
4-METHYLPHENOL	--	--	--	120 J	--	--	--	--	--	--
BENZOIC ACID	--	--	--	--	--	50 J	120 J	73 J	--	--
ACENAPHTHYLENE	--	--	--	--	--	--	--	--	--	--
PESTICIDE/PCB										
ENDOSULFAN SULFATE	27	--	--	--	--	--	--	--	--	--

All results in ug/kg

J=Estimated Value

B=Compound was also detected in blank

--=Not Detected

Samples collected on 7/11/90

TABLE 23

SURFACE WATER SEDIMENT INORGANIC ANALYTICAL RESULTS

SIGNORE REMEDIAL INVESTIGATION REPORT
ELLICOTTVILLE, NEW YORK

ANALYSIS	SED-GV-1	SED-GV-2	(GV-2) DUP 7	SED-GV-3	SED-PC-1	SED-PC-2	SED-PC-3	SED-PC-4	SED-PC-5	SED-PC-6
ALUMINUM	8630	17800	11200	13600	14100	17500	13100	14000	12200	11000
ANTIMONY	--	--	--	--	--	--	--	--	--	--
ARSENIC	10.20 J	29.4 J	17.3 J	18.6 J	32.6 J	27.7 J	13.8 J	18.7 J	19.2 J	13.2 J
BARIUM	89.90	361	193	256	250	315	217	269	192	190
BERYLLIUM	--	0.95	0.53	0.67	0.59	0.86	0.74	0.61	0.48	0.38
CADMIUM	--	--	--	--	--	--	--	--	--	--
CALCIUM	2180 J	3190 J	2090 J	3260 J	2080 J	3600 J	7590 J	1850 J	1860 J	1720 J
CHROMIUM	11.80	22.10	14.20	16.10	16.80	22.10	14.30	18.00	17.70	14.00
COBALT	8.70 J	21.90 J	16.80 J	16.10 J	15.20 J	22.30 J	15.00 J	18.20 J	14.10 J	12.00 J
COPPER	13.30 J	17.60 J	20.90 J	14.50 J	19.90 J	44.40	10.30 J	29.80	6.30 J	15.20 J
IRON	26500	50300	33600	41000	38000	57100	34700	41300	37400	30600
LEAD	21.80 J	33.20 J	20.90 J	19.50 J	19.50 J	74.40 J	16.30 J	28.00 J	25.80 J	16.50 J
MAGNESIUM	2820	5150	3410	4240	4290	5880	5340	4190	3560	3410
MANGANESE	557 J	1830 J	1160 J	1510 J	983 J	1690 J	995 J	1690 J	974 J	921 J
MERCURY	--	--	--	--	--	--	--	--	--	0.10
NICKEL	21.60	35.20	24.90	30.40	27.20	37.40	21.00	32.20	31.50	23.90
POTASSIUM	--	1740	--	1280	922	1380	1210	1440	1170	769
SELENIUM	--	--	--	--	--	--	--	--	--	--
SILVER	--	--	--	--	--	--	--	--	--	--
SODIUM	276	192	130	172	147	189	138	174	155	129
THALLIUM	--	--	--	--	--	--	--	--	--	--
VANADIUM	13.70	26.40	17.20	19.00	17.80	23.20	17.20	19.50	18.40	15.00
ZINC	118 J	180 J	118 J	127 J	119 J	169 J	122 J	111 J	127 J	107 J
CYANIDE	35.10	--	--	--	--	--	--	--	--	--

J=Estimated Value
B=Compound was also detected in blank
--=Not Detected
ALL RESULTS IN MG/KG
Samples collected on 7/11/90

- No VOCs, SVOCs, pesticides or PCBs were detected in the surface water samples.
- Iron was detected at concentrations greater than the NYSDEC drinking water standards at an upstream location and at the furthest downstream location.

- Sediment samples identified four (4) VOCs, eighteen (18) SVOCs and one (1) pesticide at concentrations greater than the analytical method detection limit. These compounds were also detected in the upstream samples.
- Metals were detected in the sediment sampled, both in the downstream and upstream locations.

- Four (4) samples were collected from the sewer water.
  - Sewer water samples were analyzed for TCL VOCs, SVOCs, pesticides/PCBs and TAL metals and cyanide.
  - The RI indicated that it does not appear that the sewer contains organic or inorganic constituents indicative of impact from the Site.

Additional subsurface investigation work, other than the Record of Decision (ROD) requiring semi-annual sampling, was not completed after the RI work in the early 1990s until the Phase II Environmental Site Assessment (ESA) performed in 2007.

PREVIOUS INTERIM REMEDIAL MEASURES

In August 1989, Signore entered into an Administrative Order of Consent (#89-258-89-03) to perform a Remedial Investigation/Feasibility Study at the Site and three Interim Remedial Measures (IRMs). The three IRMs included the following:

- Installation of an interceptor well upgradient of the Town drinking water well;
- Connection of 34 residential properties to the municipal water supply source; and
- Installation of an interceptor well on the downgradient portion of the Signore Property.

The above referenced IRM activities were completed by others and put into operation by January 1992. We note that, based on the Phase II ESA completed in December 2007 and the presence of USTs at the Site, additional IRM activities were completed under the BCP, as discussed in Section 2.0. As presented above, soils found to contain constituents in exceedance of RRSCOs have been removed from the BCP Site.

PHASE II ENVIRONMENTAL SITE ASSESSMENT – DECEMBER 2007

GZA completed a Phase II ESA at the Site for due diligence purposes on behalf of Iskalo. A description of the field explorations conducted is presented in the following subsections. A copy of the complete Phase II report is provided in Appendix B.

GZA was retained to evaluate the potential presence of an on-Site cVOC contaminant source. GZA's work included observing soil probes at 29 locations and test pit excavations at eight (8) locations (see Figure 2 in Appendix B). Soil samples collected during soil probes and test pit activities were screened for total volatile organics with an organic vapor meter (OVM) equipped with 10.6eV photoionization detector (PID). Thirty

(30) subsurface soil samples and sixteen (16) groundwater samples were submitted for chemical analysis.

Soil Probe Exploration

Soil probe explorations were completed at twenty-nine (SP-1 through SP-29) on-site locations in October 2007 as shown on Figure 2 in Appendix B. The soil probes were completed using direct-push technology and were advanced using a 2-inch-diameter, 48-inch-long macrocore sampler that was driven continuously at 48-inch intervals. A dedicated acetate sample liner was used between sampling intervals. Representative portions of the recovered soils were placed in plastic zip-lock bags for further classification and headspace screening using an organic vapor meter (OVM), as discussed in Section 2.3. The soil probe logs are included in Appendix B.

The soil probe location rationale is as follows.

- SP-2, 3, 4, 8 and 17 were located in the proximity of former septic tanks.
- SP-1, 5, 6, 7, 9, 10 and 16 were performed to evaluate soil gas detections identified within the 1991 Remedial Investigation.
- SP-11 and 12 were located in the proximity of the drain/pit room.
- SP-13 and 14 were performed in the proximity of the spray booth room.
- SP-15 was located in proximity to a drain filled with sludge.
- SP-18, 28 and 29 were performed to further delineate subsurface conditions associated with the former septic tank area found near SP-4.
- SP-19, 20, 21 and 22 were performed to further delineate subsurface conditions associated with three 1,000-gallon petroleum USTs, on the east side of the Main Building.
- SP-23, 24, 25, and 26 were performed to further delineate subsurface conditions associated with a 1,000-gallon UST south of the Spray Booth Area, southwest of the Main Building.
- SP-27 was located in the proximity of Maintenance Building #1.

The twenty-nine soil probes were advanced through fill material (1 to 2 feet thick) and into native overburden soils to depths ranging from approximately 10 to 20 feet bgs. Groundwater was generally encountered at depths ranging from approximately 9 to 12 feet bgs at the probe locations. Temporary 1-inch-diameter PVC micro-wells were installed at 13 soil probe locations (SP-2, -3, -4, -5, -8, -10, -13, -15, -18, -22, -23, -27 and -28) as shown on Figure 2 in Appendix B.

Various soil samples were collected for analysis from the twenty-nine soil probes. A summary of the samples collected and the analysis performed is shown on Phase II ESA Table 2 in Appendix B. Analytical test results of the soil samples and groundwater samples are summarized on Phase II ESA Table 3 and Phase II ESA Table 4, respectively below and in Appendix B.

Table 3
Soil Analytical Testing Results Summary
Signore Facility
55-57 Jefferson
Ellicottville, New York

Parameter	Unrestricted Use Soil Cleanup Objectives	Restricted Soil Cleanup Objectives (SCO) Restricted Residential	Restricted Commercial	Restricted Industrial	SP - 3 14-16ft. 10/02/2007 Result	SP - 4 10-12ft. 10/02/2007 Result	SP - 2 10-12ft. 10/02/2007 Result	SP - 1 18-20ft. 10/02/2007 Result	TP-1 9-11ft. 10/03/2007 Result	TP - 2 6-7ft. 10/03/2007 Result	TP - 4 9ft. 10/03/2007 Result	TP - 1A 9ft. 10/03/2007 Result	TP - 5 7ft. 10/03/2007 Result	TP - 5 9.5ft. 10/03/2007 Result	TP - 4 10-11ft. 10/03/2007 Result	TP - 5 12ft. 10/03/2007 Result	TP - 6 7-8ft. 10/03/2007 Result	TP - 7 8ft. 10/03/2007 Result	TP - 7 7-8ft. 10/03/2007 Result
Volatile Organic Compounds - EPA Method 8260 TCL (ug/kg)																			
1,1-Dichloroethene	330	100,000	500,000	1,000,000	<	<	<	<	<	140	<	<	<	<	<	<	<	<	<
1,1-Dichloroethane	270	26,000	240,000	480,000	<	<	<	<	<	280	<	<	<	<	<	<	<	<	<
1,1,1-Trichloroethane	680	100,000	500,000	1,000,000	<	<	<	<	<	520	<	<	<	<	<	<	<	<	<
Benzene	60	4,800	44,000	89,000	<	<	<	<	<	<	<	<	<	<	<	<	<	**800**	**2,900**
Trichloroethene	470	21,000	200,000	400,000	150	<	73	130	<	<	<	<	<	<	<	<	<	<	<
Toluene	700	100,000	500,000	1,000,000	<	<	<	<	<	<	<	<	320,000	250,000	<	**13,000**	<	390	**29,000**
Tetrachloroethene	1,300	19,000	150,000	300,000	100	<	220	64	<	<	<	<	<	<	<	<	<	<	<
Ethylbenzene	1,000	41,000	390,000	780,000	<	78,000	<	<	<	<	<	<	**38,000**	**32,000**	<	**1,900**	<	**4,300**	**16,000**
m&p-Xylene	260	100,000	500,000	1,000,000	<	310,000	<	<	<	<	<	<	160,000	160,000	<	**9,900**	69	**22,000**	**81,000**
o-Xylene	260	100,000	500,000	1,000,000	<	130,000	<	<	<	<	<	<	**49,000**	**56,000**	<	**1,800**	<	**4,700**	**27,000**
Isopropylbenzene	NV	NV	NV	NV	<	**34,000**	<	<	<	<	<	<	1,500	1,800	<	<	<	380	1,200
n-Propylbenzene	3,900	100,000	500,000	1,000,000	<	250,000	<	<	<	<	<	<	1,100	1,300	<	<	65	2,200	**6,400**
1,3,5-Trimethylbenzene	8,400	52,000	190,000	380,000	<	550,000	<	<	<	<	<	<	630	930	<	<	70	6,100	**20,000**
1,2,4-Trimethylbenzene	3,600	52,000	190,000	380,000	<	1,400,000	<	<	<	<	<	<	1,000	1,400	<	<	140	**19,000**	53,000
sec-Butylbenzene	11,000	100,000	500,000	1,000,000	<	**21,000**	<	<	<	<	<	<	<	<	<	<	<	240	780
p-Isopropyltoluene	NV	NV	NV	NV	<	**26,000**	<	<	<	<	<	<	<	<	<	<	<	430	1,400
n-Butylbenzene	12,000	100,000	500,000	1,000,000	<	**32,000**	<	<	<	<	<	<	<	<	<	<	<	950	2,500
Naphthalene	12,000	100,000	500,000	1,000,000	<	<	<	<	<	99	<	<	<	<	<	<	<	1,200	3,200
Total VOCs					250	2,831,000	293	194		1,019			581,230	503,430		28,600	344	62,690	244,380
Semi-Volatile Organic Compounds - EPA Method 8270 STARS (ug/kg)																			
Naphthalene	12,000	100,000	500,000	1,000,000	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	<	2,000	730
2-Methylnaphthalene	NV	NV	NV	NV	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	<	4,000	1,300
Phenanthrene	100,000	100,000	500,000	1,000,000	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	<	450	<

Parameter	Unrestricted Use Soil Cleanup Objectives	Restricted Soil Cleanup Objectives (SCO) Restricted Residential	Restricted Commercial	Restricted Industrial	TP - 8 7-8ft. 10/03/2007 Result	SP - 16 10-12 10/03/2007 Result	SP - 9 4-8ft. 10/03/2007 Result	SP - 13 10-12 10/03/2007 Result	SP - 15 14-16 10/03/2007 Result	SP-19 2-4 10/05/2007 Result	SP-20 8-10 10/05/2007 Result	SP-21 8-10 10/05/2007 Result	SP-22 8-10 10/05/2007 Result	SP-23 8-10 10/05/2007 Result	SP-24 8-10 10/05/2007 Result	SP-25 8-10 10/05/2007 Result	SP-26 8-10 10/05/2007 Result	SP-28 8-10 10/05/2007 Result	SP-29 8-10 10/05/2007 Result
Volatile Organic Compounds - EPA Method 8260 TCL (ug/kg)																			
1,1-Dichloroethene	330	100,000	500,000	1,000,000	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<
1,1-Dichloroethane	270	26,000	240,000	480,000	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<
1,1,1-Trichloroethane	680	100,000	500,000	1,000,000	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<
Benzene	60	4,800	44,000	89,000	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<
Trichloroethene	470	21,000	200,000	400,000	<	260	<	<	<	<	<	<	<	<	<	<	<	<	60
Toluene	700	100,000	500,000	1,000,000	<	<	<	<	<	<	86	<	<	<	<	<	<	<	<
Tetrachloroethene	1,300	19,000	150,000	300,000	<	1,200	<	<	<	<	<	<	<	<	<	<	<	<	<
Ethylbenzene	1,000	41,000	390,000	780,000	<	<	<	**2,300**	**19,000**	<	**1,000**	<	<	<	<	<	<	**34,000**	<
m&p-Xylene	260	100,000	500,000	1,000,000	<	<	<	**8,700**	**33,000**	<	**3,600**	<	<	<	<	<	<	140,000	<
o-Xylene	260	100,000	500,000	1,000,000	<	<	<	**2,300**	**900**	<	210	<	<	<	<	<	<	**44,000**	<
Isopropylbenzene	NV	NV	NV	NV	<	<	<	2,000	940	<	660	<	<	<	<	<	<	21,000	<
n-Propylbenzene	3,900	100,000	500,000	1,000,000	<	<	<	**17,000**	570	<	730	<	<	<	<	<	<	150,000	<
1,3,5-Trimethylbenzene	8,400	52,000	190,000	380,000	<	<	<	**34,000**	<	<	1,700	<	<	<	<	<	<	350,000	<
1,2,4-Trimethylbenzene	3,600	52,000	190,000	380,000	<	<	<	90,000	<	<	**4,700**	<	<	<	<	<	<	610,000	96
sec-Butylbenzene	11,000	100,000	500,000	1,000,000	<	<	<	1,800	<	<	110	<	<	<	<	<	<	**13,000**	<
p-Isopropyltoluene	NV	NV	NV	NV	<	<	<	2,300	<	<	220	<	<	<	<	<	<	20,000	<
n-Butylbenzene	12,000	100,000	500,000	1,000,000	<	<	<	2,300	<	<	520	<	<	<	<	<	<	**19,000**	<
Naphthalene	12,000	100,000	500,000	1,000,000	<	<	<	<	<	<	1,100	<	<	<	<	<	<	<	<
Total VOCs					0	1,460	0	162,500	54,410		14,836							1,701,000	156
Semi-Volatile Organic Compounds - EPA Method 8270 STARS (ug/kg)																			
Naphthalene	12,000	100,000	500,000	1,000,000	<	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
2-Methylnaphthalene	NV	NV	NV	NV	<	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
Phenanthrene	100,000	100,000	500,000	1,000,000	<	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT

Notes:

1. Compounds detected in one or more samples are presented on this table. Refer to Attachment C for list of all compounds included in analysis.
2. Analytical testing completed by GZA GeoEnvironmental Laboratory.
3. ug/kg = part per billion and mg/kg = parts per million.
4. < indicates compound was not detected.
5. Bold indicates value exceeds the Unrestricted Use Soil Cleanup Objectives
6. Blue shading indicates value exceeds the Restricted Residential Use Soil Cleanup Objectives
7. Yellow shading indicates value exceeds the Restricted Commercial Use Soil Cleanup Objectives
8. Red shading indicates value exceeds the Restricted Industrial Use Soil Cleanup Objectives

Table 4

Groundwater Analytical Testing Results Summary

Signore Facility

55-57 Jefferson Street

Ellicottville, New York

Parameter	Class GA Criteria	MW-4-S 10/02/2007	MW-9-I 10/02/2007	MW-1-I 10/02/2007	MW-5-S 10/02/2007	MW-5-I 10/02/2007	EW-1.25 10/02/2007	SP-10 10/04/2007	SP-3 10/04/2007	SP-5 10/04/2007	SP-15 10/04/2007	SP-8 10/04/2007	SP-4 10/04/2007	SP-27 10/05/2007	SP-28 10/05/2007	SP-23 10/05/2007	SP-22 10/05/2007
VOC - EPA Method 8260 STARS (ug/L)																	
Acetone	50	<	<	<	<	<	<	50	<	<	<	<	<	<	<	<	<
1,1-Dichloroethene	5	<	<	<	<	<	<	<	2.6	<	<	<	<	<	<	<	<
1,1-Dichloroethane	5	<	<	5.3	1.2	<	<	<	4.7	<	<	<	<	<	<	<	<
cis-1,2-Dichloroethene	5	<	<	6.5	<	<	1.1	<	30	<	<	<	<	<	<	<	<
1,1,1-Trichloroethane	5	<	1.1	<	4.8	<	<	4.2	19	<	<	<	<	<	<	<	<
Benzene	1	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	250
Trichloroethene	5	<	3.8	<	19	<	5.1	<	180	<	<	<	<	<	<	<	<
Toluene	5	<	<	<	<	<	<	<	<	<	<	3.0	<	<	<	11000	2.9
Tetrachloroethene	5	<	<	<	1.7	<	<	1.0	32	<	<	1.9	<	<	<	<	<
Ethylbenzene	5	<	<	<	<	<	<	<	<	<	12000	<	2100	<	1100	700	62
m&p-Xylene	5	<	<	<	<	<	<	3.3	<	<	28000	1.1	7800	<	4300	4200	73
o-Xylene	5	<	<	<	<	<	<	1.1	<	<	5800	<	3500	<	1200	1200	24
Isopropylbenzene	5	<	<	<	<	<	<	<	<	<	400	<	420	<	490	<	<
N-Propylbenzene	5	<	<	<	<	<	<	<	<	<	<	<	2400	<	3200	<	3.9
1,3,5-Trimethylbenzene	5	<	<	<	<	<	<	<	<	<	<	<	5800	<	7000	<	2.5
1,2,4-Trimethylbenzene	5	<	<	<	<	<	<	<	<	<	<	<	21000	<	46000	<	46
sec-Butylbenzene	5	<	<	<	<	<	<	<	<	<	<	<	99	<	170	<	<
p-Isopropyltoluene	5	<	<	<	<	<	<	<	<	<	<	<	150	<	290	<	<
1,3-Dichlorobenzene	3	<	<	<	<	<	<	<	<	<	<	<	<	<	240	<	<
n-Butylbenzene	5	<	<	<	<	<	<	<	<	<	<	<	110	<	<	<	<
Naphthalene	10	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	8.0

Notes:

1. Compounds detected in one or more samples are presented on this table.
2. Analytical testing completed by GZA GeoEnvironmental Laboratory.
3. NYSDEC Class GA criteria obtained from Division of Water Technical and Operational Guidance Series (TOGS 1.1.1), June 1998.
4. ug/L = part per billion (ppb).
5. Blank indicates compound was not detected.
6. Shaded area indicates analyte concentration exceeds Class GA standard/and or guidance value.
7. * = 5ug/L criteria is for total xylenes

Exceedences of VOC Restricted Residential SCOs were detected in samples from locations SP-4, SP-13, and SP-28. Exceedences of VOC Commercial SCOs were detected a sample from SP-28; and exceedences of VOC Industrial SCOs were detected at SP-4. However, these locations were located within AOC-3, and were subject to the 2nd IRM activities conducted by GZA in fall 2013 which resulted in the removal of these impacted soils from the Site. Analytical results for the remaining soil probes were below Restricted Residential SCOs. Refer to Section 2 for additional information.

Test Pit Explorations

Test pits explorations were completed at eight (8) on-Site locations in October 2007, as shown on Figure 2 in Appendix B. The test pits are designated as TP-1/TP-1A, and TP-2 through TP-8. GZA prepared a table that summarizes the general subsurface conditions that were observed at each test pit. This table is included as Table 1 in Appendix B.

The test pit location rationale is as follows.

- TP-1/TP-1A was completed near a 6,000-gallon UST that was closed on December 8, 1987. The test pits at this location were extended to 11 and 9 feet bgs, respectively. The 6,000-gallon UST was identified and exposed. OVM readings were non-detect during completion of the test pits and groundwater was not encountered.
- TP-2 was completed near a suspected 500-gallon UST and excavated to a depth of 7 feet bgs. An OVM reading of 12 ppm was detected from 3 to 5 feet bgs. GZA complete two additional shallow test pits to a depth of approximately 4 feet bgs in an attempt to locate the UST. The UST was not encountered.
- TP-3 was completed near a suspected 1,000-gallon UST. GZA did not identify an access port associated with the UST. One manhole identified as "sanitary" was present in the area of the reported UST. The manhole was opened and confirmed to be a sanitary sewer line. The UST was not encountered. OVM readings were non-detect during the completion of the test pit.
- TP-4 was completed near an identified 1,520-gallon UST – GZA opened the access to the UST, which appeared to be filled with concrete. Approximately 8 inches of liquid was present in this UST that appeared to be water with an apparent sheen. The test pit was extended to approximately 12 feet bgs. OVM readings were non-detect during completion of the test pit. Groundwater was not encountered.
- TP-5 was completed near an identified 1,000-gallon UST (Area of Concern 2 (AOC-2)) to a depth of approximately 12 feet bgs and the UST was exposed. OVM readings were obtained at concentrations of 36 ppm and increased with depth to 4,000 ppm. Groundwater was not encountered.

- TP-6, 7 and 8 were completed near three 1,000-gallon petroleum USTs closed in place in December 1986 (AOC-1). The test pits were extended from 8 to 8.5 feet bgs which identified and exposed the USTs. OVM readings ranged from non-detect to 2,000 ppm. Groundwater was encountered at TP-7 only, where petroleum sheen was observed on the groundwater.

Various soil analytical samples were collected from the eight test pits. A summary of the soil samples collected and the analysis performed is shown on Table 2 in Appendix B. Analytical test results of the soil samples from the test pits are summarized on Phase II ESA Table 3 above and in Appendix B.

Exceedences of VOC Restricted Residential SCOs were detected in samples from locations TP-5 and TP-7. However, these locations were located within AOC-1 (TP-7) and AOC-2 (TP-5), and were subject to the two IRM activities conducted by GZA in 2011 and 2013 which resulted in the removal of these impacted soils from the Site. Analytical results for the remaining test pits were below Restricted Residential SCOs. Refer to Section 2 for additional information.

Headspace Screening

Representative portions of the soils encountered during the soil probe and test pit explorations were placed in plastic baggies for headspace screening. Headspace screening was done using an OVM equipped with a PID. The OVM was calibrated daily during its use, in accordance to manufacturer's requirements, using a standard gas (isobutylene). Prior to screening, the samples were allowed to equilibrate to room temperature. The tip of the OVM was placed inside the plastic baggie to withdraw air from the headspace within the baggie. The peak response was recorded. Headspace screening results for the soil probes and test pits are included on the respective logs in Appendix B.

Groundwater Sampling

<u>Existing Monitoring Wells</u>

Groundwater samples were collected from six (6) existing monitoring wells (MW-1I, -4S, -5S, -5I, -9I, and EW-1.25; see Figure 2 in Appendix B), using low-flow sampling techniques as part of the Phase II ESA. A peristaltic pump, disposable polyethylene tubing and a water quality meter with flow through cell were used to collect water quality readings, including temperature, specific conductance, pH, turbidity, and dissolved oxygen (DO).

Groundwater pumping rates used during the monitoring/sampling varied at each monitoring location in order to establish a relatively constant head within the sampling location. Once a constant head was established within the monitoring

well, the flow rate was maintained during the monitoring/sampling period to purge about three well volumes of groundwater. Samples were collected for analysis when water quality readings stabilized.

Temporary Micro-Wells

Groundwater samples were collected from ten (10) of the 13 micro-well locations installed (SP-3, -4, -5, -8, -10, -15, -22, -23, -27 and -28); see Figure 2 in Appendix B). The remaining temporary well locations did not produce sufficient groundwater to collect samples. Groundwater samples were collected using a stainless steel bailer that was cleaned with Alconox between micro-well locations, with the exception of SP-4, where a disposable polyethylene bailer was used to collect the sample. Samples were placed in laboratory supplied analytical containers. Temporary micro-wells installed at SP-10 and SP-11 were removed. The remaining micro-wells were left in place.

A summary of the groundwater samples collected from the existing monitoring wells, temporary micro-wells and the analysis performed is provided shown on Table 2 in Appendix B. Analytical test results of the groundwater samples are summarized on Phase II ESA Table 4 above and in Appendix B. Below is a summary of our conclusions.

During the Phase II activities, significant VOC contamination and separate phase petroleum (SPP) product impacting soil and groundwater at the Site was identified. Three areas of concern (AOC) were identified where the soil contaminant concentrations were greater than the NYSDEC Part 375 criteria. After completion of the Phase II activities, a groundwater remediation pilot study was performed involving injection of electron donor product in the area of most concentrated groundwater contamination. Figures 3 and 4 identify the three AOCs and areas of pilot study injections.

1. AOC-1 – Petroleum underground storage tank (UST) Area – Three 1,000-gallon USTs, located on the eastern portion of the Site, were closed in-place in December 1986. SPP product and petroleum impacted soil was identified during test pit completion. GZA contacted NYSDEC and Spill #707350 was assigned to the Site.

2. AOC-2 – One 1,000-gallon UST Area – The historic contents of an UST identified on the southwest side of the main building are unknown. The UST was reportedly closed in the late 1980s. Separate phase petroleum product (SPPP) was identified during the test pit completed in this area.

3. AOC-3 – Paint Kitchen Area – VOC impacted soil was identified in the area within the main building identified as the paint kitchen and spray booth area. Additionally, a former septic system was also present in the area. “Product” was identified during the soil probe investigation.

In addition to the three identified AOCs, impacted subsurface soil and groundwater was detected at a location south of a floor drain that contained sludge. Groundwater impacts from the identified VOCs in AOC-1, -2 and -3 appeared to be present at the Site at approximately 10 to 12 feet below ground surface (bgs). The detected compounds in AOC-2 and AOC-3 included toluene, ethylbenzene, TMBs, and xylenes.

SEMI-ANNUAL GROUNDWATER MONITORING (April 2009 through October 2014)

The Signore Property is listed as Site #905023, a Class 4 Site on the NYSDEC's IHWS listing. As part of the Record of Decision (ROD) issued, numerous monitoring wells were to be sampled on a semi-annual basis. Currently, twelve monitoring wells, Main School well and one town well are required to be sampled. The locations of the monitoring wells are included on Figure 2 in Appendix C.

The monitoring wells were last sampled by Signore, the former property owner and operator, in October 2006. Iskalo has been completing the semi-annual sampling in accordance with the ROD and has completed ten (10) semi-annual sampling events since April 2009, the most recent being October 2014.

The following wells are included as part of the semi-annual sampling program according to the ROD:

On-Site Wells

- MW-2I, MW-5S, MW-1I, MW-9I, EW-1.25, EW-1.5, and EW-2.5.

Off-Site Wells

- MW-4S, EW-3.5, EW-4.5, IRM-1, IRM-2, Town Well, and Main School Well.

At Iskalo's request, and to comply with NYSDEC's recommendations and requirements identified in the ROD, GZA developed a scope of work to collect groundwater samples from the twelve (12) previously sampled on- and off-Site monitoring wells, as well as the School Well and Town Well.

Prior to the first sampling event by Iskalo in April 2009, GZA met with Mr. Chad Staniszewski and Mr. David Szymanski of NYSDEC at the Signore BCP Site to discuss the project scope and to perform an on- and off-Site reconnaissance of existing wells. During the reconnaissance, off-Site monitoring well locations EW-3.5 and the Main School Well could not be located. NYSDEC did not know the locations of the wells and Signore did not provide well information. GZA and NYSDEC discussed the possibility that EW-3.5 may have been removed during construction activities in that area. The decision to determine whether extending the effort to locate the Main School Well was a

worthwhile pursuit depended on the sample results from sampling of monitoring well locations IRM-1, IRM-2 and the Town Well. Therefore, the two monitoring wells that could not be located, EW-3.5 and the Main School Well, have not been sampled during the semi-annual sampling events.

The summary provided below is from the most recent sampling event completed in October 2014. The complete report is provided in Appendix C.

- Static groundwater level measurements indicate that groundwater flows in a south to southeasterly direction at the Site, consistent with previous monitoring events (see Figure 2 in Appendix C).

- VOCs were detected at concentrations above NYSDEC Class GA criteria in the groundwater samples collected from two on-site wells (EW-1.25 and EW-1.5). VOCs were not detected above NYSDEC Class GA criteria in any of the remaining six on-Site wells sampled.

- TCE (5.4 ppb) was detected at well EW-4.5, which is located on the Signore property but approximately 800 feet south of the BCP Site. TCE concentrations have generally fluctuated between 5 and 10 ppb at this monitoring location since October 2004. (see Table 3 in Appendix C).

- A downward trend in VOC concentrations since 2009 is noted in monitoring wells EW-1.25, EW-1.5, MW-1I, MW-5S and MW-9I located on the BCP Site.

- In general, the concentrations of VOCs at monitoring wells EW-2.5, MW-1I, MW-2I, MW-4S, and MW-9I have predominantly been below NYSDEC Class GA criteria.

- Off-site monitoring well results for locations, IRM-1, IRM-2 and the Town Well, have consistently been non-detect or at concentrations below Class GA criteria since 1994.

Based on our review of the current and historic analytical data, the October 2014 results are generally consistent with findings since 2009.

6.0 CONTAMINANT FATE AND TRANSPORT

This section discusses the mechanisms that may affect migration of contaminants present at the Signore BCP Site and the chemical behavioral characteristics of the compounds detected, including persistence of these chemical substances. This information is compared with the

specific data collected and observations to assist in assessing the extent of migration that has occurred.

There are two different types of VOC contamination present at the Signore BCP Site.

1. cVOC contamination is present in the groundwater and has been documented as migrating to the south and off-site. NYSDEC requires semi-annual groundwater monitoring be conducted to monitor this condition. The source of the cVOCs is unknown but may be attributed to floor drains, sumps, pits, USTs and former on-site septic systems. The drains, sumps, pits, septic systems and USTs were either closed-in-place or rerouted. The process and sanitary discharges were redirected to the municipal sewer system. There does not appear to be a continuing source of cVOC contamination identified at the Signore BCP Site. The SRI investigation and the confirmatory sample results from the IRM activities did not identify soil contamination above the Unrestricted SCOs or RRSCOs, nor was a significant source for cVOCs within the groundwater identified.

2. Petroleum-based VOC contamination and potential SPPP were identified within soil and shallow groundwater at three locations (AOC-1, -2 and -3) within the Signore BCP Site as discussed in Section 1.4. As discussed in Section 2.0, two (2) IRMs were completed in Fall 2011 and Fall 2013 to excavate and remove soil contamination and SPPP present at the three AOCs. Figure 3 identifies the approximate limits of the IRM excavation activities completed to address the petroleum-based VOC contamination. Results of groundwater samples collected from AOC-1, -2 and -3 after excavation activities were completed, indicate residual petroleum contamination is present within immediate vicinity of the three (3) former AOCs. Of the 17 VOCs detected in the excavation groundwater samples, twelve (12) are petroleum-based VOCs. These petroleum-based VOCs have not been detected above method detection limits at monitoring well locations or microwells downgradient of the three (3) AOCs and throughout the Signore BCP Site.

6.1 POTENTIAL ROUTES OF MIGRATION

Primary routes of migration from the Signore BCP Site are via groundwater and to a lesser degree, volatilization to soil vapor. The shallow groundwater at the Signore BCP Site flows in a southerly direction, based on measured conditions. However, in the early 1990s, 34 residential properties around the Signore Site were connected to the municipal water supply to discontinue any potential use of potentially contaminated groundwater by neighboring residential properties.

Volatilized contamination from the subsurface soil and groundwater is expected to migrate in soil vapor above the groundwater table. Migration of soil vapor contaminated with low level VOCs has been documented based on the VOC detections in the SVI samples collected at off-

site locations around the Signore BCP Site. However, according the NYSDOH SVI Guidance document, No Further Action is required.

Surface soil results from samples collected during the SRI generally did not exceed the Part 375 Unrestricted SCOs. Zinc was the only analyte or compound detected at two (2) locations above its respective Part 375 Unrestricted SCO but below its RRSCO. Therefore, surface soil runoff, surface water runoff or dust migration of contaminated surface soils are not considered potential routes of migration.

6.2 CONTAMINANT PERSISTENCE AND BEHAVIORAL CHARACTERISTICS

Several classes of chemical compounds were detected in the various environmental media sampled as part of the RI completed in 1990. However, the RI concluded with NYSDEC concurrence (by their issuance of the Signore Record of Decision dated January 1992) that groundwater was the environmental media most severely impacted by contamination from the Signore operations. Various subsurface soil, sediment and surface water samples collected as part of the RI did not identify impacts from Signore operations (see Tables 13 through 23 in Appendix A).

VOCs are the compounds of concern present at and downgradient of the Signore BCP Site. The previous RI, Phase II ESA and the SRI identified cVOC contamination (PCE, TCE, TCA and their breakdown products) in groundwater. The Phase II ESA also identified petroleum-based VOC contamination (e.g., ethylbenzene, xylenes, 1,3,5-triTMB,) in both soil and shallow groundwater at concentrations greater than their respective NYSDEC standards and possible separate phase product (PSPP) at AOC-1, -2 and -3.

We note that there have been five (5) IRMs completed to date. Three (3) were previously implemented by Signore in the early 1990s to addressed groundwater impacted with cVOCs (as discussed in Section 1.5). Iskalo completed IRM activities in Fall 2011 to address petroleum-VOCs associated with AOC-1 and AOC-2 and Fall 2013 to address AOC-3 and conduct the EDC Pilot Test EDC injections to assess its effectiveness on the cVOCs in groundwater (as discussed in Section 2.0).

The focus of the SRI completed under the NYSDEC BCP and approved SRI work plan was mainly on VOCs. We note that, surface soil samples collected during the SRI included analysis for SVOCs, PCBs, pesticides and metals in addition to VOC. No SVOCs, PCBs, pesticides or metals (other than zinc at two locations) were detected above the Part 375 Unrestricted SCOs. The detected concentrations of zinc at the two (2) locations did not exceed their Part 375 RRSCO.

The sources of the petroleum-VOC contamination and PSPP were identified within soil and shallow groundwater at three (3) locations within the Signore BCP Site, as discussed in Section 5.2, and identified as AOC-1, AOC-2 and AOC-3. IRM activities (e.g., soil excavation and UST removals) were completed to address these three (3) AOCs. No

petroleum-VOC contamination has been identified in groundwater samples collected downgradient from AOC-1, -2 or -3.

There are no manufacturing operations ongoing at the facility and the building has been demolished. The cVOCs present in groundwater are biodegradable under anaerobic conditions.

6.3 OBSERVED MIGRATION

6.3.1 Groundwater

Groundwater contamination associated with cVOCs has been documented within the Signore BCP Site and off-Site. The extent of groundwater contamination, based on the October 2014 semi-annual groundwater sampling is proximate to well EW-4.5, which is on the former Signore property and is approximately 800 feet downgradient of the BCP Site (see Figure 2 in Appendix C). TCE was detected at a concentration 5.4 ppb and PCE was detected at a concentration of 1.5 ppb. TCE's concentration of 5.4 ppb slightly exceeded its Glass GA criteria of 5 ppb. PCE has consistently been detected in well EW-4.5 below its Class GA criteria of 5 ppb since 2009.

As discussed in Section 1.5, the 34 residential properties around the Signore Site were connected to the municipal water supply to discontinue the use of potentially contaminated groundwater from the Site.

6.3.2 Volatilization and Soil Vapor Migration

cVOCs present within the soil and groundwater have the potential to volatilize into the vadose zone. Migration of soil vapors (gases) occurs within the void spaces between the soil grains in the overburden soil and fill materials. Soil vapors can discharge to the atmosphere and may discharge to slab-on-grade structures and subsurface structures such as basements, manholes, or sumps.

As discussed in Section 3.5, an SVI investigation was completed at off-Site locations, five hydraulically upgradient and four hydraulically downgradient from the Signore BCP Site. As discussed in Section 5.6, compounds and concentrations detected at the sampled off-Site properties were consistent with those normally found in homes in New York State and do not require further actions according to NYSDOH SVI Guidance. e, Therefore, no Further Action isrequired at these off-Site properties.

Vapor intrusion will be evaluated on new and occupied buildings and engineering controls (i.e. installation of a vapor barrier, sub-slab depressurization, or other engineering controls) will be operated and monitored until such time the NYSDOH approves a request to diminish or eliminate the requirement to do so.

7.0 QUALITATIVE HUMAN HEALTH EXPOSURE ASSESSMENT

The purpose of the qualitative human health exposure assessment (exposure assessment) is to evaluate and document how people might be exposed to site-related contaminants, and to identify and characterize the potentially exposed population(s) now and under reasonably anticipated future uses of the site and surrounding area. The exposure assessment was completed based on the information presented in Sections 1.0 through 6.0.

A complete exposure pathway must exist for an individual or population to be impacted by the contamination at the Site. A complete exposure pathway exists when all five (5) of the following components exist.

1. A source or release of contamination;
2. Transport mechanism;
3. Point of potential human exposure with the contaminated medium;
4. Route of exposure at the contact point; and
5. A receptor population.

Section 5.0 discusses potential source areas and other contaminated media at and associated with the Site. Section 6.0 discusses potential routes of migration of chemical substances from source areas and observed contaminant migration at the Site.

7.1 HUMAN HEALTH EVALUATION

This section discusses the qualitative exposure assessment, an evaluation of Site occurrence and a comparison to standards, criteria and guidelines (SCGs) related to potential impacts to human health.

7.1.1 Exposure Assessment

This exposure assessment discusses potential migration routes by which chemicals in the environment may be able to reach human receptors. This discussion is based on current and hypothetical future Site conditions and known off-Site conditions.

Currently, the Signore BCP Site is vacant, as the former facility building has been demolished, and the surrounding areas consist of residential and recreational properties and a cemetery. It is assumed for the purposes of this evaluation that the surrounding area use will remain unchanged which is a very reliable assumption as it relates to the cemetery and the resort areas.

In developing hypothetical future Site conditions, GZA based our assumption on the plan to develop the property for mixed-use, including retail, hospitality and resort housing. Therefore, the qualitative exposure assessment will utilize Part 375

RRSCOs for on-site soil, the NYSDEC Class GA criteria for on and off-site groundwater and the NYSDOH Air Guidance values for indoor and subslab air (see Section 5.0 for discussion on the respective soil, groundwater indoor air criteria used).

We note that the SRI did not generally identify surface soil or subsurface soil contamination above the Unrestricted SCOs (zinc was detected at two surface soil sample locations at concentrations above the Unrestricted SCOs but below the Restricted Residential SCOs). The Phase II ESA identified subsurface soil contamination limited to the three (3) AOCs, which have been addressed by the IRM activities conducted in 2011 and 2013. The previous RI identified some minor metal contamination in the soil samples collected. Therefore, we do not suspect off-site soil contamination associated with the Signore BCP Site to be a concern.

7.1.1.1 Surface Soils

Exposure to chemical substances within surface soils may occur via dermal contact or ingestion.

On-Site

The 8.43 acre Signore BCP Site is covered extensively by the former building concrete slab, asphalt parking lots and roadways, gravel parking areas, and is currently inactive. However, the possibility does exist for trespassing to occur. Four (4) surface soil samples were collected, in consultation with NYSDEC, during the SRI. No VOCs, SVOCs, PCBs or pesticides were detected at concentrations above the Unrestricted SCOs. Zinc was the only metal analyte detected above the Unrestricted SCO (2 sample locations), but below the Residential SCO. Under the current conditions, exposure to surface soil contaminants via dermal contact or incidental ingestion is considered unlikely as no surface soil contamination was identified.

Off-Site

We do not suspect off-site surface soil contamination associated with the Signore BCP Site to be present or a concern, as no surface soil contamination was identified on-site and contaminants that were identified are present in subsurface soils. Therefore, exposure to surface soil contaminants via dermal contact or incidental ingestion is considered unlikely.

7.1.1.2 Subsurface Soils

On-Site

Exposure to chemical substances within on-Site subsurface soils may occur via direct contact, inhalation or incidental ingestion under the hypothetical future scenario where

on-Site intrusive work is performed and the workers are unaware or not properly trained to work with potentially hazardous materials. If these materials are brought to the surface and not adequately secured, there is a potential exposure scenario to adjacent residents that could occur via dust migration or vapor emissions. As such, intrusive work on the Site, including construction or maintenance work, should be conducted in accordance with requirements that include health and safety monitoring, under a controlled work environment. The likelihood of this potential exposure is relatively low, if proper health and safety procedures are followed.

Off-Site

We do not suspect off-site subsurface soil contamination associated with the Signore BCP Site to be a present or a concern. Therefore, exposure to subsurface soil contaminants via dermal contact or incidental ingestion is considered unlikely.

7.1.1.3 Groundwater

Exposure to groundwater contamination includes ingestion, direct contact and inhalation of vapors. The Site and surrounding area are on publicly supplied water. The IRM program that was completed in 1992 protected the municipal well, as well as connected thirty-four (34) residences to public water. The active protection of the municipal well was discontinued in 2002 as cVOC concentrations decreased and were no longer considered a health risk. The area surrounding the Signore BCP Site is on publicly supplied water. Analytical results from the Town Well, from the semi-annual sampling events (see Table 2 in Appendix C), indicates TCE was detected in five (5) of the eleven (11) sampling events completed since April 2009. The detected concentration of TCE in those five (5) events was below 1 ppb.

Future development or utility repairs proximate to the Site may expose workers to low levels of VOCs in the groundwater during excavation and dewatering, assuming excavations are completed at depths greater than 10 to 12 feet bgs. Because this depth is below conventional foundation and buried utility construction, the likelihood of on or off-site receptors exposure via incidental dermal contact is considered low.

7.1.1.4 Potential Volatile Vapors

On-Site

There is an inhalation exposure potential from organic compound volatilization based on the soil and groundwater contamination concentrations detected at the Signore BCP Site. Intrusive work performed at the Signore BCP Site, should be conducted in accordance with requirements that include health and safety monitoring under a controlled work environment, similar to the IRM activities completed at AOC-1, -2, and -3. The likelihood of this potential exposure is low, if proper health and safety

procedures are followed. However, soil vapor intrusion will need to be evaluated and mitigated on newly constructed or occupied structures within the Signore BCP Site until such time the NYSDOH approves a request to diminish or eliminate the requirement to do so.

Off-Site

A SVI assessment was conducted at off-site locations as part of the SRI. The results indicated that SVI does not pose a threat to human health, as discussed in Section 5.6, as the results were compared to the NYSDOH SVI Guidance, which required No Further Action.

7.1.1.5 Dust Migration

Potential dust migration from unpaved or unvegetated areas of the Site could occur, but limited as the 60 to 70% of the Signore BCP Site is covered with concrete slab, asphalt or vegetation. However, no surface soil contamination was identified during the SRI; therefore, the likelihood of exposure is unlikely.

If contaminated subsurface soils are brought to the surface, dust and vapor migration is a possible scenario. However, petroleum-VOCs and USTs were excavated from AOC-1, AOC-2, and AOC-3 during IRM activities in fall 2011 and fall 2013. Real-time air monitoring for particulate levels was conducted during the two IRMs in accordance with the NYSDOH Generic Community Air Monitoring Plan and particulate/dust migration was not identified as a concern (see dust monitoring data in Appendix D).

As such, intrusive work at the Site should be conducted in accordance with requirements that include health and safety monitoring under a controlled work environment. The likelihood of this potential exposure is low, if proper health and safety procedures are followed.

7.2 QUALITATIVE EXPOSURE ASSESSMENT SUMMARY

The qualitative exposure assessment identified contamination associated with on- and off-Site environmental media. The media and primary issues are summarized below.

Surface Soils: Exposure to on-site and/or off-site contamination present within surface soils via dermal contact or incidental ingestion is considered low as no surface soil contamination was identified in soil samples collected from the Signore BCP Site.

Subsurface Soils: VOCs were detected at concentrations greater than their respective SGC in the subsurface soil at three on-site locations (AOC-1, -2, and -3), as discussed

in Section 1.4. However, IRM activities conducted in fall 2011 and fall 2013 addressed the contamination associated with these three (3) AOCs.

We do not suspect off-site subsurface soil contamination associated with the Signore BCP Site to be present or a concern. Therefore, exposure to subsurface soils via dermal contact or incidental ingestion is unlikely.

Groundwater: VOCs were the only constituents analyzed that were detected in groundwater above their respective SCGs. The area surrounding the Signore BCP Site is on publicly supplied water. Analytical results from the Town Well, from the semi-annual sampling events (see Table 2 in Appendix C), indicates TCE was detected in five (5) of the eleven (11) sampling events completed since April 2009. The detected concentration of TCE in those five (5) events was below 1 ppb.

Future development or utility repairs proximate to the Site may expose workers to groundwater during excavation and dewatering, assuming excavations are completed at depths greater than 10 to 12 feet bgs. Due to the low level of VOCs at downgradient monitoring points and the depth of the groundwater in the area downgradient of the Site (approximately 10 to 12 feet bgs), there is a potential for this exposure scenario. The likelihood of this potential exposure is low, given the depth of groundwater and that the residential properties downgradient and in the vicinity of the Signore BCP Site were connected to public water supply as part of the 1992 IRM activities.

Vapor Migration: Based on the soil and groundwater contaminant concentrations detected in on-site samples, there is an inhalation exposure potential at the Signore BCP Site. Intrusive work performed at the Signore BCP Site, should be conducted in accordance with requirements that include health and safety monitoring under a controlled work environment, similar to the IRM activities completed. The likelihood of this potential exposure is low, if proper health and safety procedures, such as those identified in the NYSDOH Community Air Monitoring Plan, are followed. However, there has been no on-site soil vapor intrusion assessment completed. Therefore, soil vapor intrusion will be evaluated on newly constructed or occupied structures within the Signore BCP Site as long as groundwater contamination is present above NYSDEC Class GA criteria.

A SVI assessment was conducted at off-site locations as part of the SRI. The results indicated that SVI off-site does not appear to pose a threat to human health as the results were compared to the NYSDOH SVI Guidance, which required No Further Action.

Dust Migration: Potential dust migration from unpaved or unvegetated areas of the Site could occur, but is limited as the majority of the Signore BCP Site is covered with

concrete slab, asphalt or vegetation. Additionally, no surface soil contamination was identified during the SRI; therefore, the likelihood of exposure is unlikely.

If contaminated subsurface soils are brought to the surface, dust and vapor migration is a possible scenario. Intrusive on-site work should be conducted in accordance with requirements that include health and safety monitoring and a community air monitoring plan under a controlled work environment. The likelihood of this potential exposure is low, if proper health and safety procedures are followed.

8.0 IDENTIFICATION OF STANDARDS, CRITERIA AND GUIDELINES AND REMEDIAL ACTION OBJECTIVES

8.1 INTRODUCTION

Standards, Criteria and Guidelines (SCGs) are used to establish the locations where remedial actions are warranted and to establish Remedial Action Objectives (RAOs). The SCGs established for the Signore BCP Site consist of the following.

Surface and Subsurface Soil

- Restricted Residential Soil Cleanup Objectives (RRSCOs) per 6 New York Code Rules and Regulation (6 NYCRR) Part 375 Environmental Remediation Programs, Subparts 375-12 to 375-4 & 375-6, effective December 14, 2006.

Groundwater

- Class GA criteria per NYSDEC's Division of Water, Technical and Operational Guidance Series (TOGS 1.1.1), June 1998, amended April 2000.

Soil Vapor Intrusion Air Samples

- NYSDOH's "Final Guidance for Evaluating Soil Vapor Intrusion in the State New York" dated October 2006 (NYSDOH SVI Guidance).

8.2 REMEDIAL ACTION OBJECTIVES

The final remedial measures for the Signore BCP Site must satisfy RAOs. RAOs are site-specific statements that convey the goals for minimizing or eliminating substantial risk to human health and the environment. The RAOs for the Signore BCP Site are as follows.

Remedial Action Objectives for soil, groundwater, and soil vapor must be considered for the Site. NYSDEC distinguishes between RAOs for Public Health Protection and RAOs

for Environmental Protection. According to the NYSDEC website (http://www.dec.ny.gov/regulations/67560.html), these RAOs generally apply for the following criteria for the specific media.

Soil

- RAOs for Public Health Protection
  - Prevent ingestion and/or direct contact with contaminated soil; and,
  - prevent inhalation of or exposure from contaminants volatilizing from contaminants in soil. RAOs pertaining to soil vapor mitigation are discussed later in this section.
- RAOs for Environmental Protection
  - Prevent migration of contaminants that would result in groundwater or surface water contamination; and,
  - prevent impacts to biota from ingestion and/or direct contact with soil causing toxicity or impacts from bioaccumulation through the terrestrial food chain.

The remedial objective for the Site soil is a Track 2 cleanup under the BCP. Soils exceeding RRSCOs were remediated during IRM activities conducted in 2011 and 2013; therefore, additional remedial actions pertaining to subsurface soils are not required and Site RAOs for soil have been achieved. However, activities that disturb subsurface soils should follow applicable screening and health and safety procedures. Refer to Sections 2, 5, 6 and 7 for additional information.

Groundwater

- RAOs for Public Health Protection
  - Prevent ingestion of groundwater with contaminant levels exceeding drinking water standards. Residences in the vicinity of the Site are serviced by municipal water.
  - Prevent contact with, or inhalation of volatiles, from contaminated groundwater. RAOs pertaining to vapor mitigation are discussed later in this section.
- RAOs for Environmental Protection
  - Restore ground water aquifer to pre-disposal/pre-release conditions, to the extent practicable,
  - prevent the discharge of contaminants to surface water; and,
  - remove the source of ground or surface water contamination. Soils exceeding PGWSCOs were remediated during the IRM activities conducted in 2011 and 2013.

The RAO for groundwater should achieve, to the extent feasible, compliance with Class GA criteria and reduce the potential exposure from inhalation of organic vapors, ingestion and dermal contact with contaminated groundwater. Based on the results of the AOC-4 groundwater in-situ remediation pilot study conducted in fall 2013, GZA has

recommended implementing a full scale injection program to enhance and accelerate natural attenuation of cVOCs in on-Site groundwater at the BCP site. The full scale in-situ groundwater treatment would involve injecting an organic carbon (OC) electron donor material into the cVOC-impacted groundwater via direct-push technology. Natural attenuation could then further reduce the concentrations at downgradient locations. As degradation of the remaining source of cVOCs would be enhanced by the in-situ treatment, this should help achievement of the groundwater standards more quickly. GZA considers the remaining on-Site cVOC contamination to be relatively low, and this alternative is a final "polishing" remedial step. GZA expects that this remedial alternative will result in on-Site concentrations of cVOCs to decrease below TOGS 1.1.1 criteria in approximately three years. If after three years from the time of injection the RAOs are not met, the need to evaluate additional in-situ remediation will be considered at that time.

Chlorinated VOCs do not appear to be significantly migrating off the BCP site. The extent of groundwater contamination, based on the October 2014 semi-annual groundwater sampling is approximately to EW-4.5 (see Figure 2 in Appendix C). TCE was detected at a concentration 5.4 ppb and PCE was detected at a concentration of 1.5 ppb. TCE's concentration of 5.4 ppb slightly exceeded its Glass GA criteria of 5 ppb. TCE concentrations have generally fluctuated between 5 and 10 ppb at this monitoring location since October 2004. PCE has consistently been detected below its Class GA criteria of 5 ppb since 2009. GZA expects these concentrations to continue to decrease following the proposed in-situ groundwater remedy. Should off-Site concentrations increase, the need to evaluate additional in-situ remediation will be considered at that time.

<u>Soil Vapor</u>

- RAOs for Public Health Protection
    - Mitigate impacts to public health resulting from existing, or the potential for, soil vapor intrusion into buildings at the Site.

As discussed in Section 3.5, an SVI investigation was completed at five (5) hydraulically upgradient and four (4) hydraulically downgradient locations from the Signore BCP Site. As discussed in Section 5.6, according the NYSDOH Guidance, No Further Action will be required at these locations. Therefore, it appears that the concentrations of soil vapor in the subsurface at these off-Site locations do not pose a threat to human health..

However, vapor intrusion will be evaluated on new buildings and mitigation systems (i.e. subslab depressurization systems (SSDSs)) and will be operated and monitored until such time the NYSDOH approves a request to diminish or eliminate the requirement to do so.

In addition to achieving RAOs, NYSDEC's BCP requires remedy evaluation in accordance with DER-10. The guidance states that an appropriate remedy should identify and develop a remedial action that is based on the following criteria:

Overall Protection of Public Health and the Environment. This criterion is an evaluation of the remedy's ability to protect public health and the environment assessing how each alterative would eliminate, reduce or control through removal, treatment, containment, engineering controls, or institutional controls the existing or potential human exposures or environmental impacts.

Compliance with Standards, Criteria, and Guidance (SCGs). Compliance with SCGs addresses whether a remedy will meet applicable environmental laws, regulations, standards, and guidance.

Long-Term Effectiveness and Permanence. This criterion evaluates the long-term effectiveness and permanence of the remedy after implementation. If contamination will remain on- or off-site after the selected remedy has been implemented, the following items are evaluated: (i) human exposures, (ii) ecological receptors or (iii) impacts to the environment. Evaluation of institutional and/or engineering controls is also required.

Reduction of Toxicity, Mobility or Volume with Treatment. This criterion evaluates the remedy's ability to reduce the toxicity, mobility, or volume of Site contamination. Preference is given to remedies that permanently and significantly reduce the toxicity, mobility, or volume of the wastes at the Site.

Short-Term Impacts and Effectiveness. This criterion is an evaluation of the potential short-term adverse environmental impacts and human exposures during construction and/or implementation of the remedy. This criterion also includes a discussion of engineering controls that will be used to mitigate short term impacts (i.e., dust control measures), and an estimate of the length of time needed to achieve the remedial objectives.

Implementability. This criterion is an evaluation of the technical and administrative feasibility of implementing the remedy. Technical feasibility includes the difficulties associated with the construction and the ability to monitor the effectiveness of the remedy. For administrative feasibility, the availability of the necessary personnel and material is evaluated along with potential difficulties in obtaining specific operating approvals, access for construction, etc.

Cost. This criterion is an evaluation of the overall cost of a remedy. Capital costs and costs associated with site management are estimated for the remedy and presented on a present worth basis.

Land Use. This criterion is an evaluation of the current, intended and reasonably anticipated future use of the site and its surroundings, as it relates to a remedy, when unrestricted levels would not be achieved.

Community Acceptance. This criterion is evaluated after the public review of the remedy selection process as part of the final NYSDEC selection/approval of a remedy for site use.

8.3 REMEDIAL ACTION AREAS AND VOLUMES

This subsection presents the estimated areas and volumes of contaminated soil and groundwater present to assist in evaluating remedial alternatives later in this report. The estimates are based on the information gathered as part of the Phase II ESA, 2011 and 2013 IRMs, and SRI; and consist of the following:

- AOC-4 – Groundwater – Groundwater impacts associated with the cVOCs at concentrations greater than the Class GA criteria have been detected at the Signore BCP Site (see Figure 7). The petroleum-VOCs impacts appear to be residual impacts from the former petroleum-VOC source area soils (AOC-1, -2, and -3) which have been removed.

  The cVOCs in the groundwater do not appear to be related to AOC-1, but are likely related to other historical on-Site activities that have resulted in the impacts. It should be noted that the total cVOC concentrations detected in MW-5S and down gradient of AOC-2 and AOC-3 (see Table 2 in Appendix C and Figure 6) have decreased since 2011 IRM activities at AOC-2 were completed.

- Evaluate and mitigate soil vapor intrusion on newly constructed or occupied structures within the Signore BCP Site, as long as groundwater contamination is present above NYSDEC Class GA criteria. If groundwater contamination is present above the NYSDEC Class GA standards, an environmental easement will be established to identify site requirements regarding groundwater and vapor intrusion.

8.4 REMEDIAL RESPONSE ACTIONS

To satisfy the remedial action objectives for the Signore BCP Site, remedial action will be required to address AOC-4 and soil vapor intrusion, if identified in newly constructed or occupied structures. This general statement has been made relative to soil vapor intrusion, as a final site development plan has not been completed at this time.

It is GZA's opinion that by addressing the petroleum impacted fill material/soils associated with AOC-2 and AOC-3 as part of the 2011 and 2013 IRM activities, the groundwater conditions proximate to those locations will improve. Therefore, the remedial response actions for the groundwater (AOC-4) will focus on the cVOC impacted areas.
The IRM activities performed to date have had effectiveness on the impacted soils in those areas and a decrease in groundwater contaminant concentrations downgradient of AOC-2 at

MW-5S have shown a decrease in total VOC concentrations from pre-IRM activities (see Table 2 of the October 2014 Semi-Annual Monitoring Report in Appendix C).

In addition to the evaluation of alternatives to remediate to the likely end use of the Site, NYSDEC regulation requires evaluation of more restrictive end-use scenarios. These include an unrestricted use scenario (considered under 6NYCRR Part 375-2.8 to be representative of cleanup to pre-disposal conditions), and a scenario less restrictive than the reasonably anticipated future use. Per DER-10 evaluation of a "no-action" alternative is also required to provide a baseline for comparison against other alternatives.

Therefore, the alternatives to be discussed in greater detail in Section 9.0 include:

Soil Alternatives

- No Further Action
- Excavation and Off-Site Disposal of Contaminated Soil
    - To achieve Unrestricted SCOs (as required by 6NYCRR Part 375-2.8)

Groundwater Alternatives

- No Further Action
- Monitored Natural Attenuation for cVOC Groundwater
- In-Situ Treatment of cVOC Impacted Groundwater

SVI Alternatives

- Provisions to evaluate and mitigate, soil vapor intrusion on newly constructed or occupied structures within the Signore BCP Site..

9.0 DEVELOPMENT OF REMEDIAL ALTERNATIVES

9.1 INTRODUCTION

This section presents a description of the remedial alternatives for soil and groundwater that have been developed for the Site. The remedial alternatives were developed by media (i.e., soil, groundwater, and soil vapor) and were chosen based on remedial options that would address the VOC contaminants present in soil, groundwater, and soil vapor at the Signore BCP Site.

9.2 SOIL ALTERNATIVES

Two (2) soil remedial alternatives have been selected based on NYSDEC requirements (no action and cleanup to pre-disposal conditions) and presumed future use of the Signore BCP Site for mixed restricted residential and commercial use. An expanded description of each of the soil alternatives is provided below.

9.2.1 Soil Alternative No. 1 – No Action

The No Action alternative involves taking no further action, other than those already completed, to remedy the condition of contaminated Signore BCP Site soils. NYSDEC guidance requires that the No Action alternative be evaluated to provide a baseline for comparison against other alternatives in the detailed analysis of soil alternatives (Section 10.0).

9.2.2 Soil Alternative No. 2 - Excavation and Proper Off-Site Disposal

The following is a description of the remedial actions for Soil Alternative No. 2, which would involve excavation and proper off-site disposal of contaminated soil. The remedial actions associated with this alternative can be completed using traditional construction materials and equipment. This scenario has been evaluated to remove the soil contamination above the Unrestricted SCOs to fulfill the NYSDEC requirement to assess one alternative that will achieve unrestricted use relative to soil contamination without the use of institutional controls.

Excavation To Meet Unrestricted SCO

It has been estimated that approximately 5,400 cubic yards of soil will need to be excavated of which, 1,100 cubic yards will require off-site disposal to achieve the Part 375 Unrestricted SCOs. This estimate was based on the data collected as part of the previous RI, Phase II ESA, 2011 and 2013 IRMs and SRI. Figure 12 identifies the approximate locations of impacted soil identified above the Unrestricted SCO and provides an approximate volume. Appendix H contains the estimated volume calculations.

Areas of soils that meet the Unrestricted SCOs will be required to be excavated in an effort to remove deeper contaminated soils at some locations. These clean soils may be able to be reused on-site and placed back in the excavation once the contaminated soils have been removed. The soil excavation would be backfilled with clean soil after confirmatory soil samples indicate that the limits of the remediation have been reached.

9.3 GROUNDWATER ALTERNATIVES

Three (3) groundwater remedial alternatives have been selected based on NYSDEC requirements (no action) and presumed future use of the Signore BCP Site for mixed commercial and residential use. An expanded description of each of the groundwater alternatives is provided below.

9.3.1 Groundwater Alternative No. 1 – No Action

The No Action alternative involves taking no further action, than those already completed, to remedy the condition of contaminated Signore BCP Site groundwater. NYSDEC guidance requires that the No Action alternative be evaluated to provide a baseline for comparison against other alternatives in the detailed analysis of groundwater alternatives (Section 10.0).

9.3.2 Groundwater Alternative No. 2 – Monitored Natural Attenuation

The groundwater Monitored Natural Attenuation (MNA) alternative would involve a monitoring program to evaluate apparent VOC contamination and natural attenuation at the Signore BCP Site. Natural attenuation processes appear to be ongoing as the concentrations of cVOC contamination are decreasing in the direction of groundwater flow and petroleum-related impacts are limited to areas where petroleum soil contamination was formerly present (AOC-1, -2 and -3).

Groundwater samples would be collected from monitoring locations EW-1.25, EW-1.5, EW-2.5, EW-4.5, MW-5S, IRM-2I and Town Well.

The MNA alternative may be considered an acceptable alternative for groundwater as natural attenuation does reduce the toxicity, mobility and concentration of the contamination in groundwater and the concentrations present only pose a minimal threat to human health and the environment. This may be appropriate for the cVOC plume. Petroleum-impacted groundwater has not been identified outside three (3) AOCs. The soil alternatives discussed in Section 9.2 would significantly reduce the petroleum-impacted groundwater conditions in those areas. The MNA alternative would require a soil alternative component to address the isolated petroleum-impacted groundwater, but would be appropriate for the cVOC contamination that is of concern throughout the Signore BCP Site and detected at downgradient monitoring wells.

9.3.3 Groundwater Alternative No. 3 –In-Situ Treatment

The In-Situ Treatment alternative would involve treating the cVOC plume within the Signore BCP Site. An organic carbon electron donor would be injected into the groundwater via direct-push technology. The additive would stimulate the process

of reductive dechlorination, the microbially-mediated replacement of chlorine. This would create an environment in the groundwater that would accelerate degradation of the cVOCs. Natural attenuation could then further reduce the concentrations at downgradient locations as the remaining source of the cVOCs would be addressed and ultimately achieve the groundwater SCG.

The injections would occur in a grid pattern in the vicinity of the Signore BCP Site with groundwater concentrations above 100 ppb. Figure 13 depicts the approximate area of organic carbon additive injections.

Groundwater samples would be collected from monitoring locations EW-1.25, EW-1.5, EW-2.5, MW-1I, MW-5S, SP-32, SP-37, SP-39, SP-43, SP-45, and TP-11 to monitor the progress of this remedial alternative.

The In-Situ Treatment alternative may be considered an acceptable alternative for groundwater as further treatment of the groundwater will assist in reducing the toxicity, mobility and concentration of the contamination in groundwater, which in their current concentrations, pose a minimal threat to human health and the environment.

9.4 SOIL VAPOR INTRUSION ALTERNATIVES

9.4.1 Soil Vapor Intrusion Alternative – Assessment & Mitigation

This alternative involves assessing and, if deemed necessary, mitigating potential soil vapor intrusion into newly constructed and occupied buildings on the Signore BCP Site. No on-site soil vapor intrusion/mitigation work has been completed at this time.

An environmental easement will be required for the Signore BCP Site and will include a requirement that the potential for vapor intrusion be evaluated in newly constructed and occupied buildings on the Signore BCP Site. Provisions for mitigation, if determined to be necessary, may include installation of a vapor barrier, sub-slab depressurization, or other engineering controls (i.e., positive pressure via HVAC system). A formal redevelopment plan has not been completed and thus the details of future on-site buildings remain unknown at this time. Therefore, assessment of best mitigation alternatives and related costs, if mitigation were determined to be necessary, is not feasible at this time.

Additionally, the implementation of a remedial strategy to address the cVOC groundwater that exists, which is the cause of the potential soil vapor intrusion concern, will occur before redevelopment. Therefore, the level of effort of assessment needed and/or the level of mitigation, if deemed necessary, is unknown at this time, as the implementation of groundwater remediation may eliminate the cVOCs in groundwater and the concern for vapor intrusion.

No further discussion of vapor intrusion alternatives will occur in Sections 10 and 11 because it will be a component of the environmental easement and need to be evaluated in conjunction with a final development plan after the groundwater remedial strategy is implemented.

10.0 DETAILED ANALYSIS OF ALTERNATIVES

10.1 INTRODUCTION

The purpose of the detailed analysis of alternatives is to present the relevant information to select a remedy. During the detailed analysis, the alternatives established in Section 9.0 are compared on the basis of environmental benefits and costs using criteria discussed in Section 8.2. This approach is intended to provide needed information to compare the merits of each alternative and select an appropriate remedy that satisfies the remedial action objectives for the Signore BCP Site.

10.2 DETAILED ANALYSIS OF SOIL ALTERNATIVES

The two (2) Soil Alternatives are evaluated individually in terms of the environmental and cost criteria described in Section 8.2. Descriptions of the alternatives are provided in Section 9.2.

10.2.1 Soil Alternative No. 1 – No Action

1. Overall Protection of Human Health and the Environment: This alternative does not reduce the risk or exposure for human health and the environment, since the Site would remain in its present condition. Uncontrolled access to the Site could lead to potential exposure to soil contamination above the Unrestricted SCOs and contaminated groundwater if intrusive work were performed within the Signore BCP Site and workers are unaware or untrained regarding the contaminants.

2. Compliance with Standards, Criteria and Guidance (SCGs): This alternative will comply with the chemical-specific SCGs for the Site. The sources of petroleum-contaminant levels in the soil (former AOC-1, -2 and -3) have been removed. Petroleum-based VOCs and cVOCs have not been detected at the Site above the RRSCOs which is acceptable for the anticipated future use of the property (mixed commercial and residential).

3. Long-Term Effectiveness and Permanence: Given the mass of petroleum-impacted soil contamination has been removed to RRSCOs, this alternative will provide long-term effectiveness and permanence regarding soil for the

anticipated use (mixed commercial and residential) regarding the potential risk to human health and the environment.

4. Reduction of Toxicity, Mobility, and Volume: This alternative does not involve the removal or treatment of the soil contamination present at the Signore BCP Site. Given the mass of petroleum-impacted soil contamination has been removed to RRSCOs, no additional reduction of toxicity, mobility or volume is necessary to achieve the anticipated use (mixed commercial and residential) of the Signore BCP Site.

5. Short-Term Impact and Effectiveness: No potential short-term adverse environmental impacts and human exposures are anticipated during the implementation of this alternative since there are no remedial activities involved.

6. Implementability: This alternative is readily implementable on a technical basis, in that it involves no action. Also, institutional controls (e.g., environmental easement) would be required for the Site property because contaminants are present in the soil above the Unrestricted SCOs and contaminated groundwater is present leading to soil vapor concerns related to new on-site building construction.

7. Cost: No capital costs are anticipated for this alternative, as there would be no action.

8. Land Use: This alternative would meet the land use criteria as the 2011 and 2013 IRM activities have removed most of the soil contamination above Unrestricted SCOs. Anticipated future uses would likely be mixed commercial and residential. Institutional controls (e.g., environmental easement) would be required for the Site property because contaminants are present in the soil above the Unrestricted SCOs , contaminated groundwater is present leading to soil vapor concerns related to new on-site building construction.

10.2.2 Soil Alternative No. 2 - Excavation and Proper Off-Site Disposal

1. Overall Protection of Human Health and the Environment: This alternative is considered to be protective of human health and the environment with respect to soil. Implementation of this alternative would result in removal of the remaining soil contamination above the Unrestricted SCOs.

2. Compliance with Standards, Criteria and Guidance (SCGs): This alternative is expected to meet the Unrestricted SCO SCGs.

3. Long-Term Effectiveness and Permanence: This alternative is considered an adequate, reliable and permanent remedy for soil and, as such, the risks involved with the migration and/or direct contact with soil contaminants would be eliminated. This alternative would allow for unrestricted use of the property after the excavations are complete. However, the anticipated future use of the Signore BCP Site is mixed commercial and residential.

4. Reduction of Toxicity, Mobility, and Volume: This alternative involves the removal and off-site disposal of soil contamination to Unrestricted SCOs and would further decrease the toxicity, mobility and volume of remaining soil contamination to below Unrestricted SCOs.

5. Short-Term Impacts and Effectiveness: There are several potential short-term impacts associated with this alternative.

   - There is potential for impacts to human health (workers and construction personnel) due to direct contact, potential vapor and particulate releases. This alternative would require the preparation of a health and safety plan (HASP) to identify proper personal protective equipment required as well as the proper site and community air monitoring, as outlined in the NYSDOH Generic Community Air Monitoring Plan (CAMP), in order to mitigate potential adverse conditions.

   - Contamination of equipment used for excavation purposes could carry contamination off-site. Therefore, equipment will be decontaminated prior to leaving the Signore BCP Site, as necessary, in order to avoid the transport of contaminants.

   - Field personnel would wear appropriate personal protective equipment during excavation in order to limit health risks due to exposure to contaminants and physical hazards.

     Human health and the environment would be protected under this alternative if the HASP and CAMP are properly implemented. This alternative is expected to meet the soil remedial action objectives at completion of the excavations, because the impacted soil will be removed from the Site. Confirmatory soil sampling would be performed to verify the alternative's effectiveness.

   - This alternative would have short term effectiveness in addition to long term effectiveness. Removal of the petroleum-impacted soil would remove the potential exposure and the source of the petroleum-impacted groundwater.

6. Implementability: This alternative is readily implementable on a technical basis with standard construction methods and equipment. Materials and services necessary for construction are readily available. Confirmatory soil sampling would be performed at excavation sidewalls and floor to verify the effectiveness of this remedial alternative.

   There are no anticipated, specific problems associated with obtaining permits or approvals from agencies to implement this alternative.

7. Cost: Total capital costs for this alternative are estimated to total approximately $224,000 for remediation to Unrestricted SCOs. The quantities, unit costs, and subtotal costs and associated assumptions, estimated for comparative purposes, are presented in Appendix I.

8. Land Use: This alternative would meet the land use criteria, as the Signore BCP Site is located in a mixed residential and commercial area in the Village and Town of Ellicottville. Anticipated future use is a mixed commercial and residential scenario. We note that the IRM activities completed to date have already achieved the RRSCOs.

10.3 DETAILED ANALYSIS OF GROUNDWATER ALTERNATIVES

The three (3) Groundwater Alternatives are evaluated individually in terms of the eight (8) environmental and cost criteria described in Section 8.2. Descriptions of the alternatives are provided in Section 9.3.

10.3.1 Groundwater Alternative No. 1 – No Action

1. Overall Protection of Human Health and the Environment: This alternative does not reduce the risk or exposure for human health and the environment, since the Site would remain in its present condition. Uncontrolled access to the Site could lead to potential exposure to impacted soil and groundwater if intrusive work were performed within the Signore BCP Site and workers are unaware or untrained regarding the contaminants.

2. Compliance with Standards, Criteria and Guidance (SCGs): This alternative will not comply with the SCGs for the Site. The cVOC impacted groundwater will continue to exist on-site and migrate downgradient. Natural attenuation would eventually reduce the cVOC levels of contamination over time. This alternative would not allow change in groundwater conditions to be identified.

3. Long-Term Effectiveness and Permanence: This alternative does not involve removal or treatment of contaminated groundwater. The risks involved with

the migration and direct contact with groundwater contaminants would remain the same or similar to current conditions. Therefore, this alternative is not expected to provide long-term effectiveness to reduce the potential risk to human health and the environment.

4. Reduction of Toxicity, Mobility, and Volume: This alternative does not involve the removal or treatment of the groundwater contamination present at the Signore BCP Site. Therefore, the toxicity, mobility and volume of groundwater contamination are expected to be reduced only through natural attenuation. Natural attenuation of cVOC groundwater contaminants is occurring and will reduce the concentrations over time.

5. Short-Term Impact and Effectiveness: No short-term effectiveness is anticipated during the implementation of this alternative since there are no remedial activities involved.

6. Implementability: This alternative is readily implementable on a technical basis, in that it involves no action. There may be administrative difficulties associated with implementing this alternative as a result of community resistance to No Action. Also, institutional controls (e.g., environmental easement) would be required for the Site property because contaminants are present in the soil above the Unrestricted SCOs, contaminated groundwater is present leading to soil vapor concerns related to new on-site building construction.

7. Cost: No capital costs are anticipated for this alternative, as there would be no action.

8. Land Use: This alternative would not meet the land use criteria, as the Signore BCP Site is located in a mixed residential and commercial area in the Village and Town of Ellicottville, New York. Anticipated future uses would likely be mixed commercial and residential. Institutional controls (e.g., environmental easement) would be required for the Site property because contaminants are present in the soil above the Unrestricted SCOs, contaminated groundwater is present leading to soil vapor concerns related to new on-site building construction

10.3.2 Groundwater Alternative No. 2 – Monitored Natural Attenuation

1. Overall Protection of Human Health and the Environment: This alternative is considered protective of human health and the environment (in terms of affecting habitat or vegetation); but is not considered fully protective of the environment in terms of protecting the groundwater, since a portion of Site groundwater could remain contaminated with limited petroleum-impacted

VOCs and cVOCs. The cVOCs would be the focus of the natural attenuation monitoring as it has been detected at multiple locations within the Signore BCP Site.

Natural attenuation is occurring at the Site and reduction in risk associated with natural attenuation is occurring as the groundwater VOC concentrations approach the groundwater standards at the Signore BCP Site property line. Therefore, this alternative will eventually mitigate the environmental impacts to groundwater. The two IRMs completed to date have removed the known locations of soil contamination present within the Signore BCP Site.

2. Compliance with Standards, Criteria and Guidance (SCGs): The SCGs for groundwater are expected to be met at the Site property line over time. The cVOC groundwater contamination will naturally attenuate to the SCGs at the Signore BCP Site property line. However, SCGs for the Signore BCP Site related to cVOC may not be met in some areas of the groundwater plume. The petroleum-impacted groundwater is present and limited to the former AOCs within the Signore BCP Site. The two IRMs completed to date have removed the soil contamination present at these three AOCs. Petroleum-impacted groundwater has not been identified as a concern in other areas of the Signore BCP Site or for off-site migration.

3. Long-Term Effectiveness and Permanence: Regarding effectiveness, the environment (in terms of affecting habitat or vegetation) would be protected under this alternative. Low level cVOC contamination would still be present in the Signore BCP Site groundwater. The collection of groundwater samples would be performed to assess the condition of the cVOC contamination and the natural attenuation of groundwater as part of this MNA alternative.

   As the removal of the petroleum-impacted source soils has occurred, the focus of the natural attenuation monitoring would be the cVOC groundwater contamination. Groundwater concentrations would eventually naturally attenuate to reduce the concentration over time and is anticipated to reduce the environmental impact to groundwater. The duration of natural cleanup would depend on the natural attenuation rate of the VOCs in the groundwater. There are uncertainties in the rate and interaction of the various natural attenuation processes. Therefore, the length of time required for natural cleanup of the groundwater is unknown, but expected to be less than 30 years if the impacted soil sources are removed/remediated in-place.

4. Reduction of Toxicity, Mobility, and Volume: The toxicity, mobility and volume of contamination are expected to be reduced over time. Natural attenuation of contaminants is expected to slowly reduce the concentrations in groundwater.

5. Short-Term Impact and Effectiveness: Short-term impacts anticipated during the implementation of this groundwater monitoring/natural attenuation alternative consist of potential for impacts to human health (workers) due to direct contact and potential vapors from groundwater while performing sampling activities on the Signore BCP Site.

   This alternative would require the preparation of a health and safety plan (HASP) to identify proper personal protective equipment required as well as the proper site and community air monitoring, as outlined in the NYSDOH Generic Community Air Monitoring Plan (CAMP), in order to mitigate potential adverse conditions.

   Field personnel would wear appropriate personal protective equipment during the groundwater sampling in order to limit health risks due to exposure to contaminants and physical hazards. Equipment used for sampling activities would be decontaminated prior to leaving the Site in order to avoid the transport of contaminants.

   No short-term effectiveness is anticipated during the implementation of this alternative since MNA will monitor the natural breakdown of contaminants over time.

6. Implementability: This alternative is readily implementable on a technical basis, with the collection of groundwater samples for natural attenuation monitoring. New monitoring well locations may be required to accommodate the redevelopment of the Signore BCP Site. In terms of administrative concerns, this alternative is also considered to be implementable.

7. Cost: Capital costs for this alternative are estimated to be approximately $17,000. Present Worth costs, assuming annual operation and monitoring for 30 years, is approximately $229,000. The total Present Worth of this alternative is $246,000. Costs are summarized in Appendix I.

8. Land Use: This alternative could meet the land use criteria through the use of administrative controls (environmental easement and deed restrictions). The Signore BCP Site is located in a mixed residential and commercial area in the Village and Town of Ellicottville, New York. Anticipated future uses would likely be mixed commercial and residential. Institutional controls (e.g., environmental easement) would be required for the Site property because contaminants are present in the soil above the Unrestricted SCOs, contaminated groundwater is present leading to soil vapor concerns related to new on-site building construction

10.3.3 Groundwater Alternative No. 3 – In-Situ Treatment

1. Overall Protection of Human Health and the Environment: This alternative is considered to be protective of human health and the environment with respect to groundwater at the Signore BCP Site as groundwater treatment would occur.

2. Compliance with Standards, Criteria and Guidance (SCGs): SCGs for groundwater are expected to be met at the Signore BCP Site property line. This alternative is expected to further assist with the natural attenuation process that appears to be on-going to meet the SCGs.

3. Long-Term Effectiveness and Permanence: Because this alternative involves the treatment of contaminated groundwater, risks involved with the migration and direct contact with contaminants would be further decreased. Collection of groundwater samples would be performed to assess the remedial action and attenuation of the remaining contamination. This alternative is anticipated to reduce the environmental impact of the groundwater.

4. Reduction of Toxicity, Mobility, and Volume: The toxicity and volume of a portion of the Site groundwater contamination would likely be reduced through the use of in-situ treatment. The treatment is anticipated to enhance the natural attenuation that appears to be occurring.

5. Short-Term Impact and Effectiveness: There are several potential short-term impacts associated with this alternative.

   - There is potential for impacts to human health (workers and construction personnel) due to direct contact, potential vapor and particulate releases during intrusive activities such as the injections and collection of groundwater samples. Thus, worker skin protection and air monitoring would be required in order to mitigate potential adverse conditions.

     This alternative would require the preparation of a health and safety plan (HASP) to identify proper personal protective equipment required as well as the proper site and community air monitoring, as outlined in the NYSDOH Generic Community Air Monitoring Plan (CAMP), in order to mitigate potential adverse conditions.

   - Contamination of equipment used for well installation and injection purposes could carry contamination off-site. Therefore, equipment will be decontaminated prior to leaving the Signore BCP Site, as necessary, in order to avoid the transport of contaminants.

- Field personnel would wear appropriate personal protective equipment during sampling in order to limit health risks due to exposure to contaminants and physical hazards.

Human health and the environment would be protected under this alternative. This alternative is expected to meet the groundwater remedial action objectives at completion of the injections, assuming the impacted soil is properly addressed. Groundwater sampling and monitoring would be performed to verify the alternative's effectiveness.

Short-term effectiveness is anticipated during the implementation of this alternative, as the in-situ treatment will assist with natural breakdown of contaminants.

6. Implementability: This alternative is readily implementable on a technical basis. The injections would be completed with standard investigations methods and equipment. Materials necessary for injection are readily available. Groundwater sampling would be performed to verify the effectiveness of this remedial alternative.

7. Cost: Capital costs for this alternative are estimated to be approximately $178,000. Present Worth costs, assuming annual monitoring for 5 years, is approximately $240,000. The quantities, unit costs, and subtotal costs and associated assumptions for this Alternative, estimated for comparative purposes, are presented in Appendix G.

8. Land Use: This alternative would meet the land use criteria, as the Signore BCP Site is located in a mixed residential and commercial area in the Village and Town of Ellicottville, New York. Anticipated future use is likely to be mixed residential/commercial and this alternative would meet these anticipated future uses. Institutional controls (e.g., environmental easement) would be required for the Site property because contaminants are present in the soil above the Unrestricted SCOs, contaminated groundwater is present leading to soil vapor concerns related to new on-site building construction.

11.0 COMPARATIVE ANALYSIS OF REMEDIAL ALTERNATIVES

The Soil and Groundwater Alternatives are compared on the basis of the seven (7) environmental and one (1) cost criteria, based on the detailed analysis in Section 10.0. Soil Alternative Nos. 1 and 2 are compared in Section 11.1 and the Groundwater Alternatives Nos. 1, 2 and 3 are compared in Section 11.2.

11.1 SOIL ALTERNATIVES

11.1.1 Overall Protection of Public Health and the Environment

Soil Alternative No. 1 involves taking no action while Soil Alternative No. 2 will remove the remaining soil contamination present to USCOs. Both Soil Alternative No. 1 and No. 2 will be protective of human health and the environment with regard to contaminated soil for the intended site usage.

11.1.2 Compliance with Standards, Criteria and Guidance (SCGs)

Soil Alternative No. 1 and No. 2 will both achieve compliance with SCGs for the soil and the two IRMs have addressed the remaining soil contamination to levels below the RRSCOs.

11.1.3 Long-Term Effectiveness and Permanence

Soil Alternative No. 1 and No. 2 will both have long-term effectiveness and permanence with regard to contaminated soil for the intended site usage.

11.1.4 Reduction of Toxicity, Mobility or Volume with Treatment

Soil Alternative No. 1 does not further reduce the toxicity, mobility and volume of soil contamination to below RRSCOs as no additional action is taken. IRM activities completed to date have removed soil contamination present within the Signore BCP Site to below RRSCOs. Soil Alternative No. 2 will further reduce the toxicity, mobility and volume of contaminated soils to below the USCOs as additional soil will be excavated and properly disposed off-site.

11.1.5 Short-Term Impact and Effectiveness

Soil Alternative No. 1 requires no action and will have no short-term impact and effectiveness on soil above the USCO. Soil Alternative No. 2 addresses the soil contamination at the Signore BCP Site above the USCO which would have both short-term impacts and effectiveness. Excavation work done as part of the remedial action would utilize a work plan and health and safety plan to reduce potential exposures and properly manage materials generated, which would minimize the short-term impacts.

11.1.6 Implementability

Both Soil Alternative Nos. 1 and 2 are technically and administratively implementable with readily available methods, equipment, materials and services.

11.1.7 Cost

As Soil Alternative No. 1 requires no action, there are no costs associated with this alternative. Total capital costs for Soil Alternative No. 2 are estimated to total approximately $224,000 for remediation to Unrestricted SCOs.

11.1.8 Land Use

Soil Alternative No. 1 and Soil Alternative No. 2 will meet the land use criteria, as the soil contamination was addressed as part of two (2) IRMs and has removed the remaining soil contamination to the future land use criteria (RRSCO).

11.2 GROUNDWATER ALTERNATIVES

11.2.1 Overall Protection of Public Health and the Environment

Groundwater Alternative No. 3 will be protective of public health and the environment. Groundwater Alternative No. 1 does not reduce the risk or exposure for human health and the environment and uncontrolled access could lead to potential exposure to impacted groundwater. Groundwater Alternative No. 2 is protective in terms of habitat or vegetation, but is not considered fully protective of the environment since portions of Signore BCP Site groundwater could remain contaminated.

11.2.2 Compliance with Standards, Criteria and Guidance (SCGs)

Groundwater Alternative No. 3 is anticipated to achieve the groundwater criteria at the Signore BCP Site property line and is expected to assist with the natural attenuation process that appears to be on-going to meet the SCGs. Groundwater Alternative Nos. 1 and 2 will eventually reduce the cVOC levels of contamination over time. Alternative No. 1 will not allow for a change in groundwater conditions to be identified.

11.2.3 Long-Term Effectiveness and Permanence

Groundwater Alternative No. 3 involves the treatment of contaminated groundwater; therefore, risks involved with the migration and direct contact with contaminants would be further decreased.

Groundwater Alternative Nos. 1 and 2, in terms of affecting habitat or vegetation would be protected under this alternative. Low level cVOC contamination would still be present in the Signore BCP Site groundwater. Groundwater Alternative No. 2 would assess the condition of the cVOC contamination/natural attenuation of

groundwater contaminants and allow for a change in groundwater conditions to be identified.

11.2.4 Reduction of Toxicity, Mobility or Volume with Treatment

Groundwater Alternative No. 3 provides for the greatest reduction of toxicity, mobility and volume of the impacted groundwater. Alternatives Nos. 1 and 2 rely on natural attenuation to reduce the toxicity, mobility and volume of the impacted groundwater over time.

11.2.5 Short-Term Impact and Effectiveness

Groundwater Alternative Nos. 2 and 3 are anticipated to involve subsurface work (replacement well installation and/or injections), which could possibly cause exposure to contamination during remediation. They also involve groundwater sampling, which could also possibly cause exposure to impacted groundwater during sampling.

Work done as part of Alternative Nos. 2 and 3 would utilize a work plan and health and safety plan to reduce potential exposures and properly manage materials generated, which would minimize the short-term impacts.

No potential short-term adverse environmental impacts and human exposures are anticipated during the implementation of Groundwater Alternative Nos. 1 and 2. However, short-term effectiveness is anticipated during the implementation of Alternative No. 3 as it will assist with natural breakdown of contaminants.

11.2.6 Implementability

Alternative Nos. 1, 2, and 3 are technically and administratively implementable with readily available methods, equipment, materials and services.

11.2.7 Cost Effectiveness

Groundwater Alternative No. 3, which includes injections of additives into the subsurface and groundwater monitoring, has the greatest initial capital cost estimated at approximately $178,000 for year one. Annual O&M costs associated with groundwater monitoring for Alternative No. 2 are estimated to be about $9,000 and about 13,000 for Alternative No. 3, for subsequent years. The present worth cost of Alternative No. 2 is approximately $229,000, which assumes 30 years of annual monitoring. The present worth cost of Alternative No. 3 is approximately $240,000, which assumes 5 years of annual monitoring.

Groundwater Alternative No. 1 does not have initial capital or O&M costs.

11.2.8 Land Use

Groundwater Alternative No. 3 would meet the land use criteria and Groundwater Alternative No. 2 could meet the land use criteria through the use of administrative controls (environmental easement and deed restrictions). Groundwater Alternative No. 1 would not meet the land use criteria. Both alternatives will require institutional controls (e.g., environmental easement) for the Site property because contaminants are present in the soil above the Unrestricted SCOs, and contaminated groundwater is present leading to soil vapor concerns related to new on-site building construction.

12.0 REMEDIAL WORK PLAN

The Remedial Work Plan (RWP) for the Signore BCP Site is presented below, based on the comparative analysis of remedial alternatives in Section 11.0. This Remedial Work Plan is presented based on the current knowledge of the Signore BCP Site and may be modified if the understanding of site conditions changes.

The Sections below present the steps that are anticipated to be performed to remediate and address the impacted groundwater at the Signore BCP Site. It will consist of the following alternative:

- Groundwater Alternative No. 3: In-Situ Groundwater Treatment with Groundwater Monitoring

We note that a pilot test was implemented in September 2013 for assessment of Groundwater Alternative 3, prior to full-scale implementation. Approximately 2,275 pounds of EDC were injected at two locations within the Signore BCP Site as discussed in Section 2.3.

12.1 IN-SITU GROUNDWATER TREATMENT/Groundwater Alternative No. 3

Reductive dechlorination is the biologically- or chemically-mediated replacement of chlorine (as chloride) on a chlorinated organic compound with elemental hydrogen, in the presence of a suitable electron donor. This causes transformation of the cVOC to a less chlorinated product. An electron donor is a compound capable of supplying electrons during oxidation-reduction reactions. Microorganisms obtain energy by transferring electrons from electron donors to electron acceptors. Electron donors are chemically-reduced materials such as fuel hydrocarbons, naturally-occurring organic carbon, or organic carbon-based remedial additives. Electron donors become chemically oxidized during cVOC transformation. Electron acceptors include oxygen, nitrate, ferric iron, sulfate, and cVOCs.

Groundwater Alternative No. 3 utilizes an organic carbon electron donor material which is anticipated to enhance the anaerobic breakdown of the "parent" cVOCs present at the Signore BCP Site, trichloroethene (TCE), tetrachloroethene (PCE) and 1,1,1-trichloroethane (1,1,1-TCA). Anaerobic dechlorination reduces the parent cVOCs to their "daughter" breakdown products, cis-dichloroethene (cis-DCE), vinyl chloride (VC), 1,1-dichloroethane (1,1,-DCA), and chloroethane (CA). The daughter products can continue to degrade anaerobically, or will readily degrade under aerobic conditions. For example, reductive dechlorination of chlorinated ethenes typically occurs sequentially from PCE to TCE, TCE to DCE, DCE to VC, VC to ethene, and ultimately ethene to carbon dioxide and water.

Site groundwater data indicate that the cVOC plume (approximately 25 to 138 ppb) is located in the central area of the Site, downgradient of the closed-in-place septic tanks (SP-3 area). The plume includes monitoring wells SP-38, SP-43, and SP-45 (see Figure 13). A smaller cVOC plume (less than 20 ppb) is located near SP-32 in the northern portion of the Site. These two locations were the focus of the pilot study discussed in Section 2.3.

Based on the results of the pilot study, GZA recommends implementing a full scale injection program to enhance and accelerate natural attenuation of cVOCs at the Signore BCP Site. The full scale in-situ groundwater treatment would involve injecting an organic carbon (OC) electron donor material into the cVOC-impacted groundwater via direct-push technology. Natural attenuation could then further reduce the concentrations at downgradient locations. As degradation of the remaining source of cVOCs would be enhanced by the in-situ treatment, this should help achieve the groundwater remedial action objectives more quickly.

The OC material is composed of food-, feed-, and agricultural-grade additives. The injections would occur in a grid pattern in an approximately 12,000 ft^2 oval-shaped area of the Site. Results of the pilot test were used to determine the appropriate injection spacing, concentrations, and volumes that would be required to address the cVOC groundwater contamination remaining after the pilot test. Figure 13 depicts the approximate injection area for the OC material.

Groundwater samples would be collected from monitoring locations EW-1.25, EW-1.5, EW-2.5, MW-1I, MW-5S, SP-32, SP-37, SP-38, SP-43, SP-45, and TP-11 to monitor the progress of this remedial alternative.

Based on the results of the shallow groundwater investigation proximate to the three AOCs, it does not appear that remediation of the petroleum-impacted groundwater plume is necessary. Groundwater samples collected downgradient of AOC-1, AOC-2, and AOC-3 did not indicate the presence of petroleum VOCs.

SCOPE OF WORK

TASK 1 – BASELINE SAMPLING

Prior to additive injection, baseline groundwater samples will be collected from six locations: EW-1.25, SP-32, SP-37, SP-38, SP-43, and SP-45 (see Figure 13). The samples will be analyzed using the following analytical methods:

- VOC: SW-846, 8260C
- TOC: SM-5310B
- Chloride: EPA 300.0
- Nitrate: EPA 300.0
- Sulfate: EPA 300.0
- Methane: RSK-175
- Ethane: RSK-175
- Ethene: RSK-175
- Dissolved Iron: SW-846, 6010C
- Dissolved Manganese: SW-846, 6010C

For the sampling events, a water quality meter and flow-through cell will be used to collect field measurements for pH, specific conductance, dissolved oxygen (DO), turbidity, oxygen reduction potential (ORP) and temperature. Disposable polyethylene tubing and a variable speed low-flow sampling pump will be utilized during the sampling events. Groundwater generated during the well purging will be discharged to the ground in the vicinity of the well from which it was generated.

Each of the samples collected during the baseline monitoring event will be submitted to an ELAP and NYSDEC approved analytical laboratory The analytical data packages will be submitted to Data Validation Services (DVS) for review and development of data usability summary reports (DUSRs).

TASK 2 – ADDITIVE INJECTION

The OC injection additive will consist of an aqueous solution of approximately 53% lactose, 40% inactive brewer's yeast or yeast extract, 4% sodium bicarbonate, and 3% trace nutrients (inorganic nitrate, phosphate, and potassium, and vitamin B12) by mass. Safety Data Sheets (SDS) and informational sheets for the additive components are included in Appendix H.

The OC material will be mixed into a slurry and injected into the subsurface groundwater. A total of approximately 7,000 pounds of OC material will be injected. The 7,000 pounds of material will be mixed with about 5,000 gallons of water to create an injectable slurry. The OC material and water will be mixed on-site in tanks until the OC material dissolves

into solution. Once dissolved, the slurry will be injected into the subsurface under pressure using a grout pump. The injection rate will be limited to the rate at which the formation accepts the slurry material. The injection pressure will be regulated and monitored to avoid "blow-back" up the sides of the injection rods or up previously completed injection points.

The injection quantities will be approximately 100 pounds of OC material per injection location (approximately 50 pounds per injection interval) using approximately 70 gallons of water per injection location (35 gallons per injection interval).

The additive slurry will be injected in a grid pattern in the SP-3 area. Figure 13 depicts the approximate injection area. The injection grid will include approximately 70 injection points spaced about 15 feet apart within an approximately 12,000-square-foot oval-shaped area. The slurry will be injected through 1.5-inch diameter Geoprobe® rods using Direct Push Technology to advance the rods to the bottom of the injection zone. The rods will then be withdrawn in vertical intervals of approximately five (5) feet, for a bottom-up injection pattern. Injections will be in two (2) intervals below the groundwater table at each injection location. The shallow injection intervals will be conducted approximately five (5) feet below the groundwater table at 15 feet bgs. The deeper injection intervals will be conducted approximately 10 feet below the groundwater table at 20 feet bgs. Injections will be completed by advancing the probe to the deeper injection interval, injecting the required quantity of OC material, and then withdrawing the probe to the shallower injection interval and injecting the required quantity of OC material.

Water levels will be monitored from wells in the proximity of the injection area (SP-37, SP-43, and SP-45) periodically during the injections to potentially monitor material infiltration. A micro-bailer will be placed into well SP-38 to observe the groundwater during injections.

TASK 3 – PERFORMANCE MONITORING

The monitoring wells and analyses have been selected to provide data needed to meet the following objectives:

- Evaluation of the effectiveness of the injection on transforming dissolved-phase VOC mass, by observation of the effect of the injection on dissolved phase VOC concentrations;
- Evaluation of potential co-solvency and biosurfactant effects on dissolved-phase VOC mass, by observation of an initial effect of the injection on dissolved phase VOC concentrations;
- Evaluation of the effectiveness of the OC additive in transforming any residual VOC source mass, by observation of the longer-term effect of the injection on dissolved phase VOC concentrations; and,

- Evaluation of geochemical cVOC attenuation parameters and degradation signatures.

For the sampling events, a water quality meter and flow-through cell will be used to collect field measurements for pH, specific conductance, dissolved oxygen (DO), turbidity, oxygen reduction potential (ORP) and temperature. Disposable polyethylene tubing and a variable speed low-flow sampling pump will be utilized during the sampling events. Groundwater generated during the well purging will be discharged to the ground surface at the well from which it was generated.

Sampling Locations

In conjunction with the spring and fall semi-annual groundwater sampling events at the Signore BCP Site, groundwater samples will be collected from 11 existing monitoring locations, EW-1.25, EW-1.5, EW-2.5, MW-1I, MW-5S, SP-32, SP-37, SP-38, SP-43, SP-45, and TP-11, using low-flow sampling techniques. A peristaltic pump, disposable polyethylene tubing and a water quality meter with flow through cell will be used to collect water quality readings, including temperature, specific conductance, pH, turbidity, oxygen reduction potential (ORP), and dissolved oxygen (DO).

Groundwater pumping rates used during the sampling may vary at each monitoring location in order to establish a relatively constant head within the sampling location. Once a constant head is established within the monitoring well, the flow rate will be maintained during the sampling period to purge approximately three well volumes of groundwater. Samples will be collected for analysis when water quality readings stabilize.

In addition to VOC analysis, a subset of groundwater samples will be collected from six (6) locations, EW-1.25, SP-32, SP-37, SP-38, SP-43, and SP-45, for the following analytical methodologies:

- TOC: SM-5310B
- Chloride: EPA 300.0
- Nitrate: EPA 300.0
- Sulfate: EPA 300.0
- Methane: RSK-175
- Ethane: RSK-175
- Ethene: RSK-175
- Dissolved Iron: SW-846, 6010C
- Dissolved Manganese: SW-846, 6010C

These geochemical and natural attenuation parameters will be collected in conjunction with the spring and fall semi-annual groundwater sampling events following additive

injection. During the second year following injection, the geochemical/natural attenuation parameters will again be collected in conjunction with the spring and fall semi-annual groundwater sampling events. Subsequently, in the 3rd, 4th, and 5th years following remedial injection (as appropriate based upon analytical results), groundwater samples for these additional analyses will be collected annually, in conjunction with the spring groundwater sampling events.

Analyses

Each of the groundwater quality samples collected during the semi-annual monitoring events will be submitted to an ELAP and NYSDEC approved analytical laboratory for analysis of VOCs by EPA Method 8260C. The analytical data packages will be submitted to Data Validation Services (DVS) for review and development of data usability summary reports (DUSRs).

TASK 4 – DATA EVALUATION

Groundwater data results will be compared to Class GA criteria per NYSDEC's Division of Water, Technical and Operational Guidance Series (TOGS 1.1.1), June 1998, ammended April 2000. Results will be evaluated for decreasing trends in parent VOC concentrations (PCE, TCE, 1,1,1-TCA) and increasing trends in presumed daughter VOC concentrations relative to the objectives described in Task 3. The geochemical data provides an indication of whether conditions are favorable for continued degradation, as well as providing a signature of degradation processes.

In addition, data results will be observed for a downward temporal and spatial trend in ketones (e.g., acetone and 2-butanone). Ketones are known, short-lived fermentation byproducts of OC additives and have been observed to increase in concentration in groundwater subsequent to OC injections, and then precipitously decrease.

12.2 INSTITUTIONAL CONTROLS

The Signore BCP Site will require institutional controls in the form of an environmental easement, as the Signore BCP Site will not be remediated to achieve USCOs. The Environmental Easement will include the following requirements.

- The property will be limited to restricted residential, commercial or industrial use;
- Restriction on the use of groundwater as a source of potable or process water without necessary treatment as determined by the Cattaraugus County Health Department;
- Evaluate the potential for vapor intrusion in any occupied buildings within the Signore BCP Site. Provisions for mitigation, if determined to be necessary, may include installation of a vapor barrier, sub-slab depressurization, or other engineering controls.

- Implementation and compliance with the Site Management Plan that will be developed and require NYSDEC approval.

12.3 SITE MANAGEMENT PLAN

A Site Management Plan (SMP) will be required for the Signore BCP Site and include the environmental easement, as the Signore BCP Site will not be remediated to achieve USCOs. The SMP will include the following requirements.

- Engineering & Institutional Control Plan;
- Inspection & Notification Plan;
- Groundwater Monitoring Plan (assume 5 years after additive injections);
- Soil and Groundwater Management Plan, for future development;
- On-site vapor mitigation plan, if necessary; and
- Reporting & Certification requirements.

The SMP will require a 5 year comprehensive review of the effectiveness of the remedial alternative to meet the SCGs. If the SCGs are not achieved, to the extent practical, additional remedial strategies will be considered.

12.4 REPORTING

Remedial actions to be conducted to address the groundwater contamination will be documented. NYSDEC will be notified of the remedial actions prior to their initiation, in accordance with the BCP notification requirements. We anticipate a remedial action report will be prepared after the in-situ groundwater remediation is complete. After the approval of this SRI/IRM/AAR, we anticipate the following reports to follow.

- Semi-Annual Groundwater Monitoring Report;
- Groundwater Remediation Work Plan;
- Site Management Plan;
- Final Engineering Report (FER).

12.5 SCHEDULE

The following schedule is proposed for the implementation of the remedial action and follow up reporting requirements.

Submittal of Remedial Work Plan	Spring 2015
Implement Groundwater Remediation	Spring 2015
Submittal of Site Management Plan:	Spring 2015
Submittal of Final Engineering Report:	Summer 2015
Receive Certificate of Completion of BCP	Fall 2015