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SITE CHARACTERIZATION WORK PLAN

FORMER SCOTT TECHNOLOGIES SITE
1051 SOUTH MAIN STREET
CITY OF ELMIRA, CHEMUNG COUNTY, NY
NYSDEC PROJECT 808049

Prepared for
New York State Department of Environmental Conservation
Division of Environmental Remediation, Region 8
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1. INTRODUCTION

1.1 Background

On behalf of Unisys Corporation (Unisys), Geosyntec Consultants, Inc. (Geosyntec) is submitting this Site Characterization Work Plan for the Former Scott Technologies Site #808049 (Site) in accordance with an Order on Consent and Administrative Settlement Index No. A8-0836-1407 (Order) with the New York State Department of Environmental Conservation (NYSDEC or agency) dated 16 July 2014. The Site is located at 1051 South Main Street in Elmira, Chemung County, New York (see **Figure 1**) and is currently occupied by Southern Tier Commerce Center (STCC). A Preliminary Site Assessment (PSA) for the entire Former Sperry Remington Site was completed in 1988 on behalf of Unisys and submitted to NYSDEC (Dames & Moore, 1988). The Site has been the subject of additional environmental investigations between 1992 and 2012. In June 2013, NYSDEC identified potential areas of concern (PAOCs) at the Site based on new information related to historical use of the property and previous environmental investigations results.

Scott Technologies Inc. (STI), a former owner of the Site, entered into a Voluntary Cleanup Agreement with NYSDEC in January 1999 to conduct investigation and remedial activities at the Site. Voluntary cleanup activities at the Site were declared by NYSDEC to have been satisfactorily completed in October 2006. Prior actions included the removal of four (4) registered underground storage tanks (USTs) in 1993 (Versar, 1993) and voluntary investigations.

This proposed Site Characterization is separate from a Remedial Investigation (RI) being conducted by Unisys in accordance with the Order on Consent and Administrative Settlement (Index #B8-0815-09-10) approved by NYSDEC on 30 March 2010 for 0.28 acres of the Former Sperry Remington Site (Site #808043).

1.2 Purpose

The general purpose of a Site Characterization Work Plan is to document environmental conditions at the Site as it relates to the PAOCs, historical information, and new findings. The work plan has been completed in accordance with NYSDEC DER-10 Guidance.

1.3 Report Organization

The remainder of this report is organized into the following sections:

- Section 2 – Site Description and History;
- Section 3 – Environmental Setting;
- Section 4 – Objectives, Scope and Rationale;
- Section 5 – Field Activities Plan;
- Section 6 – Project Management; and
- Section 7 – References.

2. SITE DESCRIPTION AND HISTORY

The Site history was presented in a Preliminary Site Assessment (Dames and Moore, 1988). The following sections of this work plan present the Site location, ownership and regulatory history, previous investigations, PAOCs identified by NYSDEC, and the current Conceptual Site Model (CSM) for the Site.

2.1 Site Description

The STI property is located at 1051 South Main Street in Elmira, New York (see **Figure 1** for Site location). The Site is approximately forty-six (46) acres and includes the STCC buildings and the Former Recreation Area (FRA). A Site map is provided as **Figure 2**. The Former Sperry Remington Site is located in the northeast portion of the Site. The Site is bounded by South Main Street to the west, Elmira High School (EHS) to the north, the Consolidated Rail Corp. property to the east and residential properties to the south. Miller Pond is located approximately one thousand (1,000) feet to the northeast.

2.2 Site History

The Site history has been presented to NYSDEC in prior Site related reports (URS, 2000). The Site was used for heavy industry from the 1880s to 1977 and was previously part of an eighty-three- (83-) acre facility that included the Site and the current EHS parcel to the north. From 1887 to 1909 B.W. Payne & Sons produced high speed steam engines. Morrow Manufacturing made drill-chucks, machine parts, and a line of tools from 1909 to 1935. The manufacturing activities of B.W. Payne & Sons and Morrow Manufacturing were conducted in the northern portion of the 83-acre facility currently occupied by EHS. Remington Rand began manufacturing typewriters in 1936 with main manufacturing activities occurring north of the Site. Building 88, the primary structure at the Site as shown on **Figure 2**, was constructed in 1942 under government order for the manufacture of the Norden bomb sight. The building was often referred to as the "N Plant". Production of the Norden bomb sight at the N-Plant continued until October 1944.

Remington Rand purchased the N-Plant in 1946 and gradually relocated some operations from the northern portion of the facility to the Site. Building 88 was used for manufacturing adding machines and assembly of adding machines and UNIVAC mainframe computers. In 1963, production at the facility was streamlined in a modernization program that relocated machinery to create a "straight-flow" operation. Raw materials were to be received at one end and the finished product shipped from the other. Based on plant drawings (Lancy, 1967) and process flow, the majority of Remington Rand's manufacturing processes were on the current EHS property with painting (likely a final step in the manufacturing process) located in Building 88, suggesting product flow was north to south. Previously, manufacturing had been conducted at both ends of the plant and assembly was completed in the middle.

In August 1967, the southern portion of the Site was dedicated as Rand Park. Construction included landscaping, installation of fence enclosures, and construction of a one hundred (100)

foot by forty (40) foot main pavilion. Rand Park is currently identified as the FRA shown on **Figure 2**.

By the early 1970s, manufacturing activities at the facility were reduced and consolidated in the southern portion of the facility that included, in part, the Site until the facility closed in 1972. The Site was deeded to the Chemung County Industrial Development Agency in 1973 and leased to Westinghouse in 1974. Westinghouse used the property primarily for warehousing activities. American LaFrance took over the Westinghouse lease of the Site in 1980 and manufactured and assembled fire engines from 1982 to 1985. American LaFrance generated paint sludge, paint solvents, waste cutting oils, and waste coolants during its operation. Wastes were staged in area east of Building 88 prior to off-Site disposal. Figgie International, Inc., the owner of American LaFrance, gained full title to the property from the Chemung County Industrial Agency in 1985, shortly before ceasing manufacturing activities at the property. Figgie International, Inc. changed its name to Scott Technologies, Inc. (STI) in April 1998 (Businessweek). Equilibrium Equities, Inc. purchased the property from STI in November 2005 and redeveloped it as STCC.

STI entered into a Voluntary Cleanup Agreement with NYSDEC in January 1999 to conduct investigation and remedial activities at the Site. Voluntary cleanup activities at the Site were declared by NYSDEC to have been satisfactorily completed in October 2006. Prior actions included the removal of four (4) registered underground storage tanks (USTs) in 1993 (Versar, 1993) and voluntary investigations.

As noted above in Section 2.0, a Preliminary Site Assessment report for the Former Remington Rand plant (Dames & Moore, 1988) was completed on behalf of Unisys and submitted to NYSDEC. In March 2010, Unisys entered into an Order on Consent and Administrative Settlement (the "Order") with NYSDEC to perform a RI and feasibility study (FS) of the Former Sperry Remington Site (NYSDEC Site 0808043). Prior to entering into this Order and at the request of NYSDEC, Unisys submitted a Brownfield Cleanup Program (BCP) application to NYSDEC on 8 February 2008. NYSDEC informed Unisys by e-mail on 1 October 2009 that the BCP application would be rejected due to BCP administrative issues within the agency. The Former Sperry Remington Site consists of 0.28 acres located in the northeast corner of this Site (**Figure 2**). Unisys is currently implementing an approved RI/FS Work Plan and subsequent addenda for the Former Sperry Remington Site (0808043).

2.3 Previous Investigations and Remedial Activities

2.3.1 Phase I/II Investigations (1991 – 1993)

Previous environmental investigations of the Site have been completed on behalf of STI or as Figgie International, Inc. Versar, Inc. (Versar) conducted a Phase I Environmental Audit in August 1991 (Versar, 1991) that identified potential environmental concerns. A Phase II investigation followed in December 1991 (Versar, 1992) and included collection of samples of surface soil, subsurface soil, and sediment, and installation and sampling of three (3) groundwater monitoring wells. Detected constituents in surface soils included metals, polynuclear aromatic hydrocarbons (PAHs), and polychlorinated biphenyls (PCBs). Twelve (12)

tanks/vessels and three (3) concrete clarification chambers were identified as listed on **Table 1**. Samples of fine-grained material from the clarification chambers were analyzed for hazardous waste characteristics. The sample from CC-2 had concentrations of lead above the toxicity characteristic for lead. Analyses of holding pond sediments detected PAHs, volatile organic compounds (VOCs) and metals but not PCBs.

2.3.2 UST Removal and Supplemental Investigation (1993 – 1997)

In 1993, Versar registered and removed four (4) USTs, listed on **Table 1,** on behalf of Figgie International. Versar also conducted a limited remedial investigation that included collection of subsurface soil samples at twelve (12) locations and installation and sampling of six (6) groundwater monitoring wells (Versar, 1993). URS Consultants, Inc. (URS) conducted supplemental investigations and prepared human health and ecological risk assessments for Figgie International, Inc. between August 1995 and August 1997. Elevated concentrations of PAHs and metals were detected in surface soils in specific areas of the Site (URS, 2000). Concentrations of PAHs in surface soils exceeding NYSDEC cleanup goals at that time (Versar, 1992, URS, 1996) were localized in former work areas of the Site. Metals concentrations were comparable to background levels at the Site.

In August 1997, URS installed an additional monitoring well (MW-3A) in the northeast portion of the Site (URS, 1997) and sampled that well and three (3) existing monitoring wells (MW-1, MW-2 and MW-3) that had been installed by Versar in 1991 (Versar, 1992). PCBs and VOCs were not detected and detected concentrations of metals and semi-volatile organic compounds (SVOCs) were below applicable groundwater standards (URS, 1997). The groundwater monitoring network is shown on **Figure 3**. Monitoring wells MW-2, MW-3, and MW-3A are located downgradient of the former manufacturing areas. Monitoring well MW-1 was considered as a potential location to monitor background water quality (URS, 1997).

2.3.3 Voluntary Cleanup (1998 – 2000)

Based on the results of investigations by Versar and URS, URS submitted a remedial action work plan (RAWP) to NYSDEC in April 1998 on behalf of STI for voluntary remedial activities at the Site. The RAWP was revised in August 1998 and was subsequently approved by NYSDEC (URS, 2000). Between October 1999 and March 2000, STI conducted a voluntary remedial action in accordance with the approved RAWP. The voluntary remedial action included removal and disposal of low voltage PCB capacitors, cleaning or decommissioning of tanks/vessels, concrete clarification chambers or aboveground storage tanks (ASTs), and excavation of soils impacted by polynuclear aromatic hydrocarbons (PAHs).

Seven (6) tanks/vessels, three (3) concrete clarification chambers, and two (2) ASTs were cleaned (**Figure 4)**. Tank/vessel T/V 4 was decommissioned after cleaning and left in place. Concrete clarification chamber CC-3 was decommissioned in place by filling with bank run sand and gravel. Sludge/debris removed from structures and rinse water from cleaning were characterized for disposal. With the exception of the material and rinse water from concrete

clarification chamber CC-2, sludge/debris and rinse water were characterized as non-hazardous. Material removed from CC-2 was characterized as hazardous based on toxicity characteristic leaching procedure (TCLP) results for lead. Because of the poor condition of CC-2, the structure and one (1) foot of surrounding soil was removed and disposed as hazardous waste.

PAHs in soils identified to exceed NYSDEC cleanup goals were excavated to depth of up to three (3) feet in areas north and east of Building 88 as shown on **Figure 4**. The cleanup goal for the voluntary remedial action approved by NYSDEC was a total PAH concentration of less than or equal to 100 parts per million (ppm). The total excavated area was approximately 0.75 acres. STI submitted a Final Engineering Report (URS, 2000) for the voluntary remedial action in March 2000.

2.3.4 Holding Pond Investigation (2001 - 2002)

In March 2001, NYSDEC requested that STI conduct additional investigation of holding pond sediments. Holding pond sediments sampled and analyzed by NYSDEC in 1992 were found to have metals and PCBs above applicable sediment criteria (URS, 2002). At that time, existing data did not warrant additional investigation or remediation (NYSDEC, 2001a). Off-Site sampling conducted by NYSDEC in June 2000 detected PCBs, PAHs and metals in sediment in Coldbrook Creek and its unnamed tributary. Those data suggested to NYSDEC that holding pond sediments potentially contained concentrations of those constituents higher than previously detected and that additional investigation was warranted. Subsequently, a work plan for supplemental investigation of the holding pond was submitted in 2001 on behalf of STI, and the work plan was approved by NYSDEC in January 2002 (URS, 2002). URS collected sediment and surface water samples from the holding pond and the culvert discharging to the adjacent wetlands in July 2002. Sediment sample analytical results detected metals, pesticides, PCBs, PAHs and VOCs. Analytical results for PCBs and several metals revealed concentrations in excess of NYSDEC sediment criteria. PCB analytical results were generally lower in holding pond sediments than in the lower reaches of the unnamed tributary. Metal analytical results for sediment in Coldbrook Creek and the unnamed tributary were generally similar or greater than results from holding pond sediments. Analyses of surface water samples detected VOCs, SVOCs, metals but not PCBs. Concentrations of metals in surface water were generally higher in the unnamed tributary (URS, 2002). There were no exceedances of applicable surface water standards for surface water samples collected from the holding pond. Remedial activities for the holding pond were deemed unnecessary by NYSDEC due to a determination of low risk to wildlife and human health as documented in the 2004 NYSDEC fact sheet for the voluntary cleanup (NYSDEC, 2004).

2.3.5 FRA Investigation and Voluntary Cleanup (2000-2006)

In May 2000, NYSDEC collected soil samples in the FRA (NYSDEC, 2001b). Analytical results showed concentrations of PAHs, pesticides and metal above NYSDEC recommended cleanup levels for soil. STI conducted additional investigations of the FRA in July 2002 and received approval for a voluntary remedial action in the FRA in July 2003. STI conducted the

voluntary remedial action in the FRA in October 2004 following pre-characterization of soils in March 2004 (URS, 2006). Shallow soils were excavated to depths of two (2) to eight (8) inches in four (4) areas shown on **Figure 4**. Three (3) areas in the vicinity of soil boring B-13 measured twenty (20) feet by twenty (20) feet each. The area excavated around soil boring B-08 measured seventy-five (75) feet by one hundred (100) feet. That area was divided into two (2) sections defined as hazardous and non-hazardous based on pre-characterization. Approximately eighty-six (86) tons of hazardous fill material and one hundred and four (104) tons of non-hazardous fill material were excavated and transported off-Site for disposal. Deed restrictions were filed with Chemung County Clerk's Office in July 2005 that limited potential future use of the Site to commercial or industrial uses with the exception of day care facilities and also required maintenance of the vegetative cover. In August 2005, STI submitted a Site Management Plan (SMP) for the FRA that described procedures for excavation and maintenance of the existing vegetative cover, fencing and signage. The SMP was approved by NYSDEC in correspondence dated 13 October 2005 (URS, 2006).

In an 11 October 2006 letter, NYSDEC declared that implementation of the NYSDEC-approved RAWP had been implemented successfully and "that no further investigation or response will be required at the Site for Existing Contamination to render the Site safe for industrial or commercial uses consistent with the remediation undertaken at the Site" (NYSDEC, 2006).

2.4 NYSDEC-Identified Areas of Potential Concern

In October 2013, NYSDEC presented to Unisys certain operable units (OUs) and PAOCs associated with the Former Sperry Remington Site (#808043) that NYSDEC had identified and provided corresponding historic plans and details depicting industrial waste facilities and operations from 1967 (Lancy, 1967). Portions of the 1967 Lancy report were initially provided to NYSDEC in 1988 (Dames & Moore, 1988). However, detailed processes drawings associated with that report were not located by NYSDEC until 2013. NYSDEC identified the following Operable Units:

- Operable Unit 1 (OU-1) is presented as the oil skimmer and box culvert associated with NYSDEC Site #808043.
- Operable Unit 2 (OU-2) is presented as those off-site areas that are the subject of the RI being conducted in accordance with the Order associated with NYSDEC Site #808043
- Operable Unit 3 (OU-3) is presented as the EHS property and adjacent properties.
- Operable Unit 4 is presented as the STCC property.

With the issuance of the Order on 16 July 2014, OU-4 is henceforth identified as the Former Scott Technologies Site (Site #808049). Those Site PAOCs identified by NYSDEC based on previous investigations and prior industrial use of the property are summarized on **Table 2** and **Figure 5**.

2.5 Draft Conceptual Site Model

A CSM presents the current understanding of a site, helps to identify data gaps, helps to focus data collection needs, and if warranted can ultimately support remedial decision making. The CSM will be updated to reflect information and additional data collected during subsequent investigative activities associated with a site.

An initial draft CSM of the Site was developed in order to evaluate the potential need for investigation of PAOCs identified by NYSDEC. The draft CSM presents historical soil and groundwater analytical data from previous investigations discussed in Section 2.3. The draft CSM also reflects voluntary remedial actions, and closure activities completed at the request of, and approved by, NYSDEC, as presented in Section 2.3.

Constituents of potential concern (COPCs) were identified by comparing analytical results to relevant screening criteria. COPCs for soils were identified by comparing available analytical data to relevant Soil Cleanup Objectives (SCOs) presented in 6 NYCRR Subpart 375. Given the current industrial land use by STCC and deed restrictions (URS, 2006) limiting potential future use of the Site to commercial or industrial uses with the exception of day care facilities, the applicable SCO for the protection of public health is the industrial land use SCO. The protection of groundwater SCO will also be considered as potential indicator of groundwater quality.

A summary of analytical results from previous soil sampling at the Site is presented in **Table 3** for the STCC facility and in **Table 4** for the FRA. Spatial and vertical representations of historical analytical data for the STCC facility are presented on **Figures 6** and **7**, respectively. Historic sample collection and analytical data indicate that COPCs in soil exceeded SCOs in limited areas of the Site as compared to industrial land use (10 of 32 samples) and for protection of groundwater (12 of 32 samples) criteria. As noted above, these representations also reflect prior removal and remedial actions completed at the Site. These removal and remedial actions include the following areas:

- Surface soil samples collected during the Phase II investigation (Versar, 1992) exceeded restricted land use and protection of groundwater SCOs for SVOCs and metals. A summary of analytical data for the STCC facility is presented as **Table 3**. Soil associated with those exceedances, noted as soil boring locations STCC-SS-2, STCC-SS-3, STCC-SS-4, and STCC-SS-5 were excavated and properly disposed in 2000 (URS, 2000), as noted on **Figures 6 and 7**.

- Surface soil sample STCC-SS-1 exceeded the commercial land use and protection of groundwater SCOs for benzo(a)pyrene.

- SVOCs exceeded industrial land use and protection of groundwater SCOs at the base of the excavation following removal of UST-3 and protection of groundwater SCOs for VOCs at the base of the excavation following removal of UST-6.

Spatial and vertical representations of historical analytical data for the FRA Area are presented on **Figures 8** and **9**, respectively. FRA soil sample analytical data (NYSDEC, 2001b, URS, 2003) exceeded industrial land use (14 of 102 samples) and protection of groundwater (66 of 102 samples) SCOs for metals, pesticides and SVOCs as summarized on **Table 4**. As noted above, these representations also reflect prior removal and remedial actions completed at the Site. These removal and remedial actions include the following areas:

- Surface soils at soil boring locations RecArea-B-7 and RecArea-B-8 and shallow subsurface soils at RecArea-B-9 exceeded SCOs for metals and SVOCs.

- Dieldrin, a pesticide, exceeded the protection of groundwater SCO at locations RecArea-B-1, RecArea-B-3, RecArea-B-4 and RecArea-B-8.

Supplemental soil sampling in the FRA was completed in 2004 (URS, 2003). Analytical results from this supplemental soil sampling as compared to SCOs are presented in **Table 4** and on **Figures 8** and **9**. Soil analyses from soil borings RecArea-B-5, RecArea-B-7, RecArea-B-8, and RecArea-B-13 had lead concentrations above the suggested screening value of one thousand (1,000) milligrams per kilogram (mg/kg) (URS, 2003). As a result, and as approved by NYSDEC, four (4) areas in the vicinity of RecArea-B-8, and RecArea-B-13 were excavated to remove the fill layer in 2004 (URS, 2006) as shown on **Figures 8** and **9**. Dieldrin analyses from sampling locations primarily in areas covered with heavy grasses and/or bushes and small trees, exceeded the suggested screening value in surface soil at several locations as noted in **Table 4**. As approved by NYSDEC, these areas were left undisturbed and in-place with the understanding that any potential future exposure would be minimized by institutional controls, including deed restrictions and the development of the SMP described in Section 2.3.5.

Review of historical soil analytical data from the FRA as compared to protection of groundwater SCOs is presented on **Table 4**. This review indicates groundwater protection SCOs were exceeded for metals in areas identified by soil borings RecArea-B-7, RecArea-B-8, RecArea-B-9 and RecArea-B-13 and for SVOCs at RecArea-B-7 and RecArea-B-9. Monitoring well STCC-MW-1 (**Figure 3**) is located in the FRA. Analytical results from prior groundwater sampling of this well indicate VOCs, SVOCs, PCBs or metals are not present above applicable groundwater standards.

Historical groundwater analytical data are available for the Site. Groundwater analytical data analyzed for VOCs and SVOCs from 1993, following UST removal at the Site (Versar, 1993), are summarized in **Table 5**. Evaluation of those data suggests their value in developing a draft CSM is limited. Limiting factors include (i) sample analyses were completed for an abbreviated analyte list; (ii) laboratory method detection limits (MDL) are not available for all analyses; (iii) reporting limits for some constituents were above the above the applicable groundwater standard; and (iv) data are from 1993.

In summary, components of this draft CSM indicate historic exceedances of industrial SCOs in surface and shallow subsurface soils given the context of limitations just noted. Many of those exceedances have been addressed by previous voluntary remedial activities conducted by STI in the vicinity of Building 88 (URS, 2000) and in the FRA (URS, 2006) in accordance with work plans approved by NYSDEC. Surface and near surface soils will be assessed in PAOCs that have not previously been investigated.

Exceedances of the protection of groundwater SCOs in limited areas across the site warrant investigation of groundwater to address potential COPC migration from soil. Groundwater investigations completed to date have not confirmed that pathway or potential off-Site COPC migration in groundwater. Proposed Site Characterization will evaluate groundwater quality using the existing groundwater monitoring network (**Figure 3**) to assess potential COPC migration pathways. Historical groundwater data will be useful when evaluating subsequent sample collection from existing Site monitoring wells. Comparison of data collected during 1993 and 1997 (approximately twenty (20) years post-Sperry Remington) with data associated with this SCWP (approximately forty (40) years post-Sperry Remington) will aid in the evaluation of past and present property use on groundwater quality. Data gaps in the groundwater monitoring network will be addressed initially by evaluating well integrity and sampling, if deemed appropriate. In addition, groundwater screening during soil investigation activities will be used to evaluate areas where protection of groundwater SCOs have been exceeded, and at select locations to evaluate groundwater associated with PAOCs.

3. ENVIRONMENTAL SETTING

3.1 Land Use

The Site consists of commercial buildings leased for commercial and manufacturing use and the FRA (**Figure 2**). Land use is commercial/manufacturing to the south and residential to the west and north. To the east, the Site is bounded by the Consolidated Rail Corp. property and residential and commercial properties beyond.

3.2 Topography and Drainage

The topography of the Site is relatively flat with a slight gradient to the east. The elevation of Site is approximately eight hundred fifty-one (851) feet above mean seal level as depicted on the Elmira, New York 1976 U.S. Geological Service (USGS) 7.5-minute topographic quadrangle map (**Figure 1**). Natural surface drainage has been altered significantly by construction at the Site. Drainage would either be to storm drains or flow eastward toward the railroad tracks (Dames & Moore, 1988).

3.3 Geology and Hydrogeology

Descriptions of the local geology and hydrogeology have been presented previously for the Site and the adjacent Former Sperry Remington Site – North Portion (NYSDEC 808022).

A stratigraphic layer comprised fill material is located on the Site at a depth of approximately zero (0) to five (5) feet below ground surface (bgs) (thickness varies). That fill unit consists of gravel, sand, silt, and trace amounts of cinders and ash. Beneath the fill layer, a heterogeneous mixture of cobbles, gravel, fine to coarse grain sand, and silt is encountered. Sand and gravel content increases generally with depth and the gravel pieces become more angular.

Two (2) naturally-occurring continuous stratigraphic units underlie the fill unit. The upper unit is post-glacial outwash. This unit consists of gray-brown fine sand and sub-rounded to rounded coarse to fine gravel. The post-glacial outwash unit extends from approximately six (6) feet below grade to approximately thirty-eight (38) feet below grade.

The second unit is a glacio-lacustrine silt and clay. The unit is relatively impermeable and consists of soft, gray-brown silt and clay, and extends from approximately thirty-eight (38) feet to approximately seven-eight (78) feet below grade in undisturbed areas. The top of weathered bedrock underlies the lacustrine unit and overlays competent shale which dips slightly to the north (Sterling, 2009).

Previous investigations conducted at the Site indicate that the general groundwater flow direction in the local area is to the east in the overburden water bearing zone (Versar, 1993). Four (4) production wells were identified to be in use by Remington Rand (Lancy, 1967). Three (3) wells with a combined pumping capacity of 2,500 gallons per minute (gpm) were located on the north side of the main building and the fourth well with a pumping capacity of 130 gpm was located on

the south side (see **Figure 3**). It was reported in the Phase I Environmental Site Audit (Versar, 1991) that three (3) wells were used for the air conditioning system and that the fourth well had been removed. The three (3) production wells on the north side of the main building are no longer in use and have not been used at any point by STCC (Meinstein, 2014).

4. OBJECTIVES, SCOPE, AND RATIONALE

4.1 Objectives

The objectives of this Site Characterization are:

- to confirm historic detections of COPCs;
- to verify that concentrations of COPCs in cover soils are below standards, criteria and guidance (SCGs);
- to validate that concentrations of COPCs in media do not pose an immediate risk to human health and the environment;
- to document the presence of waste, if any, in media at the Site;
- to define the nature and extent of COPCs in media related to the presence of waste, if any, at the Site; and
- to evaluate PAOCs as potential sources of COPCs, estimate COPC mass, and determine COPC migration pathways or points of exposure;

4.2 Scope

The PAOCs identified by NYSDEC for the Site were evaluated for investigation with respect to the draft CSM developed for the Site and current activities under the Order for Site #808043. The following sections present the scope of work for the Site Characterization. A Quality Assurance Project Plan (QAPP)/Field Sampling Plan (FSP) (Appendix A) has been prepared to present the quality assurance/quality control (QA/QC) measures and describe methods and procedures that will be followed during completion of the Site Characterization activities.

4.2.1 Former Combined Industrial Sewer Inspection

The former combined industrial sewer (AOC-2) will be inspected for potential migration pathways to media at the Site. The inspection will build upon previous inspections of storm sewer connections conducted by Unisys as part of the Interim Remedial Measure (IRM) Pre-Design Investigation (Geosyntec, 2013) for Site #808043. Characterization of potential migration pathways from the former combined industrial sewer to subsurface soils (i.e. leaks) will consider the current land use, existing structures, and existing institutional and engineering controls. The former combined industrial sewer will be inspected for its structural integrity, connections to the STCC storm water management system and the presence of accumulated fine-grained material. The extent of the former combined industrial sewer inspection is shown on **Figure 10**.

Prior to the sewer inspections, Unisys will review historical plans with STCC and conduct a geophysical survey to establish the location of the former combined industrial sewer lines along the eastern portion of the Site and identify access points. Sewer inspection will include visual

observations and in-line camera surveys. If fine-grained material is present, the depth of material will be measured, to the extent practical, and recorded. If an adequate volume of material is present, a composite sample, collected across the entire material depth will be collected. The sample will be submitted to the fixed laboratory for analyses for metals, PCBs, SVOCs and VOCs. Confined space entry may be required.

Unisys will inspect the former boiler blow down line (AOC-2E). The 1958 schematic of Remington Rand waste streams (Dames and Moore, 1988) identified the discharge location of the former boiler blow down line near the eastern end of the holding pond. The former power house was located on EHS property. Soil sampling has been conducted in the vicinity of the former boiler blow down line as part of the site characterization of the Former Sperry Remington Site – North Portion (NYSDEC 808022).

Unisys will inspect the twenty-five-foot (25-ft) deep pit (AOC-3B) located in the crawl space in the northwest corner of Building 88 (**Figure 10**). The pit, which receives municipal storm water runoff from South Main Street, will be gauged for depth to water, depth to bottom and the potential presence of free product. If a sufficient water column is present in the pit, a water sample will be collected and submitted to the fixed laboratory for analyses for metals, PCBs, SVOCs and VOCs.

4.2.2 Soil Investigation

Data gaps in soil data at the Site have been evaluated through the current CSM which is based on historical soil analytical data and PAOCs identified by NYSDEC. The draft CSM presented in Section 2.5 indicated exceedances of industrial land use SCOs in soil in various areas of the Site. Many areas have already been addressed through voluntary remedial actions conducted by STI in accordance with scopes of work documented in work plans previously vetted and approved by NYSDEC. The proposed soil investigation identified in this work plan will evaluate PAOCs by comparison of surrounding soils to applicable SCOs (i.e. industrial land use and protection of groundwater). **Table 6** lists fourteen (14) proposed soil borings to be installed and the rationale for sample location selection. Proposed soil borings are shown on **Figure 11** as well as locations with PAOCs identified by NYSDEC and historical exceedances of industrial and protection of groundwater SCOs. Historical SCO exceedances are identified by COPC group (i.e. metals, VOCs, SVOCs, and/or pesticides).

Two (2) soil borings will be installed to evaluate PAOCs to the north and northeast of Building 88. Areas north and east of Building 88 were previously characterized and addressed through voluntary remedial actions. Areas to the south and southeast of Building 88 identified in the PSA (Dames and Moore, 1988) that may possibly contain wastes will be evaluated with installation of nine (9) soil borings. The soil investigation in the FRA will consist of installation of three (3) soil borings in areas to the south of the fenced area that are within the Site boundary. Soils within the fenced area have been characterized previously (NYSDEC, 2001a, URS, 2003)

and voluntary remedial action has been conducted by STI in accordance with the scope of work presented in work plans specifically approved by NYSDEC (URS, 2006).

Soil borings will be installed to the shallow water table or refusal. Up to five (5) discrete soil samples will be collected at each soil sampling location in the vicinity of historic subsurface infrastructure. A near surface soil sample will be collected from zero (0) to two (2) inches below the vegetative cover and three (3) shallow subsurface soil samples will be collected from two (2) to twenty-four (24) inches, two (2) to six (6) feet, six (6) to ten (10) feet below the vegetative cover and from ten (10) feet to the shallow water table. Depth to water is expected to be approximately fifteen (15) feet bgs. Surface soil samples will not be collected in paved areas. The depth of soil sampling in PAOCs that may contain wastes (i.e. AOC-17) will focus on the upper two (2) feet to assess surface and near surface conditions. This approach is consistent with previous historical vertical soil profiling and remedial activities in the FRA that focused on fill material (URS, 2006).

Proposed analyses for soil sampling locations are listed on **Table 6** and include PCBs, metals, VOCs, SVOCs, pesticides and cyanide. Analytical suites for specific soil sampling locations have been chosen based on (i) area operational history including known material and chemical use, and (ii) COPCs and / or analyte group chemicals detected in prior sampling events as presented in **Tables 3** and **4**. Sample designations will be in accordance with the QAPP/FSP (**Appendix A**). Soil samples will be submitted to a fixed laboratory for analyses specified in **Table 6**.

4.2.3 Groundwater Investigation

The draft CSM presented in Section 2.5 indicated potential risks for COPC migration from Soil to groundwater while historical groundwater data have not shown exceedances of applicable groundwater standards. The proposed groundwater investigation will assess potential COPC migration pathways. Investigation of groundwater will be conducted in several phases, beginning with the existing groundwater monitoring wells at the Site and DPT sampling of groundwater from specific locations.

Historic monitoring well locations are shown on **Figure 3**. The first phase of the groundwater investigation will consist of the following elements: i) location, identification of prior-installed wells, and determination if well construction is suitable for groundwater sample collection; ii) inspection and gauging of existing monitoring wells, and iii) groundwater sample collection. Each monitoring well, if located, will be inspected and gauged for depth to water from the top of inner casing, total depth of the well and estimated sedimentation depth, if applicable. Existing well construction information and field survey will be used to determine reference elevations.

Groundwater samples will be collected from those monitoring wells listed on **Table 7** and shown on **Figure 3**. **Table 7** lists the analyses to be performed on those groundwater samples to be collected and the rationale for such sampling. Sample analyses will include VOCs, SVOCs, metals, and PCBs. Analyses for PCBs will focus on historic areas of potential PCB presence in

the vicinity of Building 88 and potential off-Site migration. Sample designations will be in accordance with the QAPP/FSP (**Appendix A)**.

In addition, grab groundwater samples will be collected using DPT methods at two (2) soil boring locations listed on **Table 7** and shown on **Figure 11** during the subsurface soil investigation. **Table 7** lists analyses to be performed on those groundwater samples to be collected and the rationale for such sampling. Sample designations will be in accordance with the QAPP/FSP in **Appendix A**.

Results of this groundwater investigation will be evaluated to determine the need for additional monitoring wells at the Site. Well locations and construction may be proposed to NYSDEC in work plans for a potential, subsequent phase of Site Characterization.

5. FIELD ACTIVITIES PLAN

This section describes field activities to be conducted for storm water structure inspection, soil sampling, well inspection, synoptic water level measurement, groundwater sampling, indoor air sampling and sub-slab vapor sampling. Methods and procedures for field sampling and QA/QC are presented in the QAPP/FSP in **Appendix A**.

5.1 Former Combined Industrial Sewer Inspection

5.1.1 Records Review

Historical plans of plant operations and current utility plans will be reviewed to verify the locations of the former combined industrial sewer. As necessary, STCC personnel will be consulted to confirm findings of the records review.

5.1.2 Geophysical Survey

A subsurface geophysical survey will be conducted along the alignment of the former combined industrial sewer. Geophysical survey methods will consist of one (1) or more of the following: ground penetrating radar (GPR), electromagnetic (EM) survey, and/or comprehensive subsurface utility (CSUL) surveys. Results of the geophysical survey will be compared to historical and current plans of subsurface utilities for tentative identification of subsurface anomalies. Subsurface anomalies potentially associated with the former combined industrial sewer will be highlighted for more detailed inspection.

5.1.3 In-line Camera Survey

In-line camera surveys will be performed along the accessible length of the former combined industrial sewer. Camera inspections will be performed to evaluate the origin and/or termination points of connections/pipes. Video recordings of those inspections will be taken and stored for documentation purposes. Real-time inspections will aid in determining the integrity of the pipe, potential volume of material within the line, and whether the line is potentially active with respect to discharge to adjacent surface waters. In the event of obstructions, access points (i.e. manholes) will be evaluated for potential confined space entry prior to clearing any obstruction.

Stormwater structures will be inspected for structural integrity, hydraulic connections to storm sewer system, and the presence of accumulated fine-grained material. If present, the depth of material will be measured, to the extent practical, and recorded. If an adequate volume of material is present, a composite sample, collected across the entire material depth will be collected. The composite sample will be submitted to the fixed laboratory for analyses for metals, PCBs, SVOCs and VOCs. Sample handling and analytical methods are presented in the QAPP/FSP (**Appendix A**).

5.1.4 Pit Inspection

The twenty-five-foot (25-ft) deep pit located in the crawl space in the northwest corner of Building 88 will be visually inspected for structural integrity and hydraulic connections to the storm sewer system. The pit will be gauged for depth to water, depth to bottom and the potential presence of free product. If sufficient water column is present in the pit, a water sample will be collected and submitted to the fixed laboratory for analyses for metals, PCBs, SVOCs and VOCs. Sample collection methods may include the use of bailers, bladder pumps, or passive diffusion samplers, depending on the height of water column present. Sample handling and analytical methods are presented in the QAPP/FSP (**Appendix A**).

5.2 Soil

5.2.1 Surface and Subsurface Soil Sampling

Surface and subsurface soil sampling will be conducted using either hand augering methods or DPT, depending on access to the boring location by the DPT equipment. Between sampling locations, all reusable equipment will be cleaned prior to sample collection at the next location. For direct push boreholes, a continuous soil core will be collected starting from ground surface. With hand augering, the borehole will be advanced until the desired sample depth is reached.

Soil cores will be visually logged for soil type, and inspected for staining, debris or other evidence of anthropogenic materials. Soil cores will be additionally screened for soil vapors using a photoionization detector (PID) and/or flame ionization detector (FID). Following field screening, soil samples will be collected from soil cores as several subsamples from select segments as indicated on **Table 6** in accordance with the QAPP/FSP. Irrespective of the sampling location, each soil core segment sample will be collected from material exhibiting the highest PID/FID readings, visual observation, or the presence of odors. If PID/FID readings are not higher than background and no staining or odors are observed, the sample will be collected from the middle of each segment. It should be noted that metals, PCBs and some SVOCS are not detected by PID or FID. Samples will be submitted to the fixed laboratory for those analyses listed in **Table 5**. Sample handling and analytical methods are presented in the QAPP/FSP.

5.3 Groundwater

5.3.1 Well Inspection and Synoptic Water Level Measurement

Prior to groundwater sampling, an attempt to locate each monitoring well shown on **Figure 3** will be made and, if successfully located, will be visually inspected for integrity. If possible, the depth to water level and total depth for each well will be measured from a reference point on the inner well casing to the nearest 0.01-feet using a clean electronic water level monitoring meter. Water level measurements will be used to develop a potentiometric surface map of the water table aquifer at the Site. Total depth measurements will be compared to historical well

construction details for well integrity evaluation. Reference elevations will be measured by a licensed surveyor.

5.3.2 Low-Flow Groundwater Sampling

Groundwater samples will be collected using low-flow sampling protocols in accordance with the QAPP/FSP. Each well shown on **Figure 3** and listed on **Table 7** will be purged and sampled using a submersible bladder pump and dedicated Teflon tubing. Purge water discharge will be routed to a flow-through cell and water quality measurements will be obtained using field instruments. Field groundwater quality measurements will be collected frequently (approximately every five (5) minutes) during purging and immediately prior to sample collection. At a minimum, field measurements will include pH, temperature, specific conductance, dissolved oxygen, oxidation-reduction potential, and turbidity. When these parameters display stabilization over three (3) consecutive readings or at least three (3) well volumes have been purged, samples will be obtained by directly filling clean, laboratory-provided sampling containers directly from the discharge tubing. Upon collection, samples will be stored on ice in a cooler to remain at 4°C (± 2°C) prior to, and during, shipment to the laboratory. Prior to shipment, chain-of-custody forms for each sample shipment will be prepared and placed in the cooler with the corresponding samples. The sealed cooler will additionally contain a custody seal that will be placed over the lid. Between monitoring well locations, all reusable equipment will be cleaned prior to sample collection.

5.3.3 Direct Push Groundwater Sampling

Following DPT borehole installation and soil sample collection as described in Section 5.2.2, a groundwater grab sample will be collected at those locations shown on **Figure 11** and analyzed for the compounds summarized on **Table 7**. It is anticipated that groundwater samples will be collected by inserting decontaminated DPT sampling rods equipped with an expendable drive-point and extendable four (4) or five (5)-foot long stainless steel screen (DPT groundwater sampling apparatus). The DPT groundwater sampling apparatus will not be installed directly into the soil boring used for soil sample collection, but rather within two (2) to three (3) linear feet of the soil boring location. The DPT groundwater sampling apparatus will be installed to a depth that is approximately six (6) to seven (7) feet below the approximate water table depth identified during soil boring installation. Once the desired depth is reached, the DPT rods will be retracted four (4) or five (5) feet to expose and allow groundwater to enter the stainless steel screen. This procedure allows for the entire DPT groundwater sampling apparatus to be driven to a depth below the observed depth to groundwater and retracted to the desired sampling interval. Depth to water measurements will be taken every five (5) to ten (10) minutes to evaluate groundwater recovery. If groundwater collects in the screen, and the rate of recovery allows for sufficient sample volume, a groundwater sample will be collected.

Groundwater purging and sample collection is anticipated to be completed using a peristaltic pump and Teflon tubing. VOC data collected using a peristaltic pump will be used as screening data. If the depth to water exceeds peristaltic pump limitations, alternate purging and sampling

devices, such as a Teflon or stainless steel micro-bailer, may also be used. Prior to groundwater sample collection, the monitoring point will be developed by purging a minimum of three (3) borehole volumes from the screen. If low-yielding groundwater conditions are encountered, a reduced purge volume approach may be used. Efforts will be made to reduce sample turbidity to the extent practical as determined by the field sampler. Once purging is complete, water quality parameters (i.e., temperature, specific conductance, dissolved oxygen, oxidation-reduction potential and turbidity) will be measured using a calibrated water quality meter. Groundwater samples will then be obtained by directly filling clean, laboratory-provided sampling containers directly from the discharge tubing. Sample labeling, handling, and packing procedures described in the QAPP/FSP will be followed. Following sample collection, the DPT rods and screen will be removed from the boring and the boring will be abandoned. The boring will be abandoned by backfilling with bentonite chips. The DPT tooling and screen will be decontaminated between sampling locations as described in the QAPP/FSP.

5.4 Quality Assurance

Sample handling, including sample custody and sample control, will be conducted in accordance with the QAPP/FSP. **Table 8** lists analytical methods, containers, preservatives, and holding times for solid, water, air and sub-slab vapor analyses. Quality control samples, including field duplicates, matrix spike/matrix spike duplicates, trip blanks, and equipment blanks, will be collected at the frequency specified in the QAPP/FSP.

5.5 IDM Management

Solid Investigation Derived Material (IDM) that will be generated may include disposable personal protection equipment (PPE), disposable sampling equipment, and excavated material. Liquid IDM that will be generated will consist of purge groundwater from sampling of monitoring wells and water generated during decontamination of field equipment. Solid and liquid IDM will be temporarily stored in on-site fifty-five (55) gallon drums for waste characterization (if necessary) and subsequent, appropriate off-site disposal in accordance with the QAPP/FSP.

5.6 Health and Safety

A Site specific Health and Safety Plan (HASP) is presented in **Appendix B**. Each contractor will be required to prepare a project-specific HASP in accordance with DER-10 to be followed during implementation of the field program. The major elements of the HASP will include the following:

i) A description of the facility and work areas, availability of resources (medical care, water supply, etc.) and a summary of known hazards and potential risks associated with execution of the proposed scope of work;

ii) A listing of key personnel and alternates responsible for Site safety, as well as training requirements for personnel completing the proposed scope of work; and

iii) Health and safety procedures and protocols to be followed while completing the proposed scope of work, including site access control measures, levels of personal protection, decontamination procedures, site emergency procedures, and emergency medical care protocols.

Each HASP will be developed to be consistent with applicable National Institute for Occupational Safety and Health (NIOSH), EPA, OSHA, state and local regulations and requirements.

NYSDOH's Generic Community Air Monitoring Plan (CAMP) will be implemented during site characterization activities to monitor airborne emissions. Initial air monitoring data for each activity will be used to evaluate the need for continued monitoring. The CAMP will be implemented at the start of each new ground intrusive activity to establish an air monitoring database. When work areas are within twenty (20) feet of playgrounds, athletic playing fields, schools and childcare centers, the continuous monitoring locations for particulates will reflect the nearest potentially exposed individuals. The use of engineering controls such as dust barriers will be considered to prevent exposures related to the work activities and to control dust and odors. Consideration will be given to implementing the planned activities when the presence of potentially exposed populations is at a minimum (i.e. during hours when children are not likely to be present). Common-sense measures to keep dust and odors at a minimum around the work areas will also be implemented to ensure that the children are protected at all times.

A copy of the CAMP is included at **Appendix C**.

6. PROJECT MANAGEMENT

6.1 Schedule

Unisys will promptly commence the storm water system inspection, soil investigation and groundwater investigation activities of the PAOC investigation activities, weather permitting and pending access from the property owner, upon NYSDEC review and approval of this Site Characterization Work Plan. Completion of the work will be dependent on weather conditions and access. Once initiated and unencumbered by weather or other unforeseen delays, Unisys anticipates that the investigation will take approximately three (3) weeks to complete. A proposed schedule for Site Characterization activities is presented in **Figure 12.**

6.2 Deliverables

Unisys will provide monthly progress reports by the tenth (10^{th}) day of each month commencing with the month subsequent to the approval of this Site Characterization Work Plan in accordance with the Order. Progress reports will include data received or generated in the previous reporting period.

Unisys will provide NYSDEC with a data summary report within ninety (90) days of receipt and validation of all data. The data summary report may recommend additional phases of Site Characterization, as appropriate.

All reports will be submitted to NYSDEC with final version copies issued to the document repository at Central Library of the Chemung County District in Elmira, New York in accordance with the Citizen Participation Plan (**Appendix D**). Electronic submittals will be completed in accordance with the NYSDEC electronic documents system (eDocs) requirements effective October 3, 2005.

7. REFERENCES

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TABLES

TABLE 1
Summary of Previously Identified Tanks and Vessels
Fomer Scott Technologies Site
Elmira, New York

Phase II (Versar, 1992)	UST Removal (Versar, 1993)	FER (URS, 1999)	Capacity (gallons)	Inventory	Remedial Action
T/V#1	UST-3		3,000	No. 2 Fuel	Removed (1993)
T/V#2			Unknown		Suspected /Not Located
T/V#3		T/V#2	750	Unknown	Removed (1999)
T/V#4		T/V#4	250	Paint Stripper and Sludge	Cleaned (1999)
T/V#5		T/V#5	2000	Stormwater Runoff	Cleaned (1999)
T/V#6		T/V#6	2000	Stormwater Runoff	Cleaned (1999)
T/V#7		T/V#7	3000	Recovered Oil	Cleaned (1999)
T/V#8		T/V#8	Unknown	Recovered Oil	Cleaned (1999)
T/V#9	UST-1		4000	Gasoline	Removed (1993)
T/V#10	UST-2		4000	Diesel	Removed (1993)
T/V#11		T/V#11	Unknown	Recovered Oil	Cleaned (1999)
T/V#12	UST-6		1000	Gasoline	Removed (1993)
CC-#1		CC-#1	Unknown		Cleaned (1999)
CC-#2		CC-#2	Unknown		Cleaned and Removed (1999)
CC-#3		CC-#3	Unknown		Decommissioned (1999)
		AST-1	250	Cutting Oil	Cleaned (1999)
		AST-2	250	Cutting Oil	Cleaned (1999)

Notes

AST	Aboveground Storage Tank	T/V	Tank or Vessel
CC	Clarfication Chamber	UST	Underground Storage Tank
FER	Final Enigneering Report		

Sources

Versar, 1992 Draft Phase II - Intrusive Investigation, American LaFrance, 1051 South Main Street, Southport, Chemung County, New York.

Versar, 1993 Underground Storage Tank Closure Report and Limited Remedial Investigation, Figgie Properties Facility, 1051 South Main Street, Southport, New York

URS, 2000 Final Engineering Report, American LaFrance Voluntary Cleanup

TABLE 2
Potential Areas of Concern Identified by NYSDEC
Former Scott Technologies Site
Elmira, Chemung County, New York

Potential Area of Concern[1] (PAOC)	Description	NYSDEC Characterization
AOC-1	Holding Pond Sediments	• Remediation or Further Characterization • Extent Delineation • Potential Structure Sources • Remedial Action Threshold
AOC-2	Combined Industrial/Storm Sewer	• Structure / Integrity / Contents / Release • Extent • Collection of Surface & Subsurface Contaminants
AOC-2A	18" Pipe South of Box Culvert	• Structure / Integrity / Contents / Release • Extent • Connection to Former Industrial Structures
AOC-2B	Pipe Network East of Building 86	• Structure / Integrity / Contents / Release • Extent • Connection to Former Industrial Structures • Collection of Surface & Subsurface Contaminants
AOC-2C	Pipe Network Extending to Department 19	• Structure / Integrity / Contents / Release • Extent • Connection to Former Industrial Structures • Collection of Surface & Subsurface Contaminants
AOC-2D	Pipe Network Extending Through Building 88	• Structure / Integrity / Contents / Release • Extent • Connection to Former Industrial Structures • Collection of Surface & Subsurface Contaminants

TABLE 2
Potential Areas of Concern Identified by NYSDEC
Former Scott Technologies Site
Elmira, Chemung County, New York

Potential Area of Concern[1] (PAOC)	Description	NYSDEC Characterization
AOC-2E	Boiler Blow Down Structure and Outfall	• Structure / Integrity / Contents / Release • Extent • Connection to Former Industrial Structures • Collection of Surface & Subsurface Contaminants
AOC-3A	Pit near Former Oil Extractor Building	• Structure / Integrity / Contents / Release • Extent • Connection to Former Industrial Structures • Collection of Surface & Subsurface Contaminants
AOC-3B	25' Deep Pit in NW of Building 88	• Structure / Integrity / Contents / Release • Connection to Former Industrial Structures • Collection of Surface & Subsurface Contaminants
AOC-3C	Former Paint Pit	• Structure / Integrity / Contents / Release • Connection to Former Industrial Structures
AOC-4	Former Transformer Areas	• Any Potential PCB Containing Structures • Potential Release from PCB Containing Structures • Connection to Former Industrial Structures
AOC-17	Possible Disposal Areas	• Extent Delineation • Potential Soil Sources

Notes

AOC –Area of Concern

NYSDEC – New York State Department of Environmental Conservation

PCB –Polychlorinated Biphenyl

1. PAOCs for the Former Scott Technologies Site were identified by NYSDEC in a report dated 4 October 2013.

TABLE 3
Summary of Soil Analytical Results - STCC
Former Scott Technologies Site
Elmira, New York

				Previous Investigation	Phase II Investigation					UST-1 and UST-2 Removal					
				Sample Location	STCC-SS-1	STCC-SS-2	STCC-SS-3	STCC-SS-4	STCC-SS-5	STCC-UST-1	STCC-UST-2	STCC-UST-3	STCC-UST-4	STCC-UST-5	STCC-UST-6
				Sample Depth Range (ft)	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	9-9	9-9	9-9	9-9	9-9	12-12
				Sample Date	12/9/1991	12/9/1991	12/9/1991	12/9/1991	12/9/1991	9/22/1992	9/22/1992	9/22/1992	9/22/1992	9/22/1992	9/22/1992
SCOs				**Notes**		Excavated	Excavated	Excavated	Excavated						
Analyte Group	**Analyte**	**Units**	**Industrial**	**Protection of Ground-water**											
VOCs	Ethylbenzene	mg/kg	780	1	-	-	-	-	-	-	-	-	-	-	-
	Toluene	mg/kg	1000	0.7	-	-	-	-	-	-	-	-	-	-	-
	Xylene (m & p)	mg/kg			-	-	-	-	-	**0.00678**	ND	ND	ND	ND	ND
	Xylene (o)	mg/kg			-	-	-	-	-	**0.00844**	ND	ND	ND	ND	ND
	Xylene Total	mg/kg	1000	1.6	-	-	-	-	-	**0.01522**	ND	ND	ND	ND	ND
	Dichloromethane	mg/kg	1000	0.05	**0.005J**	**0.004JB**	**0.009**	**0.007**	**0.003JB**	-	-	-	-	-	-
Metals	Arsenic	mg/kg	16	16	**7.54**	**17.5**	**7.9**	**6.64**	**13**	-	-	-	-	-	-
	Barium	mg/kg	10000	820	**85.5**	**160**	**219**	**476**	**243**	-	-	-	-	-	-
	Beryllium	mg/kg	2700	47	ND	**0.541**	ND	ND	ND	-	-	-	-	-	-
	Cadmium	mg/kg	60	7.5	ND	**5.25**	ND	**12.1**	**38.9**	-	-	-	-	-	-
	Chromium (III+VI)	mg/kg	800	19	**9.48**	**47.2**	**20.7**	**468**	**87**	-	-	-	-	-	-
	Copper	mg/kg	10000	1720	**40**	**294**	**88.7**	**57.2**	**1770**	-	-	-	-	-	-
	Lead	mg/kg	3900	450	**62.4**	**1000**	**277**	**1500**	**1560**	-	-	-	-	-	-
	Manganese	mg/kg	10000	2000	**193**	**196**	**391**	**323**	**387**	-	-	-	-	-	-
	Mercury	mg/kg	5.7	0.73	ND	ND	**0.0707**	ND	ND	-	-	-	-	-	-
	Nickel	mg/kg	10000	130	**16.6**	**59.8**	**40.6**	**35.9**	**104**	-	-	-	-	-	-
	Selenium	mg/kg	6800	4	ND	**0.321**	ND	**1.79**	**0.536**	-	-	-	-	-	-
	Silver	mg/kg	6800	8.3	ND	ND	ND	ND	**2.17**	-	-	-	-	-	-
	Vanadium	mg/kg			**13**	**15.1**	**15.3**	**12.9**	**20.5**	-	-	-	-	-	-
	Zinc	mg/kg	10000	2480	**68**	**389**	**157**	**787**	**1650**	-	-	-	-	-	-
SVOCs	2-methylnaphthalene	mg/kg			ND	ND	**2.973**	**7.011J**	**1.261J**	-	-	-	-	-	-
	Acenaphthene	mg/kg	1000	98	ND	ND	**6.426**	**20.66**	**3.753J**	-	-	-	-	-	-
	Acenaphthylene	mg/kg	1000	107	ND	ND	ND	ND	**3.311J**	-	-	-	-	-	-
	Anthracene	mg/kg	1000	1000	**0.2885**	ND	**11.82**	**31.59**	**15.77**	-	-	-	-	-	-
	Benz(a)anthracene	mg/kg	11	1	**1.039**	**21.99J**	**16.17**	**56.61**	**50.96**	-	-	-	-	-	-
	Benzo(a) pyrene	mg/kg	1.1	22	**0.83J**	**30.58**	**16.28**	**66.13**	**59.39**	-	-	-	-	-	-
	Benzo(b)fluoranthene	mg/kg	11	1.7	**0.611J**	**16.75J**	**13.51**	ND	**41.59**	-	-	-	-	-	-
	Benzo(g,h,i)perylene	mg/kg	1000	1000	-	-	-	-	-	-	-	-	-	-	-
	Benzo(k)fluoranthene	mg/kg	110	1.7	**0.875J**	**18.17J**	**16.23**	ND	**33.73**	-	-	-	-	-	-
	Chrysene	mg/kg	110	1	**0.931J**	**20.67J**	**13.99**	**47.17**	**47.72**	-	-	-	-	-	-
	Dibenz(a,h)anthracene	mg/kg	1.1	1000	-	-	-	-	-	-	-	-	-	-	-
	Fluoranthene	mg/kg	1000	1000	**1.751J**	**35.64**	**29.69**	**95.14**	**87.95**	-	-	-	-	-	-
	Fluorene	mg/kg	1000	386	ND	ND	**5.984**	**17.59**	**6.29J**	-	-	-	-	-	-
	Indeno(1,2,3-c,d)pyrene	mg/kg	11	8.2	-	-	-	-	-	-	-	-	-	-	-
	Naphthalene	mg/kg	1000	12	ND	ND	**8.795**	**21.73**	ND	-	-	-	-	-	-
	Phenanthrene	mg/kg	1000	1000	**0.904J**	**14.21J**	**33.05**	**96.35**	**52.96**	-	-	-	-	-	-
	Pyrene	mg/kg	1000	1000	**1.605**	**38.24**	**27.61**	**86.52**	**80.78**	-	-	-	-	-	-
	Bis(2-ethylhexyl) phthalate	mg/kg			ND	ND	ND	ND	ND	-	-	-	-	-	-
	Dibenzofuran	mg/kg	1000	210	ND	ND	**3.458J**	**10.15**	ND	-	-	-	-	-	-
PCBs	Arochlor 1254	mg/kg			ND	**0.0002**	-	**0.000188**	**0.000252**	-	-	-	-	-	-
	Arochlor-unspecified	mg/kg	25	3.2	ND	**0.0002**	-	**0.000188**	**0.000252**	-	-	-	-	-	-

Notes

1. Soil Cleanup Objectives (SCOs) as presented in NYCRR Subpart 375-6.8b.
2. Detected values are shown in **bold**.
3. Exceedances of the SCOs for the Protection of Public Health are shaded.
4. Exceedances of the SCOs for the Protetction of Ground-Water are shown in **blue.**

J Estimated value
B Analytie dtected in Method Blank
< Not detected above the laboratory reporting limit
ND Not detected - reporting limit unavailable

TABLE 3
Summary of Soil Analytical Results - STCC
Former Scott Technologies Site
Elmira, New York

				Previous Investigation	UST-3 Removal					UST-6 Removal				
				Sample Location	STCC-UST-9	STCC-UST-10	STCC-UST-11	STCC-UST-12	STCC-UST-13	STCC-UST-14	STCC-UST-15	STCC-UST-16	STCC-UST-17	STCC-UST-18
				Sample Depth Range (ft)	6-6	6-6	6-6	6-6	8-8	8-8	8-8	8-8	8-8	9-9
				Sample Date	9/21/1992	9/21/1992	9/21/1992	9/21/1992	9/21/1992	9/22/1992	9/22/1992	9/22/1992	9/22/1992	9/22/1992
SCOs				**Notes**										
Analyte Group	**Analyte**	**Units**	**Industrial**	**Protection of Ground-water**										
VOCs	Ethylbenzene	mg/kg	780	1	-	-	-	-	-	ND	ND	ND	ND	**9.98**
	Toluene	mg/kg	1000	0.7	-	-	-	-	-	ND	ND	ND	ND	**0.602**
	Xylene (m & p)	mg/kg			-	-	-	-	-	ND	ND	ND	ND	**6.17**
	Xylene (o)	mg/kg			-	-	-	-	-	ND	ND	ND	ND	**1.68**
	Xylene Total	mg/kg	1000	1.6	-	-	-	-	-	ND	ND	ND	ND	**7.85**
	Dichloromethane	mg/kg	1000	0.05	-	-	-	-	-	-	-	-	-	-
Metals	Arsenic	mg/kg	16	16	-	-	-	-	-	-	-	-	-	-
	Barium	mg/kg	10000	820	-	-	-	-	-	-	-	-	-	-
	Beryllium	mg/kg	2700	47	-	-	-	-	-	-	-	-	-	-
	Cadmium	mg/kg	60	7.5	-	-	-	-	-	-	-	-	-	-
	Chromium (III+VI)	mg/kg	800	19	-	-	-	-	-	-	-	-	-	-
	Copper	mg/kg	10000	1720	-	-	-	-	-	-	-	-	-	-
	Lead	mg/kg	3900	450	-	-	-	-	-	-	-	-	-	-
	Manganese	mg/kg	10000	2000	-	-	-	-	-	-	-	-	-	-
	Mercury	mg/kg	5.7	0.73	-	-	-	-	-	-	-	-	-	-
	Nickel	mg/kg	10000	130	-	-	-	-	-	-	-	-	-	-
	Selenium	mg/kg	6800	4	-	-	-	-	-	-	-	-	-	-
	Silver	mg/kg	6800	8.3	-	-	-	-	-	-	-	-	-	-
	Vanadium	mg/kg			-	-	-	-	-	-	-	-	-	-
	Zinc	mg/kg	10000	2480	-	-	-	-	-	-	-	-	-	-
SVOCs	2-methylnaphthalene	mg/kg			-	-	-	-	-	-	-	-	-	-
	Acenaphthene	mg/kg	1000	98	ND	**1.1**	**2.5**	ND	ND	-	-	-	-	-
	Acenaphthylene	mg/kg	1000	107	ND	ND	**0.34**	ND	ND	-	-	-	-	-
	Anthracene	mg/kg	1000	1000	**1.9**	**3.1**	**10**	**1.3**	**1**	-	-	-	-	-
	Benz(a)anthracene	mg/kg	11	1	**3.5**	**6.4**	**13**	**3.3**	**2.1**	-	-	-	-	-
	Benzo(a) pyrene	mg/kg	1.1	22	**2.8**	**5.6**	**9.8**	**2.8**	**1.2**	-	-	-	-	-
	Benzo(b)fluoranthene	mg/kg	11	1.7	**3.1**	**6.2**	**7.6**	**3**	**1.6**	-	-	-	-	-
	Benzo(g,h,i)perylene	mg/kg	1000	1000	**0.39**	**0.66**	**1**	ND	ND	-	-	-	-	-
	Benzo(k)fluoranthene	mg/kg	110	1.7	**3.4**	**4.6**	**8.5**	**3.8**	**2.2**	-	-	-	-	-
	Chrysene	mg/kg	110	1	**2.8**	**3.6**	**8.2**	**2.7**	**1.3**	-	-	-	-	-
	Dibenz(a,h)anthracene	mg/kg	1.1	1000	-	-	-	-	-	-	-	-	-	-
	Fluoranthene	mg/kg	1000	1000	**4.8**	**17**	**39**	**4.9**	**3.4**	-	-	-	-	-
	Fluorene	mg/kg	1000	386	**1.6**	**2.2**	**4**	**0.77**	**0.73**	-	-	-	-	-
	Indeno(1,2,3-c,d)pyrene	mg/kg	11	8.2	**0.52**	**0.93**	**1.5**	**0.57**	**0.25**	-	-	-	-	-
	Naphthalene	mg/kg	1000	12	-	-	-	-	-	-	-	-	-	-
	Phenanthrene	mg/kg	1000	1000	**4.1**	**13**	**39**	**3.2**	**2.8**	-	-	-	-	-
	Pyrene	mg/kg	1000	1000	**0.44**	**12**	**26**	**4.7**	**3.1**	-	-	-	-	-
	Bis(2-ethylhexyl) phthalate	mg/kg			-	-	-	-	-	-	-	-	-	-
	Dibenzofuran	mg/kg	1000	210	-	-	-	-	-	-	-	-	-	-
PCBs	Arochlor 1254	mg/kg			-	-	-	-	-	-	-	-	-	-
	Arochlor-unspecified	mg/kg	25	3.2	-	-	-	-	-	-	-	-	-	-

Notes

1. Soil Cleanup Objectives (SCOs) as presented in NYCRR Subpart 375-6.8b.
2. Detected values are shown in **bold**.
3. Exceedances of the SCOs for the Protection of Public Health are shaded.
4. Exceedances of the SCOs for the Protetction of Ground-Water are shown in **blue.**

J Estimated value
B Analytie dtected in Method Blank
< Not detected above the laboratory reporting limit
ND Not detected - reporting limit unavailable

TABLE 3
Summary of Soil Analytical Results - STCC
Former Scott Technologies Site
Elmira, New York

				Previous Investigation	Soil Excavation Confirmation Sampling										
				Sample Location	STCC-AR-1	STCC-AR-2	STCC-C1-A	STCC-C4	STCC-D1	STCC-D2-A	STCC-F3-A	STCC-H2-A	STCC-I2 (Comp)	STCC-I4	STCC-T-88A
				Sample Depth Range (ft)											
				Sample Date	11/2/1999	11/2/1999	11/5/1999	10/28/1999	11/10/1999	11/2/1999	11/2/1999	11/2/1999	11/5/1999	11/10/1999	11/4/1999
			SCOs	Notes											
Analyte Group	**Analyte**	**Units**	**Industrial**	**Protection of Ground-water**											
VOCs	Ethylbenzene	mg/kg	780	1	-	-	-	-	-	-	-	-	-	-	-
	Toluene	mg/kg	1000	0.7	-	-	-	-	-	-	-	-	-	-	-
	Xylene (m & p)	mg/kg			-	-	-	-	-	-	-	-	-	-	-
	Xylene (o)	mg/kg			-	-	-	-	-	-	-	-	-	-	-
	Xylene Total	mg/kg	1000	1.6	-	-	-	-	-	-	-	-	-	-	-
	Dichloromethane	mg/kg	1000	0.05	-	-	-	-	-	-	-	-	-	-	-
Metals	Arsenic	mg/kg	16	16	-	-	-	-	-	-	-	-	-	-	-
	Barium	mg/kg	10000	820	-	-	-	-	-	-	-	-	-	-	-
	Beryllium	mg/kg	2700	47	-	-	-	-	-	-	-	-	-	-	-
	Cadmium	mg/kg	60	7.5	-	-	-	-	-	-	-	-	-	-	-
	Chromium (III+VI)	mg/kg	800	19	-	-	-	-	-	-	-	-	-	-	-
	Copper	mg/kg	10000	1720	-	-	-	-	-	-	-	-	-	-	-
	Lead	mg/kg	3900	450	-	-	-	-	-	-	-	-	-	-	-
	Manganese	mg/kg	10000	2000	-	-	-	-	-	-	-	-	-	-	-
	Mercury	mg/kg	5.7	0.73	-	-	-	-	-	-	-	-	-	-	-
	Nickel	mg/kg	10000	130	-	-	-	-	-	-	-	-	-	-	-
	Selenium	mg/kg	6800	4	-	-	-	-	-	-	-	-	-	-	-
	Silver	mg/kg	6800	8.3	-	-	-	-	-	-	-	-	-	-	-
	Vanadium	mg/kg			-	-	-	-	-	-	-	-	-	-	-
	Zinc	mg/kg	10000	2480	-	-	-	-	-	-	-	-	-	-	-
SVOCs	2-methylnaphthalene	mg/kg			-	-	-	-	-	-	-	-	-	-	-
	Acenaphthene	mg/kg	1000	98	<0.27U	<0.28U	<0.28U	**0.98J**	<0.29U	<0.28U	<0.29U	<0.28U	**0.081J**	<0.25U	<0.29U
	Acenaphthylene	mg/kg	1000	107	<0.27U	<0.28U	<0.28U	<2.7U	<0.29U	<0.28U	<0.29U	<0.28U	<0.27U	<0.25U	<0.29U
	Anthracene	mg/kg	1000	1000	<0.27U	**0.14J**	<0.28U	**2.2J**	<0.29U	<0.28U	<0.29U	<0.28U	**0.19J**	<0.25U	<0.29U
	Benz(a)anthracene	mg/kg	11	1	<0.27U	**0.83**	<0.28U	**4.5**	**0.46**	<0.28U	<0.29U	<0.28U	**0.33**	<0.25UJ	<0.29U
	Benzo(a) pyrene	mg/kg	1.1	22	<0.27U	**0.72**	<0.28U	**3.6**	**0.5**	<0.28U	<0.29U	<0.28U	**0.29**	<0.25UJ	<0.29U
	Benzo(b)fluoranthene	mg/kg	11	1.7	<0.27U	**1.2**	<0.28U	**4.4**	**0.61**	<0.28U	<0.29U	<0.28U	**0.44**	<0.25UJ	<0.29U
	Benzo(g,h,i)perylene	mg/kg	1000	1000	<0.27U	**0.32**	<0.28U	**2.1J**	**0.25J**	<0.28U	<0.29U	<0.28U	<0.27U	<0.25UJ	<0.29U
	Benzo(k)fluoranthene	mg/kg	110	1.7	<0.27U	**0.29**	<0.28U	<2.7U	**0.32**	-	<0.29U	<0.28U	<0.27U	<0.25UJ	<0.29U
	Chrysene	mg/kg	110	1	<0.27U	**0.79**	<0.28U	**3.9**	**0.44**	<0.28U	<0.29U	<0.28U	**0.33**	<0.25U	<0.29U
	Dibenz(a,h)anthracene	mg/kg	1.1	1000	<0.27U	<0.28U	<0.28U	<2.7U	<0.29U	<0.28U	<0.29U	<0.28U	<0.27U	<0.25UJ	<0.29U
	Fluoranthene	mg/kg	1000	1000	<0.27U	**1.4**	<0.28U	**9.1**	**0.77**	<0.28U	<0.29U	<0.28U	**0.64**	<0.25U	<0.29U
	Fluorene	mg/kg	1000	386	<0.27U	<0.28U	<0.28U	**0.91J**	<0.29U	<0.28U	<0.29U	<0.28U	**0.082J**	<0.25U	<0.29U
	Indeno(1,2,3-c,d)pyrene	mg/kg	11	8.2	<0.27U	**0.34**	<0.28U	**2.5J**	**0.28J**	<0.28U	<0.29U	<0.28U	**0.11J**	<0.25UJ	<0.29U
	Naphthalene	mg/kg	1000	12	<0.27U	**0.26J**	<0.28U	**0.75J**	<0.29U	<0.28U	<0.29U	<0.28U	**0.13J**	<0.25U	<0.29U
	Phenanthrene	mg/kg	1000	1000	<0.27U	**0.45**	<0.28U	**6.9**	**0.36**	<0.28U	<0.29U	<0.28U	**0.61**	<0.25U	<0.29U
	Pyrene	mg/kg	1000	1000	<0.27U	**0.97**	<0.28U	**7**	**1**	<0.28U	<0.29U	<0.28U	**0.55**	<0.25U	<0.29U
	Bis(2-ethylhexyl) phthalate	mg/kg			-	-	-	-	-	-	-	-	-	-	-
	Dibenzofuran	mg/kg	1000	210	-	-	-	-	-	-	-	-	-	-	-
PCBs	Arochlor 1254	mg/kg			-	-	-	-	-	-	-	-	-	-	-
	Arochlor-unspecified	mg/kg	25	3.2	-	-	-	-	-	-	-	-	-	-	-

Notes

1. Soil Cleanup Objectives (SCOs) as presented in NYCRR Subpart 375-6.8b.
2. Detected values are shown in **bold**.
3. Exceedances of the SCOs for the Protection of Public Health are shaded.
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J Estimated value
B Analytie dtected in Method Blank
< Not detected above the laboratory reporting limit
ND Not detected - reporting limit unavailable

TABLE 4
Summary of Soil Analytical Results - FRA
Former Scott Technologies Site
Elmira, New York

				Previous Investigation	NYSDEC Investigation																			
				Sample Location	RecArea-B-1	RecArea-B-2	RecArea-B-3	RecArea-B-4	RecArea-B-5	RecArea-B-6	RecArea-B-7	RecArea-B-7	RecArea-B-8	RecArea-B-9	RecArea-B-9	RecArea-B-10	RecArea-B-10	RecArea-B-11	RecArea-B-11	RecArea-B-12	RecArea-B-12	RecArea-B-13	RecArea-B-13
				Sample Depth Range (ft)	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	1-3	0-0.5	1-4	4-8	1-4	4-8	1-4	4-8	1-4	8-12	1-4	4-8
				Sample Date	5/11/2000	5/11/2000	5/11/2000	5/11/2000	5/11/2000	5/11/2000	5/11/2000	5/11/2000	5/11/2000	5/18/2000	5/18/2000	5/18/2000	5/18/2000	5/18/2000	5/18/2000	5/18/2000	5/18/2000	5/18/2000	5/18/2000
		SCOs		**Notes**									Excavated										
Analyte Group	**Analyte**	**Units**	**Industrial**	**Protection of Ground-water**																			
VOCs	Benzene	mg/kg	89	0.06	-	-	-	-	**0.022**	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Ethylbenzene	mg/kg	780	1	-	-	-	-	**0.007**	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Toluene	mg/kg	1000	0.7	-	-	-	-	**0.046**	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Xylene (m & p)	mg/kg			-	-	-	-	**0.026**	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Xylene (o)	mg/kg			-	-	-	-	**0.015**	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Xylene Total	mg/kg	1000	1.6	-	-	-	-	**0.041**	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Chloroform	mg/kg	700	0.37	**0.0014J**	**0.0019J**	**0.0024J**	**0.0035J**	**0.006J**	**0.0024J**	**0.0023J**	**0.0026J**	**0.002J**	**0.0042J**	-	-	-	**0.0014J**	**0.0014J**	**0.0017**	**0.002J**	**0.003J**	**0.0028J**
	Dichloromethane	mg/kg	1000	0.05	-	-	-	-	**0.0014J**	-	**0.0017J**	-	**0.0017J**	-	-	-	-	-	-	-	-	-	-
	Trichloroethene	mg/kg	400	0.47	-	-	-	-	-	-	-	-	-	**0.014**	-	-	-	-	-	-	-	**0.023**	-
	Tetrachloroethene	mg/kg	300	1.3	**0.018**	**0.046**	**0.07**	**0.083**	**0.11**	**0.033**	**0.031**	**0.011**	**0.03**	-	-	-	-	-	-	-	-	-	-
Metals	Arsenic	mg/kg	16	16	**5.8**	**6.8**	**3.7**	**4.9**	**12.7**	**10.1**	**9.8**	**6.9**	**12.8**	**16.5**	**5.9**	**4.9**	**8.7**	**4.6**	**9**	**6.7**	**5.5**	**6.2**	**9.2**
	Barium	mg/kg	10000	820	**102**	**103**	**114**	**102**	**108**	**248**	**3960**	**30.8**	**2660**	**4790**	**58**	**72.8**	**70.2**	**40**	**94.2**	**30.5**	**41.8**	**44.5**	**62.1**
	Cadmium	mg/kg	60	7.5	-	-	-	-	-	-	**7**	-	**13.8**	**3.3**	-	-	-	-	-	-	-	-	-
	Chromium (III+VI)	mg/kg	800	19	**10**	**13.2**	**10.6**	**10.1**	**10**	**17.6**	**151**	**14.8**	**385**	**193**	**8.5**	**11.5**	**17.9**	**13.4**	**11.2**	**13.5**	**7.4**	**22.9**	**24.1**
	Copper	mg/kg	10000	1720	**12.7**	**16.2**	**12**	**12.1**	**34.5**	**26.2**	**24,300**	**16.8**	**18,600**	**551**	**18.4**	**9.7**	**24.9**	**11.4**	**22.5**	**14.3**	**18.5**	**20**	**23.8**
	Lead	mg/kg	3900	450	**21.2**	**21.7**	**23.2**	**21.9**	**55.6**	**338**	**1530**	**11.3**	**1450**	**584**	**13.2**	**10.5**	**11.3**	**10.6**	**10.7**	**12.4**	**8.9**	**14.6**	**21**
	Mercury	mg/kg	5.7	0.73	-	-	-	-	**0.13**	-	**0.1**	-	**0.2**	**0.25**	-	-	-	-	-	**0.11**	-	-	-
	Nickel	mg/kg	10000	130	**15.2**	**20.1**	**13.7**	**13.5**	**14.6**	**15.5**	**699**	**20.7**	**905**	**359**	**15.3**	**15.6**	**19.7**	**19.5**	**18.3**	**21.7**	**14.2**	**79.7**	**157**
	Selenium	mg/kg	6800	4	**1.3**	**0.74**	**0.87**	**0.89**	**2.6**	**1.4**	**0.76**	-	**3**	**2.3**	-	-	-	-	-	-	-	-	-
	Silver	mg/kg	6800	8.3	-	-	-	-	-	-	**9.3**	-	-	-	-	-	-	-	-	-	-	-	-
	Zinc	mg/kg	10000	2480	**69.6**	**70.4**	**55.4**	**53.2**	**53.1**	**201**	**14,100**	**65.9**	**18,600**	**1520**	**52.4**	**47.5**	**70.1**	**50.7**	**63.3**	**56.8**	**56.5**	**75**	**93.7**
Pesticides	Aldrin + Dieldrin	mg/kg			**0.41**	-	**0.13**	**0.61**	**0.095**	**0.18**	**0.45**	-	**0.98**	-	**0.015**	-	-	-	-	-	-	**0.011**	**0.0025**
	DDT	mg/kg	94	136	-	-	-	-	-	-	**0.028**	-	-	-	-	-	-	-	-	-	-	-	-
	DDT+DDE+DDD	mg/kg			-	-	-	-	-	-	**0.028**	-	-	-	-	-	-	-	-	-	-	-	-
	Dieldrin	mg/kg	2.8	0.1	**0.41**	-	**0.13**	**0.61**	**0.095E**	**0.18E**	**0.45E**	-	**0.98**	-	**0.015**	-	-	-	-	-	-	**0.011**	**0.0025**
	Endrin	mg/kg	410	0.06	-	-	-	-	-	-	**0.013**	-	-	-	-	-	-	-	-	-	-	-	-
	Heptachlor epoxide	mg/kg			-	-	**0.0084J**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SVOCs	2-methylnaphthalene	mg/kg																					
	Acenaphthene	mg/kg	1000	98	-	-	-	-	-	-	**0.082J**	-	-	-	-	-	-	-	-	-	-	-	-
	Acenaphthylene	mg/kg	1000	107	-	-	-	-	**0.17J**	-	**0.13J**	-	**0.074J**	**0.31J**	-	-	-	-	-	-	-	-	-
	Anthracene	mg/kg	1000	1000	-	-	-	-	**0.17J**	-	**0.55**	-	**0.2J**	**0.47**	-	-	-	-	-	-	-	-	-
	Benz(a)anthracene	mg/kg	11	1	-	-	-	**0.081J**	**0.37J**	**0.047J**	**2.6**	-	**0.71**	**1.2**	-	-	-	-	-	-	-	-	-
	Benzo(a) pyrene	mg/kg	1.1	22	-	-	-	**0.093J**	-	**0.053**	**3.1**	-	**0.87**	-	-	-	-	-	-	-	-	-	-
	Benzo(b)fluoranthene	mg/kg	11	1.7	-	-	-	**0.082J**	**0.42**	-	**2.4**	-	**0.7**	**0.88**	-	-	-	-	-	-	-	-	-
	Benzo (b) pyrene	µg/kg			-	-	-	-	**310J**	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Benzo(g,h,i)perylene	mg/kg	1000	1000	-	-	-	-	**0.33J**	**0.05J**	**2.4**	-	**0.73**	**0.63**	-	-	-	-	-	-	-	-	-
	Benzo(k)fluoranthene	mg/kg	110	1.7	-	-	-	-	**0.3J**	-	**2.5**	-	**0.65**	**0.78**	-	-	-	-	-	-	-	-	-
	Chrysene	mg/kg	110	1	-	-	-	**0.12J**	**0.49**	**0.068J**	**2.5**	-	**0.86**	**1.4**	-	-	-	-	-	-	-	-	-
	Dibenz(a,h)anthracene	mg/kg	1.1	1000	-	-	-	-	**0.12J**	-	**0.88**	-	**0.26J**	**0.21J**	-	-	-	-	-	-	-	-	-
	Fluoranthene	mg/kg	1000	1000	-	**0.05J**	**0.061J**	**0.16J**	**0.61**	**0.095J**	**3.9**	-	**1.2**	**1.9**	-	-	-	-	-	-	-	-	-
	Fluorene	mg/kg	1000	386	-	-	-	-	-	-	**0.082J**	-	-	**0.084J**	-	-	-	-	-	-	-	-	-
	Indeno(1,2,3-c,d)pyrene	mg/kg	11	8.2	-	-	-	**0.065J**	**0.28J**	-	**2.3**	-	**0.66**	**0.53**	-	-	-	-	-	-	-	-	-
	Naphthalene	mg/kg	1000	12	-	-	-	-	**1.1**	-	**0.067J**	-	**0.049J**	**0.28J**	-	-	-	-	-	-	-	-	-
	Phenanthrene	mg/kg	1000	1000	-	-	-	**0.084J**	**0.83**	**0.05J**	**1.4**	-	**0.55**	**1.6**	-	-	-	-	-	-	-	-	-
	Pyrene	mg/kg	1000	1000	-	**0.056J**	**0.064J**	**0.17J**	**0.47**	**0.095J**	**2.7**	-	**0.96**	**2.1**	-	-	-	-	-	-	-	-	-
	Dibenzofuran	mg/kg	1000	210	-	-	-	-	**0.44**	-	**0.081J**	-	**0.048J**	**0.23J**	-	-	-	-	-	-	-	-	-
PCBs	Arochlor 1254	mg/kg			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**0.055**	-	-	-
	Arochlor-unspecified	mg/kg	25	3.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**0.055**	-	-	-

Notes

1. Soil Cleanup Objectives (SCOs) as presented in NYCRR Subpart 375-6.8b.
2. Detected values are shown in **bold**.
3. Exceedances of the SCOs for the Protection of Public Health are shaded.
4. Exceedances of the SCOs for the Protetction of Ground-Water are shown in **blue and underlined**.

J Estimated value

< Not detected above the laboratory reporting limit

TABLE 4
Summary of Soil Analytical Results - FRA
Former Scott Technologies Site
Elmira, New York

				Previous Investigation		URS Investigation											
				Sample Location	RecArea-B-14	RecArea-B-14	RecArea-B-5	RecArea-B-5-E-10	RecArea-B-5-N-10	RecArea-B-5-N-10	RecArea-B-5-NE-47	RecArea-B-5-NE-47	RecArea-B-5-NW-25	RecArea-B-5-S-10	RecArea-B-5-SE-25	RecArea-B-5-SW-25	RecArea-B-5-W-10	RecArea-B-5-W-25
				Sample Depth Range (ft)	1-4	4-8	0-.17	0-.17	0-.17	1.5-2.1	0-.17	2-5	2-6	0-.17	0-.17	0-.17	0-.17	0-.17
				Sample Date	5/18/2000	5/18/2000	7/10/2002	7/10/2002	7/10/2002	7/10/2002	7/10/2002	7/10/2002	7/10/2002	7/10/2002	7/10/2002	7/10/2002	7/10/2002	7/10/2002
		SCOs		**Notes**														
Analyte Group	**Analyte**	**Units**	**Industrial**	**Protection of Ground-water**														
VOCs	Benzene	mg/kg	89	0.06	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Ethylbenzene	mg/kg	780	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Toluene	mg/kg	1000	0.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Xylene (m & p)	mg/kg			-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Xylene (o)	mg/kg			-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Xylene Total	mg/kg	1000	1.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Chloroform	mg/kg	700	0.37	**0.0015J**	**0.0013J**	-	-	-	-	-	-	-	-	-	-	-	-
	Dichloromethane	mg/kg	1000	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Trichloroethene	mg/kg	400	0.47	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Tetrachloroethene	mg/kg	300	1.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Metals	Arsenic	mg/kg	16	16	**6.6**	**4.6**	-	-	-	-	-	-	-	-	-	-	-	-
	Barium	mg/kg	10000	820	**28.6**	**27.9**	**1700**	**5390**	**1160**	**602**	**1020**	**666**	**1620**	**979**	**212**	**376**	**1050**	**911**
	Cadmium	mg/kg	60	7.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Chromium (III+VI)	mg/kg	800	19	**8**	**6.3**	-	-	-	-	-	-	-	-	-	-	-	-
	Copper	mg/kg	10000	1720	**21.6**	**15.7**	**393**	**1270**	**183**	**278**	**156**	**163**	**488**	**1140**	**61.3**	**281**	**932**	**187**
	Lead	mg/kg	3900	450	**12.8**	**7**	**508J**	**1550**	**259**	**575**	**451**	**193**	**750**	**465**	**107**	**386**	**601**	**321**
	Mercury	mg/kg	5.7	0.73	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Nickel	mg/kg	10000	130	**15**	**12.7**	-	-	-	-	-	-	-	-	-	-	-	-
	Selenium	mg/kg	6800	4	-	**0.62**	-	-	-	-	-	-	-	-	-	-	-	-
	Silver	mg/kg	6800	8.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Zinc	mg/kg	10000	2480	**55.2**	**43.1**	-	-	-	-	-	-	-	-	-	-	-	-
Pesticides	Aldrin + Dieldrin	mg/kg			**0.0023**	-	-	-	-	-	-	-	-	-	-	-	-	-
	DDT	mg/kg	94	136	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	DDT+DDE+DDD	mg/kg			-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Dieldrin	mg/kg	2.8	0.1	**0.0023**	-	-	-	-	-	-	-	-	-	-	-	-	-
	Endrin	mg/kg	410	0.06	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Heptachlor epoxide	mg/kg			-	-	-	-	-	-	-	-	-	-	-	-	-	-
SVOCs	2-methylnaphthalene	mg/kg					-	-	-	-	-	-	-	-	-	-	-	-
	Acenaphthene	mg/kg	1000	98	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Acenaphthylene	mg/kg	1000	107	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Anthracene	mg/kg	1000	1000	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Benz(a)anthracene	mg/kg	11	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Benzo(a) pyrene	mg/kg	1.1	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Benzo(b)fluoranthene	mg/kg	11	1.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Benzo (b) pyrene	µg/kg			-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Benzo(g,h,i)perylene	mg/kg	1000	1000	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Benzo(k)fluoranthene	mg/kg	110	1.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Chrysene	mg/kg	110	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Dibenz(a,h)anthracene	mg/kg	1.1	1000	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Fluoranthene	mg/kg	1000	1000	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Fluorene	mg/kg	1000	386	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Indeno(1,2,3-c,d)pyrene	mg/kg	11	8.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Naphthalene	mg/kg	1000	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Phenanthrene	mg/kg	1000	1000	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Pyrene	mg/kg	1000	1000	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Dibenzofuran	mg/kg	1000	210	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PCBs	Arochlor 1254	mg/kg			-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Arochlor-unspecified	mg/kg	25	3.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes

1. Soil Cleanup Objectives (SCOs) as presented in NYCRR Subpart 375-6.8b.
2. Detected values are shown in **bold**.
3. Exceedances of the SCOs for the Protection of Public Health are shaded.
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J Estimated value

< Not detected above the laboratory reporting limit

TABLE 4
Summary of Soil Analytical Results - FRA
Former Scott Technologies Site
Elmira, New York

				Previous Investigation														
				Sample Location	RecArea-B-5-W-25	RecArea-B-6A	RecArea-B-6A-E-15	RecArea-B-6A-N-15	RecArea-B-6A-S-15	RecArea-B-6A-W-15	RecArea-B-7	RecArea-B-7-E-20-1	RecArea-B-7-E-40	RecArea-B-7-E-50	RecArea-B-7-E-72	RecArea-B-7-ENE-44	RecArea-B-7-ENE-69
				Sample Depth Range (ft)	2-5	0-.17	0-.17	0-.17	0-.17	0-.17	0-.17	0-.17	0-.17	0-.17	0-.17	0-.17	0-.17	0-.17
				Sample Date	7/10/2002	7/10/2002	7/10/2002	7/10/2002	7/10/2002	7/10/2002	7/10/2002	7/10/2002	7/10/2002	7/10/2002	7/10/2002	7/10/2002	7/10/2002
		SCOs		Notes													
Analyte Group	**Analyte**	**Units**	**Industrial**	**Protection of Ground-water**													
VOCs	Benzene	mg/kg	89	0.06	-	-	-	-	-	-	-	-	-	-	-	-	-
	Ethylbenzene	mg/kg	780	1	-	-	-	-	-	-	-	-	-	-	-	-	-
	Toluene	mg/kg	1000	0.7	-	-	-	-	-	-	-	-	-	-	-	-	-
	Xylene (m & p)	mg/kg			-	-	-	-	-	-	-	-	-	-	-	-	-
	Xylene (o)	mg/kg			-	-	-	-	-	-	-	-	-	-	-	-	-
	Xylene Total	mg/kg	1000	1.6	-	-	-	-	-	-	-	-	-	-	-	-	-
	Chloroform	mg/kg	700	0.37	-	-	-	-	-	-	-	-	-	-	-	-	-
	Dichloromethane	mg/kg	1000	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-
	Trichloroethene	mg/kg	400	0.47	-	-	-	-	-	-	-	-	-	-	-	-	-
	Tetrachloroethene	mg/kg	300	1.3	-	-	-	-	-	-	-	-	-	-	-	-	-
Metals	Arsenic	mg/kg	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-
	Barium	mg/kg	10000	820	**4030**	**145**	**137**	**232**	**138**	**133**	**117**	**1300**	**155**	**223**	**624**	**652**	**5930**
	Cadmium	mg/kg	60	7.5	-	-	-	-	-	-	-	-	-	-	-	-	-
	Chromium (III+VI)	mg/kg	800	19	-	-	-	-	-	-	-	-	-	-	-	-	-
	Copper	mg/kg	10000	1720	**207**	**29.7**	**13.4**	**34.5**	**11.8**	**11.7**	**88.2**	**5140**	**67.9**	**102**	**2530**	**1870**	**38,100**
	Lead	mg/kg	3900	450	**347**	**13.9J**	**5.4J**	**136J**	**6.7J**	**14.9**	**31**	**379**	**6**	**9.9**	**289**	**260**	**2230**
	Mercury	mg/kg	5.7	0.73	-	-	-	-	-	-	-	-	-	-	-	-	-
	Nickel	mg/kg	10000	130	-	-	-	-	-	-	-	-	-	-	-	-	-
	Selenium	mg/kg	6800	4	-	-	-	-	-	-	-	-	-	-	-	-	-
	Silver	mg/kg	6800	8.3	-	-	-	-	-	-	-	-	-	-	-	-	-
	Zinc	mg/kg	10000	2480	-	-	-	-	-	-	-	-	-	-	-	-	-
Pesticides	Aldrin + Dieldrin	mg/kg			-	-	-	-	-	-	-	-	-	-	-	-	-
	DDT	mg/kg	94	136	-	-	-	-	-	-	-	-	-	-	-	-	-
	DDT+DDE+DDD	mg/kg			-	-	-	-	-	-	-	-	-	-	-	-	-
	Dieldrin	mg/kg	2.8	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-
	Endrin	mg/kg	410	0.06	-	-	-	-	-	-	-	-	-	-	-	-	-
	Heptachlor epoxide	mg/kg			-	-	-	-	-	-	-	-	-	-	-	-	-
SVOCs	2-methylnaphthalene	mg/kg			-	-	-	-	-	-	-	-	-	-	-	-	-
	Acenaphthene	mg/kg	1000	98	-	-	-	-	-	-	-	-	-	-	-	-	-
	Acenaphthylene	mg/kg	1000	107	-	-	-	-	-	-	-	-	-	-	-	-	-
	Anthracene	mg/kg	1000	1000	-	-	-	-	-	-	-	-	-	-	-	-	-
	Benz(a)anthracene	mg/kg	11	1	-	-	-	-	-	-	-	-	-	-	-	-	-
	Benzo(a) pyrene	mg/kg	1.1	22	-	-	-	-	-	-	-	-	-	-	-	-	-
	Benzo(b)fluoranthene	mg/kg	11	1.7	-	-	-	-	-	-	-	-	-	-	-	-	-
	Benzo (b) pyrene	µg/kg			-	-	-	-	-	-	-	-	-	-	-	-	-
	Benzo(g,h,i)perylene	mg/kg	1000	1000	-	-	-	-	-	-	-	-	-	-	-	-	-
	Benzo(k)fluoranthene	mg/kg	110	1.7	-	-	-	-	-	-	-	-	-	-	-	-	-
	Chrysene	mg/kg	110	1	-	-	-	-	-	-	-	-	-	-	-	-	-
	Dibenz(a,h)anthracene	mg/kg	1.1	1000	-	-	-	-	-	-	-	-	-	-	-	-	-
	Fluoranthene	mg/kg	1000	1000	-	-	-	-	-	-	-	-	-	-	-	-	-
	Fluorene	mg/kg	1000	386	-	-	-	-	-	-	-	-	-	-	-	-	-
	Indeno(1,2,3-c,d)pyrene	mg/kg	11	8.2	-	-	-	-	-	-	-	-	-	-	-	-	-
	Naphthalene	mg/kg	1000	12	-	-	-	-	-	-	-	-	-	-	-	-	-
	Phenanthrene	mg/kg	1000	1000	-	-	-	-	-	-	-	-	-	-	-	-	-
	Pyrene	mg/kg	1000	1000	-	-	-	-	-	-	-	-	-	-	-	-	-
	Dibenzofuran	mg/kg	1000	210	-	-	-	-	-	-	-	-	-	-	-	-	-
PCBs	Arochlor 1254	mg/kg			-	-	-	-	-	-	-	-	-	-	-	-	-
	Arochlor-unspecified	mg/kg	25	3.2	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes

1. Soil Cleanup Objectives (SCOs) as presented in NYCRR Subpart 375-6.8b.
2. Detected values are shown in **bold**.
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J Estimated value

< Not detected above the laboratory reporting limit

Notes
1.
2.
3.
4.
J
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TABLE 4
Summary of Soil Analytical Results - FRA
Former Scott Technologies Site
Elmira, New York

				Previous Investigation														
				Sample Location	RecArea-B-7-N-15	RecArea-B-7-NNE-15	RecArea-B-7-NW-15	RecArea-B-7-S-20	RecArea-B-7-S-40	RecArea-B-7-S-50	RecArea-B-7-SE-20	RecArea-B-7-SE-40	RecArea-B-7-SE-50	RecArea-B-7-SW-36	RecArea-B-7-W-15	RecArea-B-8	RecArea-B-8-E-20-2
				Sample Depth Range (ft)	0-.17	0-.17	0-.17	0-.17	0-.17	0-.17	0-.17	0-.17	0-.17	0-.17	0-.17	0-.17	0-.17
				Sample Date	7/10/2002	7/10/2002	7/10/2002	7/10/2002	7/10/2002	7/10/2002	7/10/2002	7/10/2002	7/10/2002	7/10/2002	7/10/2002	7/10/2002	7/10/2002
		SCOs		Notes												Excavated	Excavated
Analyte Group	**Analyte**	**Units**	**Industrial**	**Protection of Ground-water**													
VOCs	Benzene	mg/kg	89	0.06	-	-	-	-	-	-	-	-	-	-	-	-	-
	Ethylbenzene	mg/kg	780	1	-	-	-	-	-	-	-	-	-	-	-	-	-
	Toluene	mg/kg	1000	0.7	-	-	-	-	-	-	-	-	-	-	-	-	-
	Xylene (m & p)	mg/kg			-	-	-	-	-	-	-	-	-	-	-	-	-
	Xylene (o)	mg/kg			-	-	-	-	-	-	-	-	-	-	-	-	-
	Xylene Total	mg/kg	1000	1.6	-	-	-	-	-	-	-	-	-	-	-	-	-
	Chloroform	mg/kg	700	0.37	-	-	-	-	-	-	-	-	-	-	-	-	-
	Dichloromethane	mg/kg	1000	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-
	Trichloroethene	mg/kg	400	0.47	-	-	-	-	-	-	-	-	-	-	-	-	-
	Tetrachloroethene	mg/kg	300	1.3	-	-	-	-	-	-	-	-	-	-	-	-	-
Metals	Arsenic	mg/kg	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-
	Barium	mg/kg	10000	820	**6420**	**212**	**191**	**562**	**516**	**399**	**700**	**441**	**2320**	**141**	**129**	**562**	**1650**
	Cadmium	mg/kg	60	7.5	-	-	-	-	-	-	-	-	-	-	-	-	-
	Chromium (III+VI)	mg/kg	800	19	-	-	-	-	-	-	-	-	-	-	-	-	-
	Copper	mg/kg	10000	1720	**2070**	**124**	**189**	**935**	**11,000**	**1420**	**1060**	**24,100**	**4270**	**3850**	**74.3**	**2540**	**1210**
	Lead	mg/kg	3900	450	**344**	**21.9**	**12.8**	**315**	**466**	**179**	**236**	**1170**	**444**	**317J**	**11.3**	**196J**	**253J**
	Mercury	mg/kg	5.7	0.73	-	-	-	-	-	-	-	-	-	-	-	-	-
	Nickel	mg/kg	10000	130	-	-	-	-	-	-	-	-	-	-	-	-	-
	Selenium	mg/kg	6800	4	-	-	-	-	-	-	-	-	-	-	-	-	-
	Silver	mg/kg	6800	8.3	-	-	-	-	-	-	-	-	-	-	-	-	-
	Zinc	mg/kg	10000	2480	-	-	-	-	-	-	-	-	-	-	-	-	-
Pesticides	Aldrin + Dieldrin	mg/kg			-	-	-	-	-	-	-	-	-	-	-	-	-
	DDT	mg/kg	94	136	-	-	-	-	-	-	-	-	-	-	-	-	-
	DDT+DDE+DDD	mg/kg			-	-	-	-	-	-	-	-	-	-	-	-	-
	Dieldrin	mg/kg	2.8	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-
	Endrin	mg/kg	410	0.06	-	-	-	-	-	-	-	-	-	-	-	-	-
	Heptachlor epoxide	mg/kg			-	-	-	-	-	-	-	-	-	-	-	-	-
SVOCs	2-methylnaphthalene	mg/kg			-	-	-	-	-	-	-	-	-	-	-	-	-
	Acenaphthene	mg/kg	1000	98	-	-	-	-	-	-	-	-	-	-	-	-	-
	Acenaphthylene	mg/kg	1000	107	-	-	-	-	-	-	-	-	-	-	-	-	-
	Anthracene	mg/kg	1000	1000	-	-	-	-	-	-	-	-	-	-	-	-	-
	Benz(a)anthracene	mg/kg	11	1	-	-	-	-	-	-	-	-	-	-	-	-	-
	Benzo(a) pyrene	mg/kg	1.1	22	-	-	-	-	-	-	-	-	-	-	-	-	-
	Benzo(b)fluoranthene	mg/kg	11	1.7	-	-	-	-	-	-	-	-	-	-	-	-	-
	Benzo (b) pyrene	µg/kg			-	-	-	-	-	-	-	-	-	-	-	-	-
	Benzo(g,h,i)perylene	mg/kg	1000	1000	-	-	-	-	-	-	-	-	-	-	-	-	-
	Benzo(k)fluoranthene	mg/kg	110	1.7	-	-	-	-	-	-	-	-	-	-	-	-	-
	Chrysene	mg/kg	110	1	-	-	-	-	-	-	-	-	-	-	-	-	-
	Dibenz(a,h)anthracene	mg/kg	1.1	1000	-	-	-	-	-	-	-	-	-	-	-	-	-
	Fluoranthene	mg/kg	1000	1000	-	-	-	-	-	-	-	-	-	-	-	-	-
	Fluorene	mg/kg	1000	386	-	-	-	-	-	-	-	-	-	-	-	-	-
	Indeno(1,2,3-c,d)pyrene	mg/kg	11	8.2	-	-	-	-	-	-	-	-	-	-	-	-	-
	Naphthalene	mg/kg	1000	12	-	-	-	-	-	-	-	-	-	-	-	-	-
	Phenanthrene	mg/kg	1000	1000	-	-	-	-	-	-	-	-	-	-	-	-	-
	Pyrene	mg/kg	1000	1000	-	-	-	-	-	-	-	-	-	-	-	-	-
	Dibenzofuran	mg/kg	1000	210	-	-	-	-	-	-	-	-	-	-	-	-	-
PCBs	Arochlor 1254	mg/kg			-	-	-	-	-	-	-	-	-	-	-	-	-
	Arochlor-unspecified	mg/kg	25	3.2	-	-	-	-	-	-	-	-	-	-	-	-	-

Soil Cleanup Objectives (SCOs) as presented in NYCRR Subpart 375-6.8b.
Detected values are shown in **bold**.
Exceedances of the SCOs for the Protection of Public Health are shaded.
Exceedances of the SCOs for the Protetction of Ground-Water are shown in **blue and underlined**.
Estimated value
Not detected above the laboratory reporting limit

TABLE 4
Summary of Soil Analytical Results - FRA
Former Scott Technologies Site
Elmira, New York

				Previous Investigation														
				Sample Location	RecArea-B-8-N-20	RecArea-B-8-NW-89	RecArea-B-8-S-30	RecArea-B-8-S-65	RecArea-B-8-SE-11	RecArea-B-8-SE-23	RecArea-B-8-SW-25	RecArea-B-8-SW-50	RecArea-B-8-SW-80	RecArea-B-8-W-25	RecArea-B-8-W-50	RecArea-B-8-W-75	RecArea-B-8-WSW-65
				Sample Depth Range (ft)	0-.17	0-.17	0-.17	0-.17	0-.17	0-.17	0-.17	0-.17	0-.17	0-.17	0-.17	0-.17	0-.17
				Sample Date	7/10/2002	7/10/2002	7/10/2002	7/10/2002	7/10/2002	7/10/2002	7/10/2002	7/10/2002	7/10/2002	7/10/2002	7/10/2002	7/10/2002	7/10/2002
SCOs				Notes	Excavated	Excavated	Excavated	Excavated	Excavated	Excavated	Excavated	Excavated	Excavated	Excavated	Excavated	Excavated	Excavated
Analyte Group	**Analyte**	**Units**	**Industrial**	**Protection of Ground-water**													
VOCs	Benzene	mg/kg	89	0.06	-	-	-	-	-	-	-	-	-	-	-	-	-
	Ethylbenzene	mg/kg	780	1	-	-	-	-	-	-	-	-	-	-	-	-	-
	Toluene	mg/kg	1000	0.7	-	-	-	-	-	-	-	-	-	-	-	-	-
	Xylene (m & p)	mg/kg			-	-	-	-	-	-	-	-	-	-	-	-	-
	Xylene (o)	mg/kg			-	-	-	-	-	-	-	-	-	-	-	-	-
	Xylene Total	mg/kg	1000	1.6	-	-	-	-	-	-	-	-	-	-	-	-	-
	Chloroform	mg/kg	700	0.37	-	-	-	-	-	-	-	-	-	-	-	-	-
	Dichloromethane	mg/kg	1000	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-
	Trichloroethene	mg/kg	400	0.47	-	-	-	-	-	-	-	-	-	-	-	-	-
	Tetrachloroethene	mg/kg	300	1.3	-	-	-	-	-	-	-	-	-	-	-	-	-
Metals	Arsenic	mg/kg	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-
	Barium	mg/kg	10000	820	**3670**	**277**	**580**	**144**	**924**	**337**	**1390**	**4350**	**615**	**4310**	**735**	**405**	**495**
	Cadmium	mg/kg	60	7.5	-	-	-	-	-	-	-	-	-	-	-	-	-
	Chromium (III+VI)	mg/kg	800	19	-	-	-	-	-	-	-	-	-	-	-	-	-
	Copper	mg/kg	10000	1720	**3660**	**4560**	**83,700**	**11**	**4660**	**3740**	**5820**	**8510**	**4100**	**7400**	**4260**	**608**	**253**
	Lead	mg/kg	3900	450	**672J**	**248J**	**3950**	**7.9J**	**320J**	**324J**	**664J**	**1180J**	**2230**	**2130J**	**1250J**	**46.7J**	**97.6**
	Mercury	mg/kg	5.7	0.73	-	-	-	-	-	-	-	-	-	-	-	-	-
	Nickel	mg/kg	10000	130	-	-	-	-	-	-	-	-	-	-	-	-	-
	Selenium	mg/kg	6800	4	-	-	-	-	-	-	-	-	-	-	-	-	-
	Silver	mg/kg	6800	8.3	-	-	-	-	-	-	-	-	-	-	-	-	-
	Zinc	mg/kg	10000	2480	-	-	-	-	-	-	-	-	-	-	-	-	-
Pesticides	Aldrin + Dieldrin	mg/kg			-	-	-	-	-	-	-	-	-	-	-	-	-
	DDT	mg/kg	94	136	-	-	-	-	-	-	-	-	-	-	-	-	-
	DDT+DDE+DDD	mg/kg			-	-	-	-	-	-	-	-	-	-	-	-	-
	Dieldrin	mg/kg	2.8	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-
	Endrin	mg/kg	410	0.06	-	-	-	-	-	-	-	-	-	-	-	-	-
	Heptachlor epoxide	mg/kg			-	-	-	-	-	-	-	-	-	-	-	-	-
SVOCs	2-methylnaphthalene	mg/kg			-	-	-	-	-	-	-	-	-	-	-	-	-
	Acenaphthene	mg/kg	1000	98	-	-	-	-	-	-	-	-	-	-	-	-	-
	Acenaphthylene	mg/kg	1000	107	-	-	-	-	-	-	-	-	-	-	-	-	-
	Anthracene	mg/kg	1000	1000	-	-	-	-	-	-	-	-	-	-	-	-	-
	Benz(a)anthracene	mg/kg	11	1	-	-	-	-	-	-	-	-	-	-	-	-	-
	Benzo(a) pyrene	mg/kg	1.1	22	-	-	-	-	-	-	-	-	-	-	-	-	-
	Benzo(b)fluoranthene	mg/kg	11	1.7	-	-	-	-	-	-	-	-	-	-	-	-	-
	Benzo (b) pyrene	µg/kg			-	-	-	-	-	-	-	-	-	-	-	-	-
	Benzo(g,h,i)perylene	mg/kg	1000	1000	-	-	-	-	-	-	-	-	-	-	-	-	-
	Benzo(k)fluoranthene	mg/kg	110	1.7	-	-	-	-	-	-	-	-	-	-	-	-	-
	Chrysene	mg/kg	110	1	-	-	-	-	-	-	-	-	-	-	-	-	-
	Dibenz(a,h)anthracene	mg/kg	1.1	1000	-	-	-	-	-	-	-	-	-	-	-	-	-
	Fluoranthene	mg/kg	1000	1000	-	-	-	-	-	-	-	-	-	-	-	-	-
	Fluorene	mg/kg	1000	386	-	-	-	-	-	-	-	-	-	-	-	-	-
	Indeno(1,2,3-c,d)pyrene	mg/kg	11	8.2	-	-	-	-	-	-	-	-	-	-	-	-	-
	Naphthalene	mg/kg	1000	12	-	-	-	-	-	-	-	-	-	-	-	-	-
	Phenanthrene	mg/kg	1000	1000	-	-	-	-	-	-	-	-	-	-	-	-	-
	Pyrene	mg/kg	1000	1000	-	-	-	-	-	-	-	-	-	-	-	-	-
	Dibenzofuran	mg/kg	1000	210	-	-	-	-	-	-	-	-	-	-	-	-	-
PCBs	Arochlor 1254	mg/kg			-	-	-	-	-	-	-	-	-	-	-	-	-
	Arochlor-unspecified	mg/kg	25	3.2	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes

1. Soil Cleanup Objectives (SCOs) as presented in NYCRR Subpart 375-6.8b.
2. Detected values are shown in **bold**.
3. Exceedances of the SCOs for the Protection of Public Health are shaded.
4. Exceedances of the SCOs for the Protetction of Ground-Water are shown in **blue and underlined**.

J Estimated value

< Not detected above the laboratory reporting limit

TABLE 4
Summary of Soil Analytical Results - FRA
Former Scott Technologies Site
Elmira, New York

				Previous Investigation															
				Sample Location	RecArea-B-9	RecArea-B-9	RecArea-B-9-E-11	RecArea-B-9-E-11	RecArea-B-9-N-15	RecArea-B-9-N-15	RecArea-B-9-W-15	RecArea-B-13	RecArea-B-13-E-14	RecArea-B-13-N-12	RecArea-B-13-N-30	RecArea-B-13-NNW-35	RecArea-B-13-NW-49	RecArea-B-13-S-15
				Sample Depth Range (ft)	0-.17	1.5-2.3	0-.17	1.5-2.3	0-.17	1.5-2.3	0-.17	0-.17	0-.17	0-.17	0-.17	0-.17	0-.17	0-.17
				Sample Date	7/10/2002	7/10/2002	7/10/2002	7/10/2002	7/10/2002	7/10/2002	7/10/2002	7/10/2002	7/10/2002	7/11/2002	7/11/2002	7/10/2002	7/10/2002	7/10/2002
		SCOs		Notes								Excavated	Excavated	Excavated	Excavated	Excavated	Excavated	Excavated
Analyte Group	**Analyte**	**Units**	**Industrial**	**Protection of Ground-water**														
VOCs	Benzene	mg/kg	89	0.06	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Ethylbenzene	mg/kg	780	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Toluene	mg/kg	1000	0.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Xylene (m & p)	mg/kg			-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Xylene (o)	mg/kg			-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Xylene Total	mg/kg	1000	1.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Chloroform	mg/kg	700	0.37	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Dichloromethane	mg/kg	1000	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Trichloroethene	mg/kg	400	0.47	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Tetrachloroethene	mg/kg	300	1.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Metals	Arsenic	mg/kg	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Barium	mg/kg	10000	820	**1650**	**3390**	**2480**	**2810**	**4360**	**3110**	**5570**	**9690**	**17900**	**9060**	**26200**	**349**	**2990**	**1270**
	Cadmium	mg/kg	60	7.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Chromium (III+VI)	mg/kg	800	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Copper	mg/kg	10000	1720	**149**	**119**	**243**	**766**	**180**	**193**	**298**	**18,600**	**4170**	**1850**	**47,800**	**178**	**309**	**1760**
	Lead	mg/kg	3900	450	**115**	**249**	**879J**	**433J**	**556**	**187**	**364**	**1720J**	**577J**	**557J**	**4210J**	**29.8J**	**159**	**164J**
	Mercury	mg/kg	5.7	0.73	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Nickel	mg/kg	10000	130	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Selenium	mg/kg	6800	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Silver	mg/kg	6800	8.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Zinc	mg/kg	10000	2480	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pesticides	Aldrin + Dieldrin	mg/kg			-	-	-	-	-	-	-	-	-	-	-	-	-	-
	DDT	mg/kg	94	136	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	DDT+DDE+DDD	mg/kg			-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Dieldrin	mg/kg	2.8	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Endrin	mg/kg	410	0.06	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Heptachlor epoxide	mg/kg			-	-	-	-	-	-	-	-	-	-	-	-	-	-
SVOCs	2-methylnaphthalene	mg/kg			-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Acenaphthene	mg/kg	1000	98	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Acenaphthylene	mg/kg	1000	107	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Anthracene	mg/kg	1000	1000	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Benz(a)anthracene	mg/kg	11	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Benzo(a) pyrene	mg/kg	1.1	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Benzo(b)fluoranthene	mg/kg	11	1.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Benzo (b) pyrene	µg/kg			-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Benzo(g,h,i)perylene	mg/kg	1000	1000	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Benzo(k)fluoranthene	mg/kg	110	1.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Chrysene	mg/kg	110	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Dibenz(a,h)anthracene	mg/kg	1.1	1000	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Fluoranthene	mg/kg	1000	1000	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Fluorene	mg/kg	1000	386	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Indeno(1,2,3-c,d)pyrene	mg/kg	11	8.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Naphthalene	mg/kg	1000	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Phenanthrene	mg/kg	1000	1000	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Pyrene	mg/kg	1000	1000	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Dibenzofuran	mg/kg	1000	210	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PCBs	Arochlor 1254	mg/kg			-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Arochlor-unspecified	mg/kg	25	3.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes

1. Soil Cleanup Objectives (SCOs) as presented in NYCRR Subpart 375-6.8b.
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J Estimated value

< Not detected above the laboratory reporting limit

TABLE 4
Summary of Soil Analytical Results - FRA
Former Scott Technologies Site
Elmira, New York

				Previous Investigation																	
				Sample Location	RecArea-B-13-S-37	RecArea-B-13-SW-25	RecArea-B-13-W-14	RecArea-B-13-W-47	RecArea-B-15	RecArea-B-16	RecArea-B-17	RecArea-B-18	RecArea-D-1	RecArea-D-2	RecArea-D-3	RecArea-D-4	RecArea-D-5	RecArea-D-6	RecArea-D-7	RecArea-D-8
				Sample Depth Range (ft)	0-.17	0-.17	0-.17	0-.17	0-.17	0-.17	0-.17	0-.17	0-.17	0-.17	0-.17	0-.17	0-.17	0-.17	0-.17	0-.17
				Sample Date	7/10/2002	7/10/2002	7/10/2002	7/10/2002	7/9/2002	7/9/2002	7/9/2002	7/9/2002	7/8/2002	7/8/2002	7/8/2002	7/8/2002	7/8/2002	7/8/2002	7/8/2002	7/8/2002
			SCOs	Notes	Excavated	Excavated	Excavated	Excavated												
Analyte Group	**Analyte**	**Units**	**Industrial**	**Protection of Ground-water**																
VOCs	Benzene	mg/kg	89	0.06	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Ethylbenzene	mg/kg	780	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Toluene	mg/kg	1000	0.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Xylene (m & p)	mg/kg			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Xylene (o)	mg/kg			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Xylene Total	mg/kg	1000	1.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Chloroform	mg/kg	700	0.37	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Dichloromethane	mg/kg	1000	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Trichloroethene	mg/kg	400	0.47	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Tetrachloroethene	mg/kg	300	1.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Metals	Arsenic	mg/kg	16	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Barium	mg/kg	10000	820	**394**	**14100**	**4130**	**19800**	**172**	**109**	**150**	**122**	-	-	-	-	-	-	-	-
	Cadmium	mg/kg	60	7.5	-	-	-	-	**0.084B**	<0U	<0U	<0U	-	-	-	-	-	-	-	-
	Chromium (III+VI)	mg/kg	800	19	-	-	-	-	**7.7**	**7.1**	**8.5**	**4.6**	-	-	-	-	-	-	-	-
	Copper	mg/kg	10000	1720	**113,000**	**5660**	**839**	**24,800**	-	-	-	-	-	-	-	-	-	-	-	-
	Lead	mg/kg	3900	450	**263**	**512J**	**119J**	**2310J**	**22J**	**17.3J**	**15.6J**	**25J**	-	-	-	-	-	-	-	-
	Mercury	mg/kg	5.7	0.73	-	-	-	-	**0.071B**	**0.088B**	**0.064B**	**0.047B**	-	-	-	-	-	-	-	-
	Nickel	mg/kg	10000	130	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Selenium	mg/kg	6800	4	-	-	-	-	**1.1BJ**	<0U	**1.3BJ**	**1.2BJ**	-	-	-	-	-	-	-	-
	Silver	mg/kg	6800	8.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Zinc	mg/kg	10000	2480	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pesticides	Aldrin + Dieldrin	mg/kg			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	DDT	mg/kg	94	136	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	DDT+DDE+DDD	mg/kg			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Dieldrin	mg/kg	2.8	0.1	-	-	-	-	**0.29**	**0.14**	**0.087**	**0.061**	**0.016**	**0.43**	**1.3**	**0.17**	**1.3**	**0.23**	**0.3**	**2.9**
	Endrin	mg/kg	410	0.06	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Heptachlor epoxide	mg/kg			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SVOCs	2-methylnaphthalene	mg/kg			-	-	-	-	**0.043J**	<0UJ	<0UJ	<0UJ	-	-	-	-	-	-	-	-
	Acenaphthene	mg/kg	1000	98	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Acenaphthylene	mg/kg	1000	107	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Anthracene	mg/kg	1000	1000	-	-	-	-	**0.048J**	<0UJ	<0U	<0U	-	-	-	-	-	-	-	-
	Benz(a)anthracene	mg/kg	11	1	-	-	-	-	**0.14J**	**0.055J**	**0.023J**	**0.034J**	-	-	-	-	-	-	-	-
	Benzo(a) pyrene	mg/kg	1.1	22	-	-	-	-	**0.093J**	**0.053J**	<0U	<0U	-	-	-	-	-	-	-	-
	Benzo(b)fluoranthene	mg/kg	11	1.7	-	-	-	-	**0.099J**	**0.064J**	**0.023J**	**0.037J**	-	-	-	-	-	-	-	-
	Benzo (b) pyrene	µg/kg			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Benzo(g,h,i)perylene	mg/kg	1000	1000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Benzo(k)fluoranthene	mg/kg	110	1.7	-	-	-	-	**0.071J**	**0.049J**	**0.024J**	**0.029J**	-	-	-	-	-	-	-	-
	Chrysene	mg/kg	110	1	-	-	-	-	**0.15J**	**0.07J**	**0.027J**	**0.04J**	-	-	-	-	-	-	-	-
	Dibenz(a,h)anthracene	mg/kg	1.1	1000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Fluoranthene	mg/kg	1000	1000	-	-	-	-	**0.18J**	**0.091J**	**0.036J**	**0.058J**	-	-	-	-	-	-	-	-
	Fluorene	mg/kg	1000	386	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Indeno(1,2,3-c,d)pyrene	mg/kg	11	8.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Naphthalene	mg/kg	1000	12	-	-	-	-	**0.026J**	<0UJ	<0U	<0U	-	-	-	-	-	-	-	-
	Phenanthrene	mg/kg	1000	1000	-	-	-	-	**0.14J**	**0.057J**	**0.026J**	**0.031J**	-	-	-	-	-	-	-	-
	Pyrene	mg/kg	1000	1000	-	-	-	-	**0.31J**	**0.14J**	**0.069J**	**0.092J**	-	-	-	-	-	-	-	-
	Dibenzofuran	mg/kg	1000	210	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PCBs	Arochlor 1254	mg/kg			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Arochlor-unspecified	mg/kg	25	3.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes

1. Soil Cleanup Objectives (SCOs) as presented in NYCRR Subpart 375-6.8b.
2. Detected values are shown in **bold**.
3. Exceedances of the SCOs for the Protection of Public Health are shaded.
4. Exceedances of the SCOs for the Protetction of Ground-Water are shown in **blue and underlined**.

J Estimated value

< Not detected above the laboratory reporting limit

TABLE 5
Summary of Groundwater Analytical Results
Former Scott Technologies Site
Elmira, New York

		Remedial Investigation of UST-6						
	Well ID	STCC-MW-4	STCC-MW-4	STCC-MW-5	STCC-MW-5	STCC-MW-6	STCC-MW-6
	Sample Date	3/3/1993	3/26/1993	3/3/1993	3/26/1993	3/4/1993	3/26/1993
Analyte	**Units**	TOGS 1.1.1						
Benzene	µg/L	1	ND	ND	ND	ND	ND	ND
Ethylbenzene	µg/L	5	ND	ND	ND	ND	ND	ND
Toluene	µg/L	5	0.4	ND	0.3	ND	0.27	ND
Xylene Total	µg/L	5	ND	ND	ND	ND	ND	ND
Methyl-tert-butyl ether	mg/L	0.01	ND	-	ND	-	ND	-
Naphthalene	µg/L	10	ND	-	0.85	-	ND	-
		Remedial Investigation of UST-3						
	Well ID	STCC-MW-7	STCC-MW-7	STCC-MW-8	STCC-MW-8	STCC-MW-9	STCC-MW-9
	Sample Date	3/4/1993	3/26/1993	3/4/1993	3/26/1993	3/4/1993	3/26/1993
Analyte	**Units**	TOGS 1.1.1						
Acenaphthene	µg/L	20	<8U	<8U	<8U	<8U	<8U	<8U
Anthracene	µg/L	50	<8U	<8U	8	<8U	<8U	<8U
Benz(a)anthracene	µg/L	0.002	<10U	<10U	8J	<10U	<10U	<10U
Benzo(a) pyrene	µg/L		<10U	<10U	<10U	<10U	<10U	<10U
Benzo(b)fluoranthene	µg/L	0.002	<10U	<10U	<10U	<10U	<10U	<10U
Benzo(g,h,i)perylene	µg/L		<10U	<10U	<10U	<10U	<10U	<10U
Benzo(k)fluoranthene	µg/L	0.002	<10U	<10U	<10U	<10U	<10U	<10U
Chrysene	µg/L	0.002	<10U	<10U	7J	<10U	<10U	<10U
Dibenz(a,h)anthracene	µg/L		<10U	<10U	<10U	<10U	<10U	<10U
Fluoranthene	µg/L	50	<9U	<9U	24	10	<9U	<9U
Fluorene	µg/L	50	<8U	<8U	12	<8U	<8U	<8U
Indeno(1,2,3-c,d)pyrene	µg/L	0.002	<10U	<10U	<10U	<10U	<10U	<10U
Naphthalene	µg/L	10	<6U	<6U	<6U	<6U	<6U	<6U
Phenanthrene	µg/L	50	<10U	<10U	39	11	<10U	<10U
Pyrene	µg/L	50	<8U	<8U	17	7J	<8U	<8U

Notes

1. TOGS 1.1.1 - Technical Operational Guidance Series 1.1.1 (NYSDEC, 1998).
2. Detected values are shown in **bold**.
3. Exceedances of TOGS 1.1.1 are shaded.

J Estimated value

< Not detected above the laboratory reporting limit. Some reporting limits were above the TOGS 1.1.1 values.

ND Not detected - reporting limit unavailable

µg/L micrograms per Liter

TABLE 6
PROPOSED SUBSURFACE SOIL SAMPLING
Fomer Scott Technologies Site
Elmira, New York

PAOC	Proposed Field ID	Sampling Interval					Sample Analysis					Rationale
		Surface 0 to 2 in bgs	Sub 1 2 to 24 in bgs	Sub 2 2 to 6 ft bgs	Sub 3 6 to 10 ft bgs	Sub 4 10 ft bgs to water table	PCBs	Metals	VOCs	SVOCs	Groundwater (Table 7)	
AOC-3C	STI-B20	NA	X	X	X	X	X	X	X	X	GW	Former Paint Pit ; Evaluation of soil conditions above water table
AOC-2B	STI-B21	NA	X	X	X	X	X	X	X	X	GW	Pipe Network East of Building 86 TCLP Lead > 5 mg/L in CC #2
AOC-17	STI-B22	X	X	-	-	-	X	X	X	X		Possible Surface Disposal Area along the SE near the RR Tracks; Evaluation of surface and near surface soil conditions
	STI-B23	X	X	-	-	-	X	X	X	X		
AOC-17	STI-B24	X	X	-	-	-	X	X	X	X		Possible Surface Disposal Area South of Plant Evaluation of surface and near surface soil conditions
	STI-B25	X	X	-	-	-	X	X	X	X		
	STI-B26	X	X	-	-	-	X	X	X	X		
	STI-B27	X	X	-	-	-	X	X	X	X		
	STI-B28	X	X	-	-	-	X	X	X	X		
	STI-B29	NA	X	-	-	-	X	X	X	X		
	STI-B30	X	X	-	-	-	X	X	X	X		
AOC-17/FRA	STI-B31	X	X	-	-	-	X	X	X	X		Areas outside of the fenced area of the FRA Evaluation of surface and near surface soil conditions
	STI-B32	X	X	-	-	-	X	X	X	X		
	STI-B33	X	X	-	-	-	X	X	X	X		

Notes:

PAOC - Potential Area of Concern
SCO - Restricted Residential Soil Cleanup Objective (6 NYCRR Subpart 375)
UST - Underground Storage Tank
TCLP - Toxicty Characterisitic Leaching Procedure
in bgs - inches below ground surface
ft bgs - feet below ground surface
mg//L -milligrams/Liter

PCBs - Polychlorinated Biphenyls
VOCs - volatile organic compound
SVOCs - semi-volatile organic compounds
X - Sample to be obtained at this interval
NA - Not Applicable, Paved Area
(-) - No sample to be collected.
GW - Direct Push Groundwater sample to be collected (See Table 7 for analyses)

TABLE 7
PROPOSED GROUNDWATER SAMPLING

Former Scott Technologies Site
Elmira, New York

Sample Location	Sampling Method	Sample Analysis				Rationale
		VOCs	SVOCs	Metals	PCB	
MW-1	Low-flow	X	X	X	X	Background
MW-2	Low-flow	X	X	X	X	Potential Off-Site Migration
MW-3	Low-flow	X	X	X	X	Potential Off-Site Migration
MW-3A	Low-flow	X	X	X	X	Potential Off-Site Migration
MW-4	Low-flow	X	NA	X	NA	UST-6 (Former Gasoline Tank)
MW-5	Low-flow	X	NA	X	NA	
MW-6	Low-flow	X	NA	X	NA	
MW-7	Low-flow	X	X	X	NA	UST-3 (Former No. 2 Diesel Tank)
MW-8	Low-flow	X	X	X	NA	
MW-9	Low-flow	X	X	X	NA	
STI-B20	Direct Push	X	X	X	NA	Former Paint Pit
STI-B23	Direct Push	X	X	X	X	Pipe Network East of Building 86 TCLP Lead > 5 mg/L in CC #2

Notes:

UST - Underground Storage Tank
TCLP - Toxicty Characterisitic Leaching Procedure
mg//L -milligrams/Liter

VOC - Volatile organic compound
SVOC - Semivolatile Organic Compound
PCB - Polychlorinated biphenyl

X - Analyze
NA - No Analysis

TABLE 8
ANALYTICAL METHODS, CONTAINERS, PRESERVATIVES, AND HOLDING TIMES

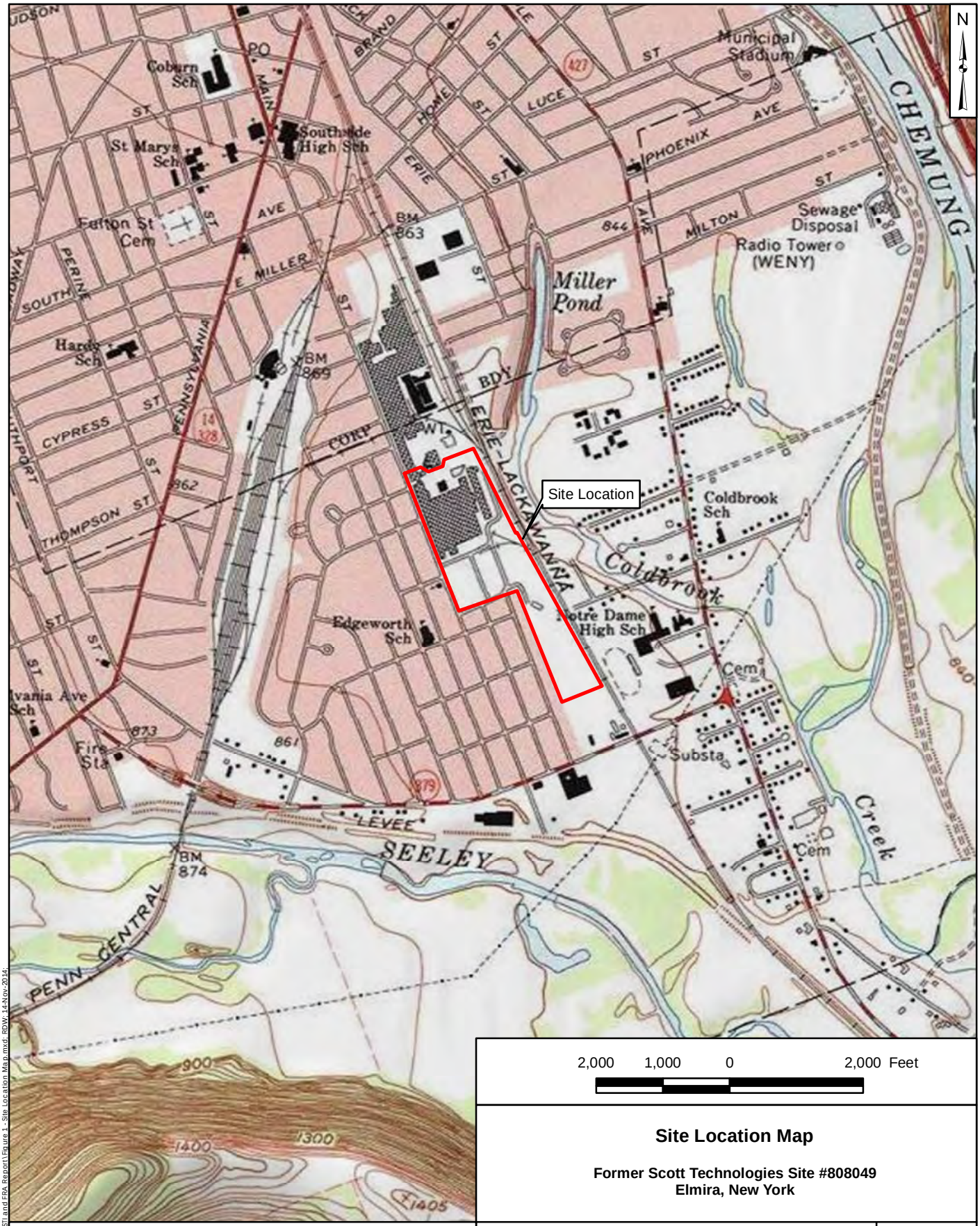
Former Scott Technologies Site
Elmira, New York

Matrix	Analytical Group	Analytical Method	Containers (number, size, type)	Preservation Requirements (chemical, temperature, etc.)	Maximum Holding Time (preparation/analysis)
Solid	TCL VOCs	SW-846 8260C	Terracore kit	2 VOA vials H_2O, 1 VOA vial MEOH, frozen within 48 hours	14 days
	TCL SVOCs	SW-846 8270D	1-4 oz glass jar	Cool <6^{0}C but not frozen	14 days to extract 40 days to analyze
	Pesticides	SW-846 8081	1-4 oz glass jar	Cool <6^{0}C but not frozen	14 days to extract 40 days to analyze
	PCBS	SW-846 8082A	1-4 oz glass jar	Cool <6^{0}C but not frozen	14 days to extract 40 days to analyze
	Mercury, Total	SW-846 7471B	1-4 oz. glass jar	Cool <6^{0}C but not frozen	28 days
	Metals, Total	SW-846 6010C		Cool <6^{0}C but not frozen	180 days
	Cyanide	Method 9014	1-4 oz glass jar	Cool <6^{0}C but not frozen	14 days
Water	TCL VOCs	SW-846 8260C	3 X 40-mL glass VOA vials	HCl to pH<2, no headspace, cool to <6^{0}C, but not frozen	14 days
	TCL SVOCs	SW-846 8270D	2 - 1 L amber glass	Cool <6^{0}C but not frozen	7 days to extract 40 days to analyze
	PCBs	SW-846 8082A Low-Level	2-1 L amber glass	Cool <6^{0}C but not frozen	7 days to extract 40 days to analyze
	Mercury, Total	SW-846 7470A	1-250 ml plastic	HNO3 to pH<2, Cool <6^{0}C but not frozen	28 days
	TAL Metals	SW-846 6010C			6 months
	TPH-DRO	SW-846 8015D	1-1 L glass	Cool <6^{0}C but not frozen	7 days to extract 40 days to analyze
	TPH-GRO	SW-846 8015D	3 X 40-mL glass VOA vials	HCl to pH<2, no headspace, cool to <6^{0}C, but not frozen	14 days

Notes:
SW-846 - USEPA "SW-846 Test Methods for Evaluating Solid Waste: Physical/Chemical Methods", April 1998, 5th edition.

ºC - Celcius
HCl – hydrochloric acid
L – liter
mL – milliliters
^{0}C – degrees Celsius
oz. – ounce
MEOH - methanol
DRO - diesel range organics
HVS - high volume sampling
VOA – volatile organic analyte
VOC – volatile organic compound
H_2O - water
SVOC – semi-volatile organic compound
TPH – total petroleum hydrocarbons
GRO - gasoline range organics
TCL - Target Compound List
TAL - Target Analyte List

FIGURES



Site Location Map

Former Scott Technologies Site #808049
Elmira, New York

Notes:
Topographic map accessed via ArcGIS Online and provided by National Geographic Society and i-cubed on 14 November 2014. Elmira, New York Quadrangle (1971, photorevised 1976) is shown.

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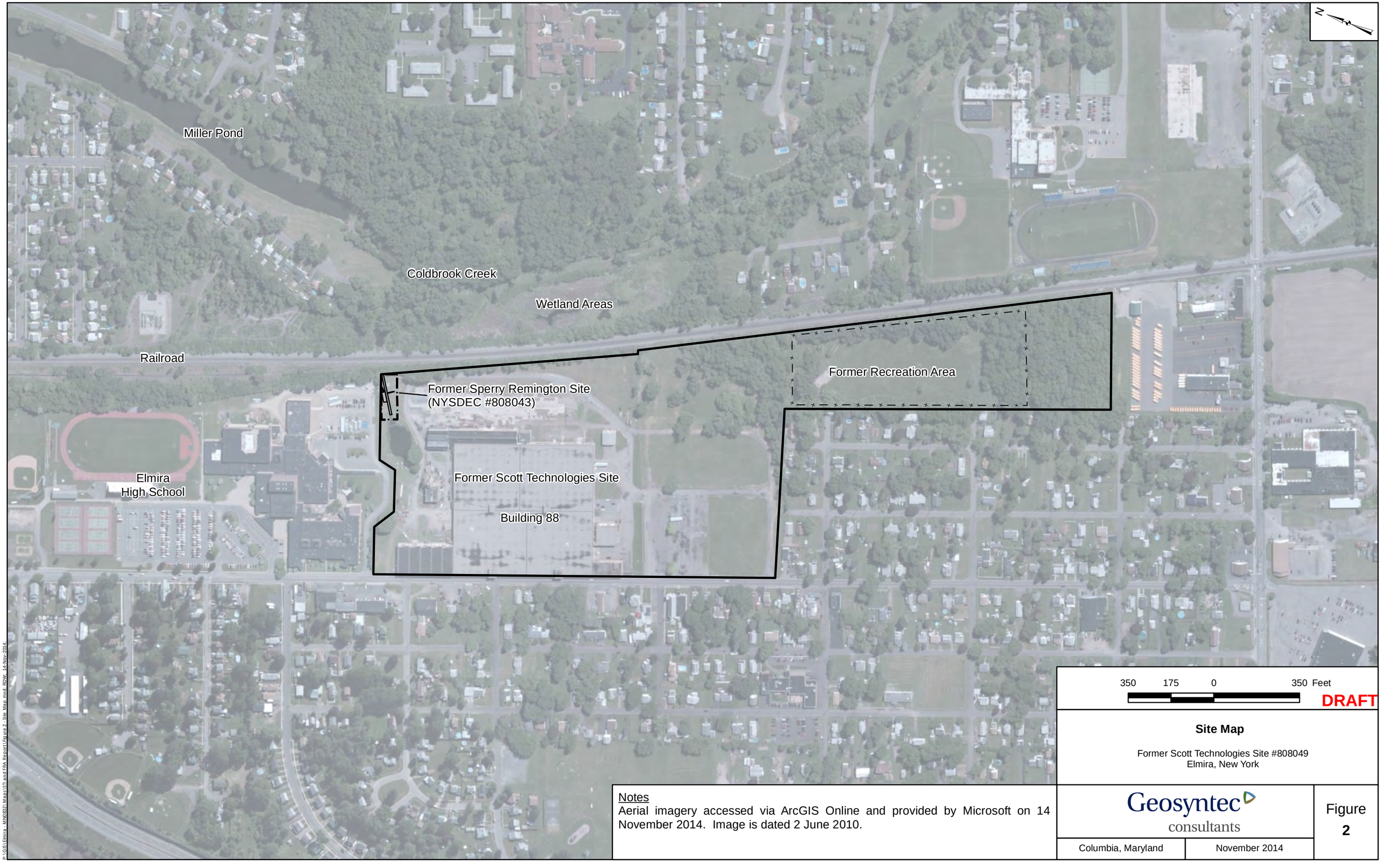
Figure 1

P:\GIS\Elmira - MW0832\Maps\STI and FRA Report\Figure 1 - Site Location Map.mxd; RDW; 14-Nov-2014;



350 175 0 350 Feet

DRAFT

Site Map

Former Scott Technologies Site #808049
Elmira, New York

Notes
Aerial imagery accessed via ArcGIS Online and provided by Microsoft on 14 November 2014. Image is dated 2 June 2010.

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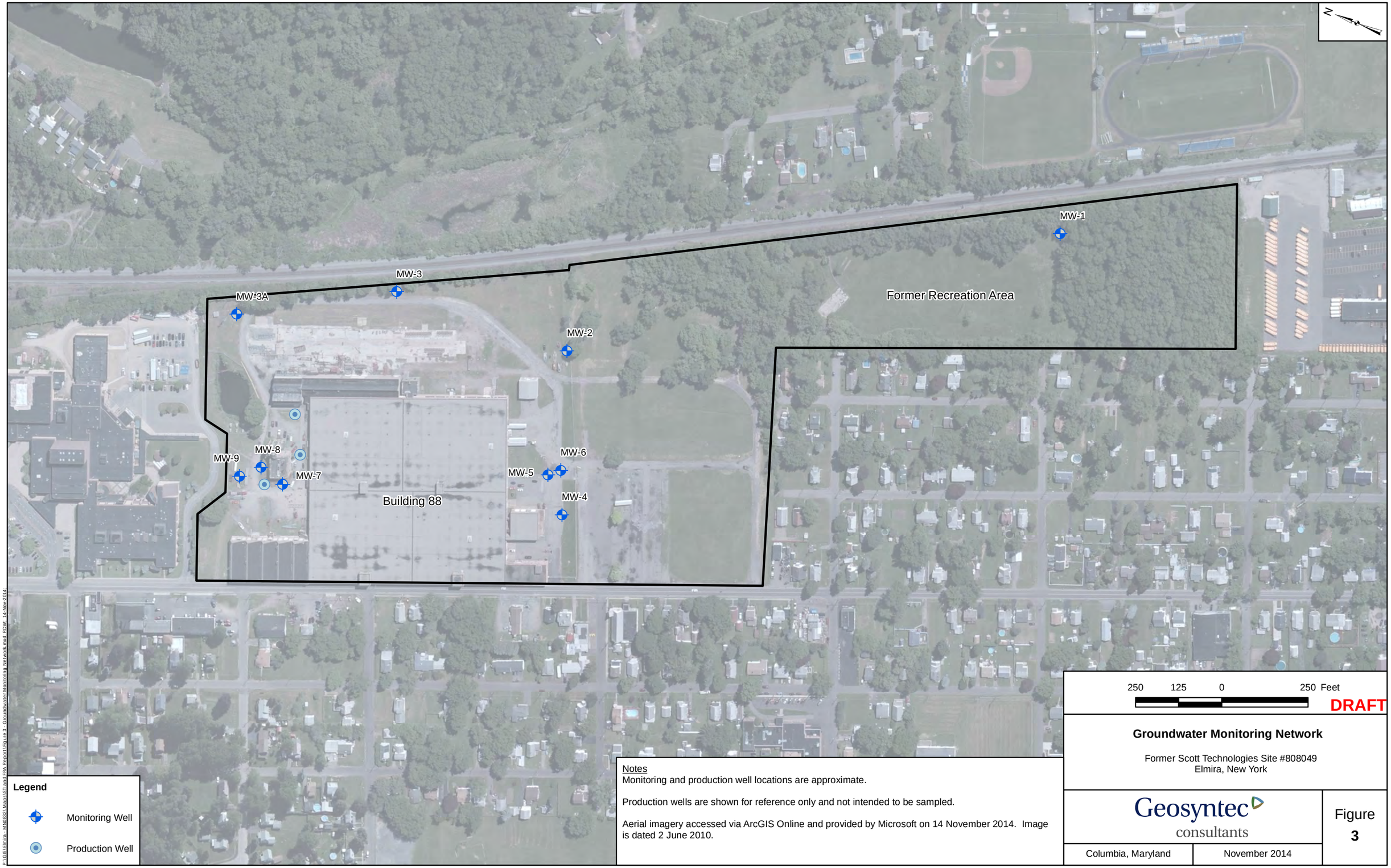
Figure **2**

P:\GIS\Elmira - MW0924\Maps\ESI and FRA Report\Figure 2 - Site Map.mxd (RDW) 14-Nov-2014



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Notes
Monitoring and production well locations are approximate.

Production wells are shown for reference only and not intended to be sampled.

Aerial imagery accessed via ArcGIS Online and provided by Microsoft on 14 November 2014. Image is dated 2 June 2010.

Groundwater Monitoring Network

Former Scott Technologies Site #808049
Elmira, New York

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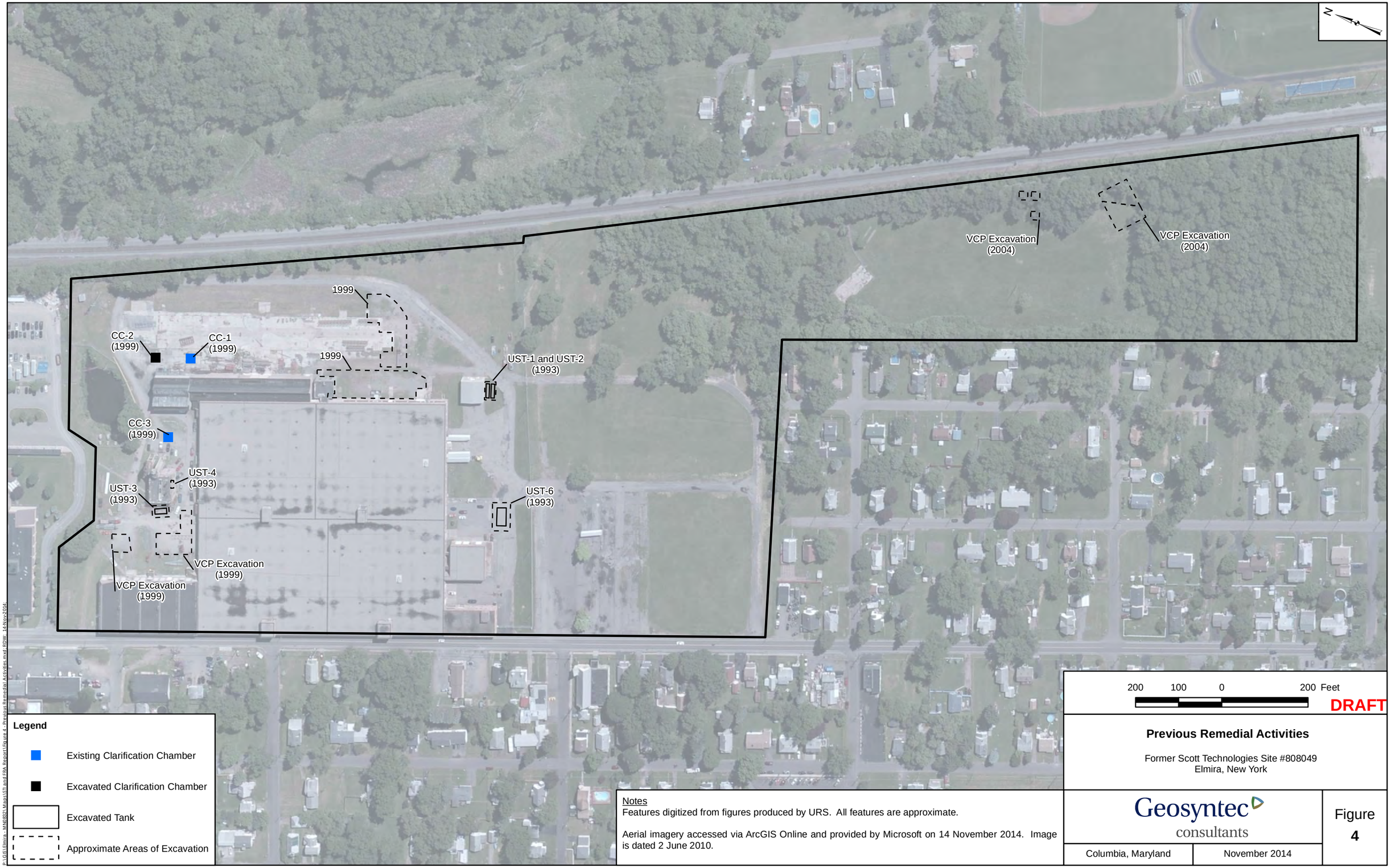
Figure **3**

P:\GIS\Elmira - MW2014\Maps\5th and FRA Report\Figure 3 - Groundwater Monitoring Network.mxd 14-Nov-2014



P:\GIS\Elmira - MW0801\Maps\3D and FSA Report\Figure 4 - Previous Remedial Activities.mxd RDW 14-Nov-2014

Notes
Features digitized from figures produced by URS. All features are approximate.

Aerial imagery accessed via ArcGIS Online and provided by Microsoft on 14 November 2014. Image is dated 2 June 2010.

Previous Remedial Activities

Former Scott Technologies Site #808049
Elmira, New York

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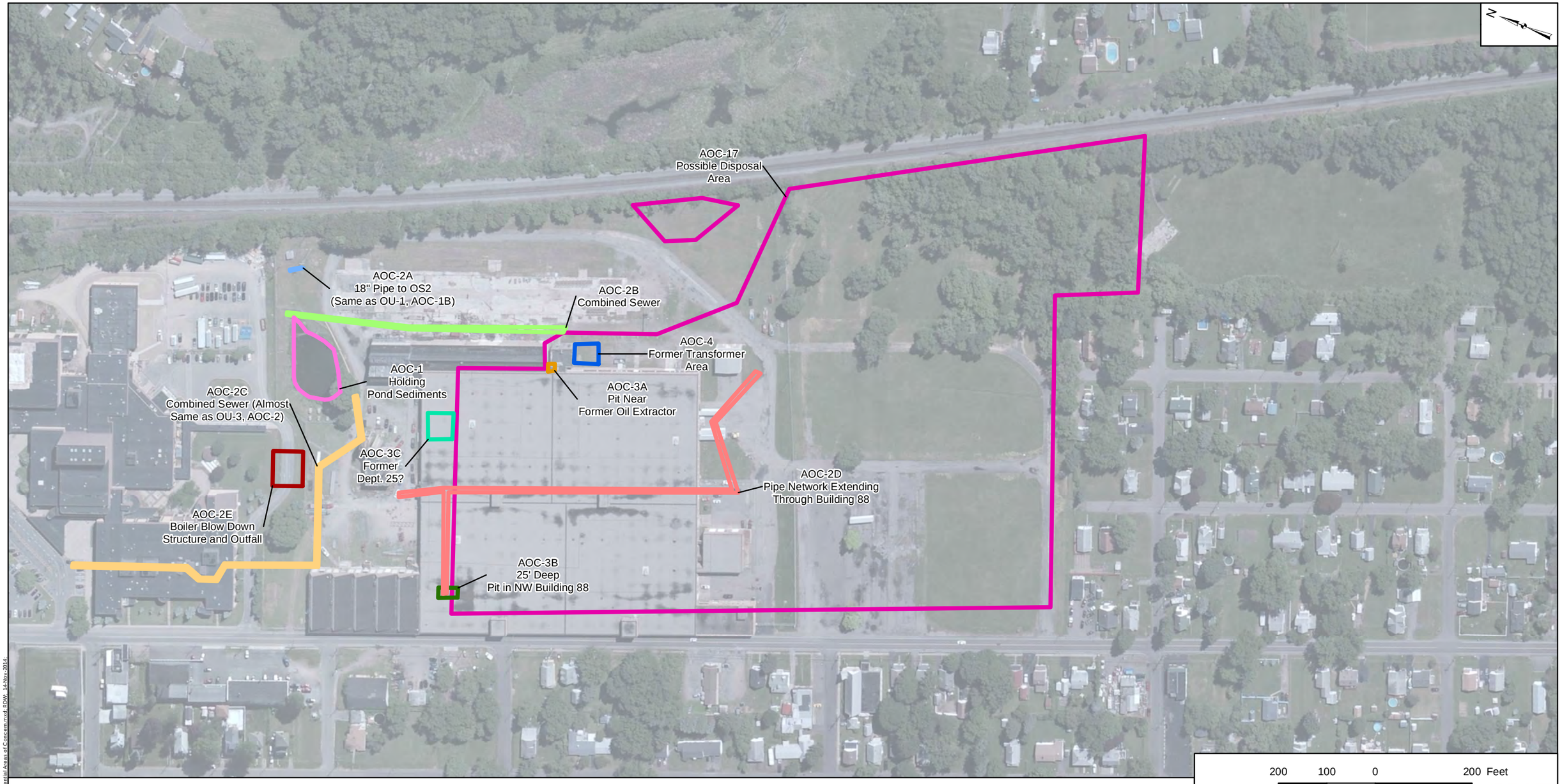
Figure **4**



Legend

AOC-1 AOC-2B AOC-2D AOC-3A AOC-3C AOC-17

AOC-2A AOC-2C AOC-2E AOC-3B AOC-4

200 100 0 200 Feet

DRAFT

NYSDEC Potential Areas of Concern

Former Scott Technologies Site #808049
Elmira, New York

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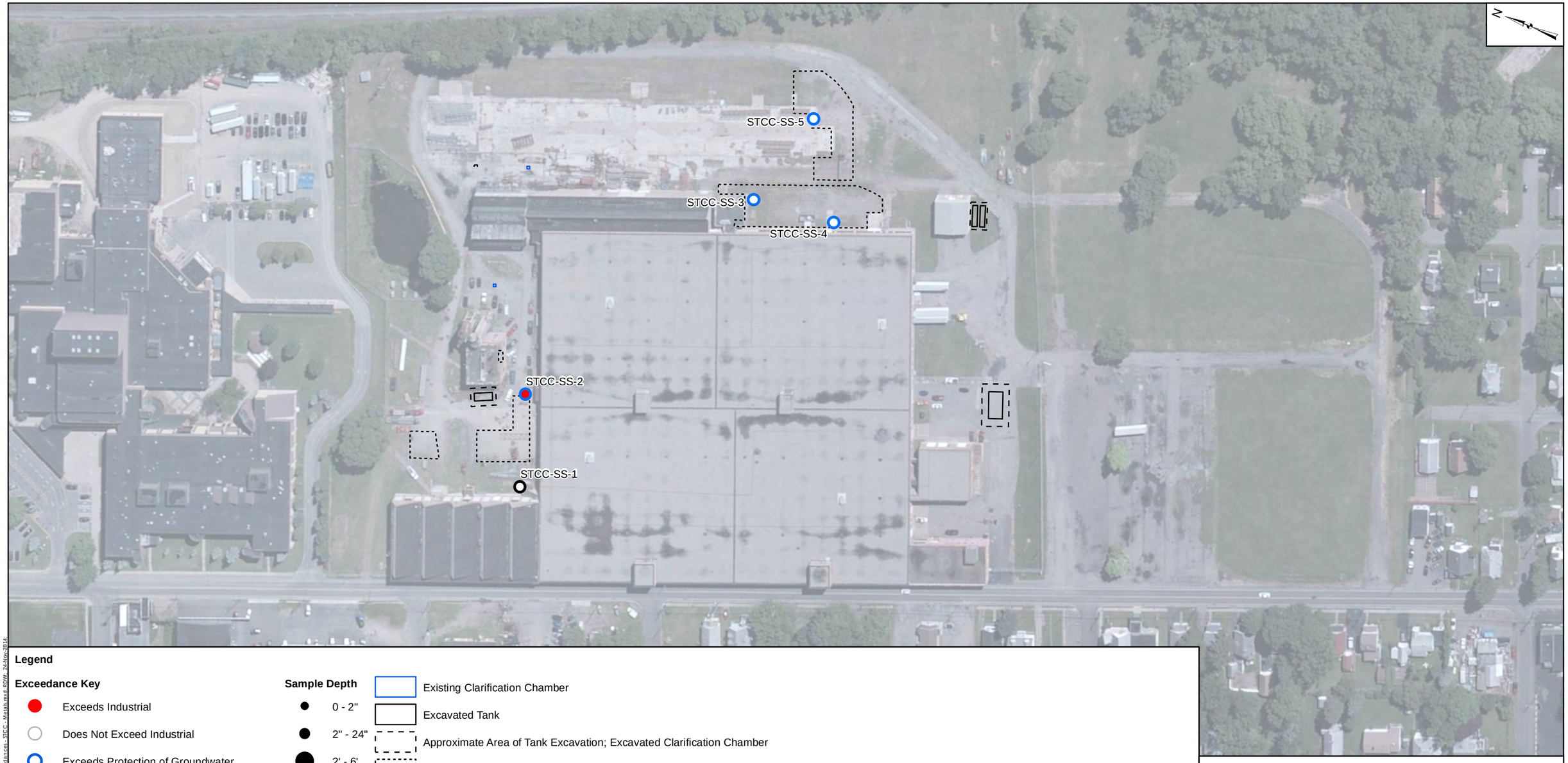
Figure **5**

Notes and Disclaimer

Areas of concern georeferenced from PDF drawings provided by New York State Department of Environmental Conservation (NYSDEC). Georeferenced items may include: historical site features, hand-drawn features, features that were not to scale, or features that were originally on a map that contained a different projection. Inherently, georeferencing introduces slight distortortions and inaccuracies in spatial data, but these distortions and inaccuracies may be exacerbated by the factors listed above. All reasonable efforts were made to accurately reflect the data provided.

Aerial imagery accessed via ArcGIS Online and provided by Microsoft on 14 November 2014. Image is dated 2 June 2010.

P:\GIS\Elmira - MW0802\Maps\SI and FSs Report\Figure 5 - NYSDEC Potential Areas of Concern.mxd ROW 14-Nov-2014



Legend

Exceedance Key

- Exceeds Industrial
- Does Not Exceed Industrial
- Exceeds Protection of Groundwater
- Does Not Exceed Protection of Groundwater

Sample Depth

- 0 - 2"
- 2" - 24"
- 2' - 6'
- 6' - 10'
- >10'

- Existing Clarification Chamber
- Excavated Tank
- Approximate Area of Tank Excavation; Excavated Clarification Chamber
- Approximate Areas of Excavation

150 75 0 150 Feet

DRAFT

Notes and Disclaimer

Areas of concern and sample locations georeferenced from PDF drawings provided by New York State Department of Environmental Conservation (NYSDEC). Georeferenced items may include: historical site features, hand-drawn features, features that were not to scale, or features that were originally on a map that contained a different projection. Inherently, georeferencing introduces slight distortortions and inaccuracies in spatial data, but these distortions and inaccuracies may be exacerbated by the factors listed above. All reasonable efforts were made to accurately reflect the data provided.

Aerial imagery accessed via ArcGIS Online and provided by Microsoft on 24 November 2014. Image is dated 2 June 2010.

Extent of Soil Cleanup Objective Exceedances for Metals at the Former Scott Technologies Site

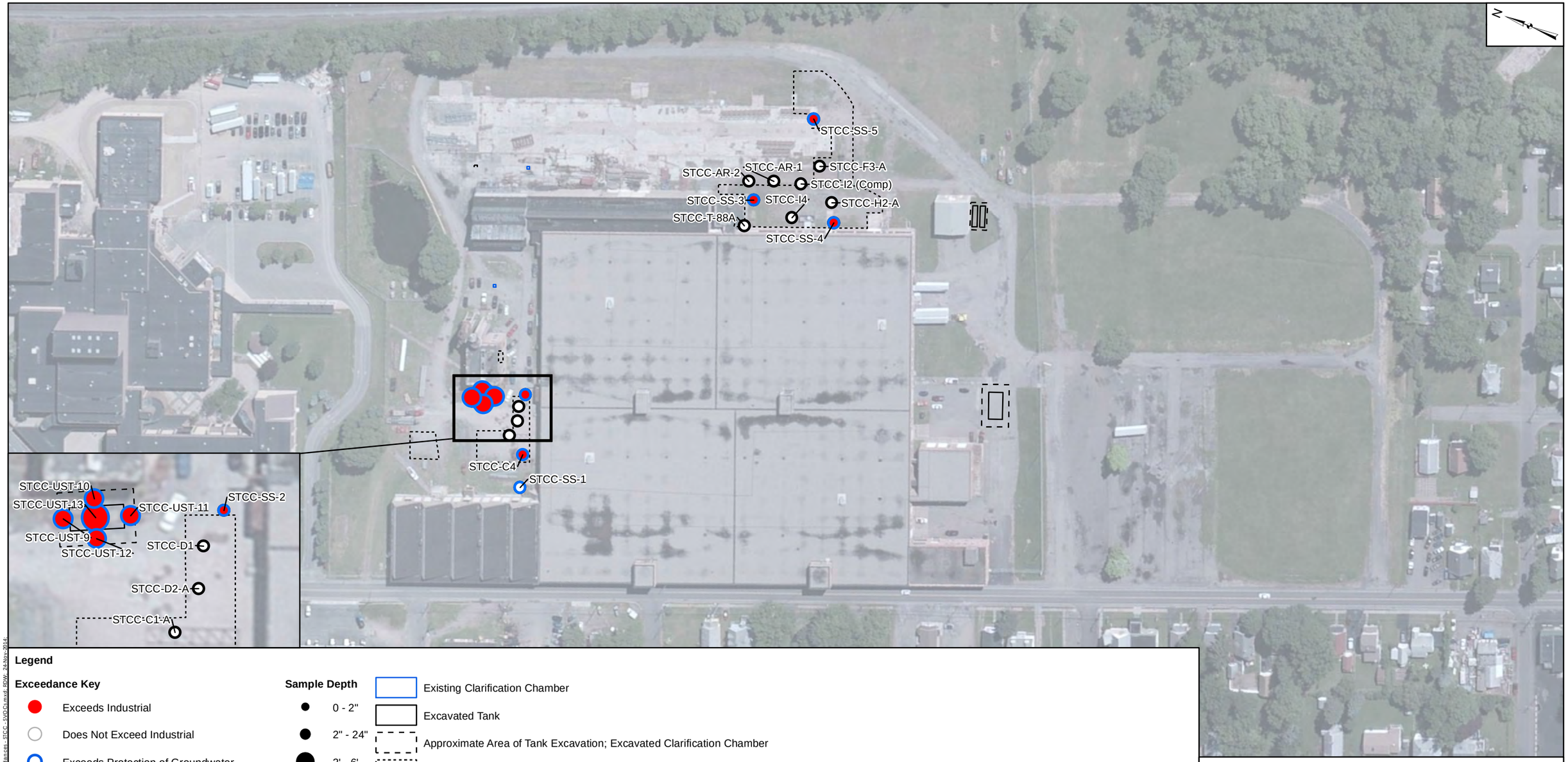
Former Scott Technologies Site #808049
Elmira, New York

Geosyntec consultants

Columbia, Maryland | November 2014

Figure 6

P:\GIS\Elmira - MN0892\Maps\ST and FS\Report\Figure 6 - Extent of SCO Exceedances - STCC - Metals.mxd RDW 24-Nov-2014



Legend

Exceedance Key

- Exceeds Industrial
- Does Not Exceed Industrial
- Exceeds Protection of Groundwater
- Does Not Exceed Protection of Groundwater

Sample Depth

- 0 - 2"
- 2" - 24"
- 2' - 6'
- 6' - 10'
- >10'

- Existing Clarification Chamber
- Excavated Tank
- Approximate Area of Tank Excavation; Excavated Clarification Chamber
- Approximate Areas of Excavation

150 75 0 150 Feet

DRAFT

Notes and Disclaimer

Areas of concern and sample locations georeferenced from PDF drawings provided by New York State Department of Environmental Conservation (NYSDEC). Georeferenced items may include: historical site features, hand-drawn features, features that were not to scale, or features that were originally on a map that contained a different projection. Inherently, georeferencing introduces slight distortortions and inaccuracies in spatial data, but these distortions and inaccuracies may be exacerbated by the factors listed above. All reasonable efforts were made to accurately reflect the data provided.

Aerial imagery accessed via ArcGIS Online and provided by Microsoft on 24 November 2014. Image is dated 2 June 2010.

Extent of Soil Cleanup Objective Exceedances for SVOCs at the Former Scott Technologies Site

Former Scott Technologies Site #808049
Elmira, New York

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Columbia, Maryland | November 2014

Figure 7

P:\GIS\Elmira - MW0921\Maps\SB and GBA Report\Figure 7 - Extent of SCO Exceedances - SSCC - SVOCs.mxd, RDW, 24-Nov-2014.

RecArea-B-1
RecArea-B-15
RecArea-B-17
RecArea-B-14
RecArea-B-13-S-37
RecArea-B-13-S-15
RecArea-B-13-E-14
RecArea-B-13
RecArea-B-13-N-12
RecArea-B-13-N-30
RecArea-B-13-NNW-35
RecArea-B-13-NW-49
RecArea-B-13-W-14
RecArea-B-13-SW-25
RecArea-B-13-W-47
RecArea-B-8-E-20-2
RecArea-B-8-SE-23
RecArea-B-8-S-30
RecArea-B-8-SE-11
RecArea-B-8
RecArea-B-8-N-20
RecArea-B-8-W-25
RecArea-B-8-W-50
RecArea-B-8-NW-89
RecArea-B-8-W-75
RecArea-B-7-ENE-69
RecArea-B-8-SW-25
RecArea-B-8-S-65
RecArea-B-8-SW-50
RecArea-B-8-WSW-65
RecArea-B-8-SW-80
RecArea-B-7-E-72
RecArea-B-7-ENE-44
RecArea-B-7-E-50
RecArea-B-7-E-40
RecArea-B-7-SE-50
RecArea-B-7-SE-40
RecArea-B-7-S-50
RecArea-B-7-E-20-1
RecArea-B-7-NNE-15
RecArea-B-7-N-15
RecArea-B-7-NW-15
RecArea-B-7-W-15
RecArea-B-7-SE-20
RecArea-B-7-S-20
RecArea-B-7-SW-36
RecArea-B-7
RecArea-B-5
RecArea-B-5-NE-47
RecArea-B-5-E-10
RecArea-B-5-SE-25
RecArea-B-4
RecArea-B-5-N-10
RecArea-B-5-W-10
RecArea-B-5-NW-25
RecArea-B-5-S-10
RecArea-B-5-W-25
RecArea-B-5-SW-25
RecArea-B-1
RecArea-B-2
RecArea-B-3
Former Recreation Area
RecArea-B-9-E-11
RecArea-B-9-N-15
RecArea-B-9
RecArea-B-9-W-15
RecArea-B-10
RecArea-B-6A
RecArea-B-6A-E-15
RecArea-B-6A-N-15
RecArea-B-6A-S-15
RecArea-B-6A-W-15
RecArea-B-11
RecArea-B-12
RecArea-B-6

Legend

Exceedance Key

- Exceeds Industrial
- Does Not Exceed Industrial
- Exceeds Protection of Groundwater
- Does Not Exceed Protection of Groundwater

Sample Depth

- 0 - 2"
- 2" - 24"
- 2' - 6'
- 6' - 10'
- >10'

- Existing Clarification Chamber
- Excavated Tank
- Approximate Area of Tank Excavation; Excavated Clarification Chamber
- Approximate Areas of Excavation

PropertyParcels

Desc

- Sperry Remington Property
- Former Recreation Area

100 50 0 100 Feet

DRAFT

Extent of Soil Cleanup Objectives Exceedances for Metals at the Former Recreation Area

Former Scott Technologies Site #808049
Elmira, New York

Geosyntec consultants

Columbia, Maryland | November 2014

Figure **8**

Notes and Disclaimer

Areas of concern and sample locations georeferenced from PDF drawings provided by New York State Department of Environmental Conservation (NYSDEC). Georeferenced items may include: historical site features, hand-drawn features, features that were not to scale, or features that were originally on a map that contained a different projection. Inherently, georeferencing introduces slight distortortions and inaccuracies in spatial data, but these distortions and inaccuracies may be exacerbated by the factors listed above. All reasonable efforts were made to accurately reflect the data provided.

Aerial imagery accessed via ArcGIS Online and provided by Microsoft on 25 November 2014. Image is dated 2 June 2010.

P:\GIS\Elmira - MW\0901\Maps\ST and FRA Report\Figure 8 - Extent of SCO Exceedances - FRA - Metals.mxd 20:09, 25 Nov 2014

RecArea-B-15
RecArea-B-8
RecArea-B-17
RecArea-B-7
RecArea-B-4
RecArea-B-5
RecArea-B-3
RecArea-B-2
Former Recreation Area
RecArea-B-9
RecArea-B-6

Legend

Exceedance Key

- Exceeds Industrial
- Does Not Exceed of Industrial
- Exceeds Protection of Groundwater
- Does Not Exceed Protection of Groundwater

Sample Depth

- 0 - 2"
- 2" - 24"
- 2' - 6'
- 6' - 10'
- >10'

- Existing Clarification Chamber
- Excavated Tank
- Approximate Area of Tank Excavation; Excavated Clarification Chamber
- Approximate Areas of Excavation

PropertyParcels

Desc

- Sperry Remington Property
- Former Recreation Area

100 50 0 100 Feet

DRAFT

Notes and Disclaimer

Areas of concern and sample locations georeferenced from PDF drawings provided by New York State Department of Environmental Conservation (NYSDEC). Georeferenced items may include: historical site features, hand-drawn features, features that were not to scale, or features that were originally on a map that contained a different projection. Inherently, georeferencing introduces slight distortortions and inaccuracies in spatial data, but these distortions and inaccuracies may be exacerbated by the factors listed above. All reasonable efforts were made to accurately reflect the data provided.

Aerial imagery accessed via ArcGIS Online and provided by Microsoft on 25 November 2014. Image is dated 2 June 2010.

Extent of Soil Cleanup Objectives Exceedances for SVOCS at the Former Recreation Area

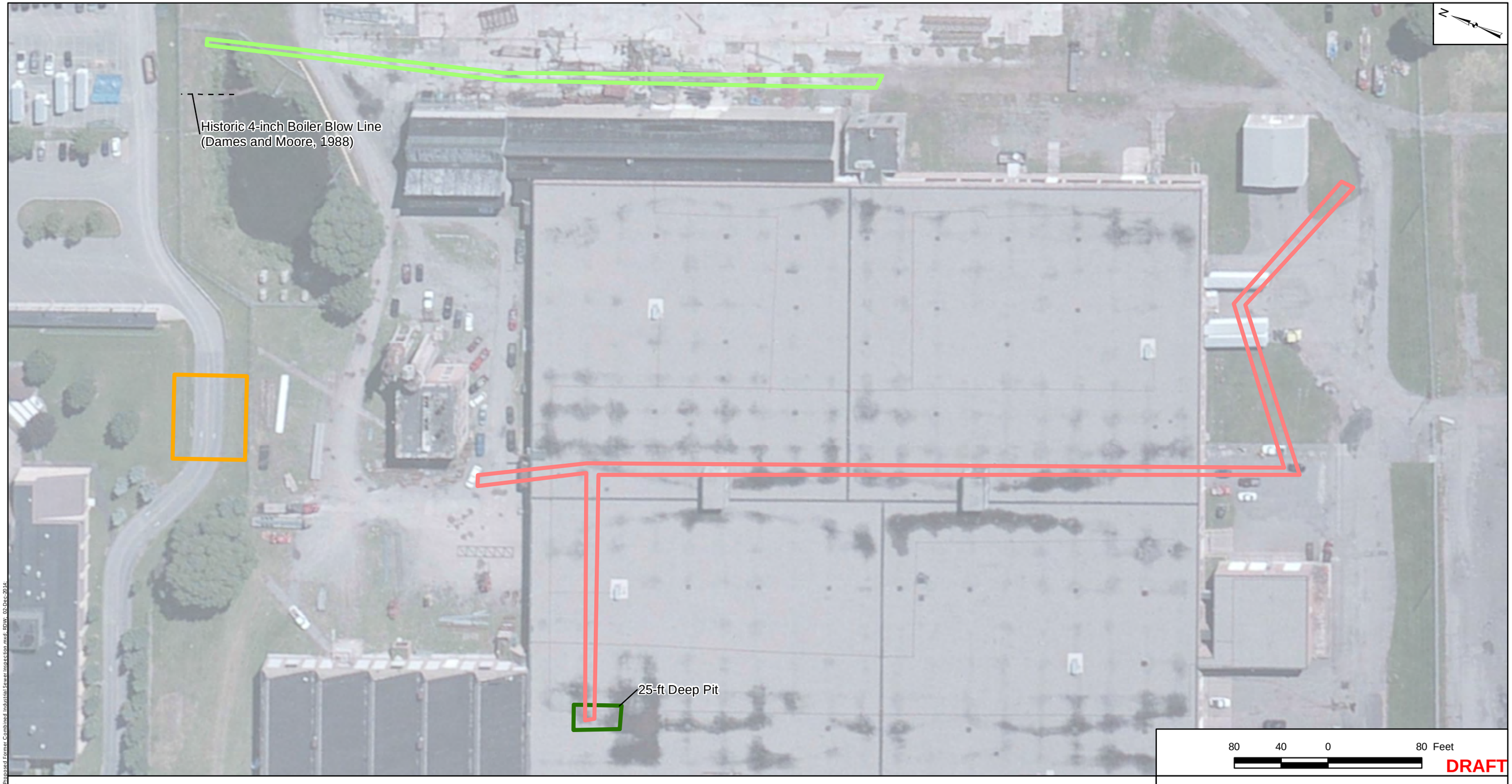
Former Scott Technologies Site #808049
Elmira, New York

Geosyntec consultants

Columbia, Maryland | November 2014

Figure 9

P:\GIS\Elmira - MW0801\Maps\ISR and FRA Report\Figure 9 - Extent of SCO Exceedances - FRA - SVOCs.mxd - RDW - 25-Nov-2014



Legend

AOC-2B AOC-2D AOC-2E AOC-3B

80 40 0 80 Feet

DRAFT

Proposed Former Combined Industrial Sewer Inspection

Former Scott Technologies Site #808049
Elmira, New York

Notes and Disclaimer

Areas of concern georeferenced from PDF drawings provided by New York State Department of Environmental Conservation (NYSDEC). Georeferenced items may include: historical site features, hand-drawn features, features that were not to scale, or features that were originally on a map that contained a different projection. Inherently, georeferencing introduces slight distortortions and inaccuracies in spatial data, but these distortions and inaccuracies may be exacerbated by the factors listed above. All reasonable efforts were made to accurately reflect the data provided.

Aerial imagery accessed via ArcGIS Online and provided by Microsoft on 02 December 2014. Image is dated 2 June 2010.

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Figure **10**

P:\GIS\Elmira - MW\MXD\ Maps\STA and FBA Report\Figure 10 - Proposed Former Combined Industrial Sewer Inspection.mxd RDW 02-Dec-2014

MW-3

MW-3A

AOC-2A
18" Pipe to OS2
(Same as OU-1/ AOC-1B)

AOC-2B
Combined
Sewer

STI-B21

AOC-1
Holding
Pond Sediments

AOC-4
Former Transformer
Area

AOC-3A
Pit Near
Former Oil Extractor

STI-B22

STI-B23

STI-B24

MW-2

STI-B25

STI-B26

AOC-2D
Pipe Network Extending
Through Building 88

AOC-17
Possible
Disposal Area

STI-B20

AOC-2E
Boiler Blow Down
Structure and Outfall

MW-8

MW-9

MW-7

AOC-3C
Former
Paint Pit

AOC-2C
Combined Sewer (Almost
Same as OU-3/ AOC-2)

AOC-3B
25' Deep Pit in NW
Building 88

MW-5

MW-6

MW-4

STI-B27

STI-B28

STI-B29

STI-B30

MW-1

STI-B31

STI-B32

STI-B33

Legend

- Monitoring Well
- Historical Soil Sample That Exceeds Industrial SCO for Metals and SVOCs
- Historical Soil Sample That Exceeds Industrial SCO for Metals
- Historical Soil Sample That Exceeds Industrial SCO for SVOCs
- Historical Soil Sample That Exceeds Industrial SCO for Pesticides
- Historical Soil Sample That Does Not Exceed Industrial SCO
- Previous Sample Locations without Data
- Proposed Soil Sample Location
- Proposed Soil and Groundwater Sample Location

- AOC-1
- AOC-2A
- AOC-2B
- AOC-2C
- AOC-2D
- AOC-2E
- AOC-3A
- AOC-3B
- AOC-3C
- AOC-4
- AOC-17
- Existing Clarification Chamber
- Excavated Tank
- Approximate Area of Excavation
- Approximate Areas of Excavation

Notes
Proposed soil sample locations are approximate. Final locations will be determined by field personnel at the time of sampling.

Features digitized from figures produced by URS. All features are approximate.

100 50 0 100 Feet

DRAFT

Proposed Soil Investigation

Former Scott Technologies Site #808049
Elmira, New York

Geosyntec consultants

Columbia, Maryland | November 2014

Figure 11

ID	Task Name	Duration	Start	Finish
1	**Former Scott Technologies Site (NYSDEC 808049)**	**143 days**	**Fri 12/5/14**	**Thu 7/9/15**
2	**Site Characterization Work Plan**	**40 days**	**Fri 12/5/14**	**Thu 2/5/15**
3	Work Plan Submittal/DEC Review	0 days	Fri 12/5/14	Fri 12/5/14
4	NYSDEC Review and Comment	4 wks	Fri 12/5/14	Wed 1/7/15
5	Work Plan Revision & Client Review	4 wks	Thu 1/8/15	Thu 2/5/15
6	Final SC Work Plan Submittal	0 days	Thu 2/5/15	Thu 2/5/15
7	**SC Work Plan Field Activities**	**29 days**	**Fri 2/6/15**	**Thu 3/26/15**
8	Contracting/Mobilization	4 wks	Fri 2/6/15	Fri 3/13/15
9	**Former Combined Industrial Sewer Inspection**	**4 days**	**Mon 3/16/15**	**Thu 3/19/15**
12	**Groundwater Investigation (Monitoring Well Network)**	**3 days**	**Mon 3/16/15**	**Wed 3/18/15**
15	**Soil & Groundwater Investigation (Direct Push)**	**4 days**	**Mon 3/23/15**	**Thu 3/26/15**
17	**SC Work Plan Data Analysis and Validation**	**40 days**	**Thu 3/19/15**	**Wed 5/13/15**
21	**SC Data Report**	**50 days**	**Thu 4/30/15**	**Thu 7/9/15**

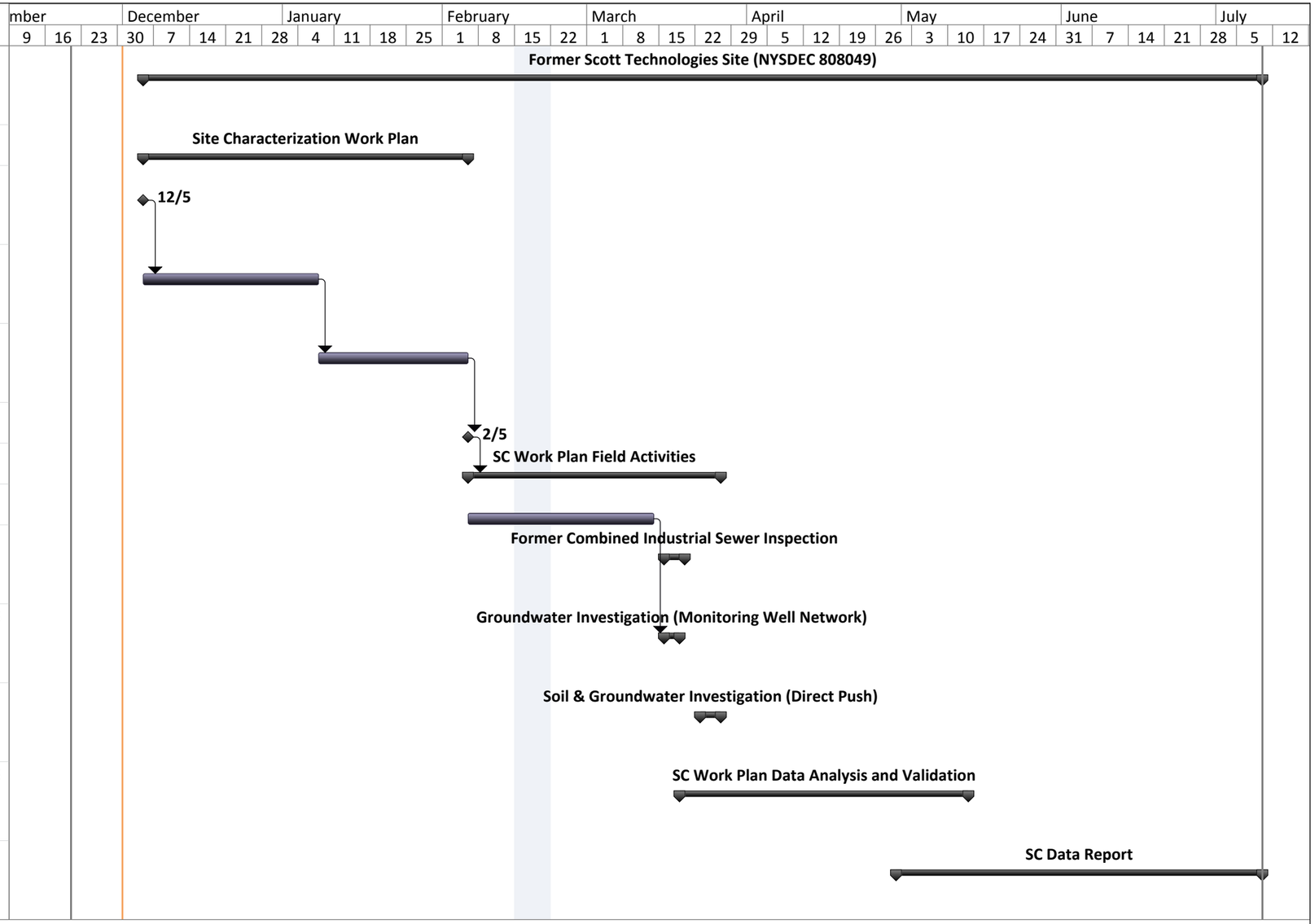

FIGURE 12
Project: project.schedule.hw8080
Date: Mon 12/1/14

Task	Project Summary	Inactive Milestone	Manual Summary Rollup	Deadline			
Split	External Tasks	Inactive Summary	Manual Summary	Progress			
Milestone	External Milestone	Manual Task	Start-only				
Summary	Inactive Task	Duration-only	Finish-only				

APPENDIX A

Quality Assurance Project Plan/Field Sampling Plan

Geosyntec consultants

engineers | scientists | innovators

QUALITY ASSURANCE PROJECT PLAN (QAPP)/ FIELD SAMPLING PLAN (FSP)

FORMER SCOTT TECHNOLOGIES SITE
1051 SOUTH MAIN STREET
CITY OF ELMIRA, CHEMUNG COUNTY, NY
NYSDEC PROJECT 808049

Prepared for
New York State Department of Environmental Conservation
Division of Environmental Remediation, Region 8
6274 East Avon-Lima Road
Avon, New York 14414-9519

Prepared by
Geosyntec Consultants, Inc.
10220 Old Columbia Road, Suite A
Columbia, Maryland 21046

Project Number MN0832

DECEMBER 2014

Agency Review Draft

QUALITY ASSURANCE PROJECT PLAN (QAPP)/
FIELD SAMPLING PLAN (FSP)
SITE CHARACTERIZATION WORK PLAN
FORMER SCOTT TECHNOLOGIES SITE
NYSDEC PROJECT 808049

Geosyntec Consultants
10220 Old Columbia Road, Suite A
Columbia, Maryland 21046

Prepared by: _____ Date: 10/21/14

Man Zhang – Senior Staff Engineer

Reviewed by: _____ Date: 12/4/14

Aron Krasnopoler – Geosyntec Project Manager

Approved by: _____ Date: 12/5/14

Julia K. Caprio- Geosyntec Quality Assurance Officer

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ABBREVIATIONS AND ACRONYMS

°C	Degrees Celsius
bgs	Below Ground Surface
CFR	Code of Federal Regulations
CLP	EPA Contract Laboratory Program
COC	Chain-of-Custody
COPCs	Compounds of Potential Concern
CSM	Conceptual Site Model
CSUL	Comprehensive Subsurface Utility
DO	Dissolved Oxygen
DOT	Department of Transportation
DPT	Direct Push Technology
DQO	Data Quality Objectives
DRO	Diesel Range Organics
DUSR	Data Usability Summary Report
EDD	Electronic Data Deliverable
EIMS	Environmental Information Management System
EM	Electromagnetic
FID	Flame Ionization Detector
ft	Feet
FSP	Field Sampling Plan
GPR	Ground-penetrating Radar
GPS	Global Positioning System
GRO	Gasoline Range Organics
HASP	Health and Safety Plan
ID	Identification
IDM	Investigation Derived Material
LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
LIMS	Laboratory Information Management System
LPM	Laboratory Project Manager
MDL	Method Detection Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
NAD 83	North America Datum 1983
NAVD88	North America Vertical Datum 1988
NELAP	National Environmental Laboratory Accreditation Program
NIST	National Institute for Standards and Testing
NTU	Nephelometric Turbidity Unit
NYSDEC	New York State Department of Environmental Conservation
ORP	Oxidation-Reduction Potential

PAOC	Potential Areas of Concern
PARCCS	Precision, Accuracy, Representativeness, Comparability, Completeness and Sensivity
PCBs	Polychlorinated Biphenyls
PPE	Personal Protective Equipment
PID	Photoionization Detector
QA	Quality Assurance
QAO	Quality Assurance Officer
QAPP	Quality Assurance Project Plan
QC	Quality Control
RL	Reporting Limit
RPD	Relative Percent Difference
SCG	Standards, Criteria and Guidance
SOPs	Standard Operating Procedures SPT standard penetration testing
SVOCs	Semi-volatile Organic Compounds
TAL	Target Analyte List
TCL	Target Compound List
TIC	Tentatively Identified Compounds
TPH	Total Petroleum Hydrocarbons
USEPA	United States Environmental Protection Agency
VOA	Volatile Organic Analysis
VOC	Volatile Organic Compound
%	Percent

1. INTRODUCTION

This Quality Assurance Project Plan (QAPP)/Field Sampling Plan (FSP) was prepared by Geosyntec Consultants (Geosyntec) to present the quality assurance/quality control (QA/QC) measures and describe methods and procedures that will be followed during completion of the site characterization activities for the Former Scott Technologies Site #808049 (Site) located at 1051 South Main Street in Elmira, Chemung County, New York. This QAPP/FSP was developed using the guidelines presented in United States Environmental Protection Agency (USEPA), *Requirements for Quality Assurance Project Plans, EPA Quality Assurance/R-5* (USEPA, 2001) and the guidance presented in the New York State Department of Environmental Conservation (NYSDEC) DER-10 *Technical Guidance for Site Investigation and Remediation* (NYSDEC, 2010).

This plan provides direction for field activities associated with the site characterization, which include: i) storm water structure inspection; ii) soil investigation; and iii) a groundwater investigation. The sampling program was designed to document waste disposal at the Site as it relates to the potential areas of concern (PAOCs), historical information and new findings.

This QAPP/FSP has been developed using the graded approach set forth in EPA QA/R5. This QAPP/FSP provides the quantitative data quality objectives that will be met for each project task. The overall task specific data quality objectives (DQOs) will be described in each project specific task work plan as they are developed. This QAPP/FSP is meant as the generic document under which each task is performed and applies for the duration of the on-site sampling program. This QAPP/FSP will be reviewed and updated as application specific information becomes known or is complete.

The project QAPP/FSP will be required reading for all members of the project team participating in sample collection, will be in the possession of all field teams, and will be distributed to laboratories performing analytical work associated with the Site Characterization. This document has been developed to ensure that data acquired during the Site Characterization are thoroughly documented, verifiable, and defensible, and that the quality of the data meets requirements for its intended use. Project QA objectives and QC requirements have been used to develop the DQOs described in the following sections for acquiring valid usable data. Criteria for data quality were established in terms of the precision, accuracy, representativeness, comparability, completeness, and sensitivity (PARCCS) parameters. This QAPP/FSP outlines the sampling strategy and establishes field procedure requirements.

1.1 Project Objectives/Problem Definition

This QAPP/FSP pertains to investigation activities described in the Site Characterization Work Plan. The general purpose of the Site Characterization Work Plan is to document waste disposal at the Site as it relates to PAOCs, historical information and new findings. The specific objectives include the following:

- Confirmation of historic detections of compounds of potential concern (COPCs);
- Verification that concentrations of COPCs in cover soils are below standards, criteria and guidance (SCGs);
- Validation that concentrations of COPCs in media do not pose an immediate risk to human health and the environment;
- Documentation of waste disposal at the Site;
- Definition of the nature and extent of COPCs in media related to waste disposal at the Site; and
- Evaluation of PAOCs as potential sources, migration pathways or points of exposure.

1.2 Project Organization

The primary project team assembled to oversee, direct and complete the investigation activities at the Site consists of personnel from Geosyntec. Geosyntec will be responsible for development of the projects technical direction, supervision and implementation of investigation activities including oversight of subcontractors, data management, and data quality assessment. The project team and corresponding projects roles are summarized below:

- Unisys Corporation Project Manager, Kevin Krueger, P.E. Mr. Krueger is primarily responsible for the project direction and decisions concerning technical issues and strategies, budget and schedule.
- Project Director, Paul Brookner, P.G., Geosyntec. Mr. Brookner will provide strategic direction to the project team as well as oversight and guidance during project execution. He will also verify that adequate resources are available, and client expectations are met.
- Project Manager, Aron Krasnopoler, Ph. D., P.E., Geosyntec. Dr. Krasnopoler has responsibility for technical, financial, and scheduling matters and overall management of the project.
- Field Activities Manager, Adam Gray, Geosyntec. Mr. Gray has the overall responsibility for completion of field activities in accordance with the Work Plan and QAPP/FSP and is the communication link between the Geosyntec Project Manager and the field team.
- Database Manager, R. Dylan Walker, Geosyntec. Mr. Walker has responsibility for maintaining the project database, archiving project data files, uploading laboratory electronic data deliverables (EDDs) and data qualifiers into the project database, and data transmittal to regulating agencies.
- Quality Assurance Officer (QAO), Julia Caprio Geosyntec. Ms. Caprio will have the overall responsibility for QA. Ms. Caprio or her designee will communicate directly to

the Geosyntec Project Manager and Laboratory Manager on matters pertaining to QA, data validation, and laboratory analyses.

- Health and Safety Officer, Adam Gray, Geosyntec. Mr. Gray will be responsible for safely implementing field activities and ensuring that they comply with the Site Health and Safety Plan (HASP).
- Analytical Laboratories, TestAmerica Pittsburgh Laboratory. The TestAmerica Pittsburgh Laboratory will be responsible for solid and water sample analyses for the project. The laboratories will ultimately be responsible for the data produced and will ensure that laboratory data are generated in compliance with this QAPP/FSP, NYSDEC Analytical Services Protocols, internal laboratory procedures, and other applicable guidance.
- Subcontractors. Geosyntec will procure various subcontractors to implement the Work Plan scope of work. The subcontractors will include a subsurface utility locator/clearer, land surveyor, and driller. The subcontractors are responsible for conducting the work in accordance with the Work Plans, contractual agreements and for communicating any issues concerning the budget, schedule, or achievement of the technical specifications to the Geosyntec Field Team Leader.

Resumes for Geosyntec personnel identified above are provided for reference in **Appendix C.1**.

1.3 QAPP Revision or Amendment

It is expected that the procedures outlined in this QAPP/FSP will be followed. However, procedural modifications may be warranted depending on field conditions, equipment limitations, or limitations imposed by the procedure(s). Modification to this QAPP/FSP will be approved in advance by the Project Manager and the QAO. Deviations from the QAPP/FSP will be documented.

2. DATA QUALITY OBJECTIVES AND CRITERIA

DQOs are qualitative and quantitative statements that clarify the project objectives, specify the most appropriate type of data for the project decisions, determine the most appropriate conditions from which to collect data, and specify tolerable limits on decision errors. The DQO process is a series of planning steps based on scientific methods that are designed to ensure that the type, quantity, and quality of environmental data used for decision-making are appropriate for the intended application. In addition to the project objectives, the DQOs specify data collection boundaries and limitations, the most appropriate type of data to collect, and the level of decision error that will be acceptable for the decision. This section describes the outcome of the DQO process for data collection activities to be conducted at the Site.

2.1 Data Quality Objectives for Measurement Data

The overall quality objective of the project is to provide valid data of known and documented quality from environmental media (soil and groundwater) to adequately characterize the PAOCs and refine the conceptual site model (CSM).

Section 3 of the Site Characterization Work Plan details the screening done to identify existing data gaps that need to be addressed. Section 4 of the Site Characterization Work Plan details the overall scope of work that will be undertaken to address the data gaps. During the investigation, laboratory analyses of environmental samples will serve as the primary sources of data to characterize the PAOCs and refine the conceptual site model. In addition, the following field activities will generate supporting data:

- Field instrument (photoionization detector and/or flame ionization detector) screening of soil samples and soil vapor samples;
- Field analytical analysis of groundwater quality parameters (pH, specific conductance, oxidation reduction potential, dissolved oxygen, and turbidity) during monitoring well purging; and
- Visual inspection and documentation of observed conditions.

A three-dimensional conceptual understanding of COPC distribution in soil and groundwater will be developed based on the analytical results and field screening. **Tables C.1 and C.2** summarize the environmental screening criteria for solid and aqueous samples, respectively, that will be used as the basis for evaluating analytical data from the Site Characterization.

2.2 Project Quality Assurance/Quality Control Objectives

Data from a certified laboratory analysis of field samples will serve as the primary basis for reaching final conclusions from the Site Characterization. These data will be derived through standard methods and will be assessed through measures of PARCCS parameters to determine the QC of the data and its suitability

for meeting the DQOs in this QAPP/FSP. The QC criteria are defined in this section, along with analytical methods and project-required reporting limits.

2.2.1 Precision

Precision refers to the reproducibility or degree of agreement among duplicate measurements of a single analyte. The closer the numerical values of the measurements, the more precise the measurement. Poor precision stems from random errors (i.e., mechanisms which can cause both high and low measurement errors at random). Precision is usually stated in terms of standard deviation, but other estimates, such as the coefficient of variation (relative standard deviation), range (maximum value minus minimum values), and relative range are common, and may be used pending review of the data.

Precision will be determined through the collection of field duplicates and the analysis of laboratory duplicates, Matrix Spike (MS)/Matrix Spike Duplicate (MSD) and Laboratory Control Spike (LCS)/Laboratory Control Sample Duplicate (LCSD) samples for the work performed at the Site. The overall precision of measurement data are a mixture of sampling and analytical factors. Sampling precision will be measured through the laboratory analysis of field duplicate samples. Laboratory precision will be measured through the analysis of laboratory duplicates, MS/MSD and LCS/LCSD samples.

Precision will be determined from replicate samples and will be expressed as the relative percent difference (RPD) between replicate/duplicate sample results, computed as follows:

$$RPD = \frac{X_1 - X_2}{(X_1 + X_2)/2} \times 100$$

where X_1 and X_2 are reported concentrations for each replicate sample and subtracted differences represent absolute values. For field duplicates, the precision goals for this project are as follows:

(i) RPD = 50% for solid samples if both results are greater than five times the quantitation limit; and

(ii) RPD = 30% for liquid samples if both results are greater than five times the quantitation limit.

RPD values are shown in **Tables C.1** and **C.2** for MS/MSD and LCS/LCSD results for solid and aqueous matrices. For laboratory duplicate analysis, the default laboratory RPD goals will be used.

2.2.2 Accuracy

Accuracy refers to the degree of difference between measured or calculated values and the true value. The closer the numerical value of the measurement comes to the true value, or actual concentration, the more accurate the measurement. The converse of accuracy is bias, in which a systematic mechanism tends to consistently introduce errors in one direction or the other. Bias in environmental sampling can occur in one of three ways; these mechanisms and their associated diagnostic and management methods are as follows:

- High bias, which can stem from cross-contamination of sampling, packaging, or analytical equipment and materials. Cross-contamination is monitored through blank samples, such as equipment blanks, field blanks, trip blanks, filter blanks, and method blanks. These samples assess the potential for cross-contamination from, respectively, sampling equipment, ambient conditions, packaging and shipping procedures, field filters, and laboratory equipment. Data validation protocols described in Section 5 present a structured approach for data qualification based on blank samples.

- Low bias, which can stem from the dispersion and degradation of target analytes; an example is the volatilization of chlorinated solvents during field sampling. The effects of these mechanisms are difficult to quantify. Sampling accuracy can be maximized, however, by the adoption and adherence to a strict field QA program. Specifically, sampling procedures will be performed following standard protocols described in Section 3; for example, eliminating headspace in sampling vials for Volatile Organic Compounds (VOCs) will reduce the potential for dispersion of VOCs during sampling. Through regular review of field procedures, deficiencies will be documented and corrected in a timely manner.

- High or low bias, due to poor recoveries, poor calibration, or other system control problems. The effects of these mechanisms on analytical accuracy may be expressed as the percent recovery of an analyte that has been added to the environmental sample at a known concentration before analysis. Analytical accuracy and bias in the laboratory will be determined through the analysis of method blanks, LCSs and MS/MSDs. As with blank samples, data validation protocols provide a structured formula for data qualification based on erroneously high or low analyte recoveries.

Accuracy, when potentially affected by high or low recoveries as described in the third bullet above, is presented as percent recovery (%R), defined as:

$$\%\ R = \frac{Spiked\ Sample\ Concentration - Sample\ Concentration}{Spike\ Concentration} \times 100$$

Laboratory control limits will be used to evaluate accuracy and are shown in Tables C.1 and C.2 for solid and aqueous matrices.

2.2.3 Representativeness

Representativeness qualitatively expresses the degree to which the sample collection and analytical protocols adequately reflect the environmental conditions present at the sampling location. If the results are reproducible, the data obtained can be said to represent the environmental condition. Representativeness is ensured by collecting sufficient numbers of samples of an environmental medium, properly chosen with respect to place and time. The

precision of a representative set of samples reflects the degree of variability of the sampled medium, as well as the effectiveness of the sampling techniques and laboratory analysis. The sampling network is expected to provide data representative of the soil and groundwater conditions in specific areas of concern at the Site. Representativeness in the laboratory is ensured by using the proper analytical procedures, attaining the quantitative DQOs, and meeting sample holding times.

2.2.4 Comparability

Comparability expresses the confidence with which one data set can be compared to another data set measuring the same property. Comparability is ensured through the use of established and approved analytical methods, consistency in the basis of analysis (e.g., wet weight, volume, etc.), consistency in reporting units, and analysis of standard reference materials. By using standard sampling and analytical procedures, data sets will be comparable.

2.2.5 Completeness

Completeness is defined as the percentage of measurements made which are judged to be valid measurements. The completeness goal is essentially the same for all data uses in that sufficient amounts of valid data are to be generated.

There are limited historical data on the completeness achieved by individual methods. However, the USEPA Contract Laboratory Program (CLP) data have been found to be 80 to 85 percent complete on a nationwide basis.

The percent completeness for each set of samples will be calculated as follows:

$$\%\ Completeness = \frac{Valid\ \ Data}{Total\ \ Data\ \ Planned} \times 100$$

The QA objective for completeness for all parameters will be 90 percent.

2.2.6 Sensitivity and Reference Limits

Sensitivity is the capability of a test or instrument to discriminate between measurement responses representing different levels (e.g., concentrations) or a variable interest. Reference limits for analyses conducted by the certified laboratory include method detection limits (MDLs) and reporting limits (RLs).

MDL is a statistically determined concentration. It is the minimum concentration of a substance (analyte) that can be measured and reported with 99 percent (%) confidence that the analyte concentration is greater than zero as determined from the analysis of a sample in a given matrix containing the analyte. The MDL is lower than the concentration at which the laboratory can

quantitatively report. Accordingly, sample results greater than the MDL but less than the RL will be laboratory qualified as "estimated." MDL is defined as follows for all measurements:

$MDL = (t_{n-1,1-\alpha=0.99}) \times (s)$

where:

MDL = method detection limit

$t_{n-1,1-\alpha=0.99}$ = students t-value for a one-sided 99% confidence level and a standard deviation estimate with n-1 degrees of freedom

s = standard deviation of the replicate analyses

n = number of replicate samples analyzed

RL is the minimum concentration of an analyte or category of analytes in a specific matrix that can be identified and quantified above the MDL and within specified limits of precision and bias during routine analytical operating conditions. The laboratory will select the RL for all analytes at concentration levels that exceed the calculated MDLs by a factor of 3 to 10 and are within the method calibration range. Frequently, RLs for specific samples are adjusted for dilution, changes to sample volume/size and extract/digestate volumes, percentage solids, and cleanup procedures.

The MDLs and RLs for this project for both solid and aqueous sample matrices are presented in **Tables C.1 and C.2**, respectively.

2.2.7 Analytical Methods

The analytical laboratories selected for this project will be the TestAmerica Pittsburgh Laboratory for soil and groundwater samples. TestAmerica Pittsburgh laboratory is certified by New York State through the National Environmental Laboratory Accreditation Program (NELAP) for all of the analytical methods required for the project. Laboratory analytical methods used to analyze field samples may include the following analyses:

- Target Compound List (TCL) VOCs – SW-846 method 8260C (solid and water) including 10 VOC of highest concentration tentatively identified compounds (TICs);
- TCL Semi-volatile Organic Compounds (SVOCs) – SW-846 method 8270D (solid and water) including 20 highest concentration TICs;
- Polychlorinated Biphenyls (PCBs) – SW-846 method 8082A for solid samples and Low-Level 8082A for water samples;
- Pesticides – SW846 method 8081 for solid samples;
- Cyanide – EPA Method 9014 for solid samples;
- Target Analyte List (TAL) Metals – SW-846 methods 6010C/7471B (solid and water);

- Total Petroleum Hydrocarbons (TPH) – Gasoline Range Organics (GRO) and Diesel Range Organics (TPH-DRO) – SW-846 8015D (water);

3. DATA GENERATION AND ACQUISITION

3.1 Overview

This section describes the sampling strategies and field procedures that will be implemented to support the Site Characterization to provide data required to meet the DQOs described in Section 2. Environmental measurements to be obtained during implementation of the Site Characterization include the following:

- data from observations and screening conducted during soil sampling via hand auger or direct push technology (DPT);
- visual observations during storm sewer inspections;
- water level data and integrity inspections from Site monitoring wells;
- data from screening and analysis of samples of the following media:
    - soil samples collected via hand auger or DPT;
    - groundwater samples from existing groundwater monitoring wells;
    - fine-grained material samples if collected from the former combined industrial sewer;

In addition, the following activities will be conducted in support of the Site Characterization:

- work necessary to clear planned sampling locations for underground utilities and structures;
- land surveying to obtain sample location coordinates and elevations;
- decontaminating of field equipment;
- sampling (if necessary) and managing investigative derived materials (IDM).

The strategy and procedure for each of these items is addressed in the remainder of this section. In addition, analytical parameters, field and laboratory QC strategies, equipment testing, inspection, and maintenance, inspection and acceptance of supplies and consumables, and non-direct measurements are discussed in this section.

3.2 Special Training and Certification

3.2.1 Health and Safety Training

All field activities will be performed by individuals with appropriate training (i.e., Code of Federal Regulations [CFR] 1910.120) and in accordance with the site-specific HASP). Before field activities commence, the site-specific HASP shall be reviewed and signed by all Geosyntec personnel conducting field work.

3.2.2 Subcontractor Training

All subcontractors performing work during the investigation will be required to conduct all activities in accordance with applicable health and safety regulations (e.g., CFR 1910.120) and site-specific requirements. A copy of the HASP will be provided to each subcontractor. However, subcontractors will be responsible for the health and safety of their personnel while working at the Site. Each day before work commences, a tailgate health and safety meeting shall be conducted by the contractor field team lead.

3.3 Sampling Process Design

The basis for the development of the site characterization scope of work is described in the Work Plan and subsequent addenda (if any). Laboratory analyses of soil and groundwater samples will serve as the primary source of data to support the completion of the investigation. Field screening and analysis will be used to assist in the conceptual characterization of Site conditions and to direct the collection of samples for laboratory analysis.

3.4 Field Methods and Procedures for Data Collection

This section describes the procedures that will be implemented to collect data during implementation of the Work Plan. It includes a description of the procedures for field collection, analysis, and handling of soil and water samples. All field activities will be carried out in accordance with this QAPP/FSP and the project HASP.

3.4.1 Surface Soil Sampling

To obtain the required surface soil samples (i.e., 0 to 2 inches below ground surface [bgs]), the following procedures shall be used:

- Obtain appropriate laboratory prepared sample containers prior to sampling and don appropriate level of Health and Safety according to the approved HASP.
- Mobilize to sampling location.
- Cut a small section of sod from sampling location and lay to side.
- Laydown plastic sheeting over the sampling location. Cut a hole in plastic sheeting large enough to allow the sampling tools to pass.
- Using a hand auger, excavate a hole in the soil approximately two (2) inches deep Alternative methods such as utilizing a decontaminated shovel, trowel, spatula, or dedicated (disposable) scoop may also be used.
- A geologist or his designee will be responsible for geologic logging of all soil, to maintain consistency. Soil will be visually inspected to record details of the color,

texture, moisture, density, cohesion, plasticity and any indication of staining or obvious odor, and digital photographs will be taken.

- Divide the soil core into the desired sample depth segments noted above.
- Scan the segments at minimum depth intervals using a photoionization detector (PID) or flame ionization detector (FID).
- If applicable, collect VOC grab soil sample using a terra core sampling kit as soon as possible before homogenizing.
- For remaining analytes, place soil sample in a mixing container (decontaminated stainless bowl or sealable plastic bag) and homogenize the sample with decontaminated stainless steel spoons or other appropriate mixing device.
- Once homogenized, place soil in laboratory provided sample containers for shipment to and analysis at the laboratory.
- Follow the sample handling and labeling procedures outlined in Section 3.7 and 3.8 of this document.
- To collect soil samples below the first interval, place a decontaminated soil collection barrel and cutting shoe with a new acetate liner in the open bore-hole and drive probe to collect the next soil interval.
- Abandon two (2) inch deep hole to ground surface with commercially available topsoil. Replace sod and apply tap water.
- Obtain location coordinates from hand-held global positioning system (GPS) instrument, and mark location on enlargement of sampling site specific map.
- Complete field forms and enter sampling and location information in the bound field book as outlined in Section 3.8.5 in this document.
- Decontaminate sampling equipment as outlined in Section 3.5.5.
- Manage IDM as outlined in Section 3.5.5.

3.4.2 Subsurface Soil Sampling

Subsurface soil sampling will be conducted using either hand augering methods or DPT, depending on access to the boring location by the DPT equipment. Between sampling locations, all reusable equipment will be cleaned prior to sample collection to prevent cross-contamination of samples. For direct push boreholes, a continuous soil core will be collected starting from ground surface. With hand augering, the borehole will be advanced until the desired sample depth is reached. Shallow subsurface soil sampling will be conducted to verify and delineate PCB and VOC soil management areas in the one (1)- foot to three (3)- foot soil horizon beneath the vegetative cover at the Site. Other subsurface soil sampling will be conducted to confirm historic detections of COPCs in soil, document waste disposal, define the nature and extent of

soil COPCs, and evaluate PAOCs as potential sources, potential migration pathways and potential points of exposure.

Soil cores will be visually logged for soil type, and inspected for staining, debris or other evidence of anthropogenic materials. The soil cores will be additionally screened for soil vapors using a PID and/or FID. Following the field screening, soil samples will be collected from soil cores as several subsamples from select segments. For the shallow subsurface sampling program, each soil boring will be divided into four (4) segments: 0-2 inches below ground surface (bgs), 0.17-1 feet (ft) bgs, 1-2 ft bgs, and 2-3 ft bgs. For the other subsurface sampling, each soil boring will be divided into five (5) segments: 0-2 inches bgs, 0.17-2 ft bgs, 2-6 ft bgs, 6-10 ft bgs, and 10 ft bgs to the shallow water table. The surface soil segment (0-2 inches bgs) will only be collected in vegetated areas. Irrespective of the sampling location, each soil core segment sample will be collected from material exhibiting the highest PID/FID readings (if applicable), visual observation, or the presence of odors. If PID/FID readings are not higher than background and no staining or odors are observed, the sample will be collected from the middle of each segment. Samples will be submitted to the fixed laboratory for analyses identified in the Work Plan.

Specific procedures for planned soil sampling activities via DPT are provided below.

- Obtain appropriate laboratory prepared sample containers prior to sampling and don appropriate level of Personal Protective Equipment (PPE) as described in the HASP.
- Mobilize DPT rig to the sampling location. The DPT rig will not be allowed to directly touch the ground surface in sensitive areas.
- After mobilization, cut a small section of sod from sampling location and lay to side.
- Laydown plastic sheeting over the sampling location. Cut a hole in plastic sheeting large enough to allow the drill tooling to pass.
- Drive the decontaminated soil probe to the desired terminal depth, collecting soil cores into the acetate liner placed within the core barrel sampler. Remove soil core barrel and associated rod from borehole and remove soil sample within acetate liner. The acetate liner will be cut with a utility knife to observe, log, and record lithology.
- A geologist or his designee will be responsible for geologic logging of all soil cores, to maintain consistency. Soil cores will be visually inspected to record details of the color, texture, moisture, density, cohesion, plasticity and any indication of staining or obvious odor, and digital photographs will be taken.
- Divide the soil core into the desired sample depth segments noted above.
- Scan the segments at minimum depth intervals using a PID or FID.
- If applicable, collect VOC grab soil samples directly from the acetate liners using a terra core sampling kit. The samples will be collected from the depth interval with the highest

PID/FID reading or in the central portion of the segment if elevated readings are not observed.

- For remaining analytes, use decontaminated stainless steel or dedicated plastic scoops (or equivalent decontaminated or dedicated sampling tools) to remove soil from acetate liners from the desired depth interval in each segment.
- Place soil sample in a mixing container (decontaminated stainless bowl or sealable plastic bag) and homogenize the sample with decontaminated stainless steel spoons or other appropriate mixing device.
- Once homogenized, place soil in laboratory provided sample containers for shipment to and analysis at the laboratory.
- Follow the sample handling and labeling procedures outlined in Section 3.7 and 3.8 of this document.
- To collect soil samples below the first interval, place a decontaminated soil collection barrel and cutting shoe with a new acetate liner in the open bore-hole and drive probe to collect the next soil interval.
- These steps are repeated until the desired maximum sample depth is reached or probe refusal is reached (point where probe will not penetrate soils due to obstruction and/or hard material).
- Abandon open borehole with bentonite chips to within 2-inches of the ground surface. Fill remainder of borehole from 2-inches to the ground surface with commercially available topsoil. Replace sod and apply tap water.
- Obtain location coordinates from hand-held GPS instrument, and mark location on enlargement of sampling site specific map.
- Complete field forms and enter sampling and location information in the bound field book as outlined in Section 3.8.5 in this document.
- Decontaminate sampling equipment as outlined in Section 3.5.5.
- Manage IDM as outlined in Section 3.5.5.

3.4.3 Monitoring Well Inspection and Synoptic Water Level Measurements

Prior to groundwater sampling, an attempt to locate the monitoring wells identified in the Work Plan will be made and, if successfully located, will be visually inspected for integrity. If possible, the depth to water level in each well will be measured from a reference point on the inner well casing to the nearest 0.01-feet using a clean electronic water level monitoring meter. The specific procedures to be used for each well are presented below:

- Navigate to the monitoring well location and locate the monitoring well.

- Once located, open the well casing and note the condition of the well casing, concrete pad, and overall condition of the monitoring well. Take a photograph of the monitoring well.
- Determine the location of the surveyed elevation mark. For monitoring wells, general markings include either a notch in the riser pipe or a permanent ink (generally black ink) mark on the riser pipe.
- Obtain a water level measurement from the surveyed elevation mark by lowering the water level probe down the well until the audible sound of the unit is detected or the light on an electronic sounder illuminates indicating that the probe is below the water. The precise measurement should be determined (to nearest 0.01 feet) by repeatedly raising and lowering the tape to converge on the exact measurement.
- Measure the depth to the bottom of the well by continuing to lower the water level probe down the well until slack is noted in the tape. The precise measurement should be determined (to nearest 0.1 feet) by repeatedly raising and lowering the tape to converge on the exact measurement. It should be noted, based on the response and feeling of the water tape during repeated measurements, whether the well has a soft or hard bottom.
- Record the water level and depth to bottom measurement as well as the location identification number, date, time, and weather conditions in the field logbook and/or field form.
- Decontaminate the water level probe as discussed in Section 3.5.5. Generally, only that portion of the tape that enters the water table needs to be decontaminated.

3.4.4 Low-Flow Groundwater Sampling

Samples will be collected from existing groundwater monitoring wells identified in the Work Plan using low-flow sampling protocols. Purging of the groundwater will be performed at relatively low flow rates (between 0.1 and 0.5 liters per minute) in order to minimize drawdown of the surrounding water table and minimize stress on the formation. Water purged from the wells will be monitored for the following water quality field parameters: temperature, pH, specific conductivity, dissolved oxygen (DO), oxidation-reduction potential (ORP), and turbidity to document changes in water quality. Samples will be collected when three consecutive readings indicate stability in the field parameters. The procedures to be followed during groundwater sampling are:

- Obtain appropriate laboratory prepared sample containers prior to sampling and don appropriate level of PPE as described in the HASP.
- Obtain a depth to water measurement with either an interface probe or a water line.
- Install a decontaminated bladder pump with a disposable bladder and clean polyethylene tubing to purge the wells. The pump should be set to the midpoint of the screen interval

or in the case of an open borehole to the midpoint of the water column. Attach pump discharge tubing to the flow through cell.

- Operate the pump at a low flow rate (between 0.1 and 0.5 liters per minute). Use a graduated cylinder or other graduated container to estimate the flow rate. Adjust pump settings to achieve desired flow rate that also minimizes drawdown of the initial water level (i.e., <0.3 feet [ft] of the initial water level).
- Purge water and other IDM generated during groundwater sampling will be managed as outlined in Section 3.5.5.
- Water quality field parameters, using a calibrated water quality meter (see below) will be recorded every three to five minutes or each time the internal volume of the flow cell is replaced with water during purging. Additionally, color, clarity and any noticeable odors will be documented. Water will continue to be purged from the wells until the drawdown of water level has stabilized and three consecutive measurements have stabilized according to the following criteria:
    - pH, ± 0.1;
    - temperature, ± 10%;
    - specific conductivity, ±3%;
    - ORP, ± 10 millivolts
    - DO, ± 10%; and
    - turbidity, ± 10% or < 10 nephelometric turbidity units (NTUs)
- Put on disposable nitrile sampling gloves prior to procuring sample. Immediately following purging activities (after the groundwater has reached stabilization), laboratory-provided sample containers (with the appropriate type and volume of preservative) will be filled directly from the sample pump discharge tube while maintaining the flow rate established during purging to minimize any potential agitation of the groundwater. Care should be taken as to not allow the tubing to the touch the inside of the sample container during filling. VOCs and TPH-GRO samples shall be collected first. Those sample analytes will be collected in 40-mL glass vials with no head space. Carefully, but quickly, slip the cap with the septum onto the vial with the Teflon™ face of the septum towards the water. Tighten the cap securely, invert the vial and tap the cap to assure that there are no air bubbles inside. If bubbles are present, open vial, add a few more drops of sample water and reseal. Following VOC and TPH-GRO sampling, sample bottles will be filled for the other desired analytes. Care should be taken such that the tubing is not allowed to touch the sample bottle.
- Check to make sure the vial caps are tight and then place on ice immediately.
- Follow the sample handling and labeling procedures outlined in Section 3.7 and 3.8 of this document.

- Complete field forms and enter sampling information in the bound field book as outlined in Section 3.8.5 in this document.
- Decontaminate sampling equipment as outlined in Section 3.5.5.

Field water quality measurements will be obtained using calibrated portable instruments capable of measuring DO, ORP, pH, temperature, turbidity, and specific conductance. The water quality meter will be calibrated as discussed in Section 3.5.4. Results will be recorded as follows: DO to the nearest 0.1 mg/L, ORP to the nearest 0.1 millivolt (mV), specific conductance to the nearest 1 microSiemens per centimeter, turbidity to the nearest 0.1 NTU, pH to the nearest 0.1 pH unit, and temperature to the nearest 1°C. If applicable, the membrane on the DO probe will be periodically checked for integrity and will be replaced according to manufacturer's specifications if it is found to be torn or if air bubbles are distinguishable under the membrane. Results of manufacturer-recommended calibration checks and any maintenance conducted on the field measurement instrument will be recorded in the field logbook or on a field data sheet as discussed in Section 3.8.5.

3.4.5 Direct Push Groundwater Sampling

Following DPT borehole installation and soil sample collection as described in Section 3.4.2, a groundwater grab sample will be collected at select locations as described in the Work Plan. It is anticipated that groundwater samples will be collected by inserting decontaminated DPT sampling rods equipped with an expendable drive-point and extendable 4 or 5-foot long stainless steel screen (DPT groundwater sampling apparatus). The DPT groundwater sampling apparatus will not be installed directly into the soil boring used for soil sample collection, but rather within 2 to 3 linear feet of the soil boring location. The DPT groundwater sampling apparatus will installed to a depth that is approximately 6 to 7 feet below the approximate water table depth identified during soil boring installation. Once the desired depth is reached, the DPT rods will be retracted 4 or 5 feet to expose and allow groundwater to enter the stainless steel screen. This procedure allows for the entire DPT groundwater sampling apparatus to be driven to a depth below the observed depth to groundwater and retracted to the desired sampling interval. Depth to water measurements will be taken every 5 to 10 minutes to evaluate groundwater recovery. If groundwater collects in the screen, and the rate of recovery allows for sufficient sample volume, a groundwater sample will be collected.

Groundwater purging and sample collection is anticipated to be completed using a peristaltic pump and Teflon tubing. If the depth to water exceeds peristaltic pump limitations, alternate purging and sampling devices, such as a Teflon or stainless steel micro-bailer, may also be used. Prior to groundwater sample collection, the monitoring point will be developed by purging a minimum of three (3) borehole volumes from the screen. If low-yielding groundwater conditions are encountered, a reduced purge volume approach may be used. Efforts will be made to reduce sample turbidity to the extent practical as determined by the field sampler. Once purging is complete, water quality parameters (i.e., temperature, specific conductance, dissolved oxygen,

oxidation-reduction potential and turbidity) will be measured using a calibrated water quality meter. Groundwater samples will then be obtained by directly filling clean, laboratory-provided sampling containers directly from the discharge tubing. Sample labeling, handling, and packing procedures described in the QAPP/FSP will be followed. Following sample collection, the DPT rods and screen will be removed from the boring and the boring will be abandoned. The boring will be abandoned by backfilling with bentonite chips. The DPT tooling and screen will be decontaminated between sampling locations as described in the QAPP/FSP. IDM generated as part of this investigation activity will be managed as outlined in the QAPP/FSP.

3.4.6 Former Combined Industrial Sewer Inspection

The former combined industrial sewer will be inspected for structural integrity, hydraulic connections to the storm sewer system and the presence of accumulated fine-grained material. The sewer inspection will include visual observations and in-line camera surveys. A detailed description of the sewer condition will be recorded in the field book or on a field form. If present, the depth of fine-grained material will be measured, to the extent practical, and recorded. If an adequate volume of material is present, a composite sample, collected across the entire material depth may be collected. The sample will be submitted to the fixed laboratory for analyses for metals, PCBs, SVOCs and VOCs. General soil sample collection and handling procedures presented in Section 3.4.1 will be used to procure the samples. All observations and sample collection (if necessary) will initially be attempted from the ground surface. If entry into a manhole is required to complete the inspection and sampling tasks, confined space entry procedures will be followed.

3.5 Field Methods and Procedures for Other Project and Support Activities

3.5.1 Utility Location Procedures

Utility surveys will be conducted in each location where invasive investigation activities deeper than six inches will be conducted in order to clear underground utilities, structures, or debris that may affect the investigation or may present health and safety or property damage risks. An area within a five-foot radius of each proposed location will be cleared using the following protocol:

- Find/confirm the most recent version of as-built Site drawings and review to identify potential utilities/structures/debris;
- Contact the local public utility locating service;
- Contact Site Representative to discuss utility locations;
- Perform a site reconnaissance to locate utilities/structures on as-built drawings and to find evidence of undocumented utilities/structures/debris;
- Mark the proposed sampling locations and the known underground utility lines/structures/debris in the immediate vicinity using color-coded surveyor paint;

- Use ground penetrating radar (GPR)/ electromagnetic (EM) geophysical equipment and procedures to assure underground obstruction clearance.

Wherever possible, a transmitter/receiver unit will be attached to the exposed pipe or utility to trace metallic pipes or utilities that are either indicated on facility utility maps or obvious by surface expression. The location of the utility will be marked on the ground using color-coded surveyor paint. If a utility is identified within 3 feet of the proposed sampling/drilling location, the sampling/drilling point will be moved and the clearance procedures repeated.

3.5.2 Land Survey Procedures

A New York State registered land surveyor will survey the horizontal location and elevation of all existing groundwater monitoring wells at the Site. Surveyed locations will be accurate to plus or minus 0.01 foot vertically and plus or minus 0.1 foot horizontally. Horizontal data will be reported in reference to the North American Datum 1983 (NAD83) New York State Plane; vertical data will be reported in reference to the North American Vertical Datum 1988 (NAVD88). Monitoring well elevations will be measured at a reference point at the north side of the top of each inner well casing to the nearest 0.01 foot. Soil boring sampling locations will be surveyed using a GPS and/or by a registered land surveyor. Sampling locations will be staked (or marked through another method of identification) and identified in the interim between media sampling and land surveying activities.

3.5.3 Geophysical Survey

A subsurface geophysical survey will be conducted along the alignment of the former combined industrial sewer. Geophysical survey methods will consist of one (1) or more of the following: GPR, EM survey, and/or comprehensive subsurface utility (CSUL) surveys. Results of the geophysical survey will be compared to historical and current plans of subsurface utilities for tentative identification of subsurface anomalies. Subsurface anomalies potentially associated with the former combined industrial sewer will be highlighted for more detailed inspection.

3.5.4 In-line Camera Survey

In-line camera surveys will be performed along the accessible length of the former combined industrial sewer. Camera inspections will be performed to evaluate the origin and/or termination points of connections/pipes. Video recordings of those inspections will be taken and stored for documentation purposes. Real-time inspections will aid in determining the integrity of the pipe, potential volume of material within the line, and whether the line is a potentially active with respect to discharge to adjacent surface waters. In the event of obstructions, access points (i.e. manholes) will be evaluated for potential confined space entry prior to clearing any obstruction.

3.5.5 Management of Investigation-Derived Materials

IDM generated during the Site Characterization activities will include disposable PPE, disposable sampling equipment, soil boring cuttings, decontamination water, and purge water. PPE, disposable sampling equipment, and soil boring cuttings will be collected and placed in 55-gallon Department of Transportation (DOT)-approved drums for characterization (if necessary) and offsite disposal. Liquid IDM (decontamination water and purge water) will be collected and stored in 55-gallon drums for waste characterization (if necessary) and off-site disposal.

3.5.6 Field Instrument Calibration and Operation

All instruments and equipment used during sampling and analysis (e.g. PID/FID or water quality meters) will be operated, calibrated, and maintained according to the manufacturer's guidelines and recommendations. Operation, calibration, and maintenance will be performed by trained personnel on a daily basis. Calibration will be performed at the beginning, middle and end of each sampling day. If instruments appear to be reading incorrectly, additional calibration may be required. All maintenance and calibration information will be documented and will be available upon request.

Appropriate corrective actions will be taken if a field instrument fails the instrument-specific calibration QC criteria. Corrective action steps will be as follows:

- Check the instrument;
- Investigate the cause of failure;
- Recalibrate the instrument;
- If the instrument recalibration still fails, call the instrument manufacturer or rental company technical support for assistance;
- If the problem persists, send the instrument for service;
- If the instrument is a rental, contact the rental office for immediate replacement of the instrument; and
- If practicable, keep a backup instrument on site.

3.5.7 Field Equipment Decontamination

Decontamination of non-dedicated and non-disposable sampling equipment will be performed prior to sampling and between sampling locations to prevent the introduction of extraneous material into samples and to prevent cross-contamination between sample locations. All sampling equipment will be decontaminated as described below. Decontamination water will be collected and managed as outlined in Section 4.3.4.

3.5.7.1 Decontamination of Soil Sampling Equipment

This procedure applies to equipment used in the collection of environmental soil samples submitted for organic and inorganic constituent analysis. Examples of relevant items of equipment include DPT shoes, trowels, scoops/spoons, and other small items. Decontamination is to be performed before sampling events and between sampling points.

- Place five wash basins in an established decontamination area that has a low permeability liner (e.g., polyethylene) and secondary containment. The decontamination area must be of sufficient size to allow placement of the five plastic wash bins in a line, and provide an air drying area for equipment.
- Fill the first wash basin with potable water. Add sufficient soap powder or solution to cause suds to form in the basin. Do not use an excessive amount of the soap or rinsing the soap off the equipment will be difficult. Periodic changing of the water is required.
- Using a clean coarse scrub brush, wash the sampling equipment in the soap solution in the first basin, removing all visible residues. Be sure to wash inside surfaces of equipment as well as the exterior surfaces. Allow excess soap to drain off the equipment when finished.
- Fill the second basin with potable water (first rinse) and rinse the equipment. A coarse scrub brush or pressure sprayer may be used to aid in the rinse, if necessary. Periodic changing of the water is required.
- Rinse the equipment with distilled/deionized water in the third basin. Periodic changing of the water is required.
- If samples for organic analysis will be collected, rinse the equipment with isopropyl alcohol over the fourth basin such that the isopropyl alcohol is collected. The step may be performed using a squeeze bottle or pressure sprayer.
- Rinse with distilled/deionized water over the fourth basin to remove any residual isopropyl alcohol.
- If the equipment is being used to sample for metals, rinse the equipment with a 5% nitric acid solution over the fifth basin such that the solution is collected. The step can be performed using a squeeze bottle or pressure sprayer.
- Rinse with distilled/deionized water over the fifth basin to remove any residual acid.
- Allow the equipment to air-dry in a clean area or blot with chemical-free paper towels before reuse. Wrap the equipment in aluminum foil with the shiny side out if it will not be reused immediately.

3.5.7.2 Decontamination of Submersible Sampling Pumps

This procedure will be used to decontaminate bladder pumps before and between groundwater sample collection points.

- Place four wash basins in an established decontamination area that has a low permeability liner (e.g., polyethylene) and secondary containment. The decontamination area must be of sufficient size to allow placement of the five plastic wash bins in a line.
- Fill the first wash basin with potable water. Add sufficient soap powder or solution to cause suds to form in the basin. Do not use an excessive amount of the soap or rinsing the soap off the equipment will be difficult. Periodic changing of the water is required.
- Using a clean coarse scrub brush, wash the pump and power cord thoroughly in the soap solution in the first basin, removing all visible residues. While submersed in the soap solution, the pump should be turned on and a minimum of one gallon pumped through the system. Allow excess soap to drain off the equipment when finished.
- Fill the second basin with potable water and rinse the pump and power cord. While submersed, the pump should be turn on and a minimum of one gallon pumped through the system. Periodic changing of the water is required.
- Fill the third basin with distilled/deionized water and rinse the pump and power cord. While submersed, the pump should be turn on and a minimum of one gallon pumped through the system. Periodic changing of the water is required.
- If samples for organic analysis will be collected, rinse the pump exterior with isopropyl alcohol over the fourth basin such that the isopropyl alcohol is collected. The step can be performed using a squeeze bottle or pressure sprayer. Isopropyl alcohol should not be run through the pump.
- Rinse the exterior with distilled/deionized water over the fourth basin to remove any residual isopropyl alcohol.
- Wrap the equipment in aluminum foil with the shiny side out if it will not be reused immediately.

3.5.7.3 Decontamination of Measuring Equipment

This procedure will be used to decontaminate measuring equipment, such as water level indicators before and between measuring points.

- Fill two clean basins or spray bottles with potable water.
- Add sufficient soap powder to one basin or spray bottle to form a thin layer of soap suds.
- Immerse the device in the soap containing basin and gentle agitate. Scrub the device if is soiled. Periodic changing of the water is required. Alternatively, the equipment may be

cleaned using a spray bottle containing a water/soap solution and wiped with a chemical free paper towel.

- Immerse the device in the basin containing the rinse water and gentle agitate. Periodic changing of the water is required. Alternatively, the equipment may be cleaned using a spray bottle and wiped with a chemical free paper towel.

3.5.7.4 Decontamination of Large Equipment

If large equipment such as a drilling rig becomes soiled and decontamination is thought necessary, a temporary decontamination pad will be established for decontamination of heavy equipment. This pad may include a membrane-lined and bermed area large enough to drive heavy equipment (e.g., drill rig, backhoe) onto with enough space to spread other equipment and to contain overspray. Usually a small sump is necessary to collect and contain rinsate (a pump is used to remove these wastes from the sump). A water supply and power source is also necessary to run steam cleaning and/or pressure washing equipment. Decontamination will be accomplished by steam cleaning or high pressure water wash and manual scrubbing. This may be performed at the decontamination pad or in the vicinity of the drilling location, if the rinsate can be captured and containerized.

3.6 Inspection/Acceptance of Supplies and Consumables

Supplies and consumables will be inspected and approved by the on-site project manager or field team leader to ensure that products meet project requirements. Those items not meeting project requirements should be returned immediately for replacement or refund.

3.7 Sample Handling Procedures

Many of the chemical constituents and physicochemical parameters that are to be measured or evaluated in the QAPP are volatile or are not chemically stable, and therefore sample preservation is required. For these constituents, samples will be transferred in the field from the sampling equipment directly into the container that has been specifically prepared for that analysis or set of compatible parameters. All samples will be stored at ≤ 6 degrees Celsius ($^{\circ}$C) from the time of collection to the time of analysis. Collected samples will be stored together with any MS/MSD, blind field duplicate, trip blank, and equipment blank samples collected during that sampling event on ice in a cooler. All samples will be stored together in an area known to be free of contamination.

3.7.1 Sample Containers and Preservatives

The laboratory will be responsible for supplying the proper containers to ensure sample integrity. The laboratory will provide new and/or pre-cleaned containers from an outside supplier. **Table C.3** details the bottle type, quantity, preservative and holding time for each parameter analyzed

in soil and groundwater. All sample preservation additives will be measured and placed in the appropriate sample containers by the laboratory prior to sampling.

3.7.2 Sample Designation

Each separate sample will be identified using a sample label with a unique sample identifier (ID). The following presents the sample designation for soil and groundwater samples.

3.7.2.1 Soil Sample Designation

Soil sample identification (ID) will use the following nomenclature:

Site Location-Field ID-(Confirmation or Step Out)-Matrix-(Depth From)-(Depth To)

Where:

Site Location:	STI
Field ID:	Confirmation Sample: Historic Field ID + "-A" Step Out Location: Historic Field ID + "-B", "-C", etc. PAOC Evaluation: B## – Subsurface; numbered sequentially SS## – Surface Soil; numbered sequentially
Matrix:	Surface Soil: SS Subsurface Soil: SUB
Depth From:	Upper depth of sample interval in feet (subsurface only)
Depth To:	Lower depth of sample interval in feet (subsurface only)

3.7.2.2 Groundwater Sample Designation

Groundwater sample IDs will use the following nomenclature:

Site Location-Field ID

Where:

Site Location: STI

Field ID: Monitoring Well ID

3.7.3 Sample Labeling

Each separate sample will be identified using a sample label. The sampler will complete all information using waterproof ink with the following information:

- Sample ID in accordance with Section 3.7.2
- job name and identification number;
- date and time of sample collected;
- preservative;
- analytical method requested; and
- name of sampler.

The sample label contains the authoritative information for the sample. Inconsistencies with other documents will be settled in favor of the container label unless otherwise corrected in writing from the field personnel collecting samples. A chain-of-custody (COC) should reflect the same information as the label and be kept with the samples at all times.

3.7.4 Sample Packaging and Shipment

When all samples have been collected at the end of the day, samples will be retrieved from their storage location and packaged for shipment. The following procedures will be during sample packing.

- Place plastic bubble wrap matting or other suitable packing material over the base of each cooler or shipping container as needed.
- Insert a clean trash bag into the cooler to serve as a liner.
- Bag cubed ice in heavy duty zipper-lock plastic bags, close the bags, and distribute the bagged ice in a layer over the bottom of the cooler. Loose ice should not be used. Cold packs should be used only if the samples are chilled before being placed in the cooler.
- Check that each sample container is sealed, labeled legibly, and is externally clean. Re-label and/or wipe bottles clean if necessary. If needed, clear tape should be placed over the labels to protect them and keep them from falling off the container. To protect each bottle from breakage during shipment, each glass sample bottle should be wrapped individually with bubble wrap and secured with tape or rubber bands. Alternate bottle protection procedures such as placing glass jars back in the cardboard shipping box in which they arrived, using cardboard dividers in the cooler, or placing in an appropriate foam holder may also be used. Bottles should be placed into the cooler in an upright single layer with approximately one inch of space between each bottle. Do not stack bottles or place them in the cooler lying on their side. If plastic and glass sample

containers are used, alternate the placement of each type of container within the cooler so that glass bottles are not placed side by side.

- Insert the cooler temperature blank supplied by the laboratory into each cooler (if any).
- Insert a Trip Blank into each cooler containing VOC samples.
- If space allows, place bagged ice in voids between sample containers. Other packing materials such as bubble wrap, and/or Styrofoam pellet packing material may be used as a substitute to fill voids between sample containers within each cooler to a level that meets the approximate top of the sample containers. Packing material may require tamping by hand to reduce the potential for settling.
- Bag cubed ice in heavy duty zipper-lock plastic bags, close the bags, and distribute the bagged ice in a layer over the top of the samples. Loose ice should not be used. Cold packs should be used only if the samples are chilled before being placed in the cooler.
- Add additional bubble wrap/Styrofoam pellets or other packing materials to fill the balance of the cooler or container, if necessary.
- Sign and date a custody seal as discussed in Section 3.8.3 and enter the custody seal numbers in the appropriate place on the COC form.
- Complete the COC form as discussed in Section 3.8.1. If shipping the samples involves use of a third party commercial carrier service, sign the COC record thereby relinquishing custody of the samples. Shippers should not be asked to sign COC records. If a laboratory courier is used, or if samples are transported to the laboratory by field personnel, the receiving party should accept custody and sign the COC records. Keep a copy of the COC for the project file. Place the original (with remaining copies) in a zipper-lock plastic bag and tape the bag to the inside lid of the cooler or shipping container.
- Close the lid of the cooler or the top of the shipping container.
- Place the custody seal across the cooler or container lid opening and overlap with transparent packaging tape.
- Packaging tape should be placed entirely around the sample shipment containers. A minimum of three full wraps of packaging tape will be placed on at least two places on the cooler/container.
- Place a shipping label on the outside of the shipping container that indicates the point of origin and destination.
- Repeat the above steps for each cooler or shipping container.

Following sample packing, the cooler/container containing the samples will be transported to the laboratory overnight via a package delivery service office or laboratory courier under executed chain of custody. The appropriate shipping form or air bill will be filled out and affixed to the

cooler/container. Some courier services may use multi-package shipping forms where only one form needs to be filled out for all packages going to the same destination. If not, a separate shipping form should be used for each cooler/container. The receipt for package tracking purposes should be kept in the project files, in the event a package becomes lost.

3.8 Sample Custody and Documentation

An overriding consideration for data resulting from laboratory analyses is the ability to demonstrate that the data are legally defensible (i.e., that the samples were obtained from the locations stated and that they reached the laboratory without alteration). To accomplish this, evidence of collection, shipment, laboratory receipt, and laboratory custody until disposal will be documented through the COC record. A sample is considered to be in custody if the following applies to the sample:

- It is in actual possession or in view of the person who collected the samples;
- It is locked in a secure area;
- It is placed in an area restricted to authorized personnel; or
- It is placed in a container and secured with an official custody seal, such that the sample cannot be reached without breaking the seal.

If sample preservation requires temperature control, then samples will be stored in iced coolers or a refrigerator in an access-controlled area of the site. Sample custody will be the responsibility of the field manager or on-site designee from the time of sample collection until the samples are accepted by the courier service for delivery to the laboratory. Thereafter, the laboratory performing the analysis will maintain custody.

3.8.1 Chain-of-Custody

COC records will be filled out for all samples to establish the documentation necessary to trace sample possession from the time of collection. In addition to providing a custody exchange record for the samples, the COC record serves as a formal request for sample analyses. The COC record lists each sample and the individuals performing the sample collection, shipment, and receipt. The following information will be recorded on the COC record:

- Project name;
- Project location;
- Geosyntec project number;
- Geosyntec project manager;
- Geosyntec project manager contact information;
- Sample numbers;
- Date (of sample collection);

- Time (of sample collection to the nearest minute, military time);
- Sample type (composite or grab);
- Sample description (matrix);
- Number of sample containers;
- Analysis required;
- Project specific QC samples (e.g.MS/MSD)
- Remarks (including special instructions to the laboratory);
- Type of data deliverable;
- Preservative information;
- Date/time (of custody transfer);
- Laboratory name;
- Turnaround time required; and
- Sampler's signature.

The COC records will be completed, signed, and distributed as follows:

- one copy will be retained by the sample coordinator for inclusion in the project files; and
- the original will be sent to the analytical laboratory with the sample shipment as described in Section 3.7.3 of this document.

3.8.2 Field Sample Custody

All necessary sample containers will be shipped by the laboratory. The field personnel and/or Geosyntec QAO will determine the sample containers needed for a specific sampling task, check the integrity of the containers, and assure that the proper containers are assigned to the task to be conducted.

The COC record will be the controlling document to ensure that sample custody is maintained. The COC record will be initiated in the field by sampling personnel when they collect a sample. Each time the sample custody is transferred, the former custodian will sign the COC in the "Relinquished By" line, and the new custodian will sign the COC in the "Received By" line. The date and time will accompany each signature.

Immediately after sample collection, each sample will be handled as described in Section 3.7 of this document.

3.8.3 Custody Seals

Custody seals are used to prevent unauthorized tampering with samples from the time of sample collection through the time of laboratory analysis. The seals will be signed and dated by sampling personnel and then placed on the shipping containers in such a way that they must be broken to open the containers. Seals will be affixed to the sample containers before the samples leave the custody of the sampling personnel. It is recommended that clear packing tape be placed over the custody seal to ensure that it is securely affixed to the shipping container. The laboratory will immediately notify Geosyntec personnel upon receipt in the event that the custody seal indicates that the container has been tampered with.

3.8.4 Laboratory Sample Custody and Documentation

Samples will be delivered to laboratory personnel authorized to receive samples, also referred to as the "sample custodian". The custodian, upon receipt of a sample, will inspect the condition of the sample (including temperature of the cooler) and the custody seal, reconcile the information on the sample label against that on the COC record, assign a laboratory number, log the sample in the laboratory information management system (LIMS), and store the sample in a secured sample storage area. The custodian will record all pertinent observations and measurements on the COC record, and sign the COC record.

Upon receiving the samples, the laboratory personnel will note on the original COC record any discrepancy in the number of samples, temperature within the cooler or broken samples. The Geosyntec QAO or designated representative will be notified immediately of any problems identified with shipped samples. The Geosyntec QAO or designated representative will, in turn, notify the project manager and together they will determine the appropriate course of action.

If the laboratory sample custodian judges sample custody to be invalid (e.g., custody seals have been broken), the Geosyntec QAO or designated representative will be immediately notified. The Geosyntec QAO or designated representative will, in turn, notify the project manager. The project manager will make a decision, in consultation with the client, as to the fate of the sample in question on a case-by-case basis. The sample will either be processed "as-is" with custody failure noted along with the analytical data, or rejected with resampling scheduled, if necessary. The laboratory will initiate an internal COC that will track the sample within the various areas of the laboratory. Custody of the samples is transferred with the relinquishing signature of the sample custodian and the custody acceptance signature of the laboratory personnel. This procedure is followed each time a sample changes hands. The laboratory will archive the samples and maintain their custody, as required by the contract, or until further notification from the Geosyntec QAO or designated representative, at which time the samples will either be returned to the project for disposal or disposed of by the laboratory.

3.8.5 Field Documentation

All information pertinent to field sampling will be recorded in a permanently bound or electronic field logbook or field forms to maintain the integrity and traceability of samples. Detailed field data will be recorded on activity-specific field forms. All entries will be recorded in black indelible ink.

At a minimum, the logbook and/or corresponding field forms will contain the following information as applicable to the sample type collected:

- Project name and location (on the front page of the logbook);
- Signature of field sampler;
- Date and time of collection for each sample;
- Sample identification number;
- Sample location (sampling point);
- Weather (rain, sunny, approximate temperature, etc.);
- Requested analysis;
- If prudent, a drawing of or a copy of a map with the sample locations;
- Field analyses performed, including results, instrument checks, problems, and calibration records for field instruments;
- Descriptions of deviations from this QAPP/FSP;
- Problems encountered and corrective action taken;
- Identification of field QC samples; and
- Any other events that may affect the samples.

Field documentation will be stored in the project files for future use or reference, if necessary.

3.8.6 Document Corrections

Changes or corrections on any project documentation will be made by crossing out the item with a single line. The person performing the correction must initial and date the correction. The original item, although erroneous, must remain legible. The new information will be written above the crossed-out item. Corrections will be written clearly and legibly.

4. QUALITY ASSURANCE/QUALITY CONTROL MEASURES

4.1 Field Quality Control

Field QC samples will be collected and analyzed to assess the precision and accuracy of groundwater and soil sampling activities. Field QC samples for this project will include field duplicates, MS/MSD, equipment rinsates, source blanks when necessary, temperature blanks, and trip blanks. **Table C.4** describes the field quality control samples per matrix and their frequencies.

4.1.1 Field Duplicates

Field duplicates are two samples (an original and a duplicate) of the same matrix, collected at the same time and location and using the same sampling techniques, to the extent practicable. Field duplicate samples are used to evaluate the precision of the overall sample collection process. Field duplicates will be collected at a frequency of 1 per 10 regular samples and will be analyzed for the full set of analyses used for the regular samples collected. Field duplicates receive unique sample numbers; therefore, the identities of the duplicate samples are "blind" to the analytical laboratory. Exact locations of duplicate samples and sample identifications will be recorded in the field logbook.

4.1.2 Matrix Spike/Matrix Spike Duplicate

The laboratory will analyze an MS/MSD for every 20 samples analyzed or for every analytical batch prepared, whichever is more frequent. Field personnel will collect triple the amount of the volume of the sample matrix for the designated MS/MSD sample. The MS/MSD sample will be used to determine the precision and accuracy of the sample preparation and analytical methods.

4.1.3 Equipment Rinsate Blank and Source Blank

Equipment rinsate samples will be collected at a frequency of one per day for each matrix that non-disposable or non-dedicated sampling equipment is used. Rinsate samples are laboratory-certified clean water collected from the final rinse of the decontamination process. Rinsate samples will be collected from the sampling equipment, placed in appropriate containers supplied by the analytical laboratory, and analyzed for the full set of analyses used for the samples collected that day. Equipment rinsate samples are used to evaluate the effectiveness of the decontamination procedure and the potential for cross-contamination during sampling events. One source blank will be collected per event by pouring laboratory-certified clean water directly into the appropriate sample containers while at a site.

4.1.4 Trip Blanks

Trip blanks will be prepared by the laboratory in 40-mL volatile organic analysis (VOA) vials with analyte-free water. The trip blanks will be carried into the field, stored, and shipped to the laboratory along with the water samples. Trip blanks will be shipped with each cooler that contains groundwater samples to be analyzed for VOCs. Trip blanks are evaluated to determine whether VOC cross-contamination between samples has occurred during storage and transportation. Trip blanks apply only to volatile organics in groundwater and must be free of headspace.

4.1.5 Temperature Blanks

Each cooler will be shipped with a temperature blank. A temperature blank is a sample container filled with tap water and stored in the cooler during sample collection and transportation. The laboratory will record the temperature of the temperature blank immediately upon receipt of the samples. If samples are received at the laboratory less than 8 hours after collection, they may not have had sufficient time to cool to the required ≤ 6 ºC.

4.2 Laboratory Quality Control/Quality Assurance

4.2.1 Laboratory Qualifications

The analytical laboratory selected for soil and groundwater analyses for this project will be the TestAmerica Pittsburgh Laboratory. TestAmerica Pittsburgh Laboratory is certified by New York State through the National Environmental Laboratory Accreditation Program for the analytical methods required for the project.

4.2.2 Quality Control Samples

The laboratory has a QC program in place to ensure the reliability and validity of the analysis performed by the laboratory. All analytical procedures are documented in writing as Standard Operating Procedures (SOPs) and each SOP includes a QC section which addresses the minimum QC requirements for the procedures. The internal QC checks differ slightly for each individual procedure but in general the QC requirements include the following:

- Method blanks;
- Reagent/preparation blanks (inorganic parameters);
- Instruments blanks;
- MS/MSDs;
- Surrogate spikes;
- Laboratory duplicates;

- LCSs;
- Internal standards;
- Mass tuning;
- serial dilutions; and
- interference check samples.

4.2.3 Calibration

All instruments will be calibrated and the calibration acceptance criteria met before samples are analyzed. Calibration standards will be prepared with National Institute for Standards and Testing (NIST)-traceable standards and analyzed according to method requirements. Initial calibration acceptance criteria documented in the laboratory SOPs will meet those of applicable guidance documents. The initial calibration will meet one of the following requirements:

- The lowest concentration of the calibration standard is less than or equal to the RL based on the final volume of extract or sample; or
- For each target analyte, at least one of the calibration standards will be at or below the regulatory limit (action level) as defined by the DQOs.

Initial calibration will be verified, before samples are analyzed, with a second source standard prepared at the mid-point of the calibration curve. Initial calibration verification will meet the acceptance criteria that are expressed in the laboratory SOPs.

Daily calibration verification will be conducted at the method-prescribed frequencies, and will meet the acceptance criteria of applicable guidance documents. Daily calibration verification will not be used for quantitation of target analytes.

Calibration data (calibration tables, chromatograms, instrument printouts, and laboratory logbooks) will be clearly labeled to identify the source and preparation of the calibration standard, and, will therefore be traceable to the standard preparation records.

4.2.4 Preventive Maintenance

The primary objective of a preventive maintenance program is to help ensure the timely and effective completion of a measurement effort by minimizing the downtime of crucial analytical equipment caused by expected or unexpected component failure. In implementing this program, efforts are focused in three primary areas: maintenance responsibilities, maintenance schedules, and adequate inventory of critical spare parts and equipment.

Maintenance responsibilities for laboratory equipment are assigned to the respective laboratory managers. The laboratory managers then establish maintenance procedures and schedules for

each major equipment item. These are contained in the maintenance logbooks assigned to each instrument.

The effectiveness of any maintenance program depends, to a large extent, on adherence to specific routine maintenance for each major equipment item. Other maintenance activities may also be identified as requiring attention on an as-needed basis. The manufacturer's recommendations or sample throughput provide the basis for the established maintenance schedules, and the manufacturers' service contracts provide primary maintenance for many major instruments (e.g., gas chromatography instruments, atomic absorption spectrometers, analytical balances, etc.). Maintenance activities for each instrument are documented in a maintenance log.

Along with a schedule for maintenance activities, an adequate inventory of spare parts is required to minimize equipment downtime. This inventory emphasizes those parts (and supplies) that are subject to frequent failure, have limited useful lifetimes, or cannot be obtained in a timely manner should failure occur.

The laboratory manager is responsible for maintaining an adequate inventory of necessary spare parts. Sufficient equipment will be on hand to continue analyses in the event that an instrument encounters problems. In addition to backup instrumentation, a supply of spare parts, such as fittings, septa, atomic absorption lamps, mirrors, diaphragms, graphite furnace tubes, and other ancillary equipment, will be maintained.

4.2.5 Training

The laboratory will have an established policy and procedure on training and documenting of the analyst's competency. As described in SW-846 (USEPA, 1996), each staff member that performs sample preparation and analysis will demonstrate their proficiency through preparation and analysis of four LCSs. An analyst will be considered proficient if the acceptance criteria for method accuracy and precision are met. The laboratory will maintain all training records on file.

4.2.6 Supplies and Consumables

The laboratory will inspect supplies and consumables before their use in analysis. The materials specifications in the analytical methods will be used as a guideline for establishing the acceptance criteria for these materials. Purity of reagents will be monitored by analysis of solvent blanks. An inventory and storage system for materials and supplies will ensure use before manufacturers' expiration dates and storage under safe and chemically compatible conditions.

5. DATA MANAGEMENT, VALIDATION, AND USABILITY

5.1 Data Management

Data management operations include data recording, validation, transformation, transmittal, reduction, analysis, tracking, storage and retrieval.

Data will be managed by an ESdat® Database System powered by a Microsoft Access database®. Upon receipt from the laboratory, the analytical report and electronic data deliverable (EDD will be entered into the project's data validation tracking system, which allows the data to be tracked from receipt, through validation, to data loading and storage. The electronic data will be imported into the database system concurrent with the data validation process. The database will be updated with validated data after validation of the laboratory data is complete.

The data will be considered final when data validation is complete and any required data qualifiers have been added to the database. Any changes made to the database after finalization will be documented, including a description of the change, date of change, person responsible, and reason for change.

Once all data quality checks are performed, the data will be exported to a variety of formats to meet project needs. Cross-tab tables showing concentrations by sample location will be prepared. Data can be accessed by a variety of mapping and visualization tools.

The project database will be maintained on a secure network drive which is backed up regularly. Access to the database will be limited to authorized and trained project personnel.

An EDD meeting the requirements of the NYSDEC EDD Manual (NYSDEC, 2013) will be submitted with the PAOC Investigation Report so that the data can be uploaded to the NYSDEC Environmental Information Management System (EIMS). The EIMS uses the database software application EQuIS™ from EarthSoft® Inc. (EarthSoft).

5.2 Data Reduction, Review, Verification, and Validation

This section addresses the stages of data quality assessment by the laboratory, and by Geosyntec after data have been generated and received (i.e., data reduction, review, verification, and validation). It also sets procedures for evaluating the usability of data with respect to the DQOs set forth in Section 2. Data validation pertinent to this Site will be performed in general accordance with the following data validation guidance documents, where applicable:

- USEPA, Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review, OSWER 9240.1-51, EPA 540-R-10-011, January 2010
- USEPA, Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review, EPA 540-R-08-01, June 2008

- DER-10/Technical Guidance for Site Investigation and Remediation, NYSDEC May 3, 2010

5.2.1 Data Reduction

Raw analytical data generated in the laboratory are collected on printouts from the instruments and associated data system or are manually recorded into bound notebooks. Analysts review data as they are generated to determine that the instruments are performing within specifications. This review includes calibration checks, surrogate recoveries, blank checks, retention time reproducibility, and other QC checks as specified in the SOPs. If any problems are noted during the analytical run, corrective action is taken by the laboratory and documented. Each analytical run is reviewed by the laboratory for completeness prior to interpretation and data reduction.

5.2.2 Data Review

Data review is an initial and relatively non-technical step of data assessment that primarily addresses issues of completeness and data handling integrity. In data review, the reviewer will ensure that all necessary reporting components have been included in laboratory reports, such as necessary fields (e.g., collection/analysis dates, units, etc.) as well as the presence of (but not implications of) QC data components (e.g., LCS records, surrogate results, etc.).

5.2.3 Data Verification

Data verification is a more technical process than data review in that the core technical aspects of data quality (e.g., precision, accuracy, etc.) are evaluated through a review of the results of QA/QC measures, such as LCSs and surrogates.

Following interpretation and data reduction by an analyst, data are transferred to the laboratory sample management system either by direct data upload from the analytical data system or manually. The data are reviewed by the group leader or another analyst and marked on the sample management system as being verified. The person performing the verification reviews all data including QC information prior to verifying the data. If data package deliverables have been requested, the laboratory will complete the appropriate forms summarizing the QC information and transfer copies of all raw data (e.g., instrument printouts, spectra, chromatograms, etc.) to the data packages group. This group will combine the information from the various analytical groups and the analytical reports from the laboratory sample management system into one package. This package is reviewed by the laboratory project manager (LPM) for conformance with SOPs and to ensure that all project QC goals have been met. Any analytical problems are discussed in the case narrative, which is also included with the data package deliverables.

5.2.4 Data Validation and Usability Determination

Following data verification by the laboratory, data validation will be coordinated and/or conducted by Geosyntec's QAO. Validation documentation will be stored in the project file. Validation will be conducted on 100 percent of the laboratory data by an entity independent of the laboratory. This validation will be done on the hard copy (or pdf version) data with electronic data screening as a component of the validation.

While data verification is a technical process in which the data's adherence to core PARCCS elements is evaluated, it still does not answer the final question of the usability of the data and the implications of any departures from data expectations. The data validation process is designed to answer these questions through: (i) the assignment of data qualifiers based on the data validation results; and (ii) a case-by-case review of data quality issues with respect to project DQOs to render a final assessment of data usability.

5.3 Data Evaluation Roles and Responsibilities

The following components of data evaluation will be performed by certain entities as noted:

- data reduction will be performed by the analytical laboratory;
- data review will be performed both by the laboratory and by Geosyntec;
- data verification will be performed both by the laboratory and by Geosyntec; and
- data validation and usability determination will be performed by Geosyntec.

5.4 Data Reporting

The laboratory data package receipt schedules will be based on the laboratory standard turnaround time. The laboratory will provide hard copy data packages that consist of several components, as well as an EDD for each set of samples (i.e., each work order). The data package deliverables from the laboratory will be specific to each type of data collected but will consist of Level 4 data packages (referred as Category B by NYSDEC). The components of a Level 1 through Level 4 data package are as follows:

- Level 1– Signed cover sheet, narrative, data results, and copy of the chain-of-custody;
- Level 2 – Signed cover sheet, narrative, data results, QC sample results, copy of the chain-of-custody;
- Level 3 – Signed cover sheet, narrative, data results, raw data result information, QC sample results, raw data QC information, calibration and continuing calibration information; and
- Level 4, Full, or CLP-like – All of the above plus all raw data and supporting information for the data results.

The reporting scheme from collection of raw data through document storage is as follows:

- Raw data collected by laboratory technical personnel;
- Data reviewed/checked by laboratory supervisor;
- Data receive QA/QC review by LPM;
- Data deliverable undergoes data validation as per project requirements; validation qualifier codes are applied to the data (as applicable) and incorporated into the EDD (with follow-up QC check). The EDD is checked against the hardcopy results during the validation process. Minor errors are corrected in-house. Resubmittal of the hardcopy or the EDD may be required if major errors are observed; and
- If data are found to be incorrect, then corrective action procedures are implemented, and the data review process is reinitiated.

The validation process for laboratory data will include a review of laboratory quality control results and comparison against USEPA validation limits and/or project specific criteria that could affect the quality of sample results. Specific quality control components to be evaluated in the review include the following:

- Case narrative;
- Data completeness check;
- Holding times;
- Sample preservation;
- Blank results (instrument blanks, method blanks, field blanks, trip blanks, equipment blanks (as applicable);
- Surrogate recoveries;
- Internal standard recoveries (as applicable);
- Calibrations ;
- Initial and Continuing calibration;
- Analytical run sequence;
- Chromatograms;
- Raw data files;
- Internal Standard and Retention Time Summary
- Instrument tune (as applicable);
- Serial dilution;

- Laboratory duplicates (as applicable);
- Matrix spike and matrix spike duplicate results;
- Field duplicates;
- Laboratory control sample results; and
- Other specific information as described in the most current NYSDEC ASP.

Based on validation results, qualifiers will be added to reported analytical results to indicate uncertainty or potential bias or interferences. Specific data qualifiers which will be applied to sample concentration include the following:

J - The results are considered estimated. The analyte was detected above the MDL but the associated reported concentration is approximate and is considered estimated because it is below the RL, also referred to as reporting limit) or because there was a QC issue identified and associated with the analytical result.

R - The reported analyte concentration is rejected due to a serious deficiency with the associated quality control result(s). The presence or absence of the analyte cannot be confirmed.

U - The analyte was not detected above the MDL or RL as applicable.

UJ - The analyte was not detected above the MDL or RL as applicable. However, due to quality control results that did not meet acceptance criteria, the RL is uncertain and may not accurately represent the actual limit.

5.5 Data Usability and Reconciliation with Project Quality

The following sections describe the performance criteria and data usability for the investigation program. In general, if issues with data quality are found in the various data sets, they will be discussed with the project team including the laboratory and NYSDEC. A NYSDEC Data Usability Summary Report (DUSR) will be prepared to assess the usability of the data when compared to its intended use as established in the DQO statement. Data sets will be assessed with regard to the PARCCS parameters described below.

5.5.1 Precision

Field and laboratory duplicates have been incorporated into the program to assess the precision of the measurement system. If duplicate results indicate matrix heterogeneity greater than anticipated, qualifiers will be added to the reported concentrations and a description of validation actions will be included in the DUSR.

5.5.2 Accuracy

Accuracy is a measure of how a concentration is in agreement with a reference concentration. Calibrations, matrix spikes, surrogate spikes, internal standards, and laboratory control sample results will be used to assess accuracy. The DUSR will identify non-compliant results and discuss the impact to reported results. Data qualifiers will be applied to sample concentrations based on a comparison of quality control results to laboratory or method specified performance criteria.

5.5.3 Representativeness

Sample representativeness will be assessed through an analysis of the blank results. The concentrations and frequencies of target analytes detected in blanks will provide an indication of data representativeness. The DUSR will describe issues concerning representativeness based on a review of these data. Qualifiers will be applied to data that not meet the specified laboratory or method criteria of these measurement parameters.

5.5.4 Comparability

Comparability between data sets will be made qualitatively and quantitatively to determine the extent to which different measurements of the same quantity will yield valid conclusions. Comparability performance will be assessed on the basis of duplicate results from samples of the same media collected from the same location at the same time compared against measurement performance criteria, as discussed in Section 2.

Field parameters can provide another means of assessing the comparability of data points within a data set. Parameters including pH, turbidity, and specific conductivity are generally similar among like samples, within certain limits. Should laboratory data appear anomalous, field parameters will be checked to assess the potential that a sample may not have been representative of general conditions for a particular location at a particular time.

5.5.5 Completeness

A data set for a specific medium will be considered complete if at least 90 percent of the results have all associated quality control results and are accepted a valid data to meet the Quality Objectives provided in this QAPP/FSP. The DUSR will include a discussion of the results obtained from the completeness review and recommend corrective action(s) as appropriate.

6. REFERENCES

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TABLES

TABLE C.1
ANALYTICAL REFERENCE LIMITS AND SCREENING VALUES - SOLID SAMPLES
Quality Assurance Project Plan
Former Scott Technologies Site
Elmira, New York

Analytical Group	Analyte	CAS Number	Units	Analytical Method [1] Reporting Limit	Analtyical Method [1] Method Detection Limit	Screening [2] Criteria	LCS % Recovery (%R)	Relative Percent Difference (RPD)	Matrix Spike/Matrix Spike Duplicate %R	RPD
VOCs/8260C	1,1,1-Trichloroethane	71-55-6	µg/Kg	5.00	0.486	680	67 -126	31	67 -126	31
	1,1,2,2-Tetrachloroethane	79-34-5	µg/Kg	5.00	0.718	-	60 -139	24	60 -139	24
	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	µg/Kg	5.00	1.07	-	55 -130	37	55 -130	37
	1,1,2-Trichloroethane	79-00-5	µg/Kg	5.00	0.831	-	70 -128	22	70 -128	22
	1,1-Dichloroethane	75-34-3	µg/Kg	5.00	0.575	270	66 -124	23	66 -124	23
	1,1-Dichloroethene	75-35-4	µg/Kg	5.00	0.848	330	59 -129	25	59 -129	25
	1,2-Dibromo-3-Chloropropane	96-12-8	µg/Kg	5.00	0.749	-	35 -136	40	35 -136	40
	1,2-Dichlorobenzene	95-50-1	µg/Kg	5.00	0.798	1100	71 -124	22	71 -124	22
	1,2-Dichloroethane	107-06-2	µg/Kg	5.00	0.613	20	61 -127	23	61 -127	23
	1,2-Dichloroethene, Total	540-59-0	µg/Kg	10.0	1.28	20	70 -121	25	70 -121	25
	1,2-Dichloropropane	78-87-5	µg/Kg	5.00	0.543	-	72 -122	20	72 -122	20
	1,2,4-Trichlorobenzene	120-82-1	µg/Kg	5.00	0.882	-	51 -136	40	51 -136	40
	1,3-Dichlorobenzene	541-73-1	µg/Kg	5.00	0.656	2400	75 -118	20	75 -118	20
	1,4-Dichlorobenzene	106-46-7	µg/Kg	5.00	0.637	1800	77 -116	20	77 -116	20
	2-Butanone (MEK)	78-93-3	µg/Kg	5.00	0.882	120	35 -149	36	35 -149	36
	2-Hexanone	591-78-6	µg/Kg	5.00	0.690	-	32 -150	32	32 -150	32
	4-Methyl-2-pentanone (MIBK)	108-10-1	µg/Kg	5.00	0.653	-	44 -148	30	44 -148	30
	Acetone	67-64-1	µg/Kg	20.0	5.00	50	20 -150	40	20 -150	40
	Benzene	71-43-2	µg/Kg	5.00	0.675	60	77 -120	20	77 -120	20
	Bromoform	75-25-2	µg/Kg	5.00	0.442	-	53 -140	23	53 -140	23
	Bromomethane	74-83-9	µg/Kg	5.00	0.739	-	25 -150	40	25 -150	40
	Carbon disulfide	75-15-0	µg/Kg	5.00	0.512	-	50 -127	23	50 -127	23
	Carbon tetrachloride	56-23-5	µg/Kg	5.00	0.446	760	69 -122	22	69 -122	22
	Chlorobenzene	108-90-7	µg/Kg	5.00	0.757	1100	79 -120	20	79 -120	20
	Chlorodibromomethane	124-48-1	µg/Kg	5.00	0.710	-	70 -132	20	70 -132	20
	Chloroform	67-66-3	µg/Kg	5.00	0.585	370	72 -120	25	72 -120	25
	Chloromethane	74-87-3	µg/Kg	5.00	0.852	-	44 -131	27	44 -131	27
	Chloroethane	75-00-3	µg/Kg	5.00	1.55	-	22 -150	40	22 -150	40
	cis-1,2-Dichloroethene	156-59-2	µg/Kg	5.00	0.703	250	80 -118	20	80 -118	20
	cis-1,3-Dichloropropene	10061-01-5	µg/Kg	5.00	0.678	-	73 -120	20	73 -120	20
	Dichlorobromomethane	75-27-4	µg/Kg	5.00	0.561	-	70 -125	21	70 -125	21
	Dichlorodifluoromethane	75-71-8	µg/Kg	5.00	0.666	-	25 -150	34	25 -150	34
	Ethylbenzene	100-41-4	µg/Kg	5.00	0.643	1000	78 -125	21	78 -125	21
	1,2-Dibromoethane	106-93-4	µg/Kg	5.00	0.863	-	70 -131	20	70 -131	20
	Cyclohexane	110-82-7	µg/Kg	5.00	0.371	-	64 -130	21	64 -130	21
	Isopropylbenzene	98-82-8	µg/Kg	5.00	0.679	-	70 -133	22	70 -133	22
	Methyl acetate	79-20-9	µg/Kg	5.00	0.901	-	27 -142	40	27 -142	40
	Methyl tert-butyl ether	1634-04-4	µg/Kg	5.00	0.748	930	48 -132	36	48 -132	36
	Methylcyclohexane	108-87-2	µg/Kg	5.00	0.725	-	66 -135	23	66 -135	23
	Methylene Chloride	75-09-2	µg/Kg	5.00	0.672	50	58 -127	28	58 -127	28
	m-Xylene & p-Xylene	179601-23-1	µg/Kg	10.0	1.47	-	75 -126	21	75 -126	21
	o-Xylene	95-47-6	µg/Kg	5.00	0.779	-	83 -127	20	83 -127	20
	Styrene	100-42-5	µg/Kg	5.00	0.705	-	83 -129	20	83 -129	20
	Tetrachloroethene	127-18-4	µg/Kg	5.00	0.680	1300	78 -129	20	78 -129	20
	Toluene	108-88-3	µg/Kg	5.00	0.730	700	78 -124	21	78 -124	21
	trans-1,2-Dichloroethene	156-60-5	µg/Kg	5.00	0.596	190	77 -121	20	77 -121	20
	trans-1,3-Dichloropropene	10061-02-6	µg/Kg	5.00	0.598	-	74 -129	20	74 -129	20

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Quality Assurance Project Plan
Former Scott Technologies Site
Elmira, New York

Analytical Group	Analyte	CAS Number	Units	Analytical Method [(1)] Reporting Limit	Analtyical Method [(1)] Method Detection Limit	Screening [(2)] Criteria	LCS % Recovery (%R)	Relative Percent Difference (RPD)	Matrix Spike/Matrix Spike Duplicate %R	RPD
	Trichloroethene	79-01-6	µg/Kg	5.00	0.658	470	76 -119	21	76 -119	21
	Trichlorofluoromethane	75-69-4	µg/Kg	5.00	0.919	-	20 -150	40	20 -150	40
	Vinyl chloride	75-01-4	µg/Kg	5.00	0.469	20	63 -124	27	63 -124	27
	Xylenes, Total	1330-20-7	µg/Kg	15.0	2.24	1600	83 -126	20	83 -126	20
SVOCs/8270D	Acenaphthene	83-32-9	µg/Kg	67	6.41	98000	42 -104	34	42 -104	34
	Acenaphthylene	208-96-8	µg/Kg	67	7.64	107000	43 -117	36	43 -117	36
	Anthracene	120-12-7	µg/Kg	67	6.53	1000000	43 -111	35	43 -111	35
	Benzo[a]anthracene	56-55-3	µg/Kg	67	8.36	1000	45 -110	31	45 -110	31
	Benzo[a]pyrene	50-32-8	µg/Kg	67	6.68	22000	42 -114	31	42 -114	31
	Benzo[b]fluoranthene	205-99-2	µg/Kg	67	10.5	1700	37 -108	28	37 -108	28
	Benzo[g,h,i]perylene	191-24-2	µg/Kg	67	6.64	1000000	35 -127	21	35 -127	21
	Benzo[k]fluoranthene	207-08-9	µg/Kg	67	13.5	1700	39 -115	42	39 -115	42
	Bis(2-ethylhexyl) phthalate	117-81-7	µg/Kg	670	53.9	-	41 -121	31	41 -121	31
	2,2'-oxybis[1-chloropropane]	108-60-1	µg/Kg	67	7.2	-	37 -105	31	37 -105	31
	4-Bromophenyl phenyl ether	101-55-3	µg/Kg	330	29	-	43 -111	20	43 -111	20
	Butyl benzyl phthalate	85-68-7	µg/Kg	330	45.6	-	40 -117	34	40 -117	34
SVOCs/8270D	Carbazole	86-74-8	µg/Kg	67	6.15	-	42 -114	35	42 -114	35
	4-Chloroaniline	106-47-8	µg/Kg	330	26.7	-	33 -102	28	33 -102	28
	2-Chloronaphthalene	91-58-7	µg/Kg	67	6.96	-	40 -104	34	40 -104	34
	4-Chlorophenyl phenyl ether	7005-72-3	µg/Kg	330	37.1	-	42 -111	37	42 -111	37
	Chrysene	218-01-9	µg/Kg	67	7.94	1000	44 -108	31	44 -108	31
	Dibenz(a,h)anthracene	53-70-3	µg/Kg	67	7.42	1100	34 -131	32	34 -131	32
	Dibenzofuran	132-64-9	µg/Kg	330	32.8	-	42 -106	33	42 -106	33
	Di-n-butyl phthalate	84-74-2	µg/Kg	330	41.8	-	44 -120	34	44 -120	34
	3,3'-Dichlorobenzidine	91-94-1	µg/Kg	330	35.3	-	24 -113	30	24 -113	30
	Diethyl phthalate	84-66-2	µg/Kg	330	36.4	-	44 -113	32	44 -113	32
	Dimethyl phthalate	131-11-3	µg/Kg	330	36.3	-	44 -111	34	44 -111	34
	2,4-Dinitrotoluene	121-14-2	µg/Kg	330	26.9	-	48 -118	33	48 -118	33
	2,6-Dinitrotoluene	606-20-2	µg/Kg	330	34.4	-	47 -119	30	47 -119	30
	Di-n-octyl phthalate	117-84-0	µg/Kg	330	35.2	-	35 -129	33	35 -129	33
	Fluoranthene	206-44-0	µg/Kg	67	7.13	1000000	40 -118	23	40 -118	23
	Fluorene	86-73-7	µg/Kg	67	8.79	386000	43 -110	37	43 -110	37
	Hexachlorobenzene	118-74-1	µg/Kg	67	7.11	-	42 -110	29	42 -110	29
	Hexachlorobutadiene	87-68-3	µg/Kg	67	7.47	-	40 -114	25	40 -114	25
	Hexachlorocyclopentadiene	77-47-4	µg/Kg	330	36	-	10 -150	33	10 -150	33
	Hexachloroethane	67-72-1	µg/Kg	330	24	-	40 -102	34	40 -102	34
	Indeno[1,2,3-cd]pyrene	193-39-5	µg/Kg	67	6.87	8200	34 -130	30	34 -130	30
	Isophorone	78-59-1	µg/Kg	330	25.1	-	39 -114	33	39 -114	33
	2-Methylnaphthalene	91-57-6	µg/Kg	67	6	-	43 -105	34	43 -105	34
	Naphthalene	91-20-3	µg/Kg	67	5.75	12000	42 -104	25	42 -104	25
	2-Nitroaniline	88-74-4	µg/Kg	1,700	149	-	41 -118	33	41 -118	33
	3-Nitroaniline	99-09-2	µg/Kg	1,700	137	-	38 -116	27	38 -116	27
	4-Nitroaniline	100-01-6	µg/Kg	1,700	135	-	37 -120	31	37 -120	31
	4-Nitrophenol	100-02-7	µg/Kg	1,700	122	-	27 -131	33	27 -131	33
	Nitrobenzene	98-95-3	µg/Kg	670	27.8	1500	40 -109	31	40 -109	31
	N-Nitrosodi-n-propylamine	621-64-7	µg/Kg	67	7.82	-	42 -108	32	42 -108	32

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Former Scott Technologies Site
Elmira, New York

Analytical Group	Analyte	CAS Number	Units	Analytical Method [1] Reporting Limit	Analtyical Method [1] Method Detection Limit	Screening [2] Criteria	LCS % Recovery (%R)	Relative Percent Difference (RPD)	Matrix Spike/Matrix Spike Duplicate %R	RPD
	N-Nitrosodiphenylamine	86-30-6	µg/Kg	330	30.9	-	41 -110	32	41 -110	32
	Phenanthrene	85-01-8	µg/Kg	67	10.6	100000	41 -107	20	41 -107	20
	Pyrene	129-00-0	µg/Kg	67	6.75	100000	39 -113	28	39 -113	28
	4-Chloro-3-methylphenol	59-50-7	µg/Kg	330	30.7	-	43 -110	31	43 -110	31
	2-Chlorophenol	95-57-8	µg/Kg	330	27.3	-	40 -105	37	40 -105	37
	2-Methylphenol	95-48-7	µg/Kg	330	23.3	330	41 -104	37	41 -104	37
	Methylphenol, 3 & 4	106-44-5	µg/Kg	330	32.7	330	43 -107	36	43 -107	36
	2,4-Dichlorophenol	120-83-2	µg/Kg	67	6.69	-	44 -110	27	44 -110	27
	2,4-Dimethylphenol	105-67-9	µg/Kg	330	52.2	-	39 -106	42	39 -106	42
	2,4-Dinitrophenol	51-28-5	µg/Kg	1,700	397	-	19 -140	43	19 -140	43
	4,6-Dinitro-2-methylphenol	534-52-1	µg/Kg	1,700	134	-	28 -130	35	28 -130	35
	2-Nitrophenol	88-75-5	µg/Kg	330	36.8	-	45 -112	30	45 -112	30
	Pentachlorophenol	87-86-5	µg/Kg	330	29.8	800	18 -125	34	18 -125	34
	Phenol	108-95-2	µg/Kg	67	7.88	330	39 -105	40	39 -105	40
	2,4,5-Trichlorophenol	95-95-4	µg/Kg	330	35.6	-	42 -110	35	42 -110	35
	2,4,6-Trichlorophenol	88-06-2	µg/Kg	330	49.9	-	43 -111	36	43 -111	36
	Acetophenone	98-86-2	µg/Kg	330	27.4	-	30 -150	40	30 -150	40
	Atrazine	1912-24-9	µg/Kg	330	32.5	-	30 -150	40	30 -150	40
	Benzaldehyde	100-52-7	µg/Kg	330	50	-	30 -150	40	30 -150	40
	1,1'-Biphenyl	92-52-4	µg/Kg	330	29.8	-	30 -150	40	30 -150	40
	Caprolactam	105-60-2	µg/Kg	1,700	252	-	30 -150	40	30 -150	40
	Bis(2-chloroethoxy)methane	111-91-1	µg/Kg	330	22	-	42 -103	35	42 -103	35
	Bis(2-chloroethyl)ether	111-44-4	µg/Kg	67	8.95	-	40 -100	33	40 -100	33
Pesticides/8081A	Aldrin	309-00-2	µg/Kg	0.0833	0.0149	190	50-150	20	50-150	20
	alpha-BHC	319-84-6	µg/Kg	0.0833	0.0136	20	50-150	20	50-150	20
	alpha-Chlordane	5103-71-9	µg/Kg	0.0833	0.0165	2900	30-150	20	30-150	20
	beta-BHC	319-85-7	µg/Kg	0.0833	0.0216	90	50-150	20	50-150	20
	4,4'-DDD	72-54-8	µg/Kg	0.0833	0.0109	14000	50-150	20	50-150	20
	4,4'-DDE	72-55-9	µg/Kg	0.0833	0.0126	17000	50-150	20	50-150	20
	4,4'-DDT	50-29-3	µg/Kg	0.0833	0.0125	94000	30-150	37	30-150	37
	delta-BHC	319-86-8	µg/Kg	0.0833	0.0128	250	20-124	20	20-124	20
	Dieldrin	60-57-1	µg/Kg	0.0833	0.0139	100	50-150	20	50-150	20
	Endosulfan I	959-98-8	µg/Kg	0.0833	0.0157	102000	50-150	23	50-150	23
	Endosulfan II	33213-65-9	µg/Kg	0.0833	0.0147	102000	50-150	33	50-150	33
	Endosulfan sulfate	1031-07-08	µg/Kg	0.0833	0.00870	920000	44-140	26	44-140	26
	Endrin	72-20-8	µg/Kg	0.0833	0.0162	60	30-150	20	30-150	20
	Endrin aldehyde	7421-93-4	µg/Kg	0.0833	0.0162	-	30-150	20	30-150	20
	Endrin ketone	53494-70-5	µg/Kg	0.0833	0.0130	-	50-150	20	50-150	20
	gamma-BHC (Lindane)	58-89-9	µg/Kg	0.0833	0.0146	100	50-150	20	50-150	20
	gamma-Chlordane	5103-74-2	µg/Kg	0.0833	0.0164	-	30-150	24	30-150	24
	Heptachlor	76-44-8	µg/Kg	0.0833	0.0185	380	50-150	20	50-150	20
	Heptachlor epoxide	1024-57-3	µg/Kg	0.0833	0.0162	-	50-150	20	50-150	20
	Methoxychlor	72-43-5	µg/Kg	0.167	0.0174	-	30-150	26	30-150	26
	Toxaphene	8001-35-2	µg/Kg	3.33	0.556	-	-	-	-	-
PCBs/8082A	Aroclor-1016	12674-11-2	µg/Kg	0.833	0.124	-	55 -135	20	55 -135	20
	Aroclor-1221	11104-28-2	µg/Kg	0.833	0.159	-				

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	Aroclor-1232	11141-16-5	µg/Kg	0.833	0.143	-				
	Aroclor-1242	53469-21-9	µg/Kg	0.833	0.136	-				
	Aroclor-1248	12672-29-6	µg/Kg	0.833	0.0788	-				
	Aroclor-1254	11097-69-1	µg/Kg	0.833	0.119	-				
	Aroclor-1260	11096-82-5	µg/Kg	0.833	0.118	-	50 -140	20	50 -140	20
	Aroclor-1262	37324-23-5	µg/Kg	0.833	0.183	-				
	Aroclor-1268	11100-14-4	µg/Kg	0.833	0.107	-				
	Polychlorinated Biphenyls, Total	1336-36-3	µg/Kg	0.833	0.183	3200				1,000
Metals/6010C & 7471B	Silver	7440-22-4	mg/Kg	0.5	0.0404	8.3	80 -120	20	75 -125	20
	Aluminum	7429-90-5	mg/Kg	20	2.08	-	80 -120	20	75 -125	20
	Arsenic	7440-38-2	mg/Kg	1	0.306	16	80 -120	20	75 -125	20
	Antimony	7440-36-0	mg/Kg	1	0.199	-	80 -120	20	75 -125	20
	Barium	7440-39-3	mg/Kg	20	0.0128	820	80 -120	20	75 -125	20
	Beryllium	7440-41-7	mg/Kg	0.4	0.0112	47	80 -120	20	75 -125	20
	Cadmium	7440-43-9	mg/Kg	0.5	0.0143	7.5	80 -120	20	75 -125	20
	Calcium	7440-70-2	mg/Kg	500	1.5	-	80 -120	20	75 -125	20
	Chromium, total	7440-47-3	mg/Kg	0.5	0.0772	19 [3]	80 -120	20	75 -125	20
	Cobalt	7440-48-4	mg/Kg	5	0.0418	-	80 -120	20	75 -125	20
	Copper	7440-50-8	mg/Kg	2.5	0.144	1720	80 -120	20	75 -125	20
	Iron	7439-89-6	mg/Kg	10	0.887	-	80 -120	20	75 -125	20
	Lead	7439-92-1	mg/Kg	1	0.102	450	80 -120	20	75 -125	20
	Magnesium	7439-95-4	mg/Kg	500	2.07	-	80 -120	20	75 -125	20
	Manganese	7439-96-5	mg/Kg	1.5	0.0889	2000	80 -120	20	75 -125	20
	Mercury	7439-97-6	mg/Kg	0.033	0.0109	130	80 -120	20	75 -125	20
	Nickel	7440-02-0	mg/Kg	4	0.0475	310	80 -120	20	75 -125	20
	Potassium	9/7/7440	mg/Kg	500	6.39	-	80 -120	20	75 -125	20
	Selenium	7782-49-2	mg/Kg	1	0.268	4	80 -120	20	75 -125	20
	Sodium	7440-23-5	mg/Kg	500	1.06	-	80 -120	20	75 -125	20
	Thallium	7440-28-0	mg/Kg	2	0.147	-	80 -120	20	75 -125	20
	Vanadium	7440-62-2	mg/Kg	5	0.175	-	80 -120	20	75 -125	20
	Zinc	7440-66-6	mg/Kg	2	0.103	2480	80 -120	20	75 -125	20
Cyanide/9014	Cyanide	74-90-8	mg/Kg	0.5	0.147	40	75 -125	20	75 -125	20

Notes:

[1] The Analytical Reporting Limit and Method Detection Limit listed are those that can be routinely achieved by the analytical laboratory.

[2] Screening criteria values are the minimum of the New York State Department of Environmental Conservation Table 375-6.8(b) Restricted Use Soil Cleanup Objectives for Industrial Land Use and Protection of Ground Water, December 2006.

[3] Screening value for total chromium is value specifed for hexavalent chromium.

- Refers to no screening criteria established
CAS - Chemical Abstracts Service
VOC - volatile organic compound
SVOC - semi-volatile organic compound
PCB - polychlorinated biphenyl
µg/Kg - micrograms per kilogram
mg/Kg - milligrams per kilogram

TABLE C.2
ANALYTICAL REFERENCE LIMITS AND SCREENING VALUES - WATER SAMPLES
Quality Assurance Project Plan
Former Scott Technologies Site
Elmira, New York

Analytical Group	Analyte	CAS Number	Units	Analytical Method [1] Reporting Limit	Analtyical Method [1] Method Detection Limit	Screening [2] Criteria	LCS % Recovery (%R)	Relative Percent Difference (RPD)	Matrix Spike/Matrix Spike Duplicate %R	RPD
VOCs/8260C	1,1,1-Trichloroethane	71-55-6	µg/L	1.00	0.286	5	63 -133	35	63 -133	35
	1,1,2,2-Tetrachloroethane	79-34-5	µg/L	1.00	0.200	-	62 -125	35	62 -125	35
	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	µg/L	1.00	0.320	5	46 -148	35	46 -148	35
	1,1,2-Trichloroethane	79-00-5	µg/L	1.00	0.201	1	77 -127	35	77 -127	35
	1,1-Dichloroethane	75-34-3	µg/L	1.00	0.116	5	73 -126	35	73 -126	35
	1,1-Dichloroethene	75-35-4	µg/L	1.00	0.296	5	65 -136	35	65 -136	35
	1,2-Dibromo-3-Chloropropane	**96-12-8**	µg/L	**1.00**	**0.141**	**0.04**	**37-133**	**35**	**37-133**	**35**
	1,2-Dichlorobenzene	95-50-1	µg/L	1.00	0.152	3	**77-120**	35	**77-120**	35
	1,2-Dichloroethane	**107-06-2**	µg/L	**1.00**	**0.212**	**0.6**	**68-132**	**32**	**68-132**	**32**
	1,2-Dichloroethene, Total	540-59-0	µg/L	1.00	0.512	-	**71-124**	**35**	**71-124**	**35**
	1,2-Dichloropropane	78-87-5	µg/L	1.00	0.095	1	**76-124**	**34**	**76-124**	**34**
	1,2,4-Trichlorobenzene	120-82-1	µg/L	1.00	0.271	5	**60-127**	**35**	**60-127**	**35**
	1,3-Dichlorobenzene	541-73-1	µg/L	1.00	0.105	3	76 -120	24	76 -120	24
	1,4-Dichlorobenzene	106-46-7	µg/L	1.00	0.206	3	77 -120	24	77 -120	24
	2-Butanone (MEK)	78-93-3	µg/L	5.00	0.548	50	39 -138	35	39 -138	35
	2-Hexanone	591-78-6	µg/L	5.00	0.159	50	25 -132	35	25 -132	35
	4-Methyl-2-pentanone (MIBK)	108-10-1	µg/L	5.00	0.528	-	45 -145	35	45 -145	35
	Acetone	67-64-1	µg/L	5.00	2.5	50	22 -150	35	22 -150	35
	Benzene	71-43-2	µg/L	1.00	0.11	1	80 -120	32	80 -120	32
	Bromoform	75-25-2	µg/L	1.00	0.191	50	46 -150	35	46 -150	35
	Bromomethane	74-83-9	µg/L	1.00	0.313	5	33 -150	35	33 -150	35
	Carbon disulfide	75-15-0	µg/L	1.00	0.212	60	54 -132	35	54 -132	35
	Carbon tetrachloride	56-23-5	µg/L	1.00	0.137	5	55 -150	35	55 -150	35
	Chlorobenzene	108-90-7	µg/L	1.00	0.135	5	80 -120	29	80 -120	29
	Chlorodibromomethane	124-48-1	µg/L	1.00	0.137	50	60 -140	35	60 -140	35
	Chloroform	67-66-3	µg/L	1.00	0.171	7	72 -127	35	72 -127	35
	Chloromethane	74-87-3	µg/L	1.00	0.283	5	50 -139	35	50 -139	35
	Chloroethane	75-00-3	µg/L	1.00	0.215	5	36 -142	35	36 -142	35
	cis-1,2-Dichloroethene	156-59-2	µg/L	1.00	0.237	5	70 -120	35	70 -120	35
	cis-1,3-Dichloropropene	**10061-01-5**	µg/L	**1.00**	**0.187**	**0.4**	**66 -120**	**35**	**66 -120**	**35**
	Dichlorobromomethane	75-27-4	µg/L	1.00	0.130	50	66 -130	35	66 -130	35
	Dichlorodifluoromethane	75-71-8	µg/L	1.00	0.193	5	13 -150	35	13 -150	35
	Ethylbenzene	100-41-4	µg/L	1.00	0.227	5	72 -126	33	72 -126	33
	1,2-Dibromoethane	**106-93-4**	µg/L	**1.00**	**0.180**	**0.0006**	**74 -123**	**35**	**74 -123**	**35**
	Cyclohexane	110-82-7	µg/L	1.00	0.254	-	45 -142	35	45 -142	35
	Isopropylbenzene	98-82-8	µg/L	1.00	0.164	5	58 -130	35	58 -130	35
	Methyl acetate	79-20-9	µg/L	1.00	0.138	-	47 -142	35	47 -142	35
	Methyl tert-butyl ether	1634-04-4	µg/L	1.00	0.183	10	64 -123	35	64 -123	35
	Methylcyclohexane	108-87-2	µg/L	1.00	0.261	-	45 -145	35	45 -145	35
	Methylene Chloride	75-09-2	µg/L	1.00	0.125	5	63 -129	35	63 -129	35
	m-Xylene & p-Xylene	179601-23-1	µg/L	2.00	0.406	5	73 -130	32	73 -130	32
	o-Xylene	95-47-6	µg/L	1.00	0.109	5	72 -124	33	72 -124	33
	Styrene	100-42-5	µg/L	1.00	0.097	930	71 -127	34	71 -127	34
	Tetrachloroethene	127-18-4	µg/L	1.00	0.149	5	70 -135	35	70 -135	35
	Toluene	108-88-3	µg/L	1.00	0.15	5	80 -123	35	80 -123	35
	trans-1,2-Dichloroethene	156-60-5	µg/L	1.00	0.17	5	73 -126	35	73 -126	35
	trans-1,3-Dichloropropene	**10061-02-6**	µg/L	**1.00**	**0.148**	**0.4**	**65 -125**	**35**	**65 -125**	**35**
	Trichloroethene	79-01-6	µg/L	1.00	0.143	5	73 -120	35	73 -120	35
	Trichlorofluoromethane	75-69-4	µg/L	1.00	0.199	5	44 -150	35	44 -150	35
	Vinyl chloride	75-01-4	µg/L	1.00	0.227	2	53 -138	35	53 -138	35
	Xylenes, Total	1330-20-7	µg/L	3.00	0.488	5	76 -128	32	76 -128	32

TABLE C.2
ANALYTICAL REFERENCE LIMITS AND SCREENING VALUES - WATER SAMPLES
Quality Assurance Project Plan
Former Scott Technologies Site
Elmira, New York

Analytical Group	Analyte	CAS Number	Units	Analytical Method [1] Reporting Limit	Analtyical Method [1] Method Detection Limit	Screening [2] Criteria	LCS % Recovery (%R)	Relative Percent Difference (RPD)	Matrix Spike/Matrix Spike Duplicate %R	RPD
SVOCs/8270D	Acenaphthene	83-32-9	µg/L	0.200	0.0291	20	30-150	35.00	30-150	35
	Acenaphthylene	208-96-8	µg/L	0.200	0.0215	-	30-150	35.00	30-150	35
	Anthracene	120-12-7	µg/L	0.200	0.0189	50	30-150	35.00	30-150	35
	Benzo[a]anthracene	**56-55-3**	µg/L	**0.200**	**0.0366**	**0.002**	**30-150**	**35**	**30-150**	**35**
	Benzo[a]pyrene	50-32-8	µg/L	0.200	0.0282	ND	30-150	35.00	30-150	35
	Benzo[b]fluoranthene	**205-99-2**	µg/L	**0.200**	**0.0487**	**0.002**	**30-150**	**35**	**30-150**	**35**
	Benzo[g,h,i]perylene	191-24-2	µg/L	0.200	0.0291	-	30-150	35.00	30-150	35
	Benzo[k]fluoranthene	**207-08-9**	µg/L	**0.200**	**0.0301**	**0.002**	**30-150**	**35**	**30-150**	**35**
	Bis(2-ethylhexyl) phthalate	117-81-7	µg/L	2.00	0.439	5	30-150	35.00	30-150	35
	2,2'-oxybis[1-chloropropane]	108-60-1	µg/L	1.00	0.0239	-	30-150	35.00	30-150	35
	4-Bromophenyl phenyl ether	101-55-3	µg/L	1.00	0.117	-	30-150	35.00	30-150	35
	Butyl benzyl phthalate	85-68-7	µg/L	1.00	0.213	50	30-150	35.00	30-150	35
	Carbazole	86-74-8	µg/L	1.00	0.0267	-	30-150	35.00	30-150	35
	4-Chloroaniline	106-47-8	µg/L	1.00	0.291	5	10-150	35.00	10-150	35
	2-Chloronaphthalene	91-58-7	µg/L	0.200	0.0307	10	30-150	35.00	30-150	35
	4-Chlorophenyl phenyl ether	7005-72-3	µg/L	1.00	0.0799	-	30-150	35.00	30-150	35
	Chrysene	**218-01-9**	µg/L	**0.200**	**0.0309**	**0.002**	**30-150**	**35**	**30-150**	**35**
	Dibenz(a,h)anthracene	53-70-3	µg/L	0.200	0.0268	-	30-150	35.00	30-150	35
	Dibenzofuran	132-64-9	µg/L	1.00	0.0965	-	30-150	35.00	30-150	35
	Di-n-butyl phthalate	84-74-2	µg/L	1.00	0.243	50	30-150	35.00	30-150	35
	3,3'-Dichlorobenzidine	91-94-1	µg/L	1.00	0.147	5	10-150	35.00	10-150	35
	Diethyl phthalate	84-66-2	µg/L	1.00	0.297	50	30-150	35.00	30-150	35
	Dimethyl phthalate	131-11-3	µg/L	1.00	0.183	50	30-150	35.00	30-150	35
	2,4-Dinitrotoluene	121-14-2	µg/L	1.00	0.214	5	30-150	35.00	30-150	35
	2,6-Dinitrotoluene	606-20-2	µg/L	1.00	0.137	5	30-150	35.00	30-150	35
	Di-n-octyl phthalate	117-84-0	µg/L	1.00	0.204	50	10-150	35.00	10-150	35
	Fluoranthene	206-44-0	µg/L	0.200	0.0211	50	30-150	35.00	30-150	35
	Fluorene	86-73-7	µg/L	0.200	0.0240	50	30-150	35.00	30-150	35
	Hexachlorobenzene	**118-74-1**	µg/L	**1.00**	**0.0610**	**0.04**	**30-150**	**35.00**	**30-150**	**35**
	Hexachlorobutadiene	**87-68-3**	µg/L	**1.00**	**0.0937**	**0.50**	**30-150**	**35.00**	**30-150**	**35**
	Hexachlorocyclopentadiene	77-47-4	µg/L	1.00	0.136	5	30-150	35.00	30-150	35
	Hexachloroethane	67-72-1	µg/L	1.00	0.139	5	30-150	35.00	30-150	35
	Indeno[1,2,3-cd]pyrene	**193-39-5**	µg/L	**0.200**	**0.0433**	**0.002**	**30-150**	**35.00**	**30-150**	**35**
	Isophorone	78-59-1	µg/L	1.00	0.0738	50	30-150	35.00	30-150	35
	2-Methylnaphthalene	91-57-6	µg/L	0.200	0.0192	-	30-150	35.00	30-150	35
	Naphthalene	91-20-3	µg/L	0.200	0.0228	10	30-150	35.00	30-150	35
	2-Nitroaniline	88-74-4	µg/L	5.00	0.673	5	30-150	35.00	30-150	35
	3-Nitroaniline	99-09-2	µg/L	5.00	0.805	5	10-150	35.00	10-150	35
	4-Nitroaniline	100-01-6	µg/L	5.00	0.773	5	30-150	35.00	30-150	35
	4-Nitrophenol	100-02-7	µg/L	5.00	0.804	-	30-150	35.00	30-150	35
	Nitrobenzene	**98-95-3**	µg/L	**2.00**	**0.149**	**0.40**	**30-150**	**35.00**	**30-150**	**35**
	N-Nitrosodi-n-propylamine	621-64-7	µg/L	1.00	0.0501	-	30-150	35.00	30-150	35
	N-Nitrosodiphenylamine	86-30-6	µg/L	1.00	0.122	50	30-150	35.00	30-150	35
	Phenanthrene	85-01-8	µg/L	0.200	0.0415	50	30-150	35.00	30-150	35
	Pyrene	129-00-0	µg/L	0.200	0.0226	50	30-150	35.00	30-150	35
	4-Chloro-3-methylphenol	59-50-7	µg/L	1.00	0.171	-	30-150	35.00	30-150	35
	2-Chlorophenol	95-57-8	µg/L	1.00	0.225	-	30-150	35.00	30-150	35
	2-Methylphenol	95-48-7	µg/L	1.00	0.187	-	30-150	35.00	30-150	35
	Methylphenol, 3 & 4	106-44-5	µg/L	1.00	0.209	-	30-150	35.00	30-150	35
	2,4-Dichlorophenol	120-83-2	µg/L	1.00	0.0671	1	30-150	35.00	30-150	35
	2,4-Dimethylphenol	105-67-9	µg/L	1.00	0.171	1	30-150	35.00	30-150	35
	2,4-Dinitrophenol	**51-28-5**	µg/L	**5.00**	**2.50**	**1**	**10-150**	**35.00**	**10-150**	**35**
	4,6-Dinitro-2-methylphenol	534-52-1	µg/L	5.00	1.56	-	30-150	35.00	30-150	35
	2-Nitrophenol	88-75-5	µg/L	1.00	0.112	-	30-150	35.00	30-150	35
	Pentachlorophenol	87-86-5	µg/L	1.00	0.500	1	10-150	35.00	10-150	35
	Phenol	108-95-2	µg/L	1.00	0.0553	1	30-150	35.00	30-150	35

TABLE C.2
ANALYTICAL REFERENCE LIMITS AND SCREENING VALUES - WATER SAMPLES
Quality Assurance Project Plan
Former Scott Technologies Site
Elmira, New York

Analytical Group	Analyte	CAS Number	Units	Analytical Method [1] Reporting Limit	Analtyical Method [1] Method Detection Limit	Screening [2] Criteria	LCS % Recovery (%R)	Relative Percent Difference (RPD)	Matrix Spike/Matrix Spike Duplicate %R	RPD
SVOCs/8270D (continued)	2,4,5-Trichlorophenol	95-95-4	µg/L	1.00	0.122	-	30-150	35.00	30-150	35
	2,4,6-Trichlorophenol	88-06-2	µg/L	1.00	0.298	-	30-150	35.00	30-150	35
	Acetophenone	98-86-2	µg/L	2.00	0.112	-	30-150	35.00	30-150	35
	Atrazine	1912-24-9	µg/L	2.00	0.223	-	30-150	35.00	30-150	35
	Benzaldehyde	100-52-7	µg/L	2.00	0.106	-	30-150	35.00	30-150	35
	1,1'-Biphenyl	92-52-4	µg/L	1.00	0.105	-	30-150	35.00	30-150	35
	Caprolactam	105-60-2	µg/L	5.00	1.47	-	30-150	35.00	30-150	35
	Bis(2-chloroethoxy)methane	111-91-1	µg/L	1.00	0.134	5	30-150	35.00	30-150	35
	Bis(2-chloroethyl)ether	111-44-4	µg/L	1.00	0.0317	1	30-150	35.00	30-150	35
PCBs/8082A - Low Level	Aroclor-1016	12674-11-2	µg/L	0.0100	0.00252	-	50 -120	30	50 -120	30
	Aroclor-1221	11104-28-2	µg/L	0.0100	0.00249	-				
	Aroclor-1232	11141-16-5	µg/L	0.0100	0.00293	-				
	Aroclor-1242	53469-21-9	µg/L	0.0100	0.00186	-				
	Aroclor-1248	12672-29-6	µg/L	0.0100	0.00227	-				
	Aroclor-1254	11097-69-1	µg/L	0.0100	0.00229	-				
	Aroclor-1260	11096-82-5	µg/L	0.0100	0.00136	-	50 -120	30	50 -120	30
	Aroclor-1262	37324-23-5	µg/L	0.0100	0.00206	-				
	Aroclor-1268	11100-14-4	µg/L	0.0100	0.00272	-				
	Polychlorinated biphenyls, Total	1336-36-3	µg/L	0.0100	0.00293	0.09				
Total Petroleum Hydocarbons/801	Diesel Range Organics [C10 - C28]	STL00019	µg/L	500	105		40 -124	30	27 -120	31
	Gasoline Range Organics [C6 - C10]	8006-61-9	µg/L	100	25		67 -132	35	63 -120	11
Metals/6010C & 7471B	Aluminum	7429-90-5	µg/L	200	41.7	2000	80-120	20	75-125	20
	Antimony	7440-36-0	µg/L	10.0	2.49	6	80-120	20	75-125	20
	Arsenic	7440-38-2	µg/L	10.0	3.02	50	80-120	20	75-125	20
	Barium	7440-39-3	µg/L	200	0.193	2000	80-120	20	75-125	20
	Beryllium	7440-41-7	µg/L	4.00	0.269	3	80-120	20	75-125	20
	Cadmium	7440-43-9	µg/L	5.00	0.166	10	80-120	20	75-125	20
	Calcium	7440-70-2	µg/L	5000	14.1	-	80-120	20	75-125	20
	Chromium	7440-47-3	µg/L	5.00	1.02	100	80-120	20	75-125	20
	Cobalt	7440-48-4	µg/L	50.0	0.394	-	80-120	20	75-125	20
	Copper	7440-50-8	µg/L	25.0	0.848	1000	80-120	20	75-125	20
	Iron	7439-89-6	µg/L	100	5.30	600	80-120	20	75-125	20
	Lead	7439-92-1	µg/L	10.0	1.45	50	80-120	20	75-125	20
	Magnesium	7439-95-4	µg/L	5000	10.9	35000	80-120	20	75-125	20
	Manganese	7439-96-5	µg/L	15.0	0.0938	600	80-120	20	75-125	20
	Nickel	7440-02-0	µg/L	40.0	0.486	200	80-120	20	75-125	20
	Potassium	7440-09-7	µg/L	5000	40.5	-	80-120	20	75-125	20
	Selenium	7782-49-2	µg/L	10.0	1.71	20	80-120	20	75-125	20
	Silver	7440-22-4	µg/L	5.00	0.266	100	80-120	20	75-125	20
	Sodium	7440-23-5	µg/L	5000	21.0	case by case	80-120	20	75-125	20
	Thallium	7440-28-0	µg/L	20.0	1.51	0.50	80-120	20	75-125	20
	Vanadium	7440-62-2	µg/L	50.0	1.06	-	80-120	20	75-125	20
	Zinc	7440-66-6	µg/L	20.0	5.98	5000	80-120	20	75-125	20
	Mercury	7439-97-6	µg/L	0.200	0.0384	1.4	80-120	20	75-125	20

Notes:

[1] The Analytical Reporting Limit and Method Detection Limit listed are those that can be routinely achieved by the analytical laboratory.

[2] Screening criteria values are Division of Technical and Opertional Guidance Series (1.1.1) June, 1998 Table 5 New York State Groundwater Effluent Limitations Maximum Allowable Concentrations

- Refers to no screening criteria established

All concentration units are micrograms per liter

CAS - Chemical Abstracts Service

VOC - volatile organic compound

PCB - polychlorinated biphenyl

Bold - Indicates that the sceening criteria value is between the reporting limit and method detection limit.

Bold and Shaded - Indicates that the screening criteria value is below both the reporting limit and method detection limit.

TABLE C.3
ANALYTICAL METHODS, CONTAINERS, PRESERVATIVES, AND HOLDING TIMES
Quality Assurance Project Plan
Former Scott Technologies Site
Elmira, New York

Matrix	Analytical Group	Analytical Method	Containers (number, size, type)	Preservation Requirements (chemical, temperature, etc.)	Maximum Holding Time (preparation/analysis)
Solid	TCL VOCs	SW-846 8260C	Terracore kit	2 VOA vials H_2O, 1 VOA vial MEOH, frozen within 48 hours	14 days
	TCL SVOCs	SW-846 8270D	1-4 oz glass jar	Cool <6^{0}C but not frozen	14 days to extract 40 days to analyze
	Pesticides	SW-846 8081	1-4 oz glass jar	Cool <6^{0}C but not frozen	14 days to extract 40 days to analyze
	PCBS	SW-846 8082A	1-4 oz glass jar	Cool <6^{0}C but not frozen	14 days to extract 40 days to analyze
	Mercury, Total	SW-846 7471B	1-4 oz. glass jar	Cool <6^{0}C but not frozen	28 days
	Metals, Total	SW-846 6010C		Cool <6^{0}C but not frozen	180 days
	Cyanide	Method 9014	1-4 oz glass jar	Cool <6^{0}C but not frozen	14 days
Water	TCL VOCs	SW-846 8260C	3 X 40-mL glass VOA vials	HCl to pH<2, no headspace, cool to <6^{0}C, but not frozen	14 days
	TCL SVOCs	SW-846 8270D	2 - 1 L amber glass	Cool <6^{0}C but not frozen	7 days to extract 40 days to analyze
	PCBs	SW-846 8082A Low-Level	2-1 L amber glass	Cool <6^{0}C but not frozen	7 days to extract 40 days to analyze
	Mercury, Total	SW-846 7470A	1-250 ml plastic	HNO3 to pH<2, Cool <6^{0}C but not frozen	28 days
	TAL Metals	SW-846 6010C			6 months
	TPH-DRO	SW-846 8015D	1-1 L glass	Cool <6^{0}C but not frozen	7 days to extract 40 days to analyze
	TPH-GRO	SW-846 8015D	3 X 40-mL glass VOA vials	HCl to pH<2, no headspace, cool to <6^{0}C, but not frozen	14 days

Notes:

SW-846 - USEPA "SW-846 Test Methods for Evaluating Solid Waste: Physical/Chemical Methods", April 1998, 5th edition.

ºC - Celcius
HCl – hydrochloric acid
L – liter
mL – milliliters
^{0}C – degrees Celsius
oz. – ounce
MEOH - methanol
DRO - diesel range organics
HVS - high volume sampling
VOA – volatile organic analyte
VOC – volatile organic compound
H_2O - water
SVOC – semi-volatile organic compound
TPH – total petroleum hydrocarbons
GRO - gasoline range organics
TCL - Target Compound List
TAL - Target Analyte List

TABLE C.4
SUMMARY OF FIELD QUALITY CONTROL SAMPLES
Quality Assurance Project Plan
Former Scott Technologies Site
Elmira, New York

Parameter	Matrix	MS/MSD[1]	Field Duplicate	Equipment Rinsate Blanks[2]*	Trip Blank	Source Blank
TCL VOCs	Soil/Solids	1 set/20 samples or less	1 per 10 samples or less	1 per 20 samples or 1 per day	NA	1 per source or 1 per day
TCL SVOCs		1 set/20 samples or less	1 per 10 samples or less	1 per 20 samples or 1 per day	NA	1 per source or 1 per day
PCBs		1 set/20 samples or less	1 per 10 samples or less	1 per 20 samples or 1 per day	NA	1 per source or 1 per day
TAL Metals		1 set/20 samples or less	1 per 10 samples or less	1 per 20 samples or 1 per day	NA	1 per source or 1 per day
Cyanide		2 set/20 samples or less	1 per 10 samples or less	2 per 20 samples or 1 per day	NA	2 per source or 1 per day
TCL VOCs	Aqueous	1 set/20 samples or less	1 per 10 samples or less	1 per 20 samples or 1 per day	1 per cooler containing VOC samples	1 per source or 1 per day
TCL SVOCs		2 set/20 samples or less	1 per 10 samples or less	2 per 20 samples or 1 per day	NA	2 per source or 1 per day
PCBs		1 set/20 samples or less	1 per 10 samples or less	1 per 20 samples or 1 per day	NA	1 per source or 1 per day
TPH-Diesel Range Organics		1 set/20 samples or less	1 per 10 samples or less	1 per 20 samples or 1 per day	NA	1 per source or 1 per day
TPH-Gasoline Range Orgnics		1 set/20 samples or less	1 per 10 samples or less	1 per 20 samples or 1 per day	NA	1 per source or 1 per day

Notes:

[1] Field personnel must collect triple volume to account for MS/MSD sample.

[2] No equipment blanks are required for disposable or dedicated field sampling equipment.

*If less than 20 samples are collected but two days are required for sample collection; two equipment rinsate samples will be collected.

NA - Not Applicable

TAL - Target Analyte List

TCL - Total Compound List

MS/MSD - Matrix Spike/Matrix Spike Duplicate

VOCs - Volatile Organic Compounds

SVOCs - Semi-volatile Organic Compounds

PCBs - Polychlorinated Biphenyls

APPENDIX C.1 – GEOSYNTEC RESUMES

Geosyntec
consultants

PAUL L. BROOKNER, MBA, P.G.

environmental management assessment
environmental management systems
litigation support
site investigation and remediation
international projects

EDUCATION

M.B.A., University of Minnesota, Carlson School of Business, Twin Cities, Minnesota, 2001
M.S., Geology, University of Nebraska, Lincoln, Nebraska, 1986
B.A., Geology, State University of New York, Binghamton, New York, 1982

REGISTRATIONS AND CERTIFICATIONS

Registered Professional Geologist, Florida, No. 001153
Registered Professional Geologist, Minnesota, No. 30307

CAREER SUMMARY

Mr. Brookner has more than 25 years of experience in the environmental industry having served as regulator, consultant, and environmental manager for a multi-national corporation. Most recently, he served as Program Manager for the Corporate Environmental Affairs group for a Fortune 500 Company where he managed corporate environmental risk, financial reserves, and compliance for a global portfolio of legacy manufacturing facilities. In this role, he led negotiations with regulators in CERCLA, RCRA, and European agencies, as well as multiple state lead programs. Mr. Brookner specializes in the financial reporting of contingent environmental liabilities, including FAS 5 and Sarbanes-Oxley requirements. For a Fortune 500 company, he provided recommendations to treasury, accounting, and internal/external audit stakeholders on managing and reporting environmental reserves. He has also used this expertise to evaluate the scope and quantify the cost of potential remedial scenarios for environmental insurance underwriting, corporate due diligence, consistency with the National Contingency Plan, and environmental litigation support. He has served as a fact and testifying expert in these and other areas.

Mr. Brookner also possesses expertise in investigating and estimating the nature and extent of environmental contamination and in developing remedial strategies for sites impacted by chlorinated solvents, metals, petroleum hydrocarbons and polychlorinated biphenyls. The sites have included industrial manufacturing, petroleum and

petrochemical, and railroad facilities; RCRA, CERCLA, state lead superfund and voluntary cleanup programs, and European Union sites.

Site Investigation/Remediation

Former Vickers Facility, *Fortune 500 Corporation, Joplin, Missouri*. Program manager for this U.S. EPA Region VII and MDNR RCRA site. Soil, groundwater, surface water and soil vapor have been identified to have been impacted by chlorinated solvents and metals. Provided strategic direction for this highly complex karst site for both the RCRA Facility Investigation and Corrective Measures Study (CMS) from 1992 to present. Instrumental in development and completion of the 1993 and 2010 CMS reports produced for the Site.

Former Vickers Facility, *Fortune 500 Corporation, Omaha, Nebraska.* Project manager for this U.S. EPA Region VII RCRA site. Led negotiations of the Administrative Order on Consent for completion of and RFI/CMS for the site. Implemented a residential indoor air vapor investigation in coordination with EPA and ATSDR that determined that subsurface vapors have not caused unacceptable risk in the homes. Implemented a source area IRM resulting in the removal of greater than 20,000 pounds of VOCs from the subsurface.

Former Manufacturing Facility, *Fortune 500 Corporation, Bad Homburg, Germany.* Project manager for this former manufacturing facility in a highly industrialized section of Germany. Chlorinated solvents, identified in soil and groundwater, were initially addressed by excavation and pump and treat (PT) technologies. Cost-benefit analysis indicated that continuation of PT would be inefficient. Enhanced reductive dechlorination (ERD) pilot test was first successful implementation of in situ bioremediation for RP Darmstadt – Wiesbaden. Negotiated and implemented ERD full-scale implementation with regulators to include parallel shutdown of PT.

Former Sperry Marine Facility, *Fortune 500 Corporation, Charlottesville, Virginia*. Project manager for this RCRA Facility Lead Program (FLP) site regulated by U.S. EPA Region III. Implementation of an RCRA Facility Investigation for chlorinated solvents and metals in soil and groundwater. Negotiated scope of the FLP with EPA to incorporate historical data and focus the RFI on specific SWMUs and AOCs.

McInerney Farm Site, Fortune 500 Corporation, Southport, New York. Project manager for the remediation of a former typewriter manufacturing facility's waste landfill. Negotiated revised soil cleanup criteria for paint waste, cadmium, nickel, zinc and PCBs with NYSDEC for incorporation into an Explanation of Significant Difference. Oversaw the RD/RA implementation which included removal in excess of 25,000 tons of waste from the site. A major goal of the RD/RA effort was to

differentiate waste types to minimize disposal costs. Paint waste generated at the site was segregated into two distinct waste streams – high VOCs and low VOCs. As a result, multiple disposal options became available to reduce T&D costs. RD/RA Costs >$7 million.

Former Remington Site, Fortune 500 Corporation, Elmira, New York. Project manager for the evaluation of interim measures (IM) and completion of remedial investigation/feasibility studies (RI/FS) of a former typewriter manufacturing facility. IM evaluation included a pre-design investigation of potential continuing discharge sources to an adjacent wetland and surface water bodies for compounds of potential concern (COPCs) including: cadmium, nickel, zinc and PCBs. RI/FS activities included a sediment, soil, and surface water sampling program intended to delineate the magnitude and extent for COPCs. Investigation activities are anticipated to be completed in 2012/2013.

HWD Site, Multi-Party PRP Group, Farmingdale, New York. Member of the technical committee for this New York State superfund site. RI/FS investigation included soil, groundwater, and vapors for chlorinated solvents. The committee oversaw implementation of an interim measures response for vapors detected in buildings adjacent to the site. A sub-slab depressurization system was installed to provide an engineering control for the issue. The approved RD for the site will address site soils with SVE and site groundwater by multiple ISCO injections. Site Costs > $2 million.

Former Memorex Facility, Fortune 500 Corporation, Westlake Village, California. Project manager for this LA RWQCB regulated site. Demonstrated to the water board that the site pump and treat system had reached its practicable technical limits for treating site groundwater. An annual groundwater monitoring program has been implemented to document that the extent of dissolved phase chlorinated solvents and 1,4 dioxane are stable. Coordinated redevelopment of the site with the current owner. This resulted in the removal of over 100,000 cubic yards of soil from the site and installation of a liquid boot vapor barrier system.

Amenia Landfill*, Multi-Party PRP Group, Amenia, New York.* Member of the technical committee for this New York State superfund site. RI/FS investigation included soil, groundwater, surface waters, wetlands, and sediments for chlorinated solvents, metals and PCBs. The committee was also responsible for determining cost allocation for this multi-party PRP site. Allocation was refined at the completion of the RI/FS phase, prior to RD/RA implementation. Final allocation incorporated NYS EQBA funding which significantly reduced overall financial exposure to industrial and municipal parties. Site Costs > $8 million.

Environmental Management/Liability Valuation/Litigation Support

***Corporate Environmental Insurance Initiative**, Fortune 500 Corporation, Portfolio of 50 Sites across the United States.* Led a project team consisting of internal/external legal counsel, financial analysts and environmental professionals to evaluate the efficacy of cost cap insurance (with commutation account) for a portfolio of over 50 legacy environmental liabilities (traditional multi-media impacted sites) across the United States.

***Quarterly and Annual Financial Reporting,** Fortune 500 Corporation, Global Portfolio of Environmental Liabilities*. Led a team to complete quarterly and annual reviews of the corporation's environmental reserve end-position. Prepared and presented the subsequent reserve position reports to the CFO and Comptroller. Provided financial reports and supporting documentation for annual external audit review.

***Estimate and Management of Environmental Liabilities**, Fortune 500 Corporation, Global Portfolio*. Managed the Environmental Reserve for a portfolio of over 50 sites in accordance with FAS 5 contingent liability accounting and Sarbanes Oxley reporting requirements. Lifetime cost estimates for individual sites were developed based on a project life-cycle and cost probability analysis and rolled-up for top level review. Developed annual operating plans for individual projects to recognize organizational spending priorities.

***Evaluation of Environmental Liabilities**, Fortune 500 Corporation, Orange County, California*. Consulting expert for a prior owner to evaluate the feasibility and net present value of alternative remediation options proposed by a 3rd party and current site owner. The prior owner retained environmental liability for the property through an existing contractual obligation. Our evaluation indicated that lesser cost remedial alternatives that met regulatory obligations were technically feasible for this site. A potential cost savings of $1 million would be realized by not implementing the 3rd party recommended alternative.

***Evaluation of Environmental Liabilities**, Fortune 500 Corporation, Brazil, France and Great Britain*. Project manager for evaluating potential environmental liabilities for the corporation's former manufacturing operations in Brazil, France and Great Britain. Liabilities were estimated based on period of ownership/operation, chemical usage history, employee headcount and normalized revenue.

***Evaluation of Environmental Liabilities**, Multi-National Specialty Chemical Manufacturer, Malaysia*. Evaluation of potential environmental liabilities for a

chemical manufacturing plant in Malaysia. The evaluation was a key factor in the client's negotiations for purchase of the plant. Evaluation included a Monte Carlo probability analysis of future costs.

***Evaluation of Environmental Liabilities**, Multi-National Specialty Chemical Manufacturer, North Carolina*. Evaluation of existing and potential environmental liabilities for a legacy chemical manufacturing plant in North Carolina. The evaluation helped the client recognize potential future costs and establish an environmental reserve.

***Government Owned–Company Operated Cost Recovery Action**, Fortune 500 Corporation*. Project team member for a multi-party CERCLA cost recovery action against the United States for environmental issues related to a World War II era manufacturing facility (recoverable costs exceed $200 million). Responsibilities included interrogatory response preparation, technical evaluation of plaintiff and defendant cost allocation proposals, and generation of a historical summary for environmental response costs.

***Rule 30(b)(6) Witness**, Fortune 500 Corporation, Mid-West United States*. Deposed, rule 30(b)(6) witness for a Fortune 500 corporation in defense of a multi-party lawsuit for alleged damages resultant from the operation of a farm implement manufacturing plant. Deposition included all historical operational aspects of the plant, including manufacturing processes, equipment throughput, chemical use and environmental investigations completed at the site. Managed the litigation driven investigation of alternative source(s) for chlorinated solvents in groundwater for the multiple defendants.

***Expert Witness, General Liability Insurance Recovery**, Schloff Chemical Supply, Co., St. Louis Park, Minnesota.* Factual and expert witness for Plaintiff, Schloff Chemical Supply Co., seeking cost recovery from a Comprehensive General Liability and multiple excess coverage policies. Provided interrogatory response, deposition and court room testimony in support of policy coverage.

PROFESSIONAL EXPERIENCE

Geosyntec Consultants, Minneapolis, Minnesota, 2009 – Present
Unisys Corporation, Eagan, Minnesota, 1994 – 2009
Delta Environmental Consultants, Inc., St. Paul, Minnesota and Tampa, Florida, 1987-1994
Nebraska Department of Environmental Control, Lincoln, Nebraska, 1986-1987
Anadrill/Schlumberger, Corpus Christi, Texas, 1984-1986

Geosyntec consultants

AWARDS AND RECOGNITIONS

CEO Achievement for Excellence, Unisys Corporation, 1997

REPRESENTATIVE PUBLICATIONS

12-01 Brookner, P., I. Tawney, N. Durant, T. Etter, S. Stiasny, and S. Huettemann, "Reducing Environmental Impact through Biological Insitu Enhanced Reductive Dechlorination via Closed-Loop Groundwater Recirculation at a German Site," November 2012, Platform Presentation. 2nd International Conference on Sustainable Remediation, Vienna, Austria.

12-02 Brookner, P., I. Tawney, N. Durant, T. Etter, K. Krueger, J. Allen, S. Stiasny, and S. Huettemann, "Biological Insitu Enhanced Reductive Dechlorination via Closed-Loop Groundwater Recirculation at a German Site," May 2012, Poster. 8th International Conference. Remediation of Chlorinated and Recalcitrant Compounds, Monterey, CA .

12-03 Langenbach, J., P. Brookner, N. Durant, M. Annable, and M. Howe, "Assessing Chlorinated Solvent Mass Flux Change and Treatment Performance in Three Adjoining In Situ Pilot Studies," May 2012, Presentation. 8th International Conference. Remediation of Chlorinated and Recalcitrant Compounds, Monterey, CA .

08-01 Tawney, I., J. Wang, N. Durant, J. Roberts, S. Dworatzek, T. Etter, and P. Brookner, "Remediation of a Mixed Chlorinated Solvents Source Using a Biodegradable Cosolvent and Bioaugmentation Cultures ," May 2008, Presentation. 6th International Conference. Remediation of Chlorinated and Recalcitrant Compounds, Monterey, CA .

06-01 Daly, M, J. McTigue, N. Grasso, C. Regan, and P. Brookner, "Assessing TCE Uptake in Vegetable Produce Crops for Risk Characterization", May 2006, Poster, 5th International Conference. Remediation of Chlorinated and Recalcitrant Compounds, Monterey, CA

88-01 Brookner P., F. Farley, and W.K. Lederman, "A Cost Effective Alternative for Diesel Contaminated Soil Disposal: Biological Degradation Using Land Farming Techniques", November 1988, Presentation. Petroleum Hydrocarbons and Organic Chemicals in Groundwater, Houston, TX

Geosyntec
consultants

JULIE KLENS CAPRIO

quality assurance manager
analytical data specialist
site analytical data evaluation and validation
qa auditing
environmental biotechnology
office manager

EDUCATION

M.B.A. Quality Management, Upper Iowa University; 2009
M.A., Organizational Management, Tusculum College, Knoxville, Tennessee; 2002
B.A., Biology, Lock Haven University, Lock Haven, Pennsylvania; 1980

REGISTRATIONS AND CERTIFICATIONS

ASQ Certified Quality Manager #13876
Certified Environmental Field Sampler #0414
Certified Radiochemistry Data Validator (Radiochemistry Society)
NQA-1 Lead Auditor
Certified Environmental Sampler

CAREER SUMMARY

Ms. Caprio is a Senior Project Professional specializing in Quality Assurance located at the Geosyntec Knoxville office. She holds a B.A. degree in biology from Lock Haven State University, a Master's Degree in Organizational Management and a MBA degree in Quality Management. Ms. Caprio has over 25 years of experience in the environmental field. Currently, she specializes in project quality management, preparation and review of quality assurance project plans (QAPPs), quality assurance management plans (QMPs), field sampling plans, data verification, data evaluation, data validation, QA audits including laboratory audits and project on-site field audits. Her data validation experience includes chemical, radiological and geotechnical parameters for media including but not limited to sediment, soil, groundwater, surface water, biota, soil vapor and air monitoring. Ms. Caprio also provides both in-house quality assurance training through the various office locations within Geosyntec and outside quality assurance training for clients. Her experience also includes; natural attenuation of petroleum hydrocarbons and chlorinated solvents, bioventing, biosparging, land treatment, and treatability studies, bioremediation system design, technical support for project managers, and work plan development. She also contributes to Geosyntec's sales and proposal efforts by preparing project designs, cost estimates, and bioremediation project proposals. She has over 20 years of experience as an analytical chemist in environmental and biotechnology laboratories including laboratory management, data management, quality control/quality assurance, and supervision of wet chemistry, gas chromatography, and high performance liquid chromatography departments. Her experience also includes methods development, design and

execution of treatability studies involving biological treatment of hazardous wastes and mixed wastes.

Investigation and Characterization Former Adak Naval Complex Project, *Adak, Alaska, Quality Assurance Manager*. Developed the Sampling and Analysis Plan (SAP) for the United States Department of the Navy Naval Facilities Engineering Command Northwest (NAVFAC NW) under the Environmental Multiple Award Contracts (EMAC) and under the regulatory oversight of the Alaska Department of Environmental Conservation. The SAP was specific to the investigation and characterization of the East Canal/Building T-1341. Also responsible for coordinating the data validation of the samples sent to the fixed base laboratory for analysis.

Ocean Cape Radio Relay System, *Uakutat, Alaska*. Developed the UFP-QAP*P*. The UFP-QAPP was developed to detail the QA/QC processes and procedures implemented during the Removal Action of multiple areas of interest at the Ocean Cape Radio Relay Station Formerly Used Defense Site near Yukutat, Alaska. The project is under the supervision of the Army Corps of Engineers and under the regulatory oversight of the Alaska Department of Environmental Conservation.

Katzebue Federal Aviation Administration (FAA) Station, *Katzebue, Alaska*. Responsible for coordinating the Stage 2A data validation of the sample data. The data are from a contaminated soil removal action at the Power Plant and Carpenter Shop Areas of Concern. The validation was performed for Athna Engineering Services, LLC.

Savannah River Site Project (NQA-1), *Quality Assurance Manager*. Responsible for the overall implementation of all quality assurance practices for the project including 1) on-site activities: drilling practices, sample collection, on-site project documentation, and on-site geotechnical testing/measurements 2) off site laboratory geotechnical testing, 3) engineering practices and procedures utilized for the project. Responsible for on-going audits for sub-tier contractors throughout the project, as well as audits of the project offices, both on-site and off-site.

QA Audits of full service commercial analytical laboratories as well as on-site mobile laboratories and project specific field audits. Responsible for the auditing to ensure compliance with good laboratory practices, EPA method specifications, laboratory QA program and implementation and project specific QA requirements.

Naval Auxiliary Landing Field Site, *San Clemente Island, CA, Quality Assurance Manager*. Responsible for preparation and implementation of the SAP (under Navy UFP-QAPP specifications). Also responsible for field and laboratory audits; as well as coordination of laboratory analyses and data validation.

Berry's Creek Study Area – Mega-Sediment Site, *New Jersey, EPA Region 2, Quality Assurance Manager*. Responsible for the preparation, final review and implementation of the UFP QAPP. Conducted field and laboratory audits against project requirements. Also responsible for the Tier III validation of the project data.

Town of Ocean Ridge, *Quality Assurance Manager*. Responsible for preparation of the QAPP under Section 319 Nonpoint Source Grant.

Conchiglio Warehouse and Edwards Supply Site Remediation Project, *Ocala, Florida, EPA, Region 4, Quality Assurance Manager*. Responsible for preparation of the QAPP.

Mattheissen and Hegleler Zinc Company (Carus) Site Remediation Project*, LaSalle, Illinois, EPA Region 5, Quality Assurance Manager.* Responsible for the preparation and implementation of the QAPP. Also responsible for the Tier III project data validation.

OMYA site, *Florence, Vermont, EPA Region 1, Quality Assurance Manager.* Responsible for the preparation and implementation of the QAPP. Also responsible for the Tier III project data valiadation as well as review and assessment of historical analytical data.

Former Baskins Dry Cleaner*- Pinnelas County Florida, Quality Assurance Manager*. Responsible for the final review of the QAPP under the USEPA Quality Assurance guidance for Brownsfield Sites.

Asia Rare Earth Project*, GSM, Malaysia, Laboratory Management Skills Training, QA/QC, Data Validation.* GSM is a Geosyntec subsidiary that is providing remediation services at a former rare earth processing facility in Malaysia. The laboratory performs gross alpha/beta and gamma spectroscopy analyses.

BCX Tank Farm Project, *Quality Assurance Manager*. Responsible for the preparation, final review, and implementation of the QAPP, validation and final data review, EPA Region 4.

Progress Energy Site Tampa, *Florida, EPA Region 4, Quality Assurance Manager.* Responsible for preparation of the QAPP.

West Shore Landings Site, *Tampa, Florida, EPA Region 4, Quality Assurance Manager.* Responsible for preparation of the QAPP.

Geosyntec EPA Region 5 Superfund Projects, *Quality Assurance Manager.*

Los Angeles Unified School District, *Los Angeles, CA, Data Validation and QAPP Review*. Responsible for data validation, including data from both fixed base laboratory analysis and mobile laboratory data, and QAPP review for SRES #1, SRHS#12, SRHS#15, SRES#4, CHS#15, SRES #2, SR MS #6, CRHS#16, CRES#20, Gratts, Glassel Park, East LA High School #2 Area C, Area D, and 28th Street. Data deliverables included Level II and Level IV packages for inorganic and organic analyses.

South Western Division (SWDIV); *U.S. Navy QAO, Quality Assurance Officer and Geosyntec Liaison*. Responsible for final review and completion of Sampling Analytical Plans (SAPs) for projects performed for SWDIV. Responsible for project adherence to SAP over the duration of the project and for QA oversight of the project. All communication between the QAO for the Navy and GeoSyntec project personnel are directed through the Geosyntec QAO.

Commercial Nitrogen Processing Plant Site*, Dodge City, Kansas, Quality Assurance Officer for Remediation.* Responsible for writing the Quality Assurance Project Plan (QAPP) for assuring the integrity of the QAPP. Includes the co-ordination all QA-specific activities. Responsible for on-going data validation and verification.

Honeywell International Moundsville Site, *Moundsville, West Virginia, Quality Assurance Officer for Remediation.* Responsible for writing the Quality Assurance Project Plan (QAPP) and the Sampling and Analysis Plan (SAP) and for assuring the integrity of the QAPP. Includes the co-ordination all QA-specific activities. Responsible for initial on-site QA training of the field sampling teams. Responsible for on-going data validation and verification**.**

35-acre Honeywell International Chromium Ore Processing Residue (COPR) Site, *Jersey City, New Jersey, Region 4, Quality Assurance Officer for remediation pilot testing.* Responsible for writing the Quality Assurance Project Plan (QAPP) and the Sampling and Analysis Plan (SAP) and for assuring the integrity of the QAPP. Includes the co-ordination all QA-specific activities. Responsible for on-going data validation and verification.

160 Acre Parcel Site, *Rialto, CA, Region 9, Quality Assurance Officer.* Responsible for assuring the integrity of the QAPP and will coordinate all QA-specific activities. Responsible for on-going data validation and verification.

LCP-HoltraChem Site*, Reigelwood, NC, Quality Assurance Officer.* Responsible for assuring the preparation, review and integrity of the QAPP and will coordinate all QA-specific activities. (CERCLA)

GEMCOR Site*, Calipatria, CA.* Data review and validation of NORM, lead, and arsenic. Site historically produced geothermal brines resulting in elevated levels of normally occurring radioactive material (NORM) across the area of the site.

Environmental Laboratory Auditor – perform full and analytical method specific audits of commercial laboratories

Data validation expertise including all media types, chemical and radiological parameters.

PROFESSIONAL EXPERIENCE

Geosyntec Consultants, Knoxville, Tennessee, 2002 – Present
IT Corporation
- Environmental Biotechnologies, Knoxville, Tennessee, 1998-2002
- Technical Applications Group, Knoxville, Tennessee, 1997-1998
- Biotechnology Applications Center, Knoxville, Tennessee, 1995-1997
- ABB Environmental Services, Knoxville, Tennessee, 1995
- Quanterra Environmental Service, Knoxville, Tennessee, 1994-1995

IT Corporation
- HPLC and Water/Wastewater Departments, IT Analytical Services, Knoxville, Tennessee, 1988-1994

HPLC/GC, IT Analytical Services, Knoxville, Tennessee, 1985-1988
Technology Development Laboratory, Knoxville, Tennessee, 1984-1985
University of Tennessee, Environmental Toxicology, Knoxville, Tennessee, 1984
Supelco Inc., HPLC R&D Applications Department, Bellefonte, Pennsylvania, 1980-1984

CONTINUING EDUCATION

Neilson Field School Environmental Sampling Certification Course, Las Cruces, NM, February 2012
NQA-1 Lead Auditor Training, Atlanta, Georgia, November 2011
FLADaPT Training, Tallahassee, Florida, June 2009
Staged Electronic Data Deliverables (SEDD) 101 and Advanced SEDD training, Atlanta, GA. 2008
Advanced Radiochemistry Society Radiometric Data Validation and Certification Training, Knoxville, TN, 2008
USEPA, Transforming DQOs to MQOs Training Course, Cleveland, OH, 2007
USEPA, Planning for Sampling Training Course, Cleveland, OH, 2007
Radiochemisty Society Radiometric Data Validation and Certification Training, Knoxville TN, 2007, (Certification completed February 2007)
USEPA Data Quality Assessment Training Course, Austin, TX 2006
USEPA Data Quality Objectives Training Course, Austin, TX 2006
ISO9001/2000 Lead Auditor Certification Training, Houston, TX 2004
USEPA Statistical Analysis of Site Data Course, Tampa, FL, 2004
USEPA Data Verification and Validation Course, New Orleans, LA, 2003
OSHA HAZWOPER Supervisor Training, Knoxville, TN; 2002
USEPA Seminar on Monitored Natural Attenuation, Atlanta, GA, 1998
8 Hour Radiation Workers Training, Knoxville, TN; 1997, 1998, 1999, 2000, 2001
40 Hour OSHA Training and 8 Hour refreshers, Knoxville, TN, current
Air Shipping Dangerous Goods by IATA (DOT Function Specific) Training, 1995, 1997, 1998
ITAS Radiation Workers Training, Knoxville, TN, 1994
ITAS Human Resource Coordinator Training, Knoxville, TN, 1994
Key Results Indicator Training, Knoxville, TN, 1994
Total Quality Management Training, Knoxville, TN, 1994
Perkin-Elmer Omega System Training, Kingsport, TN, 1991
Spectra-Physics Short Course, Piscataway, NJ, 1981

REPRESENTATIVE PUBLICATIONS

J.K. Caprio, S. Compston, S. Hill, and D. Dunlap, "Selective, Low Sample Mass Invertebrate Sampling in Support of a Remedial Investigation with Potential Bioaccumulation of COPCs" Proceedings of the 2012 NEMC Conference, August, 2012

J.K. Caprio, "Disposal Dilemma – How to Characterize Liquid Waste, When it is Treated as a Solid?" Proceedings from the 2012 Show of the South Conference, April 2012.

J.K. Caprio, D. Adilman, and **M. Lodato,** "Being Positive Your False Positives are False" Proceedings of the 2011 8th Annual DOD Environmental Data Quality Workshop, April, 2011

J.K. Caprio, M. Tyler, and **S. Hill,** "Systematic Planning to Improve Data Quality at a Superfund Site in New Jersey" Proceedings of the Sixth International Conference on Remediation of Contaminated Sediments, March 2011

J.K. Caprio, "Common Laboratory Contaminants" Proceedings of the 2010 Industrial Expo, Georgia Association of Water Professionals, March 2010

J.K. Caprio, "Laboratory Auditing from a Consultants Perspective" Proceedings of the 2010 7th Annual DOD Environmental Monitoring Data Quality Workshop, April 2010

J.K. Caprio, "A Brief Discussion of Three Important Quality Management Concepts" Proceedings of the 2009 EPA Quality Management Conference, May 2009

J.K. Caprio, "Quality Management is not an Oxymoron!" Proceedings of the 2009 6th Annual DOD Environmental Monitoring Data Quality Workshop, April 2009

H. Kerfoot, and **J. Caprio,** "Performance of EPA Method 8270 with Isotopic Dilution for 1,4-Dioxane in Groundwater Samples" Proceedings of the 42nd Western Regional Meeting (WRM) of the American Chemical Society, September 2008

J.K. Caprio, "Lessons Learned and Continuous Improvement During Implementation of the Uniform Federal Policy for Quality Assurance Project Plans (UFP-QAPP)" Proceedings of the 2008 5th Annual DOD Environmental Monitoring and Data Quality Workshop, April 2008

M. Lodato, J. Klens Caprio, and **D. Graves**, "Accelerated Site Cleanup at Drycleaner Sites Using Multiple Remedial Technologies" in Proceedings of the 5th International Conference on the Remediation of Chlorinate and Recalcitrant Compounds, May 2006

J. Caprio, "Asking Appropriate Questions in Order to Assure Data Quality," in Proceedings of the 25th Annual Conference on Managing Environmental Quality Systems, April 2006

J. Klens, D. Graves, R. Rogers, J. Chytil and T. Streckfuss, "Coupled Permeable Reactive Barrier and Natural Attenuation Remediates Chlorinated Solvents," in Proceedings of the 3rd International Conference on the Remediation of Chlorinated and Recalcitrant Compounds, May 2002

J.K. Caprio, *The Applicability of the 9/80 Work Week in Today's Fast Paced Economy, Master's Thesis*, 2002

J. Klens, D. Pohlmann, S. Scarborough, and **D. Graves,** "The Effects of Permanganate Oxidation on Subsurface Microbial Populations," in *Natural Attenuation of Environmental Contaminants*, Eds. A. Leeson, M.E. Kelley, Il, S. Rifai, and V. S. Magar, Battelle Press, Columbus, OH, pp. 253-259, 2001

J.L. Klens, J. R. Cochran, and **D. Graves**, "Sample Collection Technique for Laboratory Based Hydrogen Analysis in Groundwater," in *Risk, Regulatory, and Monitoring Considerations: Remediation of Chlorinated and Recalcitrant Compounds*, eds. G. B. Wickramanayake, A. R. Gavaskar, M. E. Kelley, and K. W. Nehring, Battelle Press, Columbus, OH, pp. 393-400, 2000

W.D. Brady, J. Klens, and **D.A. Graves,** "*Cost Effective Biological/Chemical Treatment of Ammonia/Ammonium Impacted Media*," Proceedings of the Sixth International Symposium on In Situ and On-Site Bioremediation, San Diego California, 2000

W.D. Brady, D. Graves, J. Klens, and M. Eick, "Evaluation and Implementation of Natural Attenuation at Metals Impacted Sites," in: *Natural Attenuation Considerations and Case Studies: Remediation of Chlorinated and Recalcitrant Compounds*, Eds. G. B. Wickramanayake, A. R. Gavaskar, and M. E. Kelley. Battelle Press, Columbus, OH, pp. 209-215, 2000

W.D. Brady, D. Graves, M.J. Eick, E. Lay, and **J Klens,** "Demonstrating Metal Irnmobilization/Attenuation Mechanisms in Soil: A Case Study," *Proceedings from the 15th International Conference on Contaminated Soil and Groundwater*, Amherst, Massachusetts, October, 1999

J. Klens, G. Roberts, and **D. Graves**, "Rapid Qualification of Sites for Natural Attenuation Potential," Proceedings of the Fifth International In Situ and On-Site Bioremediation Symposium, Battelle Press, Columbus, Ohio, 1999

J.Klens, M. Distefano, G. Dodson, A. Weigand, K. Ramanand, **D. Graves,** "Reductive Dehalogenation of Ethylene Dichloride in Groundwater," Presented at the *First International Conference on Remediation of Chlorinated and Recalcitrant Compounds*, Monterey California, May 1998

M.A. De, **J. Klens,** G. Gaillot, and **D. Graves,** September 1996, "Field and Laboratory Evaluations of Natural Attenuation of Chlorinated Organics at a Complex Industrial Site", presented at the *Symposium on Natural Attenuation of Chlorinated Organics in Groundwater*, Dallas Texas

Geosyntec
consultants

ADAM L. GRAY

site characterization and remediation
hydrogeologic investigation
geographic information systems
water resources

EDUCATION

M.S., Natural Resource Sciences, University of Maryland, College Park, MD, 2010
B.S., Environmental Science, West Virginia University, Morgantown, WV, 2004
B.S., Agronomy, West Virginia University, Morgantown, WV, 2004

REGISTRATIONS AND CERTIFICATIONS

OSHA Hazardous Waste Site Worker (40-Hour Certification)
RCRA Refresher Training
American Red Cross Adult CPR/AED and First Aid
Railway Worker Protection and e-Railsafe Training
Transportation Worker Identification Certification (TWIC)

CAREER SUMMARY

Mr. Gray is an environmental scientist with 6 years of experience supporting environmental site characterization and remediation projects and is currently serving as project manager (PM) on several projects. Through his work to date, he has gained field experience sampling many different environmental media for a broad range of analytes. His experience has allowed him supervise numerous field sampling teams and oversee subcontractors for a variety of purposes. These experiences have also allowed him to contribute to numerous project deliverables designed for various regulatory authorities.

Mr. Gray graduated in 2010 with a Master's of Science in Natural Resource Sciences from the University of Maryland. While at the University (2004-2007), he was employed as a Graduate Research Assistant. His graduate research integrated soil chemical and biological parameters to determine morphological patterns in wetland soils. His coursework included soil characterization, environmental chemistry, statistical data analysis, and Geographical Information Systems (GIS). Prior to completing his graduate studies, he was employed by the USDA-Forest Service. His professional interests include environmental site remediation, hydrogeologic investigation, geologic characterization, GIS modeling, and water resource sciences. He is currently employed full time at Geosyntec as a Scientist. While employed at Geosyntec, Mr. Gray has gained significant experience on the following projects.

Cortese Landfill Superfund Site*, New York.* Mr. Gray is currently serving as PM for the routine environmental monitoring program (groundwater, surface water, and landfill gas) at this complex CERCLA site impacted with various volatile and semi-volatile organic compounds including

chlorinated solvents and petroleum hydrocarbons and is lead author for the Environmental Monitoring Report submitted annually to USEPA Region II. The site is currently undergoing a groundwater remedy transition from pump and treat to air sparging/soil vapor extraction (AS/SVE) for which Mr. Gray has made several key contributions including: (i) assisting with development of a pilot test work plan, field implementation, data analysis, and reporting; (ii) assisting with AS/SVE source are remedy design; and (iii) helping draft several key documents including Monitored Natural Attenuation Remedial Design for downgradient groundwater, Operation Maintenance and Monitoring Plan for source area groundwater and treatment system operations, and Report on Supplemental Monitoring Well Installation. Due to his extensive experience and conceptual site knowledge, it is expected that Mr. Gray will continue to support the project in a variety of ways.

Newland Park Landfill, *Wicomico County, Maryland.* Mr. Gray is PM for the comprehensive environmental monitoring program at this municipal solid waste landfill located on the Maryland eastern shore. He is responsible for ensuring that environmental monitoring activities comply with requirements specified in 40 CFR 258 Subpart E as well as the Site's disposal permit issued by Maryland Department of the Environment (MDE). He coordinates implementation of all environmental monitoring activities, directs data analysis, and is responsible for delivering semi-annual groundwater and quarterly landfill gas monitoring reports to MDE.

Confidential Client, *Virginia.* Mr. Gray has served as PM for investigation and remediation activities related to petroleum hydrocarbon releases at two of the client's facilities in Virginia. He has helped the client understand the Virginia regulatory framework and coordinated all investigation and remediation activities under guidance of the Virginia Oil Control Program. He was responsible for planning, coordinating, and implementing investigation and clean-up activities at both sites and authoring site characterization reports.

Large RCRA Facility, *Confidential Client.* Mr. Gray has been an integral team member and task manager for this comprehensive and complex RCRA site that is a 400-acre former rocket motor manufacturing facility. He has generally served as the field team leader for various large environmental media (groundwater, surface water including NPDES, and soil) sampling events for the detection of volatile organic compounds (VOC), energetics, hydrocarbons, and metals. He has gained significant experience implementing a hydrogeologic investigation at the fractured bedrock site, which included monitoring well drilling and installation oversight, packer testing, electronic borehole flowmeter, aquifer pump testing with pressure transducers, tracer testing, and various other borehole characterization activities. He has also serviced on-site environmental remediation systems, excavated test pits to investigate subsurface geophysical anomalies, and other various field activities to support project needs. He has helped to draft, review, and edit various site documents submitted to USEPA, which include site work plans, quality assurance project plan, health and safety plan, supplemental RCRA Facility Investigation (RFI) report, and an interim measures report. He has also provided significant GIS support which included drafting maps and completing surface analyses using ESRI ArcMap® for site work plans and reports.

Confidential Client, *Maryland and Virginia.* Mr. Gray has assisted on many field activities for this large company client at various sites throughout Maryland and Virginia and is currently serving as an assistant PM on the client's large environmental portfolio. His duties as an assistant PM role include planning, coordinating, implementing, and reporting for various site activities that support client and project needs. Most recently, he has provided extensive field support and served as an integral team member for a complex site investigation at a petroleum hydrocarbon impacted site in the District of Columbia. His duties have included installation oversight of 70 UVOST (UltraViolet Optical Screening Tool) soil borings for real-time delineation of the area impacted by hydrocarbons and installation oversight of 15 monitoring wells using Hollow Stem Auger drilling methods. He was also responsible for completing slug tests on several monitoring wells and analyzing the data to determine site specific hydraulic conductivity. Other routine activities at various sites throughout the client's portfolio include sampling soil and groundwater for VOC's, polycyclic aromatic hydrocarbons, and metals, documenting and shipping site derived waste, and management of site treatment systems.

Pennsylvania Act 2 Remediation. Mr. Gray served as task manager for confirmatory sampling efforts and attainment demonstrations related to excavation and capping clean-up work at this metals impacted foundry site located in northwest Pennsylvania. He was responsible for developing a confirmatory soil sampling program that meets Pennsylvania Act 2 requirements and managing all soil sample collection activities. Following sample collection, he compiled the sample results and preformed statistical analysis to demonstrate contaminant attainment at each excavation.

PROFESSIONAL EXPERIENCE

Geosyntec Consultants, Columbia, Maryland, August 2007-present
University of Maryland, College Park, Maryland, Research Assistant, June 2004 – August 2007
USDA-Forest Service, Elkins, West Virginia, June 2003 – August 2003

REPRESENTATIVE PUBLICATIONS

10-01 Gray, A.L., 2010. Redoximorphic Features Induced by Organic Amendments and Simulated Wetland Hydrology. Masters Thesis, University of Maryland, College Park MD.

INVITED PRESENTATIONS

Gray, A.L. and M.C. Rabenhorst, 2006. Organic Matter Effects on New Redox Feature Formation Under Induced Hydric Soil Conditions. Soil Science Society of America Proceedings, Indianapolis IN.

Geosyntec
consultants

ARON KRASNOPOLER, Ph.D., P.E.

remedial design and construction
in-situ bioremediation and chemical oxidation
soil and groundwater investigation
site conceptual model development

EDUCATION

Ph.D., University of Washington, Chemical Engineering, Seattle, Washington, 1994
M.S., University of Washington, Chemical Engineering, Seattle, Washington, 1992
B.S., Cornell University, Chemical Engineering, Ithaca, New York, 1988

REGISTRATIONS AND CERTIFICATIONS

Professional Engineer, Maryland, 34714
Professional Engineer, New York, 089954-1
Advanced Post-Master's Certificate, The Johns Hopkins University, Environmental Engineering, Baltimore, Maryland, 1999
OSHA 40-hr Hazardous Waste Operations and Emergency Response Certified

CAREER SUMMARY

Dr. Krasnopoler has over twelve years of experience in site investigation and remediation of contaminated sites under CERCLA, RCRA, state-lead, and voluntary cleanup. He has developed and implemented work plans for site characterization and pilot testing and design packages for remedial construction. Client sectors have included industrial manufacturing, pharmaceutical, military, municipal, railroad, and solid waste management. Sites contaminants have included chlorinated solvents, petroleum hydrocarbons, and heavy metals.

Dr. Krasnopoler specializes in the design of in-situ remedial systems, including air sparging, bioventing, biosparging, in-situ chemical oxidation (e.g., Fenton's reagent, ozone), and soil vapor extraction. He has developed pilot test programs for feasibility demonstration and the collection of design parameters.

Dr. Krasnopoler excels in the use of relational databases and geographical information systems (GIS) for data reporting, developing site conceptual models and analyzing remedy performance.

Dr. Krasnopoler has conducted environmental due diligence for potential real estate transactions and corporate acquisition for a variety of properties including manufacturing facilities, pest control operations, aerial photography operations, former lumber mills and solid waste facilities.

Remediation Design and Construction

In-situ Chemical Oxidation

Cortese Landfill NPL Site, *Narrowsburg, New York* **–** Prepared a feasibility study for treatment of a residual source area at a Superfund site that increased the duration of the proscribed groundwater extraction and treatment remedy that resulted in the selection of a remedial alternative with lower cost and expected operational duration. The selected remedial alternative will reduce migration of organic contaminants downgradient through in-situ source area treatment including air sparging, soil vapor extraction, and amendment with ozone. Planned and implemented a pilot test to collect design parameters for the full-scale design of the air sparging and soil vapor extraction systems. Prepared a final design report for in-situ source area treatment in two treatment areas. Prepared a bid package for construction of the air sparging and soil vapor extraction components of the in-situ source treatment and assisted the client in evaluating the bids for contractor selection. Engineer of Record for construction quality assurance for source area remedial action construction.

Willow Grove Air Reserve Station, *Horsham, Pennsylvania* – Project Engineer for the design of a two-staged remedy to treat free product and dissolved constituents resulting from a jet fuel release. The remedy included in-situ chemical oxidation to remediate free product and enhanced bioremediation to break down the dissolved jet fuel constituents. The design included well layout and construction, oxidation reagent quantities. Designed, planned and provided oversight for in-situ chemical oxidation (Fenton's reagent) pilot study to determine feasibility and provide design parameters for full-scale design. Obtained necessary permits for pilot studies including a waiver for underground injection control permit.

Howard County Department of Public Works Maintenance Facility, *Elkridge, Maryland* - Project Engineer for the design of a source removal action of chlorinated solvents using Fenton's reagent for in-situ chemical oxidation. Determined extent of contamination and designed well layout for treatment. Provided oversight for baseline groundwater sampling.

Locomotive Painting Facility, *Boise, Idaho* - Project Engineer for the design of a large-scale pilot study for remediation of chlorinated solvents using Fenton's reagent for in-situ chemical oxidation. Determined extent of contamination and designed injection well layout. Provided oversight for reagent application.

In-situ Bioremediation

Confidential Client, *Voorhees, New Jersey* – Project Engineer for construction, start-up, operation and monitoring of an aerobic biobarrier to prevent groundwater contamination from adjacent closed industrial and municipal landfills from reaching surface water receptors. Pre-construction activities included preparing construction permits and soliciting bids for drilling, trenching, pipe installation and electrical work. Construction activities included trenching for the installation of utilities and underground air injection piping, installation of air injection

equipment and associated piping and instrumentation. Start-up activities included leak checking, flow balancing, vapor monitoring and groundwater monitoring. Operation and monitoring activities included flow balancing and performance groundwater monitoring. After seven years of operation, concentrations in shallow and intermediate groundwater downgradient of the barrier were below remediation standards and surface water concentrations were below remediation standards in all but a few locations.

City of Alexandria, *Virginia* **–** Designed and implemented pilot test for aerobic in-situ bioremediation remedy to treat BTEX and naphthalene plume located downgradient of a former manufactured gas plant and to prevent discharge to the Potomac River. Prepared a 60% remedial design of a full-scale biosparging system based on pilot test results and lab-scale treatability studies. The remedial design also includes an in-situ oil-water separator and an in-situ permeable reactive barrier to collect free product that may be mobilized during storm events.

Elizabethtown Landfill NPL Site, *West Donegal Twp., Pennsylvania* **–** Supported a focused feasibility study of aerobic in-situ bioremediation and metals precipitation using dilute hydrogen peroxide as an alternative to the ROD groundwater extraction and treatment remedy.

Confidential Client, *Minnesota* **–** Provided technical advice for optimization of butane-stimulated co-metabolic biosparging system for treatment of chlorinated solvents.

Naval Air Station North Island, *California* **–** Designed and implemented control logic for a groundwater recirculation system to enhance bioremediation of dissolved chlorinated solvents. Set up and programmed a supervisory control and data acquisition (SCADA) system to monitor system inputs, control system outputs and notify remotely in the case of an alarm condition.

United States Geological Survey, *Baltimore, Maryland* – Supported pilot studies in the West Branch Canal Creek Study Area, Aberdeen Proving Grounds, Edgewood, MD to intercept chlorinated solvent contamination arising from a groundwater seep that is hydraulically connected to a groundwater plume. Supported construction of an artificial layer of natural materials to mimic natural attenuation through sediment and supporting monitoring wells. Participated in baseline and performance groundwater sampling for analysis of VOCs, redox parameters and major ions. Collected and analyzed groundwater samples for bromide concentration as part of a tracer test prior to a bioaugmentation by direct injection.

Willow Grove Air Reserve Station, *Horsham, Pennsylvania* – Project Engineer for the design of a two-staged remedy to remediate free product and dissolved constituents resulting from a jet fuel release. The remedy included in-situ chemical oxidation to remove free product and enhanced bioremediation to break down the dissolved jet fuel constituents. The design included well layout and construction, and specification of air injection equipment for oxygen delivery. Designed, planned and performed a biosparging pilot study to collect design parameters for full-scale design.

Pharmaceutical Manufacturing Facility - Project Engineer in support of RCRA Corrective Action Designed and implemented pilot studies for bioventing and biosparging remedies for residual contamination in overburden soils and groundwater. Assisted in the design of a containerized air injection system, which included explosion-proof blowers, heat exchanger, moisture separator, system piping, telemetry, and electrical components. Also assisted with system shakedown and start-up operation. Performed soil gas sampling and in situ respirometry testing and analyzed data to establish baseline and intermediate VOC concentrations and biodegradation rates. Prepared monthly reports of VOC emissions during pilot studies for use in the facility's air emissions reports.

Nano-scale Zero Valent Iron

Aerojet General Corporation, *Rancho Cordova, California* – Project Engineer for the evaluation of laboratory treatability studies to measure the performance of nanoscale metallic particles for treating trichloroethene, perchlorate, and n-nitrosodimethylamine in soil and groundwater at a California Superfund site.

Edwards Air Force Base, *California* – Project Engineer for the evaluation of laboratory treatability studies to measure the performance of nanoscale metallic particles for treating trichloroethene, carbon tetrachloride, and perchlorate in soil and groundwater at a California Superfund site.

Other

Nuclear Metals, Inc. Superfund Site, *Concord, Massachusetts*- Developed feasibility study cost estimates for remedial alternatives using RACER cost estimating software and site-specific cost estimates for VOC and uranium plumes. Remedial technologies included groundwater extraction, air stripping, ion exchange, permeable reactive barriers and monitored natural attenuation.

FMC Corporation, *Newark, California* - Project Engineer for the design and construction of a steam-enhanced dual-phase extraction system to remove ethylene dibromide and ethylene dichloride from shallow, low permeability soils and groundwater. Prepared draft process design including sizing and costing of major equipment, mass balances and equipment layout.

High Voltage Engineering Corp., *Burlington, Massachusetts* - Project Engineer for the redesign of a groundwater treatment system including new pumps, packaged air stripper system and piping network. Determined sizes for submersible pumps and piping. Determined replacement schedule for vapor-phase carbon adsorber. Designed layout of metering well vaults. Investigated the requirements for installation of packaged air stripper system in an underground building. Prepared drawings and specifications for the construction of the system and reviewed subcontractor proposals.

Confidential Client, *New Jersey* - Developed conceptual design and cost estimate for contingency to upgrade a municipal water supply to remove arsenic and mercury by ion exchange.

Campbell's Soup Company, *Napoleon, Ohio* – Developed costs for removal of an unregulated landfill and soil treatment by medium-temperature thermal desorption.

Site Investigation

Confidential Client, *New York* – Developed and implemented a supplemental remedial investigation of potential discharges from an oil-water separator to adjacent wetlands and surface water. Potential impacts include PCBs and inorganic constituents in soil, sediment and surface water. Conducted pre-design investigation for closure-in-place of the oil-water separator as an interim remedial measure.

Confidential Client, *Connecticut* – Developed a pre-design investigation for remedial action at a former manufacturing facility. Areas of concern include solid waste disposal areas and releases of petroleum hydrocarbons and chlorinated solvents. Updated conceptual site model and developed remedial approach. Proposed remedial actions include selective soil removal, engineered controls and monitored natural attenuation of groundwater.

Confidential Client, *Virginia* – Task manager for the site investigation of navigational components manufacturer under the USEPA Region 3 Facility Lead Corrective Action Program. Prepared a Description of Current Conditions Report and site characterization work plan. Coordinated site characterization activities and analysis and reporting of results. Prepared an Interim Measures Work Plan for a soil removal action to remove soils that represent a potential risk to construction workers.

Confidential Client, *Maryland* – Prepared site investigation work plan and managed site characterization data for investigation of relationship between VOCs in site soil gas and groundwater and in off-site production wells.

Due Diligence

Confidential Client, *Ohio* Performed Phase I ESA of aseptic creamer manufacturing facility for a potential acquisition.

Confidential Client, *Georgia***,** Performed Phase I ESA of a pest control operation for a potential acquisition.

Confidential Client, *Pennsylvania* **–** Performed Phase I ESAs of medical device manufacturing facilities for a potential acquisition.

Confidential Client, *Maryland* **–** Performed a Phase I ESA of a former lumber mill in Eastern Maryland for a potential property acquisition.

Confidential Client, *Illinois* **–** Performed Phase I ESAs of aerial photography operations for potential investors.

EnviroSolutions, Inc. – Performed environmental and operational review of a transfer facility in Newark, New Jersey for potential solid waste acquisition.

Environmental Liability Valuation

***Confidential Client* –** Prepared cost estimates for future environmental liabilities for an automobile parts manufacturer as part of insurance cost recovery using cost modeling database application.

Confidential Client – Managed review and categorization of incurred costs for an electrical transformer manufacturer related to environmental investigation, remediation and legal defense.

Database Management and Geographic Information Systems (GIS)

Aberdeen Proving Ground, *Edgewood, Maryland* **–** Consolidated site characterization data from multiple consultants into a relational database and GIS. Compared extent of chemicals of potential concern for vapor intrusion to building locations to screen buildings for further investigation.

Confidential Client, *Northwestern Pennsylvania* **–** Managed and analyzed site characterization data for a foundry site. Utilized database queries and GIS to identify areas requiring remediation.

Municipal Solid Waste Facility, *Pennsylvania* **–** Enhanced database application for management and reporting of site data on landfill gas extraction, leachate collection and leachate application.

Confidential Client, Maryland – Managed geographic information for a geotechnical investigation that included over 100 cone penetrometer test (CPT) locations and over twenty soil borings.

Welsh Road Landfill Superfund Site, Honey Brook Township, *Chester County, Pennsylvania.* Developed database application to report monitoring data for a full scale evapo-transpiration landfill cover system. Form-based system allows the user to select and report data for various instruments, including soil moisture probes, landfill gas probes, Gee lysimeters, a pan lysimeter, and a weather station. Developed queries to determine frequency of measurements using a tipping bucket as a measure of infiltration to a pan lysimeter.

Confidential Fortune 500 Company - Identified target chemicals for site characterization at a former metals extraction plant based on analysis of the manufacturing process and chemicals stored on site.

Data Visualization

Pharmaceutical Manufacturing Facility – Created a digital animation using the Environmental Visualization Software (EVS) and site water level data to visualize the spatial and temporal relationships between water levels in a river and underlying bedrock aquifer.

Ohio EPA - Constructed a visualization using the Groundwater Modeling System (GMS) of a contaminant plume that combined cross section of the plume and underlying geology.

Confidential Client, *New Jersey* - Prepared three-dimensional visualization of proposed excavation of contaminated soil using the Environmental Visualization Software (EVS) software package.

Savannah River Site - Prepared three-dimensional visualization of tritium and tetrachloroethylene groundwater sampling data and site geology using the EVS software package.

Modeling

Confidential Client, *Tennessee* - Developed groundwater flow model using MODFLOW 2000 to simulate groundwater extraction in fractured bedrock in order to optimize pumping rates.

Edwards Air Force Base, *California* **–** Used Visual MODFLOW and MODPATH to predict groundwater flow and particle pathways during injection and recirculation of nanoscale zero valent iron particles as part of pilot test to remediate a chlorinated solvent plume.

Savannah River Site - Developed calculation of the rate of TCE biodegradation in wetland sediments that showed that intrinsic bioremediation was occurring in the wetland sediments. SRS Engineering Calculation Q-CLC-B-00026," Biological Degradation Rate for TCE at Twin Lakes Wetlands".

Pharmaceutical Manufacturing Facility, *New Jersey* - Peer reviewed another consultant's model for assessing SVE performance and selection of cleanup levels at a RCRA facility. Developed an alternative SVE model that improved the description of mass transfer across the water table and vapor flow to the extraction well. The client selected our SVE model over the other consultant's model.

Litigation Support

U. S Department of Justice - Researched costs for treatment using low-temperature thermal desorption in support of cost recovery for remediation of a Superfund site. Costs were found to be within the range of similar projects despite contractor errors and the Federal government was able to recover partial costs of the remedy from the responsible parties.

Training

U.S. EPA Technology Innovation Office - Prepared course materials for short course on Field-based Investigations of DNAPL. Materials included descriptions of DNAPL physics and chemistry, invasive and non-invasive techniques.

NEPA Assessments

Bechtel Corp. – Conducted site visits and prepared NEPA assessments for construction and co-location of cellular communications antennas in the Washington DC Metro area.

PROFESSIONAL EXPERIENCE

Geosyntec Consultants, Columbia, MD, 2004 – Present
GeoTrans, Inc., Sterling, VA, 1999 – 2003
Texas A&M University Department of Chemistry, College Station, Texas, Research Associate, 1997 – 1998
University of Colorado at Boulder Department of Chemistry, Boulder, Colorado, Post-doctoral Research Associate, 1995 – 1997

REPRESENTATIVE PUBLICATIONS

01-01 Krasnopoler, A., G. Council and P. Andersen. (2001) Biological Degradation Rate for TCE at Twin Lakes Wetlands. Calculation Number Q-CLC-B-00026. Savannah River Site.

01-98 Krasnopoler and S. M. George. (1998) Infrared Resonant Desorption of H2O from Ice Multilayers. Journal of Physical Chemistry B. 102:788**.**

01-96 Krasnopoler, A., N. Kizhakevariam and E. M. Stuve. (1996) Hydrogen Bonding and Surface Interactions among Protic Solvents: Coadsorption of Ammonia and Hydrogen Fluoride with Water on Silver (110). J. Chem. Society, Faraday Transactions. 92:2445.

01-95 Krasnopoler, A., A. L. Johnson and E. M. Stuve. (1995) Hydrogen Bonding and Molecular Orientation in Water/Fluorine Adlayers on Silver (110). Surface Science, 328:186.

02-95 Krasnopoler, A. and E. M. Stuve. (1995) Evidence of Specific and Non-Specific Adsorption of ClO4 on Ag (110). J. Vac. Sci. and Tech.A, 13:1681.

03-95 Stuve, E. M., A. Krasnopoler and D. E. Sauer. (1995) Relating the In-situ, Ex-situ and Non-situ Environments in Surface Electrochemistry. Surface Science. 335:177.

01-94 Krasnopoler, A. and E. M. Stuve. (1994) Coadsorption of Fluorine and Water on Ag (110). Surface Science.303:355.

02-94 Krasnopoler, A. (1994) Studies of the Structure of the Electrode-Electrolyte Interface by Ultra-high Vacuum Simulation. Ph. D. Dissertation, University of Washington.

01-92 Krasnopoler, A. (1992). Coadsorption of Water and Fluorine on Ag (110). Master's Thesis, University of Washington.

INVITED PRESENTATIONS

Krasnopoler, A., K. Philpy, M. Hansen, M. Berman, N. Durant and L. Hamilton. "Performance Evaluation of a Full-Scale Biosparging Barrier." Ninth International In Situ and On-site Bioremediation Symposium. Baltimore, MD. May, 2007.

Krasnopoler ,A. and S. M. George. "H2O Resonant Desorption from Ice Multilayers using the Mark III Infrared Free Electron Laser." 43rd National Symposium of the American Vacuum Society. Philadelphia, PA. October, 1996.

Krasnopoler, A. and E. M. Stuve. "Evidence of Specific and Non-specific Adsorption of ClO4 on Ag (110)." 41st National Symposium of the American Vacuum Society. Denver, CO. October, 1994

Krasnopoler, A., A. L. Johnson and E. M. Stuve. "Hydrogen Bonding and Molecular Orientation in Water/Fluorine Adlayers on Silver (110)." 40th National Symposium of the Americana Vacuum Society. Orlando, FL. October, 1993.

Geosyntec
consultants

R. DYLAN WALKER

database management
application integration and automation
geographic information systems
data visualization and conceptual modeling

EDUCATION

M.A, Secondary Education, University of Maryland, College Park, Maryland, 2011
B.S., Environmental Science, Virginia Tech, Blacksburg, Virginia, 2007

CAREER SUMMARY

Mr. Walker is a data management and visualization professional with extensive experience in database management, geospatial data analysis, and application integration and automation including the development of site conceptual models, online data access and visualization, animation, automation, and geospatial statistical analysis. His experience is supplemented by extensive and diverse field and management experience, including geotechnical readings, groundwater and soil sampling and reporting, landfill gas monitoring, staff management, equipment management, work plan development, and reporting.

Mr. Walker provides data management, geospatial information systems, and data visualization support for several projects on an as-needed basis, including internet based systems. Occasional use of a global positioning system is employed to demark or find instruments. Several of the maps and other visualizations, including boring logs and three-dimensional models, are later used in reports and in conjunction with large databases associated with the project.

Data Management, Automation, and Visualization

BASF-Harshaw, *Cleveland, Ohio.* Staff GIS Professional at a former chemical manufacturing plant near the Cuyahoga River. Provides geospatial analysis and data management support for planning, environmental sample collection and results, and reporting.

Conway Railyard, *Conway, Pennsylvania.* Staff GIS Professional at a major rail yard near the Ohio River. The Site is under active river gauge monitoring with active light non-aqueous phase liquid (LNAPL) recovery systems monitored monthly. Provides data management and automation tools to enhance workflows, including calculations, data import, and charts.

Blue Ridge Dam Evaluation, *Toccoa River, Georgia.* Staff GIS Professional at a hydroelectric dam undergoing geotechnical analysis. Provides data management and data visualization support via an all-in-one tool with GIS, spreadsheets, and 3-D modeling integration. Tools programmed support engineers by providing easy access and charting of long-term, complex data.

Former Vickers Facility, *Bad Homburg, Germany.* Staff GIS Professional at a site undergoing active environmental remediation via enhanced reductive dechlorination (ERD). Provides geospatial analysis, including mass estimates and calculations, and three-dimensional modeling. Also manages the site database to monitor on-site remediation systems.

Cortese Landfill NPL Site, *Narrowsburg, New York.* Staff GIS Professional at a national priorities listed landfill. Provides database management, quality control/quality assurance, and data analysis and reporting for environmental data collected at the site. Mr. Walker also provides geographic information systems support and data visualization at the site.

Coal Combustion Byproducts Storage Sites, *Confidential Client, Mid-Atlantic.* Staff GIS Professional at multiple CCB storage facilities in the Mid-Atlantic. Provides environmental data management and geospatial analysis and data visualizations including web-based mapping products.

Spring Site Development, *Confidential Client, Mid-Atlantic.* Staff GIS Professional tasked with managing spring level measurements and environmental boreholes. Automated data management and reporting for improved efficiency and faster reporting.

Litigation Support Project, *Confidential Financial Client.* Staff GIS Professional tasked with producing figures to be used by legal personnel and expert witnesses on a matter relating to alleged environmental contamination on a former agricultural property sold for residential development.

Phase I and Phase II ESA Project Support. Staff GIS Professional tasked with producing figures depicting observations and results of several Phase I and Phase II environmental site assessments through the United States and Canada. Work products included GIS analysis and figures and boring logs.

Field Work, Data Management, Reporting

Cherry Island Landfill*, Wilmington, Delaware.* Staff Scientist/Site Manager/Lead Field Technician at an active landfill undergoing an extensive expansion designed by Geosyntec. Work primarily involved management of a tracer test, data analysis, and a site-specific database. Responsible for oversight of the installation and development of new well installation using mud-rotary techniques. Solely responsible for ensuring groundwater is sampled according to the work plan. Often required to manage other field personnel to accomplish this task. Also responsible for collection of geotechnical information from several on-site instruments prior to tracer injection. Extensive reporting required following completion of tracer test.

Welsh Road Landfill*, Honey Brook Township, Chester County, Pennsylvania.* Staff Scientist / Lead Field Technician at a recently capped landfill utilizing a full scale evapo-transpiration cover system. Responsible for database management and groundwater sampling through 2007. Beginning in 2008, became solely responsible for all tasks related to the project. Tasks included maintaining proper function of all on-site instruments and the data they produced. On-site

instruments include soil moisture probes, landfill gas probes, Gee lysimeters, a pan lysimeter, and a weather station. Extensive data management, data analysis, and reporting required.

Closed Landfill Sampling, *Meadville, Pennsylvania.* Staff Scientist / Primary Field Scientist at a site suspected of heavy metals and semi-volatile organic carbon chemicals contamination. Provided field support by sampling groundwater and soil. Responsible for the post-sampling data analysis, primarily statistical analysis, and reports. Site includes a closed landfill that requires sampling and other post closure care procedures.

Old York Road, *Burlington Township, New Jersey.* Staff Scientist who provided field and technical support at a former construction and engineering facility suspected of heavy metals and volatile organic compounds contamination. Conducted groundwater sampling and reporting for the facility in accordance with strict New Jersey Department of Environmental Protection requirements. Also provided support at the site through use of geospatial information systems and technical support, such as deed restrictions and notifications.

Spring Scouting, *Various Sites*. Staff Scientist, responsible for providing geospatial information systems support and research to aid clients in scouting for and finding potential natural springs for use as drinking water. Experience involves extreme confidentiality, extensive contact with local and state municipalities, and hydrogeology.

Atlantic Research Corporation, *Gainesville, Virginia.* Staff Scientist who provided field support at a 400-acre decommissioned facility with extensive perchlorate contamination that is utilizing active bioremediation. Activities included soil, groundwater, and concrete environmental sampling. Geospatial and global positioning system are used as needed.

Canal Creek Study Area, *Aberdeen Proving Ground, Aberdeen, Maryland.* Staff Scientist who provided geospatial and database support that utilized third-party data to provide maps and figures used in presentations.

Fresh Kills Landfill, *New York City, New York.* Staff Scientist who provided geotechnical drilling oversight for several geophysical investigation borings which included split-spoon sampling and Shelby tubes. Logged the geological conditions for depth and engineering property accuracy were important to the task.

Newland Park Landfill, *Salisbury, Maryland.* Staff Scientist who provided field support at an active landfill utilizing landfill gas control systems to prevent off-site vapor intrusion.

Central Landfill, *Cecil County, Maryland.* Staff Scientist who provided geospatial information systems support for the project including, but not limited to, converting computer-aided drafting and drawing designs to a geospatial information systems. Also prepared data collection software for field staff to use which supplemented automatic borehole log and fence diagram generation for site reports. Information analysis support was provided to project management and field staff on an as needed basis.

Geosyntec consultants

PROFESSIONAL EXPERIENCE

Geosyntec Consultants, Columbia, Maryland, 2012 - Present
Geosyntec Consultants, Columbia, Maryland, 2007 - 2010

TEACHING EXPERIENCE

Chesapeake Senior High School, Pasadena, Maryland - August 2011 – December 2012 – Science Teacher. Earth Science, Chemistry, and AP Environmental Science

River Hill High School, Clarksville, Maryland - August 2010 - June 2011 – Student Teaching. AP Biology and Anatomy and Physiology

INVITED PRESENTATIONS

"*The Use of Bio-Based Surfactants to Enhance the Efficacy of Potash as a Contact Herbicide*," Walker, Robert D., Donald Mullins, Ph.D., Richard Fell, Ph.D., and James Westwood, Ph.D., The American Society of Agronomy, Crop Science Society of America, and Soil Science Society of America 2006 International Annual Meeting, 12 Nov. 2006.

Geosyntec
consultants

William E. Wertz **subsurface vapor transport & inhalation exposure**
innovative technology development

EDUCATION

Pennsylvania State University, Univ. Park, PA, B.S. (Honors), Geochemistry, 1974
Pennsylvania State University, Univ. Park, PA, Ph.D., Geology, 1983

CAREER SUMMARY

William is a Senior Consultant based in Albany, New York with more than 30 years of experience in investigation and remediation of contaminated groundwater, soil and vapor intrusion sites. From 1982 to 2010, he worked for the New York State Department of Environmental Conservation (NYSDEC) on many of the largest and most complex remedial sites in the State. From the early 2000's through the present, his primary focus has been on the assessment and mitigation of vapor intrusion. Prior to joining Geosyntec in 2010, he served as the New York State Department of Environmental Conservation's (NYSDEC) technical lead on the development of the State's "Guidance for Evaluating Soil Vapor Intrusion in the State of New York, and on the development of several other policy documents related to vapor intrusion. He developed the technical criteria and headed the team that evaluated the vapor intrusion pathway at more than 400 "legacy" sites in the state. He conducted research on the spatial and temporal variability of volatile organic compounds in sub-slab soil vapor and indoor air, on the comparability of data collected from passive diffusion samplers (modified EPA TO-17) and Summa® samplers, and on the impacts of subslab depressurization systems (active and passive) on the subslab concentration of VOCs. His research was used to develop NYSDEC policies on how to conduct vapor intrusion evaluations (number of samples, time of year to sample, which locations within and beneath a home to sample, use of tracers), how long to monitor structures where a potential for vapor intrusion exists, and when to consider "blanket mitigation" of adjacent structures in a neighborhood.

William has continued to focus on vapor intrusion assessment and mitigation since joining Geosyntec in 2011. He has conducted vapor intrusion investigations for the United States Air Force the United States Navy and corporate clients, and has provided litigation support. He serves on the USEPA's technical workgroup that is updating the November 2002, "OSWER Draft Guidance for Evaluating the Vapor Intrusion to Indoor

Air Pathway from Groundwater and Soils (Subsurface Vapor Intrusion Guidance. He also coauthored draft vapor intrusion guidance for the Air Force, and has lead vapor intrusion training seminars for regulators and the public.

Applied Research

Temporal and Spatial Variability in the Distribution of VOCs in Sub-slab and Indoor Air. Principal investigator on a New York statewide project to characterize the distribution of VOCs at residential structures and the factors that influence it.

Evaluation of Passive Samplers for Vapor Intrusion Assessment, NYSDEC, NY. Principal Investigator for a study comparing quantitative passive samplers/TO-17 and Summa canister /TO-15 analyses for use in vapor intrusion assessments at residential structures.

Building Pressure Cycling to Discern Vapor Intrusion from Background Sources, Edwards Air Force Base, CA. Principal Investigator for a field demonstration in 2013 using building pressure cycling to assess vapor intrusion at structure where traditional sampling methods were not practicable. Comparison of indoor air samples collected before and during periods of building pressurization and depressurization demonstrated that the source of TCE in indoor air was due to vapor intrusion, but that other VOCs were present as a result of background contributions. A smoke pen was used to identify preferential vapor intrusion pathways during periods of building depressurization, which was confirmed by collecting a sample of vapor entering the building via a seam at the slab-wall intersection. Samples collected during periods of depressurization were used to estimate reasonable maxim exposure concentrations for use in a risk assessment.

Regulatory and Other Guidance Documents

New York State Department of Environmental Conservation's (NYSDEC) technical lead on the development of the State's Guidance for Evaluating Soil Vapor Intrusion in the State of New York (2006), DER-13, Strategy For Evaluating Soil Vapor Intrusion at Remedial Sites in New York (NYSDEC 2006) and the vapor intrusion components of DER-10, Technical Guidance for Site Investigation and Remediation (NYSDEC 2010).

US EPA OSWER Guidance Expert Panel: Paid member of the expert panel developing EPA Technical Documents and Tools Prepared to Support Vapor intrusion Guidance Development, including: Background Indoor Air Concentrations of Volatile Organic Compounds in North American Residences (1990–2005): A Compilation of Statistics for Assessing Vapor Intrusion (2011); EPA's Vapor Intrusion Database:

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Evaluation and Characterization of Attenuation Factors for Chlorinated Volatile Organic Compounds and Residential Buildings (2012): and, Conceptual Model Scenarios for the Vapor Intrusion Pathway (2012).

PROFESSIONAL EXPERIENCE

Assistant Professor of Geology Beloit College, Beloit, WI, 1978-1980
Assistant Professor of Geology Hamilton College, Clinton, NY, 1980-1982
New York State Department of Environmental Conservation, Albany, NY, 1982 -2010
Geosyntec Consultants, Albany, NY, 2011 - Present

AFFILIATIONS

Geological Society of America, 1974 - present.
Hudson Mohawk Professional Geologists Association (former President), 1996 - present

TEACHING EXPERIENCE

Assistant Professor of Geology Beloit College, 1978-1980. Introduction to Geology, Sedimentary Petrology and Petrography, Paleontology, Environmental Geology, Field Methods.

Assistant Professor of Geology Hamilton College, 1980-1982. Introduction to Geology, Sedimentary Petrology and Petrography, Paleontology, Environmental Geology, Field

REPRESENTATIVE PUBLICATIONS

13-3 McAlary, T., R.Ettinger, S. Welt, J. Kurtz, D. Folkes, and W. Wertz, 2013. Update on the USEPA OSWER Guidance for Vapor Intrusion, platform presentation at the University Consortium for Field-Focused Groundwater Contamination Research Program for Annual Progress Meeting: May 30&31, 2013, Guelph, Ontario.

11-2 Schuver,H., and Wertz,W. 2011 A General (Evidence-Based) Framework for Assessing the Vapor Intrusion Pathway, Featured Article, EM Magazine, Air & Waste Management Association,

11-3 Wertz, W. 2011. Turning the VI Database on its Head, Some Thoughts on Screening Your Site and Improving the Efficiency of Site Evaluations,

Presented at EPA/AEHS Workshop, 15 March 2011 - Update on Vapor Intrusion at U.S. EPA, San Diego Ca.

11-3 Wertz, W. and T. McAlary. 2011. Next Generation Vapor Intrusion Assessment and Mitigation, Presented at the United States Air Force Restoration and Technology Transfer Workshop, 11 March 2011, San Antonio Tx.

10-10 Wertz, W. 2010. New York State's Approach to Vapor Intrusion. *Proceedings 18th Section Fall Meeting:The ABA* ***Section of*** *Environment, Energy, and Resources Law Summit.* New Orleans, LA.

10-9 Wertz, W. 2010. Home, Home On The Range, Assessing The Potential for Vapor Intrusion In Light Of (In Spite Of) Highly Variable Data. Invited Presentation, SERDP/ESTCP Technical Exchange Meeting on Vapor Intrusion Salt Lake City, UT.

10-9 Wertz, W. 2010 Invited Panelist, Regulatory Panel Discussion - Grappling With Vapor Intrusion, AEHS 26th Annual International Conference on Soils, Sediments, Water and Energy, Amherst MA.

10-6 Wertz, W. and R. Ettinger. 2010. "Soil Vapor Intrusion Training In The New Economy". A Vapor Intrusion Workshop presented at the ASTSWMO *2010 Remediation and Reuse Symposium Remediation and Reuse in the New Economy*. Portland OR.

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09-10 Wertz, W. 2009.Temporal and Spatial Variability in the Distribution of Subsurface VOCs: Implications for Vapor Intrusion Evaluations. Invited Presentation, *Midwestern States Risk Assessment Symposium*. Indianapolis, IN.

09-10 Wertz, W. 2009. Invited Panelist, Regulatory Panel Discussion - Grappling With Vapor Intrusion, AEHS 26th Annual International Conference on Soils, Sediments, Water and Energy, Amherst MA.

09-12 Folkes, D., W. Wertz, J. Kurtz, T. Kuehster. 2009. Observed Spatial and Temporal Distributions of CVOCs at Colorado and New York Vapor Intrusion Sites *Groundwater Monitoring & Remediation* 29, no.1: 70-80.

08-10 Wertz, W. 2008. Spatial and Temporal Variability of Vapor Intrusion Data, Invited Presentation, Vapor Intrusion Workshop AEHS 26th Annual International Conference on Soils, Sediments, Water and Energy, Amherst MA.

08-03 Wertz, W. 2008. Vapor Intrusion Challenges Making Good Decisions In The Face Of Uncertainty. Invited Presentation, Strategic Environmental Research and Development Program (SERDP) and the Environmental Security Technology Certification Program (ESTCP) Technical Symposium. Washington D.C.

07-09 Wertz, W. and T. Festa. 2007. The Patchy Fog Model of Vapor Intrusion. *Proceedings AWMA Vapor Intrusion Conference, Vapor Intrusion - Learning From the Challenges.* Providence, RI.

07-09 McDonald, J., and W. Wertz. 2007. PCE, TCE, and TCA Vapors in Subslab Soil Gas and Indoor Air: A Case Study in Upstate New York. *Groundwater Monitoring & Remediation* 27, no.4: 86-92.

06-06 Wertz, W. 2006. Mitigating Vapor Intrusion. *Northeast Waste Management Officials' Association (NEWMOA) and the Brown University Superfund Basic Research Program (SBRP) Vapor Intrusion Mitigation Workshop.* Providence RI

06-08 Wertz, W., 2006. Mitigating Vapor Intrusion -A Case Study. *Proceedings AWMA Vapor Intrusion Conference,* Phil., PA

06-05 Wertz, W. 2006. Impacts of Vapor Intrusion on Brownfield Site Redevelopment: The Ugly, The Bad, & The Good. Invited Presentation to the Environmental Section, New York State Bar Association, New York, NY.

06-03 Wertz, W. 2006. **Near-Building and Subslab Sampling at the Endicott (NY) Site, Implications for Site Screening Approaches,** Presented at EPA/AEHS Workshop, 16 March 2006 - A Summary Workshop in the Context of EPA's VI Guidance, San Diego CA.

04-03 Wertz, W. and G. McDonald. 2004. Vapor Intrusion in Endicott, NY: Observed Differences in the Concentrations of Chlorinated Volatile Organic Vapors (CVOCs) in Basement and Subslab Samples, Presented at EPA/AEHS, 15 Mar 2004 - Vapor Intrusion Attenuation Workshop, San Diego, CA.

APPENDIX B
Site Specific Health and Safety Plan

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engineers | scientists | innovators

HEALTH AND SAFETY PLAN

FORMER SCOTT TECHNOLOGIES SITE
1051 SOUTH MAIN STREET
CITY OF ELMIRA, CHEMUNG COUNTY, NY
NYSDEC PROJECT 808049

Prepared for
New York State Department of Environmental Conservation
Division of Environmental Remediation, Region 8
6274 East Avon-Lima Road
Avon, New York 14414-9519

Prepared by
Geosyntec Consultants, Inc.
10220 Old Columbia Road, Suite A
Columbia, Maryland 21046

Project Number MN0832
Document Number MD14351

December 2014

Geosyntec consultants

TABLE OF CONTENTS

APPENDICES

EHS Incident Response Procedures

CHOOSE THE RIGHT PATH

For more Information:
All work-related injuries, illnesses, and near-miss situations, to include vehicle accidents and general liability claims, must be documented and reported to the Environmental, Health & Safety (EHS) Team.

Dale Prokopchak
804-349-8067

Ersin Yalcin
404-435-4722

Visit the EHS Team on the intranet:
http://home.geosyntec.com/Corp/EHS/

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ROUTE TO HOSPITAL

St. Joseph's Hospital
607-733-6541
555 E. Market Street
Elmira, NY 14901

Written Directions to Hospital from Site:

1. Depart S Main St toward Robert St (0.7 miles)
2. Turn right onto W Miller St, and then immediately turn left onto RT-14 /Clemens Center Pkwy (0.6 miles)
3. Turn right onto Pennsylvenia Ave (0.4 miles)
4. Road name changes to Madison Ave ((0.2 miles)
5. Turn right onto E Market St (465 ft)
6. Arrive at **St. Joseph's Hospital**

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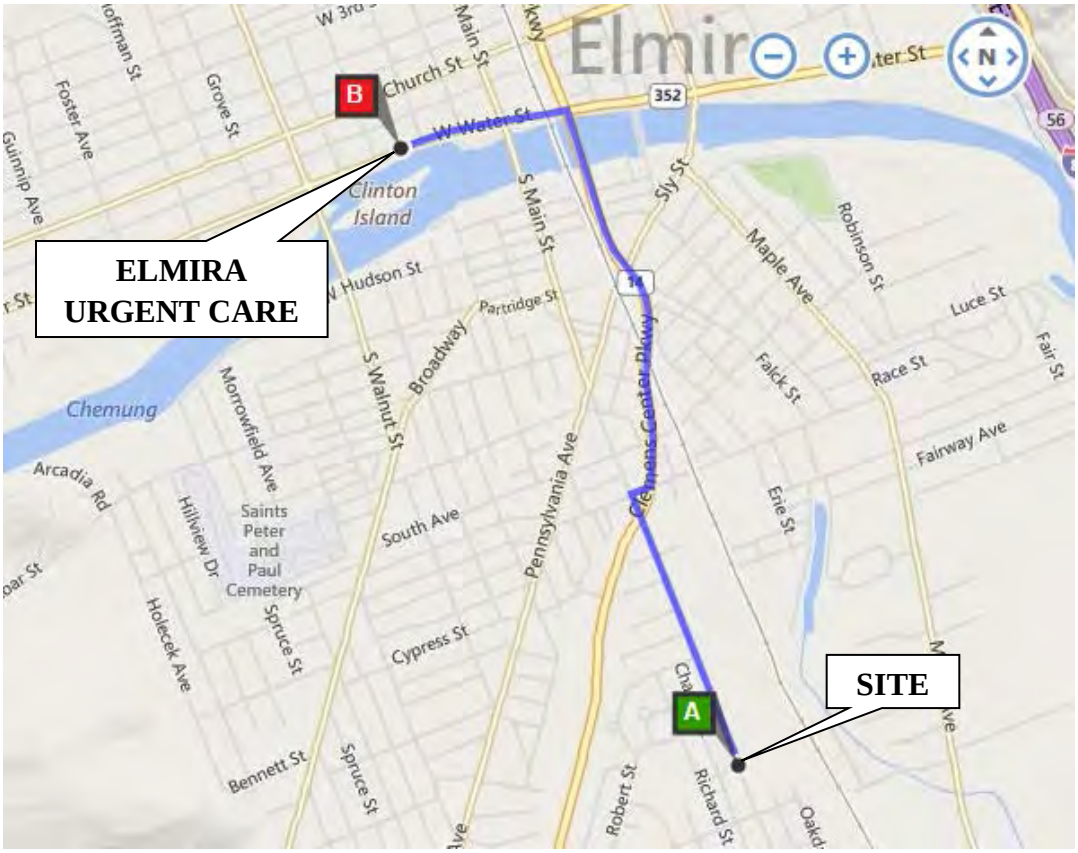
ROUTE TO URGENT CARE FACILITY



URGENT CARE FACILITY NAME

Elmira Urgent Care
607-732-1100
360 West Water St.
Elmira, New York

Written Directions to Urgent Care Facility from Site:

1. Depart S Main St toward Soper St (0.7 miles)
2. Turn right onto West Miller St. and then immediately turn left onto RT-14/Clemens Center Pkwy (1.0 miles)
3. Turn left onto RT -352E/E Water St. (0.4 miles)
4. Arrive at 360 W. Water St., Elmira, NY (Elmira Urgent Care)

SITE MAP


Work Area
Main Exit
Soper St
Southside High School
Richard St
Charles St
Robert St
Mac's Tavern
Federal St
Coldbrook Creek
Laurentian Pl
Curtis St
Oakdale Ave
Wilkins St
Shannon Ave
Woodbine Ave
Plymouth Ave
Sherman Ave
Lee St
Concord St
Cadet Terrace
Elmira City School Bus Garage
First Heritage Federal Credit ...
S Main St
427
Cedar St
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1. INTRODUCTION

This site-specific Health and Safety Plan (HASP) was prepared to address project-specific hazards known or suspected to be present associated with the existing conditions and work to be performed at the work site(s). This HASP was prepared to meet the requirements specified in Occupational Safety and Health (OSHA) Hazardous Waste Operations Emergency and Response (HAZWOPER) program, Geosyntec's Health and Safety (H&S) Procedure HS 301, and the H&S requirements of the client.

2. SIGNATURES

2.1 Preparers and Reviewers

This HASP must be maintained on site when field work is being performed. The Site Health and Safety Officer (SHSO) can change or amend this document, in agreement with the Health and Safety Coordinator (HSC) or Project Manager. Amendments (e.g., changes in personal protective equipment, addition of tasks, etc.) must be documented in Section 19 and in Appendix A. This HASP must be reviewed and amended on an annual basis for projects lasting more than one year.

Prepared by:	Man Zhang	10/21/2014
	SHSO	Date
Reviewed by:	Michael Hansen	10/22/2014
	HSC	Date
Approved by:	Aron Krasnopoler	12/5/2014
	Project Manager	Date

This HASP has been given to the following H&S approved subcontractor(s).

Subcontractor: _____ Representative: _____ Date: _____

_____ Representative: _____ Date: _____

Subcontractor:			

Subcontractor: _____ Representative: _____ Date: _____

2.2 Site Workers

This HASP must be reviewed by personnel prior to site work. Workers not in attendance at the initial meeting must be trained by the SHSO on the information covered in the pre-entry briefing. After reading the HASP and attending a pre-entry briefing, Geosyntec employees and other parties covered under this HASP must sign the following acknowledgment statement.

"I have read, understand, and will perform my work in accordance with the information set forth in this HASP."

Signature	Printed Name	Date

3. EMERGENCY CONTACT INFORMATION

Contact	*Telephone Numbers*	
	Office	*Alternate (Type)*
Fire Department	911	
Police Department	911	
Site Emergency Response (if applicable)	Not Applicable	
Hospital - St. Joseph's Hospital	911	(607) 733-6541
Director of H&S– *Dale Prokopchak*	(804) 332-6376	(804) 349-8067 (Cell)
H&S Regional Manager – *Mark Malchik*	(978) 206-5777	(781) 392-5440 (Cell)
Project Manager – *Aron Krasnopoler*	(410) 910-7612	(202) 550-7724 (Cell)
Site Health & Safety Officer – *Adam Gray*	(410) 910-7610	(301) 379-0933 (Cell)
H&S Coordinator – *Michael Hansen*	(410) 910-7640	(443) 812-1430 (Cell)
Principal- or Associate-in-Charge - *Paul Brookner*	(612) 253-8203	(612) 599-7473 (Cell)
Utility Emergencies	811	
Work Care	(888) 449-7877	(714) 978-7488
Facility Contact – *Kevin Knapp (Equilibrium Equities, Inc.)*	(607) 735-5623	(607) 742-5798 (Cell)
Client Contact – *Kevin Krueger (Unisys Corporation)*	(651) 687-2210	
Subcontractor -		
Subcontractor -		
Other -		

4. APPLICABILITY OF THIS HASP

This HASP was prepared in accordance with Geosyntec Consultants' H&S Procedures for use by Geosyntec project staff and subcontractors. Subcontractors, at a minimum, shall ensure that their employees, and those of its lower tier subcontractors, comply with these procedures and other health, safety and security provisions in the Subcontract. Compliance with this HASP shall represent the minimum requirements to be met by subcontractors, who shall be responsible for examining all requirements and determining whether additional or more stringent health, safety and security provisions are appropriate for their portion of the work and implementing them accordingly. Therefore, for firms executing all or any portion of the work, this document and its contents should not be used without a thorough peer review by their health and safety managers. Prior to commencing work, such firms are responsible for reviewing and supplementing the HASP to add appropriate procedures specific to their portion of the work.

5. SITE/TASK/HAZARD DESCRIPTION

5.1 Site Background

The following is a brief description of the site, including information as to the location, approximate size, previous usage, and current usage. A description of the tasks to be performed is also presented.

- Site Location: Former Scott Technologies Site
- Approximate Size of Site: 46 acres
- Previous Site Usage: Manufacturing – engines, drill tools, typewriters
- Current Site Usage: Manufacturing and warehouse space
- Description of Surrounding Property/Population:

North	Elmira High School	East	Rail Road Tracks; Residential/Commercial
South	Residential/Commercial	West	Residential/Commercial

- Summary of previous site investigations (if available/applicable):

Several rounds of soil and groundwater investigation have been completed in the vicinity of the Site. Based on the current conceptual site model presented in the Site Characterization Work Plan contaminants of potential concern (COPCs) in soil include metals, polychlorinated biphenyls (PCBs), semi-volatile organic compounds (SVOCs) which mostly consist of polycyclic aromatic hydrocarbons (PAHs), and volatile organic compounds (VOCs). COPCs in groundwater include lead, PCBs, SVOCs/PAHs, and VOCs.

5.2 Task Descriptions

Tasks for project include:

Task 1:	Direct-Push Technology Borings for Soil Sample Collection
Task 2:	Hand Augering for Shallow Soil Sample Collection
Task 3:	Monitoring Well Inspection and Synoptic Water Level Measurement
Task 4:	Groundwater Sampling
Task 5:	Storm Water Structure Inspection

Task Hazard Analyses (THAs) describing the tasks and potential hazards for each are presented in Appendix B.

5.3 Chemical Hazards

The classes of chemicals that are known or suspected to be present that may be encountered while performing site work include the following:

- Benzene, toluene, ethylbenzene, xylenes (BTEX)
- Chlorinated volatile organic compounds (VOCs)
- Total petroleum hydrocarbon (TPH)
- Polycyclic aromatic hydrocarbons (PAHs)
- Polychlorinated biphenyls (PCBs)
- Hazardous metals
- Aesbestos

Controls for these hazards are presented in the THAs included in Appendix B. A summary of these chemical hazards is presented in Appendix C.

5.4 Physical Hazards

The following physical hazards have been identified associated with the work to be performed and the site conditions.

- Cold Stress
- Drilling (including Indoor)
- Drum and Container Handling
- Dust and particulates
- Eye Injury
- Hand/Foot Injury
- Heat Stress
- Heavy Equipment
- Knives / Blades
- Lifting Heavy Loads
- Loud Noise/Vibration
- Portable Power/Hand Tool
- Slips, Trips, and Falls
- Thoroughfares / Traffic
- Urban Environments
- Utility Protection

Controls for these hazards are presented in the THAs included in Appendix B.

5.5 Biological Hazards

The following biological hazards have been identified associated with the work to be performed and the site conditions.

- Allergic reaction to poisonous plants
- Biting/stinging insects
- Lyme disease
- Rats / vermin
- Snakes

Controls for these hazards are presented in the THAs included in Appendix B.

6. GENERAL SAFE WORK PRACTICES

The following general safe work practices must be adhered to while performing site work:

- Basic PPE shall be worn, including hard hats, safety glasses, hard-toed boots, and high-visibility vests. If conditions allow, the requirement for hard hats and hard-toed boots may be reduced with approval of the SHSO and Project Manager.
- Minimize contact with impacted materials. Do not place equipment on the ground. Do not sit or kneel on potentially contaminated surfaces.
- Smoking, eating, or drinking after entering the work zone and before personal decontamination is not allowed. Employees who are suspected of being under the influence of illegal drugs or alcohol will be removed from the site. Workers taking prescribed medication that may cause drowsiness shall not operate heavy equipment and are prohibited from performing tasks where Level C or B personal protective equipment is required.
- Practice good housekeeping.
- Use of contact lenses is not allowed under certain hazardous working conditions.
- The following conditions must be observed when operating a motor vehicle:
    - Wearing of seat belts is mandatory
    - The use of headlights is mandatory during periods of rain, fog, or other adverse weather or low-light conditions
    - A backup warning system or use of vehicle horn is mandatory when the vehicle is engaged in a backward motion
    - Posted traffic signs and directions from flagmen must be observed
    - Equipment and/or samples transported in vehicles must be secured from movement

  - The use of vehicles acquired by Geosyntec by non-Geosyntec personnel is prohibited
- In an unknown situation, always assume the worst reasonable conditions.
- Be observant of your immediate surroundings and the surroundings of others. It is a team effort to notice and warn of dangerous situations. Withdrawal from a hazardous situation to reassess procedures is the preferred course of action.
- Conflicting situations may arise concerning safety requirements and working conditions. These must be addressed and resolved rapidly by the SHSO and PM to relieve motivations or pressures to circumvent established safety policies.
- Unauthorized breaches of specified safety protocol are not allowed. Workers unwilling or unable to comply with established procedures will be asked to leave the work site.

7. EMERGENCY RESPONSE

This section discusses emergency response procedures and response equipment to be maintained on site. A table presenting a list of contacts and telephone numbers for the applicable local and off-site emergency responders is provided inside the front cover of this HASP (after figures).

7.1 Injury and Emergency Response Procedures

In the event of an **injury** to an employee, the instructions for injury response and reporting, located in the front of this HASP, must be implemented immediately. In the event that an **emergency** develops, the following procedures are to be implemented:

- The Site Health and Safety Officer (SHSO), or designated alternate, should be immediately notified via the on-site communication system. The SHSO assumes control of the emergency response.
- If applicable, the SHSO must immediately notify off-site emergency responders (e.g., fire department, hospital, police department, etc.) and must inform the response team of the nature and location of the emergency on site.
- If applicable, the SHSO may call for evacuation of the site. Site workers should move to their respective refuge stations using the evacuation routes provided on the Site Map.
- For small fires, flames should be extinguished using the appropriate type of fire extinguisher. Large fires should be handled by the local fire department.
- If a worker is injured, the procedures presented in “Instructions for Injury Response”, located in the front of this HASP, must be implemented immediately.
- After an incident has stabilized, the procedures presented in “Instructions for Incident Reporting”, located in the front of this HASP, must be followed.

7.2 Emergency Response Equipment

Emergency response equipment will be maintained in the work area as necessary for this project. Examples of emergency response equipment include first aid kits, and fire extinguishers (Type ABC).

8. KEY PERSONNEL AND HEALTH AND SAFETY RESPONSIBILITIES

Project personnel and their responsibilities in regard to health and safety concerns on this project are as follows:

Project Manager (PM): Aron Krasnopoler

- Approve this HASP and amendments, if any;
- Monitor the field logbooks for health and safety work practices employed;
- Coordinate with SHSO so that emergency response procedures are implemented;
- Check that corrective actions are implemented;
- Check and document that qualified personnel receive this plan and are aware of its provisions and potential hazards associated with site operations, and that they are instructed in safe work practices and familiar with emergency response procedures; and
- Provide for appropriate monitoring, personal protective equipment, and decontamination materials.

Site Health and Safety Officer (SHSO): Adam Gray

- Prepare and implement project HASP and amendments, if any, and report to the Project Manager for action if deviations from the anticipated conditions exist and authorize the cessation of work if necessary;
- Check that site personnel meet the training and medical requirements;
- Conduct pre-entry briefing and daily tailgate safety meetings;
- Check that monitoring equipment and personal protective equipment are operating correctly according to manufacturer's instructions and such equipment is utilized by on-site personnel. Calibrate or check calibration of monitoring equipment and record results;
- Check that decontamination procedures are being implemented;
- Implement site emergency response and follow-up procedures;
- Notify the HSC in the event an emergency occurs; and
- Perform and document weekly inspections, if necessary.

Health and Safety Coordinator: Michael Hansen

- Review and audit HASP and amendments;
- Notify Director of Health & Safety when an emergency occurs;
- Assist with the implementation of the corporate health and safety program; and
- Consult with staff on health and safety issues.

Site Workers

- Provide verification of required health and safety training and medical surveillance prior to arriving at the site;
- Notify supervisors of workplace accomodation requirements as the result of physical limitations or medical conditions;
- Attend pre-entry briefings and daily tailgate safety meetings;
- Immediately report accidents and/or unsafe conditions to the SHSO;
- Be familiar with and abide by the HASP; and
- Be ultimately responsible for his or her own safety.

9. WORKER TRAINING AND MEDICAL SURVEILLANCE

Personnel involved in field activities subject to OSHA HAZWOPER 29 CFR 1910.120 will be required to participate in both a health and safety training program that complies with criteria primarily set forth by the OSHA HAZWOPER in 29 CFR 1910.120(e) and a medical surveillance program covered under 29 CFR 1910.120(f), or equivalent regulations based on the jurisdiction in which the project is performed.

9.1 Pre-Assignment and Annual Refresher Training

Prior to arrival on site, the Geosyntec Project Manager will be responsible for monitoring that their staff meet the requirements of pre-assignment training (40/24 hours per Procedure HS 301). In addition, personnel must be able to document dates of attendance at an annual 8-hour refresher and three days of fieldwork under a qualified supervisor. Failure to provide this documentation will prohibit entry to the active work area(s) (i.e., Exclusion Zone).

9.2 Site Supervisor Training

Consistent with OSHA 29 CFR 1910.120 (e)(4), prior to arrival on site, individuals designated as site supervisors require an additional eight hours of specialized training.

9.3 Initial Site Safety Orientation and HASP Review

In addition to complying with 29 CFR 1910(e), site personnel will attend an initial safety orientation during which the HASP and applicable THAs will be reviewed prior to initiating field activities. This review will include the following:

- Understanding the lines of authority regarding health and safety and site personnel roles and responsibilities;
- Information of specific hazard agents related to the site and site operations will be discussed, such as health hazards of site chemicals and specific safety hazards of processes, tools, and equipment;
- Training in the proper use, maintenance, and decon protocol of PPE and Level(s) of Protection;
- Appropriate work practices and engineering controls to reduce/eliminate exposures to site hazards will be reviewed;
- Personnel will be informed of means for normal site and emergency communication(s);
- Air monitoring strategies will be discussed to include the frequency/types, action levels, sampling techniques, pre/post calibration techniques;
- Unique/site specific medical surveillance requirements that need to be considered based on site contaminants;
- Understanding site control measures, work zones, and proper decontamination procedures for personnel/tools/vehicles, etc. to reduce the potential for both on/off site contamination;
- Personnel will be trained to respond quickly and properly in the event of an emergency; and
- Personnel involved in specific hazardous activities, such as confined space entry, drum handling, sampling unknowns, etc. will receive specialized training in the appropriate techniques to employ prior to commencing these operations.

9.4 Baseline Medical Surveillance Exam

The baseline medical examination is used to identify physical capabilities and certain medical limitations that may have an impact on the candidate's ability to perform in the position and/or job activity for which he/she is being considered, as well as to establish certain baseline medical parameters. The initial test results can then be compared against future periodic or project-specific monitoring results.

9.5 Periodic/Annual/Biennial Medical Exam

The periodic medical examination is used to evaluate an employee's continued fitness for duty and to assess possible impact(s) occupational exposures may have had on their health status. The periodic examination includes an update to the medical and work history, results of previous occupational exposure assessments, and a detailed medical exam tailored to the job description.

The Medical Director from WorkCare determines the frequency of the periodic medical exams based on regulatory requirements, the position/work activities of the employee, and the level of exposure to physical, chemical, and biological agents.

9.6 Exposure/Activity/Project-Specific Medical Testing

None planned.

9.7 Exit Exam

An exit medical examination is offered when an employee leaves the medical surveillance program, either because of termination of employment with Geosyntec or because of reassignment to a position not designated or identified to participate in the medical surveillance program. This optional exit examination may be used to assess potential changes in medical status that have occurred during the course of employees' previous work activities, and to establish a medical baseline at the time of departure.

9.8 Exit/Termination

An exit medical examination is offered when an employee leaves the medical surveillance program, either because of termination of employment with Geosyntec or because of reassignment to a position not designated or identified to participate in the medical surveillance program. This optional exit examination assesses potential adverse impacts occupational exposures may have contributed to the employee's health status.

10. MAPS AND SITE CONTROL

10.1 Routes to Hospital and Urgent Care Facility

A hospital and an urgent care facility near the site have been identified. Maps to the hospital and urgent care are included after the Table of Contents of this HASP. Both figures also include the facility name and phone number.

10.2 Site Map

A site map is located inside the cover of this HASP. The site map is intended to show the location of the work zone(s), to provide on-site orientation, and to delineate evacuation routes. Changes may be made to the site map by the SHSO based on changing site conditions. The site map should be accessible in the work area.

10.3 Buddy System

The buddy system is required when work is performed in hazardous areas. The buddy system includes maintaining regular contact with one or more onsite Geosyntec personnel, clients, and/or contractors to periodically check on the condition of site workers such that each employee in the work group is observed by (or in verbal contact with) at least one other employee in the work group. For field visits with only one employee onsite, the buddy system shall be implemented via periodic telephone contact with offsite Geosyntec personnel.The purpose of the buddy system is to provide rapid assistance to employees in the event of an emergency.

10.4 Controlled Work Zones

APPLIES TO TASK: ☐① ☐② ☐③ ☐④ ☐⑤ ☐⑥ ☐⑦ ☐⑧ ☒ Not Applicable

Three controlled work zones, including an Exclusion Zone, a Contaminant Reduction Zone (CRZ), and a Support Zone, are required for the task(s) indicated above. Geosyntec employees must not be allowed into the CRZ or Exclusion Zone or the Work Zone until they have received the proper personal protective equipment (PPE) and they have read, understand, and meet the requirements outlined in this HASP. The Exclusion Zone is defined as the area on site where contamination is suspected and tasks are to be performed. The CRZ is defined as the area where equipment and workers are to be decontaminated as they leave the Exclusion Zone. The Support Zone is defined as the command area and may serve as a staging and storage area for supplies. The location and extent of the work zones may be modified as necessary as site investigation information becomes available. For sites that do not require the three controlled work zones, the area(s) where work is to be performed shall be called the Work Zone.

Visitors to the site may need to be continually escorted for safety purposes. Visitors under Geosyntec's direction need to check in with the SHSO upon visiting the site.

For the tasks identified above, the boundaries of the Exclusion Zone, CRZ, and Support Zone, or the Work Zone, shall be marked using appropriate methods, including but not limited to warning tape, signs, traffic cones, fencing, or other appropriate means.

10.5 Site Access

Certain sites require controlled access to the work area. Examples of access controls include sign in/sign out logs, checking in with guards, and donning identification badges. Geosyntec personnel will adhere to the site-specific access requirements and monitor that subcontractors and other Geosytnec visitors abide by site-specific access control requirements.

10.6 Inspections

☐ APPLICABLE ☒ NOT APPLICABLE

Based on the hazards identified for the project, periodic health and safety inspections may be performed. The Health & Safety Inspection Checklist records should be kept on file at the project site. The frequency for periodic inspections is:

☐ Weekly
☐ Monthly
☐ Other: _____

11. TAILGATE MEETINGS

Tailgate meetings must be held daily prior to starting work to discuss important health and safety issues concerning tasks to be performed during that shift. Non-Geosyntec site workers should also communicate health and safety concerns associated with the tasks they will be performing. Topics discussed in the tailgate meetings must be documented.

12. STOP WORK AUTHORITY

In accordance with the Company's Procedure HS 203 - Stop Work Authority, Geosyntec personnel and subcontractor personnel have the authority and responsibility to issue a Stop Work Order if unsafe actions and/or conditions are identified. The Stop Work Authority (SWA) process involves a stop, notify, correct, and resume approach for resolving observed unsafe work actions or conditions. The person issuing the work stoppage will first notify workers engaged in or affected by the unsafe activity or condition and require that associated work be stopped. After this Stop Work Order is issued, the Geosyntec project manager and the supervisors for affected or concerned contractors will also be notified. The Geosyntec project manager will document the issuance of the Stop Work Order on the form provided in Procedure HS 203. Work will not resume until the issues and concerns of the Stop Work Order have been adequately addressed.

13. AIR MONITORING

APPLIES TO TASK: ☒① ☐② ☐③ ☐④ ☐⑤ ☐⑥ ☐⑦ ☐⑧ ☐ Not Applicable

Air monitoring will be performed to evaluate airborne chemical and/or dust exposure levels within the breathing zone of site workers. Hazardous conditions may include concentrations that may cause acute or chronic illness, potential oxygen deficient environments, or potential explosive environments. Air monitoring may also be performed to evaluate the adequacy of engineering, administrative, and/or PPE controls. Air monitoring may be "real-time" (e.g., the instrument provides immediate results at the project), using multi-gas meters, photoionization detectors (PIDs), or colorimetric tubes. Personal monitoring may also be performed by collecting samples and forwarding to a laboratory for analysis and quantification.

The type(s) of air monitoring equipment required and associated action levels are outlined in Appendix D. Monitoring equipment must be calibrated based on the manufacturer's requirements. Calibration results and air monitoring measurements must be documented. Based on the results noted and site activities or scope of work changes, the frequency of air monitoring may be adjusted on site by the SHSO with the consent of the Project Manager and communication with the HSC.

14. PERSONAL PROTECTIVE EQUIPMENT

The levels of PPE required for each task are presented in Appendix E. Required equipment and types of protective clothing materials, as well as an indication of the initial level of protection to be utilized, are listed. The level of protection may be upgraded or downgraded by the SHSO according to controls requirements in Appendix Eor according to action levels provided in Appendix D.

If respirators are worn, workers must abide by the company's Respiratory Protection Program in accordance with company's Respiratory Protection Program (EHS 112).

15. DECONTAMINATION

The SHSO and Project Manager will determine the type and level of decontamination procedures for both personnel and equipment based on evaluation of specific work activities in the controlled work zones. Medical treatment will take precedence over decontamination in the event of a life threatening and/or serious injury/illness. Personnel will perform decontamination in designated and identified areas upon leaving "hot zones" where the potential exists for exposure to hazardous chemical, biological, or environmental conditions.

Decontamination of personnel in Level D (modified) will consist of proper containerization and disposal of coveralls, disposable boots, and gloves (if applicable).

Decontamination of personnel in Level C, if applicable, will consist, at a minimum, of:

- Removal and cleaning/disposal of boot covers, coveralls, and outer gloves;
- Removal, cleaning, and storage of respiratory protection;
- Washing of non-disposable PPE suspected of being contaminated using a soap solution followed by a water rinse; and
- Removal and disposal of inner gloves.

Hand tools and sampling equipment shall be decontaminated as needed by washing in decontamination basins with appropriate solutions, or, if possible, by dry decontamination. Wash solutions and PPE may require disposal at a licensed waste facility.

16. SPILL CONTAINMENT

The task(s) for this project may involve the handling of drums and/or containers that contain stored chemicals, hazardous materials, and/or wastes. The drums and/or containers may have been spilled/dislodged during site activities due to compromised construction of the drum/container, transportation accidents, improper packaging practices, and improper handling of hazardous materials during on/off loading. Containers shall be inspected and their integrity assured prior to being moved and/or handled. If the integrity of the container is in question, the container shall be over packed or its contents transferred. Operations shall be organized and coordinated to minimize movement of such containers. Where spills, leaks, or ruptures may potentially occur, a supply of sorbents shall be located in the immediate area. Additional preventative measures include:

- UN-approved 55-gallon drums, bins, and/or Baker tanks will be inspected for visible defects upon delivery to the site;
- UN-approved 55-galon drums will also be inspected to ensure each drum includes a resealable lid with a small resealable sampling port near the top, or on the side of the drum and that the enclosure is not deformed and/or distorted;
- Drums will not be completely filled to allow for possible expansion of liquid and will be set on wooden pallets to facilitate transport by forklift;
- The storage area will be inspected to check for leaks weekly while the containers are being filled and immediately after a relocation to a temporary on-site storage area; and
- Flat areas will be selected for temporary storage away from high-traffic work areas/zones and storm/sewer drains.

In the event of an unplanned release or spill of unknown or hazardous substances, the site supervisor will designate personnel who will support the spill containment, control, and/or clean-up procedures. The team will request additional off-site emergency response assistance if necessary based on the type of spill, volume, potential toxicity, etc.

The spill area will be isolated and restricted to only authorized personnel designated to assist with the containment, control, or clean-up activity. Authorized personnel will be trained to contain and clean spills from typical materials and quantities used at the project location. Physical barriers will be set up to warn unauthorized personnel to stay clear and evacuate the affected area. The spill, leak, or incident will be assessed by the team and characterized to determine the appropriate course(s) of action(s) to consider:

- Small spills (i.e., maximum volume of 55 gallons of a liquid or 100 pounds of a solid) may be remediated using absorbent materials by designated personnel;
- Large spills (i.e., liquid volumes > 55 gallons or solid weighs > 100 pounds) and/or spills of highly toxic materials may require assistance by off-site hazardous materials (HAZMAT) teams;
- Attempts shall be made to identify and stop the source(s) of spillage immediately while donning proper PPE (based on action levels and the air monitoring program) and performing air monitoring;
- The site supervisor will direct spill-response operations and stay at the spill area until it has been cleaned, inspected, and cleared for re-entry; and
- The site supervisor will prepare a spill incident and clean-up report and will communicate findings to the Project and Branch Manager and EHS Department.

17. CONFINED SPACE ENTRY

☐ APPLICABLE ☒ NOT APPLICABLE

The task(s) for this project involve confined-space entry. Workers must abide by the company's Confined Space Entry Program (Procedure HS 118).

18. GLOBALLY-HARMONIZED SYSTEM FOR HAZARD COMMUNICATION

☒ APPLICABLE ☐ NOT APPLICABLE

The following procedures must be followed for chemicals brought onto the site by Geosyntec personnel or by subcontractors (i.e., decontamination solution, sampling preservatives, KB-1 solution, sodium permanganate, etc.) while performing the tasks of this project:

- Labels on primary chemical containers must not be defaced;
- Chemicals must be stored in appropriate storage containers;
- Secondary containers and storage cabinets must be correctly and clearly labeled;
- Chemicals incompatible with each other must not be stored together;
- Workers must receive training on the chemical hazards; and
- Safety Data Sheets (SDSs) must be added to Appendix F.

When chemicals are used on site, workers must abide by Geosyntec's GHS Hazard Communication Program (Procedure HS 115).

19. HASP AMENDMENTS

Over the course of this project, it is possible that the project-specific hazards and working conditions will change. This HASP may be reviewed and amended as necessary to effectively describe the changing working conditions and measures to mitigate the potential health and safety issues that may arise during the project. Amendments to the HASP should be briefly described in the following spaces provided. The full text of the amendments should be provided in Appendix A and/or additional THAs should be added to Appendix B.

AMENDMENT 1:

Date: _____ Project Manager: _____ HSC: _____
Brief description of amendment:
_____
_____
_____
_____
_____

AMENDMENT 2:

Date: _____ Project Manager: _____ HSC: _____
Brief description of amendment:
_____
_____
_____
_____
_____

AMENDMENT 3:

Date: _____ Project Manager: _____ HSC: _____
Brief description of amendment:
_____
_____
_____
_____
_____

Appendix A: HASP Amendments

Discuss details of amendments to this HASP here. Include amendment number, date, and details of amendments.

Appendix B: Task Hazard Analyses

TASKS	
①Direct-Push Borings for Soil Sample Collection	⑤Stormwater Structure Inspection
②Hand Augering for Shallow Soil Sample Collection	⑥
③Monitoring Well Inspection and Synoptic Water Level Measurements	⑦
④Groundwater Sampling	⑧

THAs for these tasks are presented in the following pages.

APPENDIX B – Task Hazard Analyses

Geosyntec consultants

PRE-WORK TASK HAZARD ANALYSIS (THA)

TASK/ACTIVITY:	DPT Borings for Soil Sample Collection	**Date:**	10/21/2014
Project Name:	Former Scott Technologies Site	**Client Name:**	Unisys Corporation
Project Number:	MN0832	**Geosyntec Proj. Mngr.:**	Aron Krasnopoler
Project Address:	1051 Sourth Main Street, Elmira, New York	**Geosyntec Proj. Dir.:**	Paul Brookner
Task Description:	Collect soil samples from 0 to 3 feet below ground surface via direct-push technology (DPT) for laboratory analyses		

A. SUMMARY OF SITE-SPECIFIC TASK HAZARD ANALYSIS

Site-Specific Comments:

Sub-Tasks, Activities	Hazards	Hazard Controls
Task 1: Mobilize to Site	-Driving -Mobilization to and around unfamiliar facility	- Drive carefully to facility, be well rested and avoid distracted driving. - Review scope of work.
Task 2: Locate Soil Sampling Locations and clear drilling locations for above-ground and underground utiliiites. Locate sampling locations. Place pin flags at all sampling locations. Boring location will be documented by GPS.	-Slips/trips/falls -Heat/cold stress -Biohazards: snakes, bees, spider, ticks, poison ivy	-Pay close attention to foot placement; slow deliberate movement. -Dress for weather conditions. Apply sunscreen if needed. -Beaware of surroundings and avoid biohazards.
Task 3: Conduct DPT drilling and soil sampling	-Same hazards noted above for Task 2. -Drill Rig Hazards -Sharp edges on knife and on acetate sleeves used with DPT sampling. -Potential contaminant exposure: VOCs, PCBs, SVOCs	-Same hazard controls noted above for Task 2. -Before entering work area, don level D personal protective equipment (PPE). PPE will include: hard hat, safety glasses, safety vests, steel toe boots, nitrile gloves; and ear plugs or ear muffs. -Avoid being in close proximity to drilling rig. -Have a private utility locator clear each boring location for underground utiltities. -Avoid direct contact with contaminated matrices. -Pay close attention to the sharp edges and wear hand protection, such as leather gloves, if necessary.
Task 4: Sample Collection, Labeling and Packing Homogenize samples in decontaminated stainless steel or disposable mixing containers. Place the homogenized sample in the laboratory-supplied sample containers and label the bottles. Pack samples in cooler with ice and proper quality assurance samples.	-Potential contaminant exposure: VOCs, PCBs, SVOCs -Back strain when transporting coolers full of collected samples packed with ice.	-Continue to wear level D PPE and minimize contact with sample material. -Use proper lifting techniques. Get assistance when possible, especially for containers heavier than 49 lbs.
Task 5: Equipment Decontamination Decontaminate equipment that will be reused (e.g. hand auger, trowel, et. al.)	-Slips, Trips, and Falls -Hand injuries during handling of equipment. -Potential contaminant exposure: VOCs, PCBs, SVOCs -Splash hazards	-Pay close attention to foot placement; slow deliberate movement. -Pay close attention to the sharp edge of steel hand trowel to avoid cutting or other injuries of hands. -Continue to wear level D PPE and minimize contact with water.
Task 6: Demobilization Demobilize from Site, making sure all work areas are clean and orderly	-Driving	-Drive carefully and avoid distracted driving. If too exhausted to drive safely back to the office make arrangements to stay at hotel.

B. HEALTH AND SAFETY EQUIPMENT/GEAR

Site-Specific Comments:

☒	PERSONAL PROTECTIVE EQUIPMENT (PPE)**:**	Level(s) of Protection (for chemical hazards):	☐ Level D (standard work clothes, no chemical protective clothing) ☒ Modified Level D (chemical protective clothing in addition to standard work clothes) ☐ Level C (air purifying respirator or dust mask, with chemical protective clothing) ☐ Level B or A (air supplied respirator, chemical protective suit)

		☒ Hard-toed boots/shoes ☒ Hardhat ☒ Noise/hearing protection ☒ High-visibility/reflective vest ☒ Work gloves ☒ Eye/face protection ☒ Safety glasses with side shields ☐ Goggles ☐ Face shield ☐ Other: ☒ Chemical protective clothing ☒ Gloves, type: Nitrile ☐ Coveralls, type: ☐ Outer boots, boot covers ☐ Other:	☐ Respiratory Protection ☐ Disposable n-95 face mask ☐ Half-face air-purifying respirator ☐ Full-face air-purifying respirator ☐ Resp-cartridge, type: ☐ Other: ☐ Personal flotation device ☐ Personal fall apparatus ☐ Fire retardant clothing ☐ EH (Electrical Hazard) rated boots, gloves ☐ Other:
☒	OTHER H&S EQUIPMENT and GEAR:	☒ Fire extinguisher ☒ Caution tape ☒ Traffic control warning devices ☐ Warning signs or placards ☐ Decon supplies for personal decon ☐ Portable ground fault circuit interrupter (GFCI)	☐ Lockout/tagout equipment ☐ Ventilation equipment (fan, blower) ☒ First aid kit ☒ Vehicle emergency kit (flares, lights, reflective device) ☐ Other:

C. AIR MONITORING – CHECK IF NOT APPLICABLE: ☐

Site-Specific Comments:

☒	INSTRUMENT(S), EQUIPMENT	☒ PID, Lamp energy: 10.6 eV ☐ FID ☐ Carbon monoxide detector ☐ Hydrogen sulfide detector ☐ Oxygen (O_2) detector	☐ Flammable gas (LEL) detector ☐ Particulate (dust) detector ☐ Calibration kit for each detector type ☐ Others:

☐	ACTION LEVELS FOR **O2/LEL**	☐ Oxygen	≤19.5% - provide ventilation to raise oxygen to acceptable levels, or utilize Level B. ≥23.0% - provide ventilation to lower oxygen to acceptable levels, or utilize Level B and implement controls for fire hazards, control ignition sources.
		☐ LEL	Confirm at least 12% oxygen is present to ensure accuracy of LEL readings. At <10% LEL - Continue working, continue to monitor LEL levels At ≥10% LEL- Immediately withdraw from area. Resume work ONLY after LEL readings reduced to <10% through passive dissipation, or active vapor control measures.

☒	ACTION LEVELS FOR **TOXICS** (sustained breathing zone concentrations)	**Parameters**	**Level D, Modified D**	**Use levels C or B, as indicated below, OR take action to reduce breathing zone level to concentration acceptable for Level D.**
		☒ VOCs	< 50 ppm	> 50 ppm: Stop work, evacuate the area. If upon return, levels still exceed the action level, stop work and implement engineering controls.
		☐ Carbon Monoxide	< 35 ppm	≥35 ppm - Level B (air-supplied respirator)
		☐ Hydrogen Sulfide	< 10 ppm	≥10 ppm - Level B (air-supplied respirator)
		☐ Total Dust	< mg/m^3	> mg/m^3 - Level C (air-purifying respirator)
		☐		
		☐		

HAZARD	HAZARD CONTROLS (check all that apply and comment as required)
1. PREMISES/ENVIRONMENTAL HAZARDS	
Site-Specific Comments:	
☒ LOCATION HAZARDS ☒ Outdoor field work ☒ Urban, suburban ☐ Rural, remote location ☐ Indoor field work ☐ Operating facility ☐ Vacant facility ☐ Water hazards	☒ Use routine safety precautions commensurate with routine work environment conditions ☐ For non-routine, unique, or severe location hazards, see site-specific safety comments above. ☐ For water-related work, see #2, "Water Hazards" ☐ For worksite violence/security risks, see #3, "Violence, Security, Working Alone" ☒ For transportation related hazards, see #5, "Worksite Traffic, Vehicle, Transportation Hazards" ☒ For utility-related hazards, see # 6, "Utility-Related Hazards ☐ For atmospheric hazards in enclosed, indoor, or confined spaces, see # 11 "Confined Spaces or Hazardous Enclosed/Indoor Spaces"

	HAZARD	HAZARD CONTROLS (check all that apply and comment as required)
☒	WALKING/WORKING SURFACES, HOUSEKEEPING ☒ Uneven, rough terrain, riprap ☒ Slippery surfaces ☐ Holes, pits, openings ☐ Puncture, foot hazards	☒ Keep work areas clean, orderly, dispose of trash/debris, maintain sanitary conditions. ☒ Walkways are cleared of equipment, excavated material, tools and debris, snow ☐ Holes, pits, openings to be covered or otherwise marked or guarded ☐ Apply absorbent, salt or sand, for traction/slip resistance on slippery/icy/wet surfaces ☒ Wear proper work boots/shoes with ankle support and/or traction, as appropriate for conditions
☒	TEMPERATURE/WEATHER ☐ Heat Stress ☒ Cold Stress ☒ Severe Weather ☒ Lightning	☒ Heat/Cold stress are monitored in accordance with Geosyntec procedures EHS 124 & EHS 125 ☐ Provide sufficient fluids, shade, breaks, other precautions as appropriate to adderss heat hazards. ☒ Provide protection from sun (sun screen, shaded brake area). ☒ For cold stress, wear multiple layers, protect from wind/wet, frequent break in warm location. ☐ In high wind, discontinue working at heights (e.g. on ladders, scaffold, aerial lift, similar). ☒ Use precautions for lightning, thunderstorm, hale, tornado (monitor weather, “30/30 rule,” shelter)
☒	BIOLOGICAL HAZARDS ☒ Insects, spiders, ticks ☐ Wild/feral/pet animals ☐ Mold, fungi ☒ Poisonous plants ☐ Bird Guano ☐ Infectious, wastewater, sewer ☐ Bloodborne pathogens	☒ Utilize safety practices commensurate with risk of biting/stinging insects, wild/feral/pet animals. ☒ For poisonous plants (poison ivy/oak/sumac/etc.), minimize exposed skin area, wear coveralls, use barrier cream/wash (Technu products or similar), as appropriate. For biological exposure hazards, use protective measures commensurate with hazard: ☒ Minor-moderate hazard - use ordinary hygiene practices, protective gloves, hand washing. ☐ Moderate-severe hazard - add protective clothing, respirator, decon, as appropriate. ☐ Bloodborne pathogen (human infectious agents) - implement “Universal Precautions”
☒	HAZARDOUS NOISE	☒ Hearing protection is used when exposed to excessive noise levels (greater than 85 dBA over an 8-hour work period, or intermittent….)
☐	OVERHEAD HAZARDS, FALLING OBJECTS	☐ Wear hardhat when exposed to overhead hazards, “bump” hazards, falling objects ☐ Cordon off hazard zones, route access/egress around hazards of falling objects ☐ Secure objects from falling ☐ Provide overhead protection (canopy) to protect public pedestrians, workers
☐	ILLUMINATION ☐ Night work ☐ Indoor work	☐ Make site-specific arrangements for illumination of work areas and access routes.
2. BOATING, WATER, WET LOCATIONS, FLOOD, ETC. – CHECK IF NOT APPLICABLE: ☒		
Site-Specific Comments:		
☐	WATER HAZARDS ☐ Drowning, hypothermia ☐ Boat, barge, raft ☐ Wading, wetland, mud/silt ☐ Dam release, flood, tide ☐ Diving	☐ Wear appropriate Coast Guard-approved Personal Flotation Device (PFD) ☐ Bring emergency rescue equipment (ring buoy, reaching device, flares) ☐ Use fuel safety practices, fire extinguisher present in boat ☐ See site-specific safety comments above.
3. VIOLENCE, PUBLIC PROTECTION, WORKING ALONE – SPECIAL MEASURES – CHECK IF NOT ANTICIPATED: ☒		
Site-Specific Comments:		
☐	PERSONAL SECURITY, HIGH CRIME AREA	☐ Employ standard precautions, which may include: conduct work only during daylight hours, use buddy system, avoid parking in secluded location, lock vehicles, hide valuable items in vehicles from plain view ☐ See site-specific safety comments above for project-specific security measures.
☐	PUBLIC AT RISK, SITE SECURITY	☐ Provide safe pedestrian route around work areas, use appropriate barriers, signs, warning devices. ☐ Provide covers over excavation, secure fencing, overnight protection ☐ Provide protection from overhead hazards (canopy, etc.) where public at risk of overhead hazards ☐ Provide secure locked storage of hazardous chemicals, hazardous equipment, etc.
☐	WORKING ALONE	☐ Establish “check in” procedure with supervisor or project manager (arrival, mid-day, departure) ☐ Additional measures, as appropriate for the working conditions.
4. DRIVING, TRAFFIC, TRANSPORTATION HAZARDS – CHECK IF NOT APPLICABLE: ☐		
Site-Specific Comments:		
☒	DRIVING HAZARDS ☒ Routine work travel ☐ Unfamiliar location ☐ Unfamiliar vehicle ☒ Overnight travel, distance	☒ Use routine safe/defensive driving practices (seat belts, safe speeds, eyes ahead, no tailgating, limit distractions, no texting, safe cell phone use, clear windows, account for weather/road conditions, adequate sleep, other measures as appropriate). ☒ Plan travel route before driving (assemble maps, enter destination in GPS). ☐ Familiarize yourself with vehicle operational controls before operating unfamiliar vehicle.

HAZARD		HAZARD CONTROLS (check all that apply and comment as required)
☒	WORKERS EXPOSED TO TRAFFIC HAZARDS ☒ In/near public or private roadway ☒ Parking lot, driveway ☐ Worksite, construction site traffic	☒ Workers to wear reflective vests where exposed to traffic hazards. ☒ Where possible, park vehicles as protective shield from oncoming traffic. ☐ Configure work area and support vehicles to minimize worker exposure to traffic hazards. ☐ DOT signal devices will be used to re-route vehicles around work area, site entrances/exits. ☐ Flaggers will be used and have DOT Flagger Training; police detail where appropriate or required. ☒ Park vehicles in secure location away from heavy equipment use or other site operations. ☐ Mark temporary roadways clearly, provide berms/stop logs where needed.
☐	RAILROAD/AIRPORT HAZARD	☐ Coordinate with rail company/airport and implement required safety measures ☐ Site workers to receive safety training for railroad/airport work.
☐	OFF-ROAD DRIVING, USE OF ALL-TERRAIN VEHICLE	☐ For off road driving, do not exceed capability of vehicle ☐ Follow ATV specific procedures for training, safety equipment, operation.
☐	TRANSPORTING MATERIALS, TOWING/HAULING LOADS	☐ Ensure load is firmly secured (rope, straps, load configuration) to prevent shifting during travel. ☐ For trailer use, verify signal/braking lights operational, rear-view mirrors effective, hitch/safety chains secure.
5. UTILITY-RELATED HAZARDS (for underground/overhead work) – CHECK IF NOT APPLICABLE: ☐		
Site-Specific Comments: Be aware of piping for sprinkler system on football field.		
☒	OVERHEAD UTILITIES	☒ Maintain proper clearance, employ other appropriate precautions for the conditions.
☒	UNDERGROUND UTILITIES	☒ Confirm appropriate underground utility clearance procedures have been completed prior to ground penetrations, and employ other utility clearance/locator practices, as appropriate for conditions.
6. ELECTRICAL HAZARDS – CHECK IF NOT APPLICABLE: ☒		
Site-Specific Comments:		
☐	WORKERS EXPOSED TO: ☐ Voltage < 50 v ☐ Voltage 50-600v ☐ Voltage > 600v ☐ AC ☐ DC ☐ 3-phase ☐ Battery and/or solar power ☐ Capacitor/Transformer	☐ Implement electrical safe work practices commensurate with the work to be performed, pertaining to the following (as applicable): – Worker training/qualification – Electrical equipment and hazards, safe design features – Electrical safe work practices – Grounding, use of GFCIs – Electrical equipment installation, operation, maintenance, repair – Arc flash protection – Electrical equipment diagnostics
☐	BASIC ELECTRICAL HAZARDS ☐ Equipment/tool use/operation ☐ Use of extension cords	☐ Control water-related hazards, in a manner appropriate for the job tasks/equipment/tool. ☐ Use extension cords/power cords properly, prevent damage, take out of service if damaged. ☐ Inspect tool/equipment/extension cords/power cords before each use. ☐ Use GFCI-protected outlet or portable GFCI in wet locations, outdoors, basements ☐ Ensure live parts are guarded, enclosures secure. ☐ Enclosures, circuits properly labeled.
☐	LOCKOUT/TAGOUT OF ELECTRICAL ENERGY	☐ Implement control-of-hazardous-energy practices (lockout/tagout), provide lockout/tagout locks and devices, training workers, designate “authorized” personnel, notify “affected” personnel
7. FALL HAZARDS – CHECK IF NOT ANTICIPATED: ☒		
Site-Specific Comments:		
☐	WORKING AT HEIGHTS ☐ Roof, skylight ☐ Elevated platform ☐ Holes, side opening ☐ Retaining wall, cliff, ledge ☐ Trench, excavation ☐ Protruding rebar	☐ Ensure guardrails present ☐ Use personal fall apparatus (PFA) ☐ Use tether or positioning device ☐ Restrict access to hazard (barriers, tape, sign) ☐ Ensure covers in place over holes ☐ Watch person ☐ Use fall protection net ☐ Restrict access beneath work to protect other site personnel from overhead hazards ☐ Install caps on protruding rebar
☐	LADDERS / STAIRS ☐ Extension ladders ☐ Step ladders ☐ Fixed ladders ☐ Stairs	☐ Provide instruction/review pertaining to safe ladder use ☐ Extension ladders are properly footed, secured, setup at proper angle ☐ Stepladders are set on level ground or properly shimmed with spreaders locked. ☐ Stairs have proper rise over run and stairs >4 steps or 4' have guardrails. ☐ Never use a step ladder as a straight ladder. All straight ladders shall be extended three rungs past leading edge. Never use metal ladders while working with electricity.

	HAZARD	HAZARD CONTROLS (check all that apply and comment as required)
☐	AERIAL LIFT ☐ Scissor lift ☐ Extensible boom ☐ Articulated boom ☐ Vertical Lift ("Genie")	☐ Operators are sufficiently trained, experienced and qualified. ☐ Equipment is inspected after mobilization and is in good condition. ☐ Harness & Lanyard worn whenever operating the lift (scissor lifts may be excepted) ☐ Overhead and surface obstructions are reviewed with operators prior to use.
☐	SCAFFOLD ☐ Supported scaffold ☐ Suspended scaffold ☐ Free-standing/mobile scaffold	☐ Identify/coordinate operations with competent person ☐ Supported scaffold level, stable, proper attachments, tiebacks, planking, ☐ Suspended scaffolds anchored properly ☐ Guardrails present above 10 feet or personal fall apparatus used. ☐ Proper means of accessing scaffold (proper ladders, stair tower). ☐ Total height of free-standing scaffold not to exceed four times the minimum base dimension.
8. TOOLS, EQUIPMENT, MACHINERY – CHECK IF NOT APPLICABLE: ☐		
Site-Specific Comments:		
☒	HAND TOOLS Eye injury, puncture/bruise/ laceration hazard	☒ Use proper tool for the job, maintain tools in good condition (no damage, cutting tools sharp, etc.) use appropriate PPE for hand/eye/body protection, plan for safe "follow through" motion, use vise/clamp/work surface to hold/stabilize work piece
☐	POWER TOOLS ☐ Eye/hand/body injury ☐ Fuel-related hazards ☐ Inhalation hazard ☐ Noise ☐ Sparks, heat, fire hazard ☐ Electrical hazards	☐ For all power tools: – Inspect tools to ensure safe operating condition before each use. – Use tool in accordance with manufacturer's specifications. – Use PPE or other safety practices, as appropriate, for eye/hearing/hand/head/body protection – Provide training or verify operator qualification for use of power tool. – Stay clear of hazard zone, "line of fire" when working near where power tools are used. ☐ Use safety practices for refueling, fuel handling/transport/storage. ☐ Use respirators, ventilation, wet methods, other appropriate means to control inhalation hazard. ☐ For spark/heat generating tool, control fire hazards, segregate combustible/flammable materials. ☐ For electrical hazards, see # 6, "Electrical Hazards".
☐	WELDING, CUTTING ☐ Gas welding/cutting ☐ Arc welding/cutting	☐ Hot work permit system to be implemented. ☐ Operator properly protected (eye protection, clothing, apron, etc.) ☐ Fire hazard controls (watcher, fire extinguisher, water, isolate combustibles) ☐ Protect nearby personnel from hazardous UV, IR light (shielding, curtain) ☐ Electrical safe work practices for arc welding ☐ Gas cylinder safe practices (secured, upright, caps on when not in use, prevent damage).
☒	EQUIPMENT/MACHINERY ☒ Point-of-operation hazards ☒ Pinch points, moving parts ☒ 'Struck-by,' 'caught between' ☐ Hot surfaces, heat ☐ Extension cords, flexible wire ☒ Fuel related (gas or liquid) ☐ Hydraulic pressure ☐ Compressed air/gas ☐ Kinetic, stored energy ☒ Noise ☐ Lockout/tagout ☒ Emissions, discharge gases ☐ Working at heights, falls ☐ Lifting, repetitive motion ☐ Illumination ☐ Electrical (see below)	☒ *Working Near* Equipment/Machinery ☒ Work at safe distance/restrict access, ensure guards in place, heed warning signs ☒ Implement measures necessary for adequate illumination ☒ Control exposue to emission/discharge gases (ventilation, PPE, other means). ☒ Ensure safe practices for fuels/fluids/machine-related hazardous materials ☒ Use PPE or other safety practices for eye/hearing/hand/head/body protection ☒ Segregate combustible materials from hot surfaces/hot exhaust (minimum 3 feet) ☐ Operation/Maintenance/Repair of Equipment/Machinery (see applicable control measures above) ☐ Orient/locate equipment for safe access during operation and maintenance ☐ Use equipment/machinery in accordance with manufacturer's specifications ☐ Use safe lifting practices, minimize repetitive motion hazards ☐ Ensure point-of-operation, mechanical power transmission, other moving parts are guarded with protective devices; do not override interlocks, guards, protective devices ☐ Secure long hair/loose clothing/hanging jewelry near moving/rotating parts ☐ Ensure appropriate warning signs are in place and heeded ☐ Use safe practices for fueling, fuel transport & storage. ☐ Operate fuel-powered equipment in well ventilated location. ☐ Incorporate safety provisions/safe work practices for compressed air, pressurized systems (pneumatic/hydraulic), stored energy ☐ Implement control-of-hazardous-energy practices (lockout/tagout), designate "authorized" personnel, notify "affected" personnel ☐ Protect from fall hazards (safe ladder use, personal fall protection, guardrails, other) ☐
☐	ELECTRICAL HAZARDS	☐ Implement provisions of # 6, "Electrical Hazards"
9. MANUAL MATERIAL HANDLING, MATERIAL STORAGE – CHECK IF NOT APPLICABLE: ☐		

	HAZARD	HAZARD CONTROLS (check all that apply and comment as required)
Site-Specific Comments: Drum Handling and Sample Coolers		
☒	LIFTING / ERGONOMIC Musculoskeletal strain, repetitive motion injury	☒ Use proper manual lifting techniques (straight back, bend at knees, firm grasp, firm footing). ☒ Seek assistance for lifting heavy objects (>50 lbs.) ☐ Use mechanical lifting equipment to reduce manual material handling hazard ☒ For repetitive motion activities, take breaks, switch hands, share task with others, employ other safe practices appropriate for the specific task(s).
☐	STORAGE OF MATERIALS See Sect. 12 for Chemical Storage	☐ Store materials in stable manner that prevents tipping, sliding, rolling, falling over. ☐ Materials stored in tiers to be stacked, racked, blocked, interlocked or otherwise secured to prevent sliding, falling or collapse ☐ Do not exceed load limits of racks, platform; ensure racks are stable, robust, secure ☐ On scaffold, do not store materials in excess of supplies needed for immediate use ☐ Ensure stored materials do not block aisles, passageways ☐ For used lumber, remove nails before stacking, and stack to be stable and self supporting, no higher than 20 feet (or 16 feet if lumber is to be handled manually) ☐ Debris will be removed regularly from storage area and place in designated area or disposed.
10. CONSTRUCTION OPERATIONS, HEAVY EQUIPMENT, HEAVY VEHICLES – CHECK IF NOT ANTICIPATED: ☒		
Site-Specific Comments: DPT Drilling Rig		
☒	HEAVY EQUIPMENT; CONSTRUCTION VEHICLES Hazards: Struck By, Run-Over, Caught In Between (pinch points), Roll Over, Fluid Leaks	☒ Trained/qualified persons operate all heavy equipment. ☒ No passengers on moving/operating equipment except where passenger seat/restraint is present. ☒ Equipment inspected upon mobilization and daily; maintained in good repair, backup alarms ☐ All leaks or defective safety equipment will be repaired before use. ☒ Operators required to use seatbelts. ☒ Eye contact with operator and use of hand signals prior to approaching near equipment. ☒ High visibility vests are required of all personnel in work area. ☒ Max. safe slope for each vehicle will be followed. ☒ Personnel to stay clear of swing radius of equipment. ☒ Spill equipment available for fuel and hydraulic fluid leaks. ☒ Equipment locked, secured, brakes set, buckets/forks lowered, when not in use.
☐	CRANES Overhead hazards – utility lines, swing radius, falling objects, wire ropes and hoisting equipment ☐ Overbalancing – high winds, outrigger placement, overloading, safe slope ☐ Struck By, Run-Over, Caught In Between (pinch points), Roll Over, Fluid Leaks	**In addition to general safety practices for heavy equipment (above), as applicable:** ☐ Only qualified persons operate cranes (certificate required). ☐ A Critical Lift Plan & Checklist prepared/executed (HS 506) prior to mobilization. ☐ Equipment will be inspected prior to mobilization and a Crane Pre-Operational Safety Checklist (see EHS 506) will be completed and signed by crane operator. ☐ Crane operator will remain at the controls at all times during operation. ☐ Crane operation must be performed under the direction of an appointed signal person at all times. ☐ Communication between crane operator and signal person will be maintained through standard hand signals or voice communication equipment. Radio equipment, if used, will be equipped with a dedicated channel. ☐ Lifting or lowering will not exceed 100ft/minute. Lowering must be controlled i.e. no free fall. ☐ Stop work will be issued whenever hoisting equipment is exposed to high winds. ☐ Outriggers will be fully extended/locked with a firm footing within the maximum safe slope (<1%). ☐ Crane to be on level, stable base, dunnage used when necessary. ☐ Total weight of load not to exceed 50% of rated capacity for the crane radius and configuration. ☐ Rigging procedures – see Hoisting, Lifting, Rigging, below. ☐ Suspended personnel lifting is prohibited (unless per approved “man-lift” equipment). ☐ No personnel permitted beneath suspended loads.
☐	HOISTING, LIFTING, RIGGING ☐ Crane ☐ Drill rig ☐ Loader, excavator, etc. ☐ Mechanical, electrical hoist	☐ Identify, coordinate with competent person. ☐ Rigging directly to the forks of a lull, forklift, or front loader equipped forks is prohibited. ☐ Do not exceed loading limits of equipment. ☐ A Critical Lift Checklist (see EHS 506) will be completed and signed prior to crane mobilization. ☐ Rigging, wire rope and hoisting equipment will be inspected and maintained on a weekly basis. ☐ Crane hooks will be equipped with safety latches.
☐	FORKLIFT Hazards: Struck By, Run-Over, Caught In Between (pinch points), Roll Over, Fluid Leaks	**In addition to general safety practices for heavy equipment (above), as applicable:** ☐ Qualified operater, per established forklift training (certificate is required) ☐ Equipment inspected daily and documented on Forklift Preoperation Inspection Checklist ☐ Operators required to use seatbelts, and adhere to safe operating procedures.

	HAZARD	HAZARD CONTROLS (check all that apply and comment as required)
		☐ Do not exceed lifting load limits. ☐ Forklift shall not be moved/driven with empty forks in raised position. ☐ When not in use, forks lowered, brake set, controls in neutral, key removed.
☐	EXCAVATION/TRENCHING ☐ Max Depth ≥ 20' ☐ Max Depth ≥ 5' ☐ Max Depth <5' with potential cave-in hazard ☐ Potential permit-required confined space at depth ≥ 4' ☐ Underground utilities ☐ Overhead utilities ☐ Structures/foundations ☐ Falls into excavations	☐ Activities under supervision/oversight of competent person ☐ Sloping & shoring for excavations ≥20' are approved by a professional engineer ☐ Sloping & shoring for excavations ≥5' when persons are exposed to cave-in. ☐ Sloping & shoring for shallow (<5') excavations with cave-in hazard ☐ Excavations ≥ 4' are classified as a non-permit confined space ☐ Excavations ≥ 4' are classified as Alternate Entry or Permit-Required (see confined space) ☐ Implement underground utility clearance procedures. ☐ Hand digging within 3' of utility locations. ☐ Excavations to be protected by perimeter fencing (not barricade tape) ☐ Use trench boxes in accordance with proper procedures. ☐ Workers in trenches to be within 25 feet of ladder or sloped entryway.
☒	DRILLING ☒ Struck By, Run-Over, Caught In Between (pinch points), Roll Over, Fluid Leaks ☒ Underground utilities, aboveground ☒ Spills ☒ See Equipment/Machinery	☒ Contractor inspects drill rig daily before use. ☒ Drill rig equipped with operational emergency stop. ☒ Highpressure lines equipped with whip checks. ☒ High visibility vests, hard hats are being worn near the equipment. ☒ Operators and helpers will maintain a safe distance to moving parts. Individuals working near moving or rotating parts will secure loose hair, clothing, and equipment. ☒ Drill rigs will only be moved with masts lowered. Masts will be erected with outriggers fully extended when equipped with outriggers. ☒ Max. safe slope for rig will be followed, drill rig leveled, appropriate blocking/cribbing as needed. ☒ Spinning parts of the rig are guarded when possible, no loose clothing being worn near the rig. ☒ Follow underground utility clearance procedures. ☒ Area is surveyed for overhead utilities, safe clearance distance maintained. ☒ Hearing protection is used when working near the rig. ☒ Spill equipment is available for fuel and hydraulic fluid leaks.
☐	DEMOLITION	☐ Develop/implement demolition safety plan
☐	BLASTING	☐ Develop/implement blasting safety plan
11. CONFINED SPACES, HAZARDOUS ENCLOSED or INDOOR SPACES – CHECK IF NOT APPLICABLE: ☒		
Site-Specific Comments:		
☐	CONFINED SPACE(S) ☐ Permit required ☐ Non-permit required Potential/actual hazards: ☐ Atmospheric hazards: ☐ Flammable/explosive ☐ Oxygen deficiency ☐ Hydrogen sulfide ☐ Other toxic ☐ Combustible dust ☐ Electrical ☐ Mechanical, engulfment, entrapment, stored energy	☐ For personnel <u>working near confined</u> spaces: – Confined spaces have been identified, labeled. – Communication system in place to prevent unauthorized entry. ☐ For <u>permit-required confined space entry</u>, see separate entry permit. – All entrants, attendants, supervisors are trained/qualified. – Hazards properly characterized – Necessary equipment for safe entry utilized (access, retrieval, air monitoring) – Arrangements for rescue team have been made. ☐ For entry into a <u>non-permit</u> confined space, see site specific procedures delineated above in "site-specific comments," or see alternate/attached safety work plan.
☐	ENCLOSED/INDOOR SPACE(S) ☐ Outfall, culvert ☐ Tunnel, shaft, gallery ☐ Machine/equipment pit/vault ☐ Basement/Sub-basement ☐ Crawl space entry ☐ Indoor equipment/drilling	*<u>For indoor use of gasoline/propane/diesel equipment:</u>* ☐ Duct exhaust to outdoors, and/or introduce fresh air using ventilation/blowers/fans. ☐ Perform air monitoring (see section on Air Monitoring) *<u>For entry into potentially hazardous indoor or enclosed spaces:</u>* ☐ Ventilate and/or perform air monitoring for anticipated hazards. ☐ If space classified as confined space, follow confined space entry requirements (above).
12. COMMERCIAL CHEMICAL PRODUCTS USED AT WORK SITE – CHECK IF NOT APPLICABLE: ☐		
Site-Specific Comments: Alconox, Isopropyl Alcohol, Nitric Acid, etc.		

	HAZARD	HAZARD CONTROLS (check all that apply and comment as required)
☒	PRODUCTS REGULATED BY HAZARD COMMUNICATION STANDARD	☒ Safety Data Sheets available, either on site or readily available within same work shift ☒ Containers labelled properly ☒ Workers trained on hazards ☒ For subcontractor use of chemical products, coordinate/discuss during safety meetings.
☒	COMPRESSED GAS(ES): Isosbutylene Calibration Gas for PID	☒ Secure cylinders upright, caps on when not in use, handle with care, prevent damage ☐ Propane cylinders not in use must be stored outdoors in cage or similar secure enclosure. ☐ Ensure acetylene cylinders NOT secured to steel arc welding bench ☐ Store/use in a manner to prevent asphyxiation hazard ☐ Segregate oxygen and fuel gases by distance (20') or barrier ☐ Control ignition sources, no smoking signage ☐ Use/store in a manner to control inhalation exposure hazards, PPE, air monitoring.
☐	FLAMM./COMBUST. LIQ.	☐ Proper storage (flam. storage cabinets, other storage precautions) ☐ Control ignition sources ☐ Grounding and bonding where appropriate
☐	CORROSIVES	☐ Handle with care, use appropriate eye/face/skin protection ☐ Eyewash, deluge shower, drench hose, hand washing (with water), as appropriate
☐	TOXIC	☐ For toxic substances, use/store in a manner to control exposure hazards (inhalation, ingestion, skin contact, skin absorption; use PPE as appropriate, conduct air monitoring as appropriate.
☐	CHEMICAL STORAGE	☐ Chemical storage cabinet, cage, storage room, or similar ☐ Incompatible chemicals segregated ☐ Secondary containment ☐ Safety equipment will be located near chemical storage.

13. CHEMICAL HAZARDS FROM ON-SITE CONTAMINANTS, OPERATIONS, EMISSIONS – CHECK IF N/A: ☐

Site-Specific Comments:

CHECK AS APPROPRIATE BELOW. PROVIDE ADDITIONAL INFO. AS APPROPRIATE, IN SITE-SPECIFIC HAZARD ANALYSIS ABOVE.

☒ Soil/groundwater contaminants (historical release)	☐ Oxygen deficiency	☐ Asbestos
☐ Recent release, known high concentrations	☒ Chlorinated VOCs (volatile org. cpds.)	☐ Lead paint
☐ Former chemical disposal site, landfill	☒ BTEX, petroleum derived VOCs	☐ Pesticides, herbicides, fungicides
☐ Urban fill, residual contaminants	☐ Fuel oils, petroleum, waste oil, lubricants	☐ Sensitizers
☐ Containerized waste (drums, process equipment)	☒ Metals, metal compounds, metal dusts	☐ Radioactive contaminants
☐ Buried drums (known or potential)	☐ Elemental mercury	☐ Other:
☐ Large containers, potential for spills	☒ Polyaromatic hydrocarbons (PAHs)	
☐ Emissions from active industrial processes	☒ Polychlorinated biphenyls (PCBs)	
☐ Emissions from welding/cutting/hot work	☐ Potential for flammable vapors	
☐ Carbon monoxide (vehicle/equipment exhaust)	☐ Potential for flammable gas (methane)	
☐ Contaminated building surfaces	☐ Corrosive, acids/caustics, strong irritants	
☐ Unexploded ordnance	☐ Sulfides, hydrogen sulfide (H2S)	
☐ Explosive dust	☐ Cyanides, hydrogen cyanide (HCN)	

☐	FOR SITE REGULATED AS "UNCONTROLLED HAZ. WASTE SITE," e.g. **REGULATED BY HAZWOPER** (OSHA 29 CFR 1910.120) – Establish work zones & site control plan (Exclusion Zone - EZ, Contaminant Reduction Zone - CRZ, Support Zone - SZ) – Workers to be aware of and trained on hazards per OSHA Hazard Communication Standard. – Include site map/figure depicting work locations and other relevant site-specific information. – Site workers in EZ or CRZ to have OSHA 40-hour training, current 8-hour refresher, 3 days supervised field expience. – Site workers in EZ or CRZ to participate in Medical Monitoring program. – "Peripheral" site workers, engaged on-site, with no hazardous exposure: 24 hr. training required. – Site supervisor(s) required to have 8-hr. Supervisor training. – Implement site-specific procedures for worker protection through engineering controls, work practices, personal protective equipment (PPE), air monitoring, decontamination, spill containment (see Sections B and C, "Health and Safety Equipment/Gear" and "Air Monitoring" – Include emergency response program in H&S plan.
☒	FOR SITE WITH CHEMICAL CONTAMINANTS BUT **NOT REGULATED BY HAZWOPER** – Workers to be aware of and trained on hazards per OSHA Hazard Communication Standard – Implement appropriate controls to minimize worker exposure (engineering controls, work practices) to levels below OSHA PELs. – Use PPE as needed (see B, "Health and Safety Equipment/Gear"). – Conduct air monitoring or personal air sampling to monitor and/or evaluate worker exposure (see Section C, "Air Monitoring").

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PRE-WORK TASK HAZARD ANALYSIS (THA)

HAZARD		HAZARD CONTROLS (check all that apply and comment as required)
☐	ATMOSPHERIC HAZARDS GENERATED BY EXHAUST FROM OPERATING EQUIPMENT ☐ Position work upwind of exhaust source ☐ Use blowers, fans to dissipate atmospheric hazards ☐ Conduct air monitoring (see Section C, "Air Monitoring").	
☐	OFF-SITE MIGRATION OF CONTAMINANTS	☐ Implement controls to minimize hazard migration (dust suppression, covers, foam, etc.) ☐ Community/perimeter air monitoring is not anticipated with the current scope of work. ☐ Community/perimeter air monitoring to be conducted per perimeter air monitoring plan.

EMERGENCY RESPONSE **(911 Service is Available ☒ Yes ☐ No)** ☒ Verify wireless coverage at site, use alternate communication procedures as needed.

Emergency Medical Treatment - Hospital Name: Hospital Address:	St Joseph's Hospital 555 E. Market St Elmira NY 14901	**Number:**	607.733.6541
Urgent Care Med. Treatment - Clinic Name: Occupational Clinic Address:	Elmira Urgent Care 306 W. Water St., Elmira, NY 14905	**Number:**	607.732.1100
Fire Department Name	West Elmira Fire Department	**Number:**	911
Spill Response:	West Elmira Fire Department	**Number:**	911
Client Representative Name::	Kevin Krueger	**Office Number:**	(651) 687-2210
		Cell Number:	
Geosyntec **Project Manager** Name:	Aron Krasnopoler	**Office Number:**	(410) 381-4333
		Cell Number:	(202)-550-7724
Geosyntec **Corporate H&S** Name:	Dale Prokopchak	**Office Number:**	804 332 6376
		Cell Number:	(804) 349-8067

Emergency Response Comments:

Date:	
Project Name: Former Scott Technologies Site	
THA Title: DPT Borings for Soil Sample Collection	
Subcontractor Name(s):	
Geosyntec Representative (reviewed by):	**Michael Hansen**
Subcontractor Foreman/Supervisor Signature (authorize):	
Crew Signatures (acknowledge):	
Print Name	**Signature**

PLEASE RETURN A COPY OF THIS SIGNED PAGE TO GEOSYNTEC PROJECT MGR., SUPERINTENDENT UPON REVIEW AND ACKOWLEDGMENT BY THE CREW MEMBERS. ALL NEW CREW MEMBERS SHALL BE ORIENTATED THE SAME AND A SUBMITTAL OF A NEW SIGN IN SHEET SHALL BE COMPLETED.

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PRE-WORK TASK HAZARD ANALYSIS (THA)

TASK/ACTIVITY:	Hand Augering for Shallow Soil Sample Collection	**Date:**	10/21/2014
Project Name:	Former Scott Technologies Site	**Client Name:**	Unisys Corporation
Project Number:	MN0832	**Geosyntec Proj. Mngr.:**	Aron Krasnopoler
Project Address:	1051 Sourth Main Street, Elmira, New York	**Geosyntec Proj. Dir.:**	Paul Brookner
Task Description:	Collect surface soil samples from 0 to 2 inches below ground surface via hand augering for laboratory analyses		

A. SUMMARY OF SITE-SPECIFIC TASK HAZARD ANALYSIS

Site-Specific Comments:

Sub-Tasks, Activities	Hazards	Hazard Controls
Task 1: Mobilize to Site	-Driving -Mobilization to and around unfamiliar facility	- Drive carefully to facility, be well rested and avoid distracted driving. - Review scope of work.
Task 2: Locate Soil Sampling Locations Locate sampling locations. Place pin flags at all sampling locations. Boring location will be documented by GPS.	-Slips/trips/falls -Heat/cold stress -Biohazards: snakes, bees, spider, ticks, poison ivy	-Pay close attention to foot placement; slow deliberate movement. -Dress for weather conditions. Apply sunscreen if needed. -Beaware of surroundings and avoid biohazards.
Task 3: Surface Soil Sampling A decontaminated stainless steel hand auger or hand trowel will be used to collect each near surface soil sample.	-Same hazards noted above for Task 2. -Potential hand and back injuries. -Potential contaminant exposure: VOCs, PCBs, SVOCs	-Same hazard controls noted above for Task 2. -Before entering work area, don level D personal protective equipment (PPE). PPE will include: hard hat, safety glasses, safety vests, steel toe boots, nitrile gloves, and ear plugs or ear muffs. -Wear leather work gloves and safety glasses. -Avoid direct contact with contaminated matrices. -Pay close attention to the sharp edge of steel hand trowel to avoid cutting or other injuries to hands.
Task 4: Sample Collection, Labeling and Packing Homogenize samples in decontaminated stainless steel or disposable mixing containers. Place the homogenized sample in the laboratory-supplied sample containers and label the bottles. Pack samples in cooler with ice and proper quality assurance samples.	-Potential contaminant exposure: VOCs, PCBs, SVOCs -Back strain when transporting coolers full of collected samples packed with ice.	-Continue to wear level D PPE and minimize contact with sample material. -Use proper lifting techniques. Get assistance when possible, especially for containers heavier than 49 lbs.
Task 5: Equipment Decontamination Decontaminate equipment that will be reused (e.g. hand auger, trowel, et. al.)	-Slips, Trips, and Falls -Hand injuries during handling of equipment. -Potential contaminant exposure: VOCs, PCBs, SVOCs -Splash hazards	-Pay close attention to foot placement; slow deliberate movement. -Pay close attention to the sharp edge of steel hand trowel to avoid cutting or other injuries of hands. -Continue to wear level D PPE and minimize contact with water.
Task 6: Demobilization Demobilize from Site, making sure all work areas are clean and orderly	-Driving	-Drive carefully and avoid distracted driving. If too exhausted to drive safely back to the office make arrangements to stay at hotel.

B. HEALTH AND SAFETY EQUIPMENT/GEAR

Site-Specific Comments:

☒	PERSONAL PROTECTIVE EQUIPMENT (PPE):	Level(s) of Protection (for chemical hazards):	☐ Level D (standard work clothes, no chemical protective clothing) ☒ Modified Level D (chemical protective clothing in addition to standard work clothes) ☐ Level C (air purifying respirator or dust mask, with chemical protective clothing) ☐ Level B or A (air supplied respirator, chemical protective suit)

		☒ Hard-toed boots/shoes ☒ Hardhat ☐ Noise/hearing protection ☒ High-visibility/reflective vest ☒ Work gloves, leather ☒ Eye/face protection ☒ Safety glasses with side shields ☐ Goggles ☐ Face shield ☐ Other: ☒ Chemical protective clothing ☒ Gloves, type: Nitrile ☐ Coveralls, type: ☐ Outer boots, boot covers ☐ Other:	☐ Respiratory Protection ☐ Disposable n-95 face mask ☐ Half-face air-purifying respirator ☐ Full-face air-purifying respirator ☐ Resp-cartridge, type: ☐ Other: ☐ Personal flotation device ☐ Personal fall apparatus ☐ Fire retardant clothing ☐ EH (Electrical Hazard) rated boots, gloves ☐ Other:
☒	OTHER H&S EQUIPMENT and GEAR:	☒ Fire extinguisher ☐ Caution tape ☒ Traffic control warning devices ☐ Warning signs or placards ☐ Decon supplies for personal decon ☐ Portable ground fault circuit interrupter (GFCI)	☐ Lockout/tagout equipment ☐ Ventilation equipment (fan, blower) ☒ First aid kit ☒ Vehicle emergency kit (flares, lights, reflective device) ☐ Other:

C. AIR MONITORING – CHECK IF NOT APPLICABLE: ☒

Site-Specific Comments:

☐	INSTRUMENT(S), EQUIPMENT	☐ PID, Lamp energy: eV ☐ FID ☐ Carbon monoxide detector ☐ Hydrogen sulfide detector ☐ Oxygen (O_2) detector	☐ Flammable gas (LEL) detector ☐ Particulate (dust) detector ☐ Calibration kit for each detector type ☐ Others:

☐	ACTION LEVELS FOR **O2/LEL**	☐ Oxygen	≤19.5% - provide ventilation to raise oxygen to acceptable levels, or utilize Level B. ≥23.0% - provide ventilation to lower oxygen to acceptable levels, or utilize Level B and implement controls for fire hazards, control ignition sources.
		☐ LEL	Confirm at least 12% oxygen is present to ensure accuracy of LEL readings. At <10% LEL - Continue working, continue to monitor LEL levels At ≥10% LEL- Immediately withdraw from area. Resume work ONLY after LEL readings reduced to <10% through passive dissipation, or active vapor control measures.

☐	ACTION LEVELS FOR **TOXICS** (sustained breathing zone concentrations)	**Parameters**	**Level D, Modified D**	**Use levels C or B, as indicated below, OR take action to reduce breathing zone level to concentration acceptable for Level D.**
		☐ VOCs	< ppm	ppm to ppm: Level C (air purifying respirator) > ppm: Level B (air-supplied respirator)
		☐ Carbon Monoxide	< 35 ppm	≥35 ppm - Level B (air-supplied respirator)
		☐ Hydrogen Sulfide	< 10 ppm	≥10 ppm - Level B (air-supplied respirator)
		☐ Total Dust	< mg/m^3	> mg/m^3 - Level C (air-purifying respirator)
		☐		
		☐		

HAZARD	HAZARD CONTROLS (check all that apply and comment as required)
1. PREMISES/ENVIRONMENTAL HAZARDS	
Site-Specific Comments:	
☒ LOCATION HAZARDS ☒ Outdoor field work ☒ Urban, suburban ☐ Rural, remote location ☐ Indoor field work ☐ Operating facility ☐ Vacant facility ☐ Water hazards	☒ Use routine safety precautions commensurate with routine work environment conditions ☐ For non-routine, unique, or severe location hazards, see site-specific safety comments above. ☐ For water-related work, see #2, "Water Hazards" ☐ For worksite violence/security risks, see #3, "Violence, Security, Working Alone" ☒ For transportation related hazards, see #5, "Worksite Traffic, Vehicle, Transportation Hazards" ☒ For utility-related hazards, see # 6, "Utility-Related Hazards ☐ For atmospheric hazards in enclosed, indoor, or confined spaces, see # 11 "Confined Spaces or Hazardous Enclosed/Indoor Spaces"

	HAZARD	HAZARD CONTROLS (check all that apply and comment as required)
☒	WALKING/WORKING SURFACES, HOUSEKEEPING ☒ Uneven, rough terrain, riprap ☒ Slippery surfaces ☐ Holes, pits, openings ☐ Puncture, foot hazards	☒ Keep work areas clean, orderly, dispose of trash/debris, maintain sanitary conditions. ☒ Walkways are cleared of equipment, excavated material, tools and debris, snow ☐ Holes, pits, openings to be covered or otherwise marked or guarded ☐ Apply absorbent, salt or sand, for traction/slip resistance on slippery/icy/wet surfaces ☒ Wear proper work boots/shoes with ankle support and/or traction, as appropriate for conditions
☒	TEMPERATURE/WEATHER ☐ Heat Stress ☒ Cold Stress ☒ Severe Weather ☒ Lightning	☒ Heat/Cold stress are monitored in accordance with Geosyntec procedures EHS 124 & EHS 125 ☐ Provide sufficient fluids, shade, breaks, other precautions as appropriate to adderss heat hazards. ☒ Provide protection from sun (sun screen, shaded brake area). ☒ For cold stress, wear multiple layers, protect from wind/wet, frequent break in warm location. ☐ In high wind, discontinue working at heights (e.g. on ladders, scaffold, aerial lift, similar). ☒ Use precautions for lightning, thunderstorm, hale, tornado (monitor weather, “30/30 rule,” shelter)
☒	BIOLOGICAL HAZARDS ☒ Insects, spiders, ticks ☐ Wild/feral/pet animals ☐ Mold, fungi ☒ Poisonous plants ☐ Bird Guano ☐ Infectious, wastewater, sewer ☐ Bloodborne pathogens	☒ Utilize safety practices commensurate with risk of biting/stinging insects, wild/feral/pet animals. ☒ For poisonous plants (poison ivy/oak/sumac/etc.), minimize exposed skin area, wear coveralls, use barrier cream/wash (Technu products or similar), as appropriate. For biological exposure hazards, use protective measures commensurate with hazard: ☒ Minor-moderate hazard - use ordinary hygiene practices, protective gloves, hand washing. ☐ Moderate-severe hazard - add protective clothing, respirator, decon, as appropriate. ☐ Bloodborne pathogen (human infectious agents) - implement “Universal Precautions”
☐	HAZARDOUS NOISE	☐ Hearing protection is used when exposed to excessive noise levels (greater than 85 dBA over an 8-hour work period, or intermittent….)
☐	OVERHEAD HAZARDS, FALLING OBJECTS	☐ Wear hardhat when exposed to overhead hazards, “bump” hazards, falling objects ☐ Cordon off hazard zones, route access/egress around hazards of falling objects ☐ Secure objects from falling ☐ Provide overhead protection (canopy) to protect public pedestrians, workers
☐	ILLUMINATION ☐ Night work ☐ Indoor work	☐ Make site-specific arrangements for illumination of work areas and access routes.
2. BOATING, WATER, WET LOCATIONS, FLOOD, ETC. – CHECK IF NOT APPLICABLE: ☒		
Site-Specific Comments:		
☐	WATER HAZARDS ☐ Drowning, hypothermia ☐ Boat, barge, raft ☐ Wading, wetland, mud/silt ☐ Dam release, flood, tide ☐ Diving	☐ Wear appropriate Coast Guard-approved Personal Flotation Device (PFD) ☐ Bring emergency rescue equipment (ring buoy, reaching device, flares) ☐ Use fuel safety practices, fire extinguisher present in boat ☐ See site-specific safety comments above.
3. VIOLENCE, PUBLIC PROTECTION, WORKING ALONE – SPECIAL MEASURES – CHECK IF NOT ANTICIPATED: ☒		
Site-Specific Comments:		
☐	PERSONAL SECURITY, HIGH CRIME AREA	☐ Employ standard precautions, which may include: conduct work only during daylight hours, use buddy system, avoid parking in secluded location, lock vehicles, hide valuable items in vehicles from plain view ☐ See site-specific safety comments above for project-specific security measures.
☐	PUBLIC AT RISK, SITE SECURITY	☐ Provide safe pedestrian route around work areas, use appropriate barriers, signs, warning devices. ☐ Provide covers over excavation, secure fencing, overnight protection ☐ Provide protection from overhead hazards (canopy, etc.) where public at risk of overhead hazards ☐ Provide secure locked storage of hazardous chemicals, hazardous equipment, etc.
☐	WORKING ALONE	☐ Establish “check in” procedure with supervisor or project manager (arrival, mid-day, departure) ☐ Additional measures, as appropriate for the working conditions.
4. DRIVING, TRAFFIC, TRANSPORTATION HAZARDS – CHECK IF NOT APPLICABLE: ☐		
Site-Specific Comments:		
☒	DRIVING HAZARDS ☒ Routine work travel ☐ Unfamiliar location ☐ Unfamiliar vehicle ☒ Overnight travel, distance	☒ Use routine safe/defensive driving practices (seat belts, safe speeds, eyes ahead, no tailgating, limit distractions, no texting, safe cell phone use, clear windows, account for weather/road conditions, adequate sleep, other measures as appropriate). ☒ Plan travel route before driving (assemble maps, enter destination in GPS). ☐ Familiarize yourself with vehicle operational controls before operating unfamiliar vehicle.

HAZARD		HAZARD CONTROLS (check all that apply and comment as required)
☒	WORKERS EXPOSED TO TRAFFIC HAZARDS ☒ In/near public or private roadway ☒ Parking lot, driveway ☐ Worksite, construction site traffic	☒ Workers to wear reflective vests where exposed to traffic hazards. ☒ Where possible, park vehicles as protective shield from oncoming traffic. ☒ Configure work area and support vehicles to minimize worker exposure to traffic hazards. ☐ DOT signal devices will be used to re-route vehicles around work area, site entrances/exits. ☐ Flaggers will be used and have DOT Flagger Training; police detail where appropriate or required. ☒ Park vehicles in secure location away from heavy equipment use or other site operations. ☐ Mark temporary roadways clearly, provide berms/stop logs where needed.
☐	RAILROAD/AIRPORT HAZARD	☐ Coordinate with rail company/airport and implement required safety measures ☐ Site workers to receive safety training for railroad/airport work.
☐	OFF-ROAD DRIVING, USE OF ALL-TERRAIN VEHICLE	☐ For off road driving, do not exceed capability of vehicle ☐ Follow ATV specific procedures for training, safety equipment, operation.
☐	TRANSPORTING MATERIALS, TOWING/HAULING LOADS	☐ Ensure load is firmly secured (rope, straps, load configuration) to prevent shifting during travel. ☐ For trailer use, verify signal/braking lights operational, rear-view mirrors effective, hitch/safety chains secure.
5. UTILITY-RELATED HAZARDS (for underground/overhead work) – CHECK IF NOT APPLICABLE: ☒		
Site-Specific Comments:		
☐	OVERHEAD UTILITIES	☐ Maintain proper clearance, employ other appropriate precautions for the conditions.
☐	UNDERGROUND UTILITIES	☐ Confirm appropriate underground utility clearance procedures have been completed prior to ground penetrations, and employ other utility clearance/locator practices, as appropriate for conditions.
6. ELECTRICAL HAZARDS – CHECK IF NOT APPLICABLE: ☒		
Site-Specific Comments:		
☐	WORKERS EXPOSED TO: ☐ Voltage < 50 v ☐ Voltage 50-600v ☐ Voltage > 600v ☐ AC ☐ DC ☐ 3-phase ☐ Battery and/or solar power ☐ Capacitor/Transformer	☐ Implement electrical safe work practices commensurate with the work to be performed, pertaining to the following (as applicable): – Worker training/qualification – Electrical equipment and hazards, safe design features – Electrical safe work practices – Grounding, use of GFCIs – Electrical equipment installation, operation, maintenance, repair – Arc flash protection – Electrical equipment diagnostics
☐	BASIC ELECTRICAL HAZARDS ☐ Equipment/tool use/operation ☐ Use of extension cords	☐ Control water-related hazards, in a manner appropriate for the job tasks/equipment/tool. ☐ Use extension cords/power cords properly, prevent damage, take out of service if damaged. ☐ Inspect tool/equipment/extension cords/power cords before each use. ☐ Use GFCI-protected outlet or portable GFCI in wet locations, outdoors, basements ☐ Ensure live parts are guarded, enclosures secure. ☐ Enclosures, circuits properly labeled.
☐	LOCKOUT/TAGOUT OF ELECTRICAL ENERGY	☐ Implement control-of-hazardous-energy practices (lockout/tagout), provide lockout/tagout locks and devices, training workers, designate “authorized” personnel, notify “affected” personnel
7. FALL HAZARDS – CHECK IF NOT ANTICIPATED: ☒		
Site-Specific Comments:		
☐	WORKING AT HEIGHTS ☐ Roof, skylight ☐ Elevated platform ☐ Holes, side opening ☐ Retaining wall, cliff, ledge ☐ Trench, excavation ☐ Protruding rebar	☐ Ensure guardrails present ☐ Use personal fall apparatus (PFA) ☐ Use tether or positioning device ☐ Restrict access to hazard (barriers, tape, sign) ☐ Ensure covers in place over holes ☐ Watch person ☐ Use fall protection net ☐ Restrict access beneath work to protect other site personnel from overhead hazards ☐ Install caps on protruding rebar
☐	LADDERS / STAIRS ☐ Extension ladders ☐ Step ladders ☐ Fixed ladders ☐ Stairs	☐ Provide instruction/review pertaining to safe ladder use ☐ Extension ladders are properly footed, secured, setup at proper angle ☐ Stepladders are set on level ground or properly shimmed with spreaders locked. ☐ Stairs have proper rise over run and stairs >4 steps or 4' have guardrails. ☐ Never use a step ladder as a straight ladder. All straight ladders shall be extended three rungs past leading edge. Never use metal ladders while working with electricity.

	HAZARD	HAZARD CONTROLS (check all that apply and comment as required)
☐	AERIAL LIFT ☐ Scissor lift ☐ Extensible boom ☐ Articulated boom ☐ Vertical Lift ("Genie")	☐ Operators are sufficiently trained, experienced and qualified. ☐ Equipment is inspected after mobilization and is in good condition. ☐ Harness & Lanyard worn whenever operating the lift (scissor lifts may be excepted) ☐ Overhead and surface obstructions are reviewed with operators prior to use.
☐	SCAFFOLD ☐ Supported scaffold ☐ Suspended scaffold ☐ Free-standing/mobile scaffold	☐ Identify/coordinate operations with competent person ☐ Supported scaffold level, stable, proper attachments, tiebacks, planking, ☐ Suspended scaffolds anchored properly ☐ Guardrails present above 10 feet or personal fall apparatus used. ☐ Proper means of accessing scaffold (proper ladders, stair tower). ☐ Total height of free-standing scaffold not to exceed four times the minimum base dimension.
8. TOOLS, EQUIPMENT, MACHINERY – CHECK IF NOT APPLICABLE: ☐		
Site-Specific Comments:		
☒	HAND TOOLS Eye injury, puncture/bruise/ laceration hazard	☒ Use proper tool for the job, maintain tools in good condition (no damage, cutting tools sharp, etc.) use appropriate PPE for hand/eye/body protection, plan for safe "follow through" motion, use vise/clamp/work surface to hold/stabilize work piece
☐	POWER TOOLS ☐ Eye/hand/body injury ☐ Fuel-related hazards ☐ Inhalation hazard ☐ Noise ☐ Sparks, heat, fire hazard ☐ Electrical hazards	☐ For all power tools: – Inspect tools to ensure safe operating condition before each use. – Use tool in accordance with manufacturer's specifications. – Use PPE or other safety practices, as appropriate, for eye/hearing/hand/head/body protection – Provide training or verify operator qualification for use of power tool. – Stay clear of hazard zone, "line of fire" when working near where power tools are used. ☐ Use safety practices for refueling, fuel handling/transport/storage. ☐ Use respirators, ventilation, wet methods, other appropriate means to control inhalation hazard. ☐ For spark/heat generating tool, control fire hazards, segregate combustible/flammable materials. ☐ For electrical hazards, see # 6, "Electrical Hazards".
☐	WELDING, CUTTING ☐ Gas welding/cutting ☐ Arc welding/cutting	☐ Hot work permit system to be implemented. ☐ Operator properly protected (eye protection, clothing, apron, etc.) ☐ Fire hazard controls (watcher, fire extinguisher, water, isolate combustibles) ☐ Protect nearby personnel from hazardous UV, IR light (shielding, curtain) ☐ Electrical safe work practices for arc welding ☐ Gas cylinder safe practices (secured, upright, caps on when not in use, prevent damage).
☐	EQUIPMENT/MACHINERY ☐ Point-of-operation hazards ☐ Pinch points, moving parts ☐ 'Struck-by,' 'caught between' ☐ Hot surfaces, heat ☐ Extension cords, flexible wire ☐ Fuel related (gas or liquid) ☐ Hydraulic pressure ☐ Compressed air/gas ☐ Kinetic, stored energy ☐ Noise ☐ Lockout/tagout ☐ Emissions, discharge gases ☐ Working at heights, falls ☐ Lifting, repetitive motion ☐ Illumination ☐ Electrical (see below)	☐ *Working Near* Equipment/Machinery ☐ Work at safe distance/restrict access, ensure guards in place, heed warning signs ☐ Implement measures necessary for adequate illumination ☐ Control exposue to emission/discharge gases (ventilation, PPE, other means). ☐ Ensure safe practices for fuels/fluids/machine-related hazardous materials ☐ Use PPE or other safety practices for eye/hearing/hand/head/body protection ☐ Segregate combustible materials from hot surfaces/hot exhaust (minimum 3 feet) ☐ Operation/Maintenance/Repair of Equipment/Machinery (see applicable control measures above) ☐ Orient/locate equipment for safe access during operation and maintenance ☐ Use equipment/machinery in accordance with manufacturer's specifications ☐ Use safe lifting practices, minimize repetitive motion hazards ☐ Ensure point-of-operation, mechanical power transmission, other moving parts are guarded with protective devices; do not override interlocks, guards, protective devices ☐ Secure long hair/loose clothing/hanging jewelry near moving/rotating parts ☐ Ensure appropriate warning signs are in place and heeded ☐ Use safe practices for fueling, fuel transport & storage. ☐ Operate fuel-powered equipment in well ventilated location. ☐ Incorporate safety provisions/safe work practices for compressed air, pressurized systems (pneumatic/hydraulic), stored energy ☐ Implement control-of-hazardous-energy practices (lockout/tagout), designate "authorized" personnel, notify "affected" personnel ☐ Protect from fall hazards (safe ladder use, personal fall protection, guardrails, other) ☐
☐	ELECTRICAL HAZARDS	☐ Implement provisions of # 6, "Electrical Hazards"
9. MANUAL MATERIAL HANDLING, MATERIAL STORAGE – CHECK IF NOT APPLICABLE: ☐		

	HAZARD	HAZARD CONTROLS (check all that apply and comment as required)
Site-Specific Comments:		
☒	LIFTING / ERGONOMIC Musculoskeletal strain, repetitive motion injury	☒ Use proper manual lifting techniques (straight back, bend at knees, firm grasp, firm footing). ☒ Seek assistance for lifting heavy objects (>50 lbs.) ☐ Use mechanical lifting equipment to reduce manual material handling hazard ☒ For repetitive motion activities, take breaks, switch hands, share task with others, employ other safe practices appropriate for the specific task(s).
☐	STORAGE OF MATERIALS See Sect. 12 for Chemical Storage	☐ Store materials in stable manner that prevents tipping, sliding, rolling, falling over. ☐ Materials stored in tiers to be stacked, racked, blocked, interlocked or otherwise secured to prevent sliding, falling or collapse ☐ Do not exceed load limits of racks, platform; ensure racks are stable, robust, secure ☐ On scaffold, do not store materials in excess of supplies needed for immediate use ☐ Ensure stored materials do not block aisles, passageways ☐ For used lumber, remove nails before stacking, and stack to be stable and self supporting, no higher than 20 feet (or 16 feet if lumber is to be handled manually) ☐ Debris will be removed regularly from storage area and place in designated area or disposed.
10. CONSTRUCTION OPERATIONS, HEAVY EQUIPMENT, HEAVY VEHICLES – CHECK IF NOT ANTICIPATED: ☒		
Site-Specific Comments:		
☐	HEAVY EQUIPMENT; CONSTRUCTION VEHICLES Hazards: Struck By, Run-Over, Caught In Between (pinch points), Roll Over, Fluid Leaks	☐ Trained/qualified persons operate all heavy equipment. ☐ No passengers on moving/operating equipment except where passenger seat/restraint is present. ☐ Equipment inspected upon mobilization and daily; maintained in good repair, backup alarms ☐ All leaks or defective safety equipment will be repaired before use. ☐ Operators required to use seatbelts. ☐ Eye contact with operator and use of hand signals prior to approaching near equipment. ☐ High visibility vests are required of all personnel in work area. ☐ Max. safe slope for each vehicle will be followed. ☐ Personnel to stay clear of swing radius of equipment. ☐ Spill equipment available for fuel and hydraulic fluid leaks. ☐ Equipment locked, secured, brakes set, buckets/forks lowered, when not in use.
☐	CRANES Overhead hazards – utility lines, swing radius, falling objects, wire ropes and hoisting equipment ☐ Overbalancing – high winds, outrigger placement, overloading, safe slope ☐ Struck By, Run-Over, Caught In Between (pinch points), Roll Over, Fluid Leaks	**In addition to general safety practices for heavy equipment (above), as applicable:** ☐ Only qualified persons operate cranes (certificate required). ☐ A Critical Lift Plan & Checklist prepared/executed (HS 506) prior to mobilization. ☐ Equipment will be inspected prior to mobilization and a Crane Pre-Operational Safety Checklist (see EHS 506) will be completed and signed by crane operator. ☐ Crane operator will remain at the controls at all times during operation. ☐ Crane operation must be performed under the direction of an appointed signal person at all times. ☐ Communication between crane operator and signal person will be maintained through standard hand signals or voice communication equipment. Radio equipment, if used, will be equipped with a dedicated channel. ☐ Lifting or lowering will not exceed 100ft/minute. Lowering must be controlled i.e. no free fall. ☐ Stop work will be issued whenever hoisting equipment is exposed to high winds. ☐ Outriggers will be fully extended/locked with a firm footing within the maximum safe slope (<1%). ☐ Crane to be on level, stable base, dunnage used when necessary. ☐ Total weight of load not to exceed 50% of rated capacity for the crane radius and configuration. ☐ Rigging procedures – see Hoisting, Lifting, Rigging, below. ☐ Suspended personnel lifting is prohibited (unless per approved “man-lift” equipment). ☐ No personnel permitted beneath suspended loads.
☐	HOISTING, LIFTING, RIGGING ☐ Crane ☐ Drill rig ☐ Loader, excavator, etc. ☐ Mechanical, electrical hoist	☐ Identify, coordinate with competent person. ☐ Rigging directly to the forks of a lull, forklift, or front loader equipped forks is prohibited. ☐ Do not exceed loading limits of equipment. ☐ A Critical Lift Checklist (see EHS 506) will be completed and signed prior to crane mobilization. ☐ Rigging, wire rope and hoisting equipment will be inspected and maintained on a weekly basis. ☐ Crane hooks will be equipped with safety latches.
☐	FORKLIFT Hazards: Struck By, Run-Over, Caught In Between (pinch points), Roll Over, Fluid Leaks	**In addition to general safety practices for heavy equipment (above), as applicable:** ☐ Qualified operater, per established forklift training (certificate is required) ☐ Equipment inspected daily and documented on Forklift Preoperation Inspection Checklist ☐ Operators required to use seatbelts, and adhere to safe operating procedures.

	HAZARD	HAZARD CONTROLS (check all that apply and comment as required)
		☐ Do not exceed lifting load limits. ☐ Forklift shall not be moved/driven with empty forks in raised position. ☐ When not in use, forks lowered, brake set, controls in neutral, key removed.
☐	EXCAVATION/TRENCHING ☐ Max Depth ≥ 20' ☐ Max Depth ≥ 5' ☐ Max Depth <5' with potential cave-in hazard ☐ Potential permit-required confined space at depth ≥ 4' ☐ Underground utilities ☐ Overhead utilities ☐ Structures/foundations ☐ Falls into excavations	☐ Activities under supervision/oversight of competent person ☐ Sloping & shoring for excavations ≥20' are approved by a professional engineer ☐ Sloping & shoring for excavations ≥5' when persons are exposed to cave-in. ☐ Sloping & shoring for shallow (<5') excavations with cave-in hazard ☐ Excavations ≥ 4' are classified as a non-permit confined space ☐ Excavations ≥ 4' are classified as Alternate Entry or Permit-Required (see confined space) ☐ Implement underground utility clearance procedures. ☐ Hand digging within 3' of utility locations. ☐ Excavations to be protected by perimeter fencing (not barricade tape) ☐ Use trench boxes in accordance with proper procedures. ☐ Workers in trenches to be within 25 feet of ladder or sloped entryway.
☐	DRILLING ☐ Struck By, Run-Over, Caught In Between (pinch points), Roll Over, Fluid Leaks ☐ Underground utilities, aboveground ☐ Spills ☐ See Equipment/Machinery	☐ Contractor inspects drill rig daily before use. ☐ Drill rig equipped with operational emergency stop. ☐ Highpressure lines equipped with whip checks. ☐ High visibility vests, hard hats are being worn near the equipment. ☐ Operators and helpers will maintain a safe distance to moving parts. Individuals working near moving or rotating parts will secure loose hair, clothing, and equipment. ☐ Drill rigs will only be moved with masts lowered. Masts will be erected with outriggers fully extended when equipped with outriggers. ☐ Max. safe slope for rig will be followed, drill rig leveled, appropriate blocking/cribbing as needed. ☐ Spinning parts of the rig are guarded when possible, no loose clothing being worn near the rig. ☐ Follow underground utility clearance procedures. ☐ Area is surveyed for overhead utilities, safe clearance distance maintained. ☐ Hearing protection is used when working near the rig. ☐ Spill equipment is available for fuel and hydraulic fluid leaks.
☐	DEMOLITION	☐ Develop/implement demolition safety plan
☐	BLASTING	☐ Develop/implement blasting safety plan
11. CONFINED SPACES, HAZARDOUS ENCLOSED or INDOOR SPACES – CHECK IF NOT APPLICABLE: ☒		
Site-Specific Comments:		
☐	CONFINED SPACE(S) ☐ Permit required ☐ Non-permit required Potential/actual hazards: ☐ Atmospheric hazards: ☐ Flammable/explosive ☐ Oxygen deficiency ☐ Hydrogen sulfide ☐ Other toxic ☐ Combustible dust ☐ Electrical ☐ Mechanical, engulfment, entrapment, stored energy	☐ For personnel <u>working near confined</u> spaces: – Confined spaces have been identified, labeled. – Communication system in place to prevent unauthorized entry. ☐ For <u>permit-required confined space entry</u>, see separate entry permit. – All entrants, attendants, supervisors are trained/qualified. – Hazards properly characterized – Necessary equipment for safe entry utilized (access, retrieval, air monitoring) – Arrangements for rescue team have been made. ☐ For entry into a <u>non-permit</u> confined space, see site specific procedures delineated above in "site-specific comments," or see alternate/attached safety work plan.
☐	ENCLOSED/INDOOR SPACE(S) ☐ Outfall, culvert ☐ Tunnel, shaft, gallery ☐ Machine/equipment pit/vault ☐ Basement/Sub-basement ☐ Crawl space entry ☐ Indoor equipment/drilling	*<u>For indoor use of gasoline/propane/diesel equipment:</u>* ☐ Duct exhaust to outdoors, and/or introduce fresh air using ventilation/blowers/fans. ☐ Perform air monitoring (see section on Air Monitoring) *<u>For entry into potentially hazardous indoor or enclosed spaces:</u>* ☐ Ventilate and/or perform air monitoring for anticipated hazards. ☐ If space classified as confined space, follow confined space entry requirements (above).
12. COMMERCIAL CHEMICAL PRODUCTS USED AT WORK SITE – CHECK IF NOT APPLICABLE: ☐		
Site-Specific Comments:		

	HAZARD	HAZARD CONTROLS (check all that apply and comment as required)
☒	PRODUCTS REGULATED BY HAZARD COMMUNICATION STANDARD	☒ Safety Data Sheets available, either on site or readily available within same work shift ☒ Containers labelled properly ☒ Workers trained on hazards ☒ For subcontractor use of chemical products, coordinate/discuss during safety meetings.
☒	COMPRESSED GAS(ES): Isosbutylene Calibration Gas for PID	☒ Secure cylinders upright, caps on when not in use, handle with care, prevent damage ☐ Propane cylinders not in use must be stored outdoors in cage or similar secure enclosure. ☐ Ensure acetylene cylinders NOT secured to steel arc welding bench ☐ Store/use in a manner to prevent asphyxiation hazard ☐ Segregate oxygen and fuel gases by distance (20') or barrier ☐ Control ignition sources, no smoking signage ☐ Use/store in a manner to control inhalation exposure hazards, PPE, air monitoring.
☐	FLAMM./COMBUST. LIQ.	☐ Proper storage (flam. storage cabinets, other storage precautions) ☐ Control ignition sources ☐ Grounding and bonding where appropriate
☐	CORROSIVES	☐ Handle with care, use appropriate eye/face/skin protection ☐ Eyewash, deluge shower, drench hose, hand washing (with water), as appropriate
☐	TOXIC	☐ For toxic substances, use/store in a manner to control exposure hazards (inhalation, ingestion, skin contact, skin absorption; use PPE as appropriate, conduct air monitoring as appropriate.
☐	CHEMICAL STORAGE	☐ Chemical storage cabinet, cage, storage room, or similar ☐ Incompatible chemicals segregated ☐ Secondary containment ☐ Safety equipment will be located near chemical storage.

13. CHEMICAL HAZARDS FROM ON-SITE CONTAMINANTS, OPERATIONS, EMISSIONS – CHECK IF N/A: ☐

Site-Specific Comments:

CHECK AS APPROPRIATE BELOW. PROVIDE ADDITIONAL INFO. AS APPROPRIATE, IN SITE-SPECIFIC HAZARD ANALYSIS ABOVE.

☒ Soil/groundwater contaminants (historical release)	☐ Oxygen deficiency	☐ Asbestos
☐ Recent release, known high concentrations	☒ Chlorinated VOCs (volatile org. cpds.)	☐ Lead paint
☐ Former chemical disposal site, landfill	☒ BTEX, petroleum derived VOCs	☐ Pesticides, herbicides, fungicides
☐ Urban fill, residual contaminants	☐ Fuel oils, petroleum, waste oil, lubricants	☐ Sensitizers
☐ Containerized waste (drums, process equipment)	☒ Metals, metal compounds, metal dusts	☐ Radioactive contaminants
☐ Buried drums (known or potential)	☐ Elemental mercury	☐ Other:
☐ Large containers, potential for spills	☒ Polyaromatic hydrocarbons (PAHs)	
☐ Emissions from active industrial processes	☒ Polychlorinated biphenyls (PCBs)	
☐ Emissions from welding/cutting/hot work	☐ Potential for flammable vapors	
☐ Carbon monoxide (vehicle/equipment exhaust)	☐ Potential for flammable gas (methane)	
☐ Contaminated building surfaces	☐ Corrosive, acids/caustics, strong irritants	
☐ Unexploded ordnance	☐ Sulfides, hydrogen sulfide (H2S)	
☐ Explosive dust	☐ Cyanides, hydrogen cyanide (HCN)	

☐	FOR SITE REGULATED AS "UNCONTROLLED HAZ. WASTE SITE," e.g. **REGULATED BY HAZWOPER** (OSHA 29 CFR 1910.120) – Establish work zones & site control plan (Exclusion Zone - EZ, Contaminant Reduction Zone - CRZ, Support Zone - SZ) – Workers to be aware of and trained on hazards per OSHA Hazard Communication Standard. – Include site map/figure depicting work locations and other relevant site-specific information. – Site workers in EZ or CRZ to have OSHA 40-hour training, current 8-hour refresher, 3 days supervised field expience. – Site workers in EZ or CRZ to participate in Medical Monitoring program. – "Peripheral" site workers, engaged on-site, with no hazardous exposure: 24 hr. training required. – Site supervisor(s) required to have 8-hr. Supervisor training. – Implement site-specific procedures for worker protection through engineering controls, work practices, personal protective equipment (PPE), air monitoring, decontamination, spill containment (see Sections B and C, "Health and Safety Equipment/Gear" and "Air Monitoring" – Include emergency response program in H&S plan.
☒	FOR SITE WITH CHEMICAL CONTAMINANTS BUT **NOT REGULATED BY HAZWOPER** – Workers to be aware of and trained on hazards per OSHA Hazard Communication Standard – Implement appropriate controls to minimize worker exposure (engineering controls, work practices) to levels below OSHA PELs. – Use PPE as needed (see B, "Health and Safety Equipment/Gear"). – Conduct air monitoring or personal air sampling to monitor and/or evaluate worker exposure (see Section C, "Air Monitoring").

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PRE-WORK TASK HAZARD ANALYSIS (THA)

HAZARD		HAZARD CONTROLS (check all that apply and comment as required)
☐	ATMOSPHERIC HAZARDS GENERATED BY EXHAUST FROM OPERATING EQUIPMENT ☐ Position work upwind of exhaust source ☐ Use blowers, fans to dissipate atmospheric hazards ☐ Conduct air monitoring (see Section C, "Air Monitoring").	
☐	OFF-SITE MIGRATION OF CONTAMINANTS	☐ Implement controls to minimize hazard migration (dust suppression, covers, foam, etc.) ☐ Community/perimeter air monitoring is not anticipated with the current scope of work. ☐ Community/perimeter air monitoring to be conducted per perimeter air monitoring plan.

EMERGENCY RESPONSE **(911 Service is Available ☒ Yes ☐ No)** ☒ Verify wireless coverage at site, use alternate communication procedures as needed.

Emergency Medical Treatment - Hospital Name: Hospital Address:	St Joseph's Hospital 555 E. Market St Elmira NY 14901	**Number:**	607.733.6541
Urgent Care Med. Treatment - Clinic Name: Occupational Clinic Address:	Elmira Urgent Care 306 W. Water St., Elmira, NY 14905	**Number:**	607.732.1100
Fire Department Name	West Elmira Fire Department	**Number:**	911
Spill Response:	West Elmira Fire Department	**Number:**	911
Client Representative Name::	Kevin Krueger	**Office Number:** **Cell Number:**	(651) 687-2210
Geosyntec **Project Manager** Name:	Aron Krasnopoler	**Office Number:** **Cell Number:**	(410) 381-4333 (202)-550-7724
Geosyntec **Corporate H&S** Name:	Dale Prokopchak	**Office Number:** **Cell Number:**	804 332 6376 (804) 349-8067

Emergency Response Comments:

Date:	
Project Name: Former Scott Technologies Site	
THA Title: Hand Augering for Shallow Soil Sample Collection	
Subcontractor Name(s):	
Geosyntec Representative (reviewed by):	**Michael Hansen**
Subcontractor Foreman/Supervisor Signature (authorize):	
Crew Signatures (acknowledge):	
Print Name	**Signature**

PLEASE RETURN A COPY OF THIS SIGNED PAGE TO GEOSYNTEC PROJECT MGR., SUPERINTENDENT UPON REVIEW AND ACKOWLEDGMENT BY THE CREW MEMBERS. ALL NEW CREW MEMBERS SHALL BE ORIENTATED THE SAME AND A SUBMITTAL OF A NEW SIGN IN SHEET SHALL BE COMPLETED.

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PRE-WORK TASK HAZARD ANALYSIS (THA)

TASK/ACTIVITY:	Monitoring Well Inspection and Synoptic Water Level Measurements	**Date:**	10/21/2014
Project Name:	Former Scott Technologies Site	**Client Name:**	Unisys Corporation
Project Number:	MN0832	**Geosyntec Proj. Mngr.:**	Aron Krasnopoler
Project Address:	1051 Sourth Main Street, Elmira, New York	**Geosyntec Proj. Dir.:**	Paul Brookner
Task Description:	Inspect existing monitoring wells and take depth to water and depth to bottom measurements at each location.		

A. SUMMARY OF SITE-SPECIFIC TASK HAZARD ANALYSIS

Site-Specific Comments: Some monitoring locations are in parking lot areas and may have traffic related hazards.

Sub-Tasks, Activities	Hazards	Hazard Controls
Task 1: Mobilize to Site	-Driving -Mobilization to and around unfamiliar facility	- Drive carefully to facility, be well rested and avoid distracted driving. - Review scope of work.
Task 2: Locate monitoring well	-Slips/trips/falls -Heat/cold stress -Biohazards: snakes, bees, spider, ticks, poison ivy -Potential contaminant exposure: VOCs, PCBs, SVOCs -Traffic	-Pay close attention to foot placement; slow deliberate movement. -Dress for weather conditions. Apply sunscreen if needed. -Beaware of surroundings and avoid biohazards. - don level D personal protective equipment (PPE). PPE will include: safety glasses, safety vests, steel toe boots, and nitrile gloves. - see traffic hazard controls
Task 3: Measure depth to water, depth to bottom, and complete monitoring well inspections.	-Same hazards noted above for Task 2. -Splash harzards. .	-Same hazard controls noted above for Task 2. -Avoid direct contact with contaminated matrices and/or equipment.
Task 4: Equipment Decontamination Decontaminate equipment that will be reused (e.g. water level indicator)	-Slips, Trips, and Falls -Potential contaminant exposure: VOCs, PCBs, SVOCs -Splash hazards	-Pay close attention to foot placement; slow deliberate movement. -Continue to wear level D PPE and minimize contact with water.
Task 5: Demobilization Demobilize from Site, making sure all work areas are clean and orderly.	-Driving	-Drive carefully and avoid distracted driving. If too exhausted to drive safely back to the office make arrangements to stay at hotel.

B. HEALTH AND SAFETY EQUIPMENT/GEAR

Site-Specific Comments:

☒	PERSONAL PROTECTIVE EQUIPMENT (PPE)**:**	Level(s) of Protection (for chemical hazards):	☐ Level D (standard work clothes, no chemical protective clothing) ☒ Modified Level D (chemical protective clothing in addition to standard work clothes) ☐ Level C (air purifying respirator or dust mask, with chemical protective clothing) ☐ Level B or A (air supplied respirator, chemical protective suit)

		☒ Hard-toed boots/shoes ☐ Hardhat ☐ Noise/hearing protection ☒ High-visibility/reflective vest ☒ Work gloves ☒ Eye/face protection ☒ Safety glasses with side shields ☐ Goggles ☐ Face shield ☐ Other: ☒ Chemical protective clothing ☒ Gloves, type: Nitrile ☐ Coveralls, type: ☐ Outer boots, boot covers ☐ Other:	☐ Respiratory Protection ☐ Disposable n-95 face mask ☐ Half-face air-purifying respirator ☐ Full-face air-purifying respirator ☐ Resp-cartridge, type: ☐ Other: ☐ Personal flotation device ☐ Personal fall apparatus ☐ Fire retardant clothing ☐ EH (Electrical Hazard) rated boots, gloves ☐ Other:
☒	OTHER H&S EQUIPMENT and GEAR:	☒ Fire extinguisher ☐ Caution tape ☒ Traffic control warning devices ☐ Warning signs or placards ☐ Decon supplies for personal decon ☐ Portable ground fault circuit interrupter (GFCI)	☐ Lockout/tagout equipment ☐ Ventilation equipment (fan, blower) ☒ First aid kit ☒ Vehicle emergency kit (flares, lights, reflective device) ☐ Other:

C. AIR MONITORING – CHECK IF NOT APPLICABLE: ☒

Site-Specific Comments:

☐	INSTRUMENT(S), EQUIPMENT	☐ PID, Lamp energy: eV ☐ FID ☐ Carbon monoxide detector ☐ Hydrogen sulfide detector ☐ Oxygen (O_2) detector	☐ Flammable gas (LEL) detector ☐ Particulate (dust) detector ☐ Calibration kit for each detector type ☐ Others:

☐	ACTION LEVELS FOR **O2/LEL**	☐ Oxygen	≤19.5% - provide ventilation to raise oxygen to acceptable levels, or utilize Level B. ≥23.0% - provide ventilation to lower oxygen to acceptable levels, or utilize Level B and implement controls for fire hazards, control ignition sources.
		☐ LEL	Confirm at least 12% oxygen is present to ensure accuracy of LEL readings. At <10% LEL - Continue working, continue to monitor LEL levels At ≥10% LEL- Immediately withdraw from area. Resume work ONLY after LEL readings reduced to <10% through passive dissipation, or active vapor control measures.

☐	ACTION LEVELS FOR **TOXICS** (sustained breathing zone concentrations)	**Parameters**	**Level D, Modified D**	**Use levels C or B, as indicated below, OR take action to reduce breathing zone level to concentration acceptable for Level D.**
		☐ VOCs	< ppm	ppm to ppm: Level C (air purifying respirator) > ppm: Level B (air-supplied respirator)
		☐ Carbon Monoxide	< 35 ppm	≥35 ppm - Level B (air-supplied respirator)
		☐ Hydrogen Sulfide	< 10 ppm	≥10 ppm - Level B (air-supplied respirator)
		☐ Total Dust	< mg/m^3	> mg/m^3 - Level C (air-purifying respirator)
		☐		
		☐		

HAZARD	HAZARD CONTROLS (check all that apply and comment as required)
1. PREMISES/ENVIRONMENTAL HAZARDS	
Site-Specific Comments:	
☒ LOCATION HAZARDS ☒ Outdoor field work ☒ Urban, suburban ☐ Rural, remote location ☐ Indoor field work ☐ Operating facility ☐ Vacant facility ☐ Water hazards	☒ Use routine safety precautions commensurate with routine work environment conditions ☐ For non-routine, unique, or severe location hazards, see site-specific safety comments above. ☐ For water-related work, see #2, "Water Hazards" ☐ For worksite violence/security risks, see #3, "Violence, Security, Working Alone" ☒ For transportation related hazards, see #5, "Worksite Traffic, Vehicle, Transportation Hazards" ☐ For utility-related hazards, see # 6, "Utility-Related Hazards ☐ For atmospheric hazards in enclosed, indoor, or confined spaces, see # 11 "Confined Spaces or Hazardous Enclosed/Indoor Spaces"

	HAZARD	HAZARD CONTROLS (check all that apply and comment as required)
☒	WALKING/WORKING SURFACES, HOUSEKEEPING ☒ Uneven, rough terrain, riprap ☒ Slippery surfaces ☐ Holes, pits, openings ☐ Puncture, foot hazards	☒ Keep work areas clean, orderly, dispose of trash/debris, maintain sanitary conditions. ☒ Walkways are cleared of equipment, excavated material, tools and debris, snow ☐ Holes, pits, openings to be covered or otherwise marked or guarded ☐ Apply absorbent, salt or sand, for traction/slip resistance on slippery/icy/wet surfaces ☒ Wear proper work boots/shoes with ankle support and/or traction, as appropriate for conditions
☒	TEMPERATURE/WEATHER ☐ Heat Stress ☒ Cold Stress ☒ Severe Weather ☒ Lightning	☒ Heat/Cold stress are monitored in accordance with Geosyntec procedures EHS 124 & EHS 125 ☐ Provide sufficient fluids, shade, breaks, other precautions as appropriate to adderss heat hazards. ☒ Provide protection from sun (sun screen, shaded brake area). ☒ For cold stress, wear multiple layers, protect from wind/wet, frequent break in warm location. ☐ In high wind, discontinue working at heights (e.g. on ladders, scaffold, aerial lift, similar). ☒ Use precautions for lightning, thunderstorm, hale, tornado (monitor weather, “30/30 rule,” shelter)
☒	BIOLOGICAL HAZARDS ☒ Insects, spiders, ticks ☐ Wild/feral/pet animals ☐ Mold, fungi ☒ Poisonous plants ☐ Bird Guano ☐ Infectious, wastewater, sewer ☐ Bloodborne pathogens	☒ Utilize safety practices commensurate with risk of biting/stinging insects, wild/feral/pet animals. ☒ For poisonous plants (poison ivy/oak/sumac/etc.), minimize exposed skin area, wear coveralls, use barrier cream/wash (Technu products or similar), as appropriate. For biological exposure hazards, use protective measures commensurate with hazard: ☒ Minor-moderate hazard - use ordinary hygiene practices, protective gloves, hand washing. ☐ Moderate-severe hazard - add protective clothing, respirator, decon, as appropriate. ☐ Bloodborne pathogen (human infectious agents) - implement “Universal Precautions”
☐	HAZARDOUS NOISE	☐ Hearing protection is used when exposed to excessive noise levels (greater than 85 dBA over an 8-hour work period, or intermittent….)
☐	OVERHEAD HAZARDS, FALLING OBJECTS	☐ Wear hardhat when exposed to overhead hazards, “bump” hazards, falling objects ☐ Cordon off hazard zones, route access/egress around hazards of falling objects ☐ Secure objects from falling ☐ Provide overhead protection (canopy) to protect public pedestrians, workers
☐	ILLUMINATION ☐ Night work ☐ Indoor work	☐ Make site-specific arrangements for illumination of work areas and access routes.
2. BOATING, WATER, WET LOCATIONS, FLOOD, ETC. – CHECK IF NOT APPLICABLE: ☒		
Site-Specific Comments:		
☐	WATER HAZARDS ☐ Drowning, hypothermia ☐ Boat, barge, raft ☐ Wading, wetland, mud/silt ☐ Dam release, flood, tide ☐ Diving	☐ Wear appropriate Coast Guard-approved Personal Flotation Device (PFD) ☐ Bring emergency rescue equipment (ring buoy, reaching device, flares) ☐ Use fuel safety practices, fire extinguisher present in boat ☐ See site-specific safety comments above.
3. VIOLENCE, PUBLIC PROTECTION, WORKING ALONE – SPECIAL MEASURES – CHECK IF NOT ANTICIPATED: ☐		
Site-Specific Comments:		
☐	PERSONAL SECURITY, HIGH CRIME AREA	☐ Employ standard precautions, which may include: conduct work only during daylight hours, use buddy system, avoid parking in secluded location, lock vehicles, hide valuable items in vehicles from plain view ☐ See site-specific safety comments above for project-specific security measures.
☐	PUBLIC AT RISK, SITE SECURITY	☐ Provide safe pedestrian route around work areas, use appropriate barriers, signs, warning devices. ☐ Provide covers over excavation, secure fencing, overnight protection ☐ Provide protection from overhead hazards (canopy, etc.) where public at risk of overhead hazards ☐ Provide secure locked storage of hazardous chemicals, hazardous equipment, etc.
☒	WORKING ALONE	☒ Establish “check in” procedure with supervisor or project manager (arrival, mid-day, departure) ☒ Additional measures, as appropriate for the working conditions.
4. DRIVING, TRAFFIC, TRANSPORTATION HAZARDS – CHECK IF NOT APPLICABLE: ☐		
Site-Specific Comments:		
☒	DRIVING HAZARDS ☒ Routine work travel ☐ Unfamiliar location ☐ Unfamiliar vehicle ☒ Overnight travel, distance	☒ Use routine safe/defensive driving practices (seat belts, safe speeds, eyes ahead, no tailgating, limit distractions, no texting, safe cell phone use, clear windows, account for weather/road conditions, adequate sleep, other measures as appropriate). ☒ Plan travel route before driving (assemble maps, enter destination in GPS). ☐ Familiarize yourself with vehicle operational controls before operating unfamiliar vehicle.

HAZARD		HAZARD CONTROLS (check all that apply and comment as required)
☒	WORKERS EXPOSED TO TRAFFIC HAZARDS ☒ In/near public or private roadway ☒ Parking lot, driveway ☐ Worksite, construction site traffic	☒ Workers to wear reflective vests where exposed to traffic hazards. ☒ Where possible, park vehicles as protective shield from oncoming traffic. ☒ Configure work area and support vehicles to minimize worker exposure to traffic hazards. ☐ DOT signal devices will be used to re-route vehicles around work area, site entrances/exits. ☐ Flaggers will be used and have DOT Flagger Training; police detail where appropriate or required. ☒ Park vehicles in secure location away from heavy equipment use or other site operations. ☐ Mark temporary roadways clearly, provide berms/stop logs where needed.
☐	RAILROAD/AIRPORT HAZARD	☐ Coordinate with rail company/airport and implement required safety measures ☐ Site workers to receive safety training for railroad/airport work.
☐	OFF-ROAD DRIVING, USE OF ALL-TERRAIN VEHICLE	☐ For off road driving, do not exceed capability of vehicle ☐ Follow ATV specific procedures for training, safety equipment, operation.
☐	TRANSPORTING MATERIALS, TOWING/HAULING LOADS	☐ Ensure load is firmly secured (rope, straps, load configuration) to prevent shifting during travel. ☐ For trailer use, verify signal/braking lights operational, rear-view mirrors effective, hitch/safety chains secure.
5. UTILITY-RELATED HAZARDS (for underground/overhead work) – CHECK IF NOT APPLICABLE: ☒		
Site-Specific Comments:		
☐	OVERHEAD UTILITIES	☐ Maintain proper clearance, employ other appropriate precautions for the conditions.
☐	UNDERGROUND UTILITIES	☐ Confirm appropriate underground utility clearance procedures have been completed prior to ground penetrations, and employ other utility clearance/locator practices, as appropriate for conditions.
6. ELECTRICAL HAZARDS – CHECK IF NOT APPLICABLE: ☒		
Site-Specific Comments:		
☐	WORKERS EXPOSED TO: ☐ Voltage < 50 v ☐ Voltage 50-600v ☐ Voltage > 600v ☐ AC ☐ DC ☐ 3-phase ☐ Battery and/or solar power ☐ Capacitor/Transformer	☐ Implement electrical safe work practices commensurate with the work to be performed, pertaining to the following (as applicable): – Worker training/qualification – Electrical equipment and hazards, safe design features – Electrical safe work practices – Grounding, use of GFCIs – Electrical equipment installation, operation, maintenance, repair – Arc flash protection – Electrical equipment diagnostics
☐	BASIC ELECTRICAL HAZARDS ☐ Equipment/tool use/operation ☐ Use of extension cords	☐ Control water-related hazards, in a manner appropriate for the job tasks/equipment/tool. ☐ Use extension cords/power cords properly, prevent damage, take out of service if damaged. ☐ Inspect tool/equipment/extension cords/power cords before each use. ☐ Use GFCI-protected outlet or portable GFCI in wet locations, outdoors, basements ☐ Ensure live parts are guarded, enclosures secure. ☐ Enclosures, circuits properly labeled.
☐	LOCKOUT/TAGOUT OF ELECTRICAL ENERGY	☐ Implement control-of-hazardous-energy practices (lockout/tagout), provide lockout/tagout locks and devices, training workers, designate “authorized” personnel, notify “affected” personnel
7. FALL HAZARDS – CHECK IF NOT ANTICIPATED: ☒		
Site-Specific Comments:		
☐	WORKING AT HEIGHTS ☐ Roof, skylight ☐ Elevated platform ☐ Holes, side opening ☐ Retaining wall, cliff, ledge ☐ Trench, excavation ☐ Protruding rebar	☐ Ensure guardrails present ☐ Use personal fall apparatus (PFA) ☐ Use tether or positioning device ☐ Restrict access to hazard (barriers, tape, sign) ☐ Ensure covers in place over holes ☐ Watch person ☐ Use fall protection net ☐ Restrict access beneath work to protect other site personnel from overhead hazards ☐ Install caps on protruding rebar
☐	LADDERS / STAIRS ☐ Extension ladders ☐ Step ladders ☐ Fixed ladders ☐ Stairs	☐ Provide instruction/review pertaining to safe ladder use ☐ Extension ladders are properly footed, secured, setup at proper angle ☐ Stepladders are set on level ground or properly shimmed with spreaders locked. ☐ Stairs have proper rise over run and stairs >4 steps or 4' have guardrails. ☐ Never use a step ladder as a straight ladder. All straight ladders shall be extended three rungs past leading edge. Never use metal ladders while working with electricity.

	HAZARD	HAZARD CONTROLS (check all that apply and comment as required)
☐	AERIAL LIFT ☐ Scissor lift ☐ Extensible boom ☐ Articulated boom ☐ Vertical Lift ("Genie")	☐ Operators are sufficiently trained, experienced and qualified. ☐ Equipment is inspected after mobilization and is in good condition. ☐ Harness & Lanyard worn whenever operating the lift (scissor lifts may be excepted) ☐ Overhead and surface obstructions are reviewed with operators prior to use.
☐	SCAFFOLD ☐ Supported scaffold ☐ Suspended scaffold ☐ Free-standing/mobile scaffold	☐ Identify/coordinate operations with competent person ☐ Supported scaffold level, stable, proper attachments, tiebacks, planking, ☐ Suspended scaffolds anchored properly ☐ Guardrails present above 10 feet or personal fall apparatus used. ☐ Proper means of accessing scaffold (proper ladders, stair tower). ☐ Total height of free-standing scaffold not to exceed four times the minimum base dimension.
8. TOOLS, EQUIPMENT, MACHINERY – CHECK IF NOT APPLICABLE: ☐		
Site-Specific Comments: May use hand tools to open monitoring wells		
☒	HAND TOOLS Eye injury, puncture/bruise/ laceration hazard	☒ Use proper tool for the job, maintain tools in good condition (no damage, cutting tools sharp, etc.) use appropriate PPE for hand/eye/body protection, plan for safe "follow through" motion, use vise/clamp/work surface to hold/stabilize work piece
☐	POWER TOOLS ☐ Eye/hand/body injury ☐ Fuel-related hazards ☐ Inhalation hazard ☐ Noise ☐ Sparks, heat, fire hazard ☐ Electrical hazards	☐ For all power tools: – Inspect tools to ensure safe operating condition before each use. – Use tool in accordance with manufacturer's specifications. – Use PPE or other safety practices, as appropriate, for eye/hearing/hand/head/body protection – Provide training or verify operator qualification for use of power tool. – Stay clear of hazard zone, "line of fire" when working near where power tools are used. ☐ Use safety practices for refueling, fuel handling/transport/storage. ☐ Use respirators, ventilation, wet methods, other appropriate means to control inhalation hazard. ☐ For spark/heat generating tool, control fire hazards, segregate combustible/flammable materials. ☐ For electrical hazards, see # 6, "Electrical Hazards".
☐	WELDING, CUTTING ☐ Gas welding/cutting ☐ Arc welding/cutting	☐ Hot work permit system to be implemented. ☐ Operator properly protected (eye protection, clothing, apron, etc.) ☐ Fire hazard controls (watcher, fire extinguisher, water, isolate combustibles) ☐ Protect nearby personnel from hazardous UV, IR light (shielding, curtain) ☐ Electrical safe work practices for arc welding ☐ Gas cylinder safe practices (secured, upright, caps on when not in use, prevent damage).
☐	EQUIPMENT/MACHINERY ☐ Point-of-operation hazards ☐ Pinch points, moving parts ☐ 'Struck-by,' 'caught between' ☐ Hot surfaces, heat ☐ Extension cords, flexible wire ☐ Fuel related (gas or liquid) ☐ Hydraulic pressure ☐ Compressed air/gas ☐ Kinetic, stored energy ☐ Noise ☐ Lockout/tagout ☐ Emissions, discharge gases ☐ Working at heights, falls ☐ Lifting, repetitive motion ☐ Illumination ☐ Electrical (see below)	☐ *Working Near* Equipment/Machinery ☐ Work at safe distance/restrict access, ensure guards in place, heed warning signs ☐ Implement measures necessary for adequate illumination ☐ Control exposue to emission/discharge gases (ventilation, PPE, other means). ☐ Ensure safe practices for fuels/fluids/machine-related hazardous materials ☐ Use PPE or other safety practices for eye/hearing/hand/head/body protection ☐ Segregate combustible materials from hot surfaces/hot exhaust (minimum 3 feet) ☐ Operation/Maintenance/Repair of Equipment/Machinery (see applicable control measures above) ☐ Orient/locate equipment for safe access during operation and maintenance ☐ Use equipment/machinery in accordance with manufacturer's specifications ☐ Use safe lifting practices, minimize repetitive motion hazards ☐ Ensure point-of-operation, mechanical power transmission, other moving parts are guarded with protective devices; do not override interlocks, guards, protective devices ☐ Secure long hair/loose clothing/hanging jewelry near moving/rotating parts ☐ Ensure appropriate warning signs are in place and heeded ☐ Use safe practices for fueling, fuel transport & storage. ☐ Operate fuel-powered equipment in well ventilated location. ☐ Incorporate safety provisions/safe work practices for compressed air, pressurized systems (pneumatic/hydraulic), stored energy ☐ Implement control-of-hazardous-energy practices (lockout/tagout), designate "authorized" personnel, notify "affected" personnel ☐ Protect from fall hazards (safe ladder use, personal fall protection, guardrails, other) ☐
☐	ELECTRICAL HAZARDS	☐ Implement provisions of # 6, "Electrical Hazards"
9. MANUAL MATERIAL HANDLING, MATERIAL STORAGE – CHECK IF NOT APPLICABLE: ☒		

	HAZARD	HAZARD CONTROLS (check all that apply and comment as required)
Site-Specific Comments:		
☐	LIFTING / ERGONOMIC Musculoskeletal strain, repetitive motion injury	☐ Use proper manual lifting techniques (straight back, bend at knees, firm grasp, firm footing). ☐ Seek assistance for lifting heavy objects (>50 lbs.) ☐ Use mechanical lifting equipment to reduce manual material handling hazard ☐ For repetitive motion activities, take breaks, switch hands, share task with others, employ other safe practices appropriate for the specific task(s).
☐	STORAGE OF MATERIALS See Sect. 12 for Chemical Storage	☐ Store materials in stable manner that prevents tipping, sliding, rolling, falling over. ☐ Materials stored in tiers to be stacked, racked, blocked, interlocked or otherwise secured to prevent sliding, falling or collapse ☐ Do not exceed load limits of racks, platform; ensure racks are stable, robust, secure ☐ On scaffold, do not store materials in excess of supplies needed for immediate use ☐ Ensure stored materials do not block aisles, passageways ☐ For used lumber, remove nails before stacking, and stack to be stable and self supporting, no higher than 20 feet (or 16 feet if lumber is to be handled manually) ☐ Debris will be removed regularly from storage area and place in designated area or disposed.
10. CONSTRUCTION OPERATIONS, HEAVY EQUIPMENT, HEAVY VEHICLES – CHECK IF NOT ANTICIPATED: ☒		
Site-Specific Comments:		
☐	HEAVY EQUIPMENT; CONSTRUCTION VEHICLES Hazards: Struck By, Run-Over, Caught In Between (pinch points), Roll Over, Fluid Leaks	☐ Trained/qualified persons operate all heavy equipment. ☐ No passengers on moving/operating equipment except where passenger seat/restraint is present. ☐ Equipment inspected upon mobilization and daily; maintained in good repair, backup alarms ☐ All leaks or defective safety equipment will be repaired before use. ☐ Operators required to use seatbelts. ☐ Eye contact with operator and use of hand signals prior to approaching near equipment. ☐ High visibility vests are required of all personnel in work area. ☐ Max. safe slope for each vehicle will be followed. ☐ Personnel to stay clear of swing radius of equipment. ☐ Spill equipment available for fuel and hydraulic fluid leaks. ☐ Equipment locked, secured, brakes set, buckets/forks lowered, when not in use.
☐	CRANES Overhead hazards – utility lines, swing radius, falling objects, wire ropes and hoisting equipment ☐ Overbalancing – high winds, outrigger placement, overloading, safe slope ☐ Struck By, Run-Over, Caught In Between (pinch points), Roll Over, Fluid Leaks	**In addition to general safety practices for heavy equipment (above), as applicable:** ☐ Only qualified persons operate cranes (certificate required). ☐ A Critical Lift Plan & Checklist prepared/executed (HS 506) prior to mobilization. ☐ Equipment will be inspected prior to mobilization and a Crane Pre-Operational Safety Checklist (see EHS 506) will be completed and signed by crane operator. ☐ Crane operator will remain at the controls at all times during operation. ☐ Crane operation must be performed under the direction of an appointed signal person at all times. ☐ Communication between crane operator and signal person will be maintained through standard hand signals or voice communication equipment. Radio equipment, if used, will be equipped with a dedicated channel. ☐ Lifting or lowering will not exceed 100ft/minute. Lowering must be controlled i.e. no free fall. ☐ Stop work will be issued whenever hoisting equipment is exposed to high winds. ☐ Outriggers will be fully extended/locked with a firm footing within the maximum safe slope (<1%). ☐ Crane to be on level, stable base, dunnage used when necessary. ☐ Total weight of load not to exceed 50% of rated capacity for the crane radius and configuration. ☐ Rigging procedures – see Hoisting, Lifting, Rigging, below. ☐ Suspended personnel lifting is prohibited (unless per approved “man-lift” equipment). ☐ No personnel permitted beneath suspended loads.
☐	HOISTING, LIFTING, RIGGING ☐ Crane ☐ Drill rig ☐ Loader, excavator, etc. ☐ Mechanical, electrical hoist	☐ Identify, coordinate with competent person. ☐ Rigging directly to the forks of a lull, forklift, or front loader equipped forks is prohibited. ☐ Do not exceed loading limits of equipment. ☐ A Critical Lift Checklist (see EHS 506) will be completed and signed prior to crane mobilization. ☐ Rigging, wire rope and hoisting equipment will be inspected and maintained on a weekly basis. ☐ Crane hooks will be equipped with safety latches.
☐	FORKLIFT Hazards: Struck By, Run-Over, Caught In Between (pinch points), Roll Over, Fluid Leaks	**In addition to general safety practices for heavy equipment (above), as applicable:** ☐ Qualified operater, per established forklift training (certificate is required) ☐ Equipment inspected daily and documented on Forklift Preoperation Inspection Checklist ☐ Operators required to use seatbelts, and adhere to safe operating procedures.

	HAZARD	HAZARD CONTROLS (check all that apply and comment as required)
		☐ Do not exceed lifting load limits. ☐ Forklift shall not be moved/driven with empty forks in raised position. ☐ When not in use, forks lowered, brake set, controls in neutral, key removed.
☐	EXCAVATION/TRENCHING ☐ Max Depth ≥ 20' ☐ Max Depth ≥ 5' ☐ Max Depth <5' with potential cave-in hazard ☐ Potential permit-required confined space at depth ≥ 4' ☐ Underground utilities ☐ Overhead utilities ☐ Structures/foundations ☐ Falls into excavations	☐ Activities under supervision/oversight of competent person ☐ Sloping & shoring for excavations ≥20' are approved by a professional engineer ☐ Sloping & shoring for excavations ≥5' when persons are exposed to cave-in. ☐ Sloping & shoring for shallow (<5') excavations with cave-in hazard ☐ Excavations ≥ 4' are classified as a non-permit confined space ☐ Excavations ≥ 4' are classified as Alternate Entry or Permit-Required (see confined space) ☐ Implement underground utility clearance procedures. ☐ Hand digging within 3' of utility locations. ☐ Excavations to be protected by perimeter fencing (not barricade tape) ☐ Use trench boxes in accordance with proper procedures. ☐ Workers in trenches to be within 25 feet of ladder or sloped entryway.
☐	DRILLING ☐ Struck By, Run-Over, Caught In Between (pinch points), Roll Over, Fluid Leaks ☐ Underground utilities, aboveground ☐ Spills ☐ See Equipment/Machinery	☐ Contractor inspects drill rig daily before use. ☐ Drill rig equipped with operational emergency stop. ☐ Highpressure lines equipped with whip checks. ☐ High visibility vests, hard hats are being worn near the equipment. ☐ Operators and helpers will maintain a safe distance to moving parts. Individuals working near moving or rotating parts will secure loose hair, clothing, and equipment. ☐ Drill rigs will only be moved with masts lowered. Masts will be erected with outriggers fully extended when equipped with outriggers. ☐ Max. safe slope for rig will be followed, drill rig leveled, appropriate blocking/cribbing as needed. ☐ Spinning parts of the rig are guarded when possible, no loose clothing being worn near the rig. ☐ Follow underground utility clearance procedures. ☐ Area is surveyed for overhead utilities, safe clearance distance maintained. ☐ Hearing protection is used when working near the rig. ☐ Spill equipment is available for fuel and hydraulic fluid leaks.
☐	DEMOLITION	☐ Develop/implement demolition safety plan
☐	BLASTING	☐ Develop/implement blasting safety plan
11. CONFINED SPACES, HAZARDOUS ENCLOSED or INDOOR SPACES – CHECK IF NOT APPLICABLE: ☒		
Site-Specific Comments:		
☐	CONFINED SPACE(S) ☐ Permit required ☐ Non-permit required Potential/actual hazards: ☐ Atmospheric hazards: ☐ Flammable/explosive ☐ Oxygen deficiency ☐ Hydrogen sulfide ☐ Other toxic ☐ Combustible dust ☐ Electrical ☐ Mechanical, engulfment, entrapment, stored energy	☐ For personnel <u>working near confined</u> spaces: – Confined spaces have been identified, labeled. – Communication system in place to prevent unauthorized entry. ☐ For <u>permit-required confined space entry</u>, see separate entry permit. – All entrants, attendants, supervisors are trained/qualified. – Hazards properly characterized – Necessary equipment for safe entry utilized (access, retrieval, air monitoring) – Arrangements for rescue team have been made. ☐ For entry into a <u>non-permit</u> confined space, see site specific procedures delineated above in "site-specific comments," or see alternate/attached safety work plan.
☐	ENCLOSED/INDOOR SPACE(S) ☐ Outfall, culvert ☐ Tunnel, shaft, gallery ☐ Machine/equipment pit/vault ☐ Basement/Sub-basement ☐ Crawl space entry ☐ Indoor equipment/drilling	*<u>For indoor use of gasoline/propane/diesel equipment:</u>* ☐ Duct exhaust to outdoors, and/or introduce fresh air using ventilation/blowers/fans. ☐ Perform air monitoring (see section on Air Monitoring) *<u>For entry into potentially hazardous indoor or enclosed spaces:</u>* ☐ Ventilate and/or perform air monitoring for anticipated hazards. ☐ If space classified as confined space, follow confined space entry requirements (above).
12. COMMERCIAL CHEMICAL PRODUCTS USED AT WORK SITE – CHECK IF NOT APPLICABLE: ☐		
Site-Specific Comments: Alconox		

	HAZARD	HAZARD CONTROLS (check all that apply and comment as required)
☒	PRODUCTS REGULATED BY HAZARD COMMUNICATION STANDARD	☒ Safety Data Sheets available, either on site or readily available within same work shift ☒ Containers labelled properly ☒ Workers trained on hazards ☒ For subcontractor use of chemical products, coordinate/discuss during safety meetings.
☐	COMPRESSED GAS(ES):	☐ Secure cylinders upright, caps on when not in use, handle with care, prevent damage ☐ Propane cylinders not in use must be stored outdoors in cage or similar secure enclosure. ☐ Ensure acetylene cylinders NOT secured to steel arc welding bench ☐ Store/use in a manner to prevent asphyxiation hazard ☐ Segregate oxygen and fuel gases by distance (20') or barrier ☐ Control ignition sources, no smoking signage ☐ Use/store in a manner to control inhalation exposure hazards, PPE, air monitoring.
☐	FLAMM./COMBUST. LIQ.	☐ Proper storage (flam. storage cabinets, other storage precautions) ☐ Control ignition sources ☐ Grounding and bonding where appropriate
☐	CORROSIVES	☐ Handle with care, use appropriate eye/face/skin protection ☐ Eyewash, deluge shower, drench hose, hand washing (with water), as appropriate
☐	TOXIC	☐ For toxic substances, use/store in a manner to control exposure hazards (inhalation, ingestion, skin contact, skin absorption; use PPE as appropriate, conduct air monitoring as appropriate.
☐	CHEMICAL STORAGE	☐ Chemical storage cabinet, cage, storage room, or similar ☐ Incompatible chemicals segregated ☐ Secondary containment ☐ Safety equipment will be located near chemical storage.

13. CHEMICAL HAZARDS FROM ON-SITE CONTAMINANTS, OPERATIONS, EMISSIONS – CHECK IF N/A: ☐

Site-Specific Comments:

CHECK AS APPROPRIATE BELOW. PROVIDE ADDITIONAL INFO. AS APPROPRIATE, IN SITE-SPECIFIC HAZARD ANALYSIS ABOVE.

☒ Soil/groundwater contaminants (historical release)	☐ Oxygen deficiency	☐ Asbestos
☐ Recent release, known high concentrations	☒ Chlorinated VOCs (volatile org. cpds.)	☐ Lead paint
☐ Former chemical disposal site, landfill	☒ BTEX, petroleum derived VOCs	☐ Pesticides, herbicides, fungicides
☐ Urban fill, residual contaminants	☐ Fuel oils, petroleum, waste oil, lubricants	☐ Sensitizers
☐ Containerized waste (drums, process equipment)	☒ Metals, metal compounds, metal dusts	☐ Radioactive contaminants
☐ Buried drums (known or potential)	☐ Elemental mercury	☐ Other:
☐ Large containers, potential for spills	☒ Polyaromatic hydrocarbons (PAHs)	
☐ Emissions from active industrial processes	☒ Polychlorinated biphenyls (PCBs)	
☐ Emissions from welding/cutting/hot work	☐ Potential for flammable vapors	
☐ Carbon monoxide (vehicle/equipment exhaust)	☐ Potential for flammable gas (methane)	
☐ Contaminated building surfaces	☐ Corrosive, acids/caustics, strong irritants	
☐ Unexploded ordnance	☐ Sulfides, hydrogen sulfide (H2S)	
☐ Explosive dust	☐ Cyanides, hydrogen cyanide (HCN)	

☐	FOR SITE REGULATED AS "UNCONTROLLED HAZ. WASTE SITE," e.g. **REGULATED BY HAZWOPER** (OSHA 29 CFR 1910.120) – Establish work zones & site control plan (Exclusion Zone - EZ, Contaminant Reduction Zone - CRZ, Support Zone - SZ) – Workers to be aware of and trained on hazards per OSHA Hazard Communication Standard. – Include site map/figure depicting work locations and other relevant site-specific information. – Site workers in EZ or CRZ to have OSHA 40-hour training, current 8-hour refresher, 3 days supervised field expience. – Site workers in EZ or CRZ to participate in Medical Monitoring program. – "Peripheral" site workers, engaged on-site, with no hazardous exposure: 24 hr. training required. – Site supervisor(s) required to have 8-hr. Supervisor training. – Implement site-specific procedures for worker protection through engineering controls, work practices, personal protective equipment (PPE), air monitoring, decontamination, spill containment (see Sections B and C, "Health and Safety Equipment/Gear" and "Air Monitoring" – Include emergency response program in H&S plan.
☒	FOR SITE WITH CHEMICAL CONTAMINANTS BUT **NOT REGULATED BY HAZWOPER** – Workers to be aware of and trained on hazards per OSHA Hazard Communication Standard – Implement appropriate controls to minimize worker exposure (engineering controls, work practices) to levels below OSHA PELs. – Use PPE as needed (see B, "Health and Safety Equipment/Gear"). – Conduct air monitoring or personal air sampling to monitor and/or evaluate worker exposure (see Section C, "Air Monitoring").

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PRE-WORK TASK HAZARD ANALYSIS (THA)

HAZARD		HAZARD CONTROLS (check all that apply and comment as required)
☐	ATMOSPHERIC HAZARDS GENERATED BY EXHAUST FROM OPERATING EQUIPMENT ☐ Position work upwind of exhaust source ☐ Use blowers, fans to dissipate atmospheric hazards ☐ Conduct air monitoring (see Section C, "Air Monitoring").	
☐	OFF-SITE MIGRATION OF CONTAMINANTS	☐ Implement controls to minimize hazard migration (dust suppression, covers, foam, etc.) ☐ Community/perimeter air monitoring is not anticipated with the current scope of work. ☐ Community/perimeter air monitoring to be conducted per perimeter air monitoring plan.

EMERGENCY RESPONSE **(911 Service is Available ☒ Yes ☐ No)** ☒ Verify wireless coverage at site, use alternate communication procedures as needed.

Emergency Medical Treatment - Hospital Name: Hospital Address:	St Joseph's Hospital 555 E. Market St Elmira NY 14901	**Number:**	607.733.6541
Urgent Care Med. Treatment - Clinic Name: Occupational Clinic Address:	Elmira Urgent Care 306 W. Water St., Elmira, NY 14905	**Number:**	607.732.1100
Fire Department Name	West Elmira Fire Department	**Number:**	911
Spill Response:	West Elmira Fire Department	**Number:**	911
Client Representative Name::	Kevin Krueger	**Office Number:** **Cell Number:**	(651) 687-2210
Geosyntec **Project Manager** Name:	Aron Krasnopoler	**Office Number:** **Cell Number:**	(410) 381-4333 (202)-550-7724
Geosyntec **Corporate H&S** Name:	Dale Prokopchak	**Office Number:** **Cell Number:**	804 332 6376 (804) 349-8067

Emergency Response Comments:

Date:	
Project Name: Former Scott Technologies Site	
THA Title: Monitoring Well Inspections and Synoptic Water Level Measurements	
Subcontractor Name(s):	
Geosyntec Representative (reviewed by):	**Michael Hansen**
Subcontractor Foreman/Supervisor Signature (authorize):	
Crew Signatures (acknowledge):	
Print Name	**Signature**

PLEASE RETURN A COPY OF THIS SIGNED PAGE TO GEOSYNTEC PROJECT MGR., SUPERINTENDENT UPON REVIEW AND ACKOWLEDGMENT BY THE CREW MEMBERS. ALL NEW CREW MEMBERS SHALL BE ORIENTATED THE SAME AND A SUBMITTAL OF A NEW SIGN IN SHEET SHALL BE COMPLETED.

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PRE-WORK TASK HAZARD ANALYSIS (THA)

TASK/ACTIVITY:	Groundwater Sampling	**Date:**	10/21/2014
Project Name:	Former Scott Technologies Site	**Client Name:**	Unisys Corporation
Project Number:	MN0832	**Geosyntec Proj. Mngr.:**	Aron Krasnopoler
Project Address:	1051 Sourth Main Street, Elmira, New York	**Geosyntec Proj. Dir.:**	Paul Brookner
Task Description:	Collect groundwater samples via low-flow sampling procedures from site monitoring wells.		

A. SUMMARY OF SITE-SPECIFIC TASK HAZARD ANALYSIS

Site-Specific Comments: Submersible electric centrifugal pumps (e.g. mega monsoon) are expected to be used for sampling.

Sub-Tasks, Activities	Hazards	Hazard Controls
Task 1: Mobilize to Site	-Driving -Mobilization to and around unfamiliar facility	- Drive carefully to facility, be well rested and avoid distracted driving. - Review scope of work.
Task 2: Locate sampling location and measure depth to water.	-Slips/trips/falls -Heat/cold stress -Biohazards: snakes, bees, spider, ticks, poison ivy -Potential contaminant exposure: VOCs, PCBs, SVOCs	-Pay close attention to foot placement; slow deliberate movement. -Dress for weather conditions. Apply sunscreen if needed. -Beaware of surroundings and avoid biohazards. - don level D personal protective equipment (PPE). PPE will include: safety glasses, safety vests, steel toe boots, and nitrile gloves.
Task 3: Groundwater Sampling Collect groundwater sample from monitoring well using low-flow sampling procedures.	-Same hazards noted above for Task 2. -Splash harzards. .	-Same hazard controls noted above for Task 2. -Avoid direct contact with contaminated matrices.
Task 4: Sample Labeling and Packing	-Potential contaminant exposure: VOCs, PCBs, SVOCs -Back strain when transporting coolers full of collected samples packed with ice.	-Continue to wear level D PPE and minimize contact with sample material. -Use proper lifting techniques. Get assistance when possible, especially for containers heavier than 49 lbs.
Task 5: Equipment Decontamination Decontaminate equipment that will be reused (e.g. pump, water level indicator, et. al.)	-Slips, Trips, and Falls -Potential contaminant exposure: VOCs, PCBs, SVOCs -Splash hazards	-Pay close attention to foot placement; slow deliberate movement. -Continue to wear level D PPE and minimize contact with water.
Task 6: Demobilization Demobilize from Site, making sure all work areas are clean and orderly.	-Driving	-Drive carefully and avoid distracted driving. If too exhausted to drive safely back to the office make arrangements to stay at hotel.

B. HEALTH AND SAFETY EQUIPMENT/GEAR

Site-Specific Comments:

☒	PERSONAL PROTECTIVE EQUIPMENT (PPE):	Level(s) of Protection (for chemical hazards):	☐ Level D (standard work clothes, no chemical protective clothing) ☒ Modified Level D (chemical protective clothing in addition to standard work clothes) ☐ Level C (air purifying respirator or dust mask, with chemical protective clothing) ☐ Level B or A (air supplied respirator, chemical protective suit)

		☒ Hard-toed boots/shoes ☐ Hardhat ☐ Noise/hearing protection ☒ High-visibility/reflective vest ☒ Work gloves ☒ Eye/face protection ☒ Safety glasses with side shields ☐ Goggles ☐ Face shield ☐ Other: ☒ Chemical protective clothing ☒ Gloves, type: Nitrile ☐ Coveralls, type: ☐ Outer boots, boot covers ☐ Other:	☐ Respiratory Protection ☐ Disposable n-95 face mask ☐ Half-face air-purifying respirator ☐ Full-face air-purifying respirator ☐ Resp-cartridge, type: ☐ Other: ☐ Personal flotation device ☐ Personal fall apparatus ☐ Fire retardant clothing ☐ EH (Electrical Hazard) rated boots, gloves ☐ Other:
☒	OTHER H&S EQUIPMENT and GEAR:	☒ Fire extinguisher ☐ Caution tape ☒ Traffic control warning devices ☐ Warning signs or placards ☐ Decon supplies for personal decon ☐ Portable ground fault circuit interrupter (GFCI)	☐ Lockout/tagout equipment ☐ Ventilation equipment (fan, blower) ☒ First aid kit ☒ Vehicle emergency kit (flares, lights, reflective device) ☐ Other:

C. AIR MONITORING – CHECK IF NOT APPLICABLE: ☒

Site-Specific Comments:

☐	INSTRUMENT(S), EQUIPMENT	☐ PID, Lamp energy: eV ☐ FID ☐ Carbon monoxide detector ☐ Hydrogen sulfide detector ☐ Oxygen (O_2) detector	☐ Flammable gas (LEL) detector ☐ Particulate (dust) detector ☐ Calibration kit for each detector type ☐ Others:

☐	ACTION LEVELS FOR **O2/LEL**	☐ Oxygen	≤19.5% - provide ventilation to raise oxygen to acceptable levels, or utilize Level B. ≥23.0% - provide ventilation to lower oxygen to acceptable levels, or utilize Level B and implement controls for fire hazards, control ignition sources.
		☐ LEL	Confirm at least 12% oxygen is present to ensure accuracy of LEL readings. At <10% LEL - Continue working, continue to monitor LEL levels At ≥10% LEL- Immediately withdraw from area. Resume work ONLY after LEL readings reduced to <10% through passive dissipation, or active vapor control measures.

☐	ACTION LEVELS FOR **TOXICS** (sustained breathing zone concentrations)	**Parameters**	**Level D, Modified D**	**Use levels C or B, as indicated below, OR take action to reduce breathing zone level to concentration acceptable for Level D.**
		☐ VOCs	< ppm	ppm to ppm: Level C (air purifying respirator) > ppm: Level B (air-supplied respirator)
		☐ Carbon Monoxide	< 35 ppm	≥35 ppm - Level B (air-supplied respirator)
		☐ Hydrogen Sulfide	< 10 ppm	≥10 ppm - Level B (air-supplied respirator)
		☐ Total Dust	< mg/m^3	> mg/m^3 - Level C (air-purifying respirator)
		☐		
		☐		

HAZARD	HAZARD CONTROLS (check all that apply and comment as required)
1. PREMISES/ENVIRONMENTAL HAZARDS	
Site-Specific Comments:	
☒ LOCATION HAZARDS ☒ Outdoor field work ☒ Urban, suburban ☐ Rural, remote location ☐ Indoor field work ☐ Operating facility ☐ Vacant facility ☐ Water hazards	☒ Use routine safety precautions commensurate with routine work environment conditions ☐ For non-routine, unique, or severe location hazards, see site-specific safety comments above. ☐ For water-related work, see #2, "Water Hazards" ☐ For worksite violence/security risks, see #3, "Violence, Security, Working Alone" ☒ For transportation related hazards, see #5, "Worksite Traffic, Vehicle, Transportation Hazards" ☒ For utility-related hazards, see # 6, "Utility-Related Hazards ☐ For atmospheric hazards in enclosed, indoor, or confined spaces, see # 11 "Confined Spaces or Hazardous Enclosed/Indoor Spaces"

	HAZARD	HAZARD CONTROLS (check all that apply and comment as required)
☒	WALKING/WORKING SURFACES, HOUSEKEEPING ☒ Uneven, rough terrain, riprap ☒ Slippery surfaces ☐ Holes, pits, openings ☐ Puncture, foot hazards	☒ Keep work areas clean, orderly, dispose of trash/debris, maintain sanitary conditions. ☒ Walkways are cleared of equipment, excavated material, tools and debris, snow ☐ Holes, pits, openings to be covered or otherwise marked or guarded ☐ Apply absorbent, salt or sand, for traction/slip resistance on slippery/icy/wet surfaces ☒ Wear proper work boots/shoes with ankle support and/or traction, as appropriate for conditions
☒	TEMPERATURE/WEATHER ☐ Heat Stress ☒ Cold Stress ☒ Severe Weather ☒ Lightning	☒ Heat/Cold stress are monitored in accordance with Geosyntec procedures EHS 124 & EHS 125 ☐ Provide sufficient fluids, shade, breaks, other precautions as appropriate to adderss heat hazards. ☒ Provide protection from sun (sun screen, shaded brake area). ☒ For cold stress, wear multiple layers, protect from wind/wet, frequent break in warm location. ☐ In high wind, discontinue working at heights (e.g. on ladders, scaffold, aerial lift, similar). ☒ Use precautions for lightning, thunderstorm, hale, tornado (monitor weather, “30/30 rule,” shelter)
☒	BIOLOGICAL HAZARDS ☒ Insects, spiders, ticks ☐ Wild/feral/pet animals ☐ Mold, fungi ☒ Poisonous plants ☐ Bird Guano ☐ Infectious, wastewater, sewer ☐ Bloodborne pathogens	☒ Utilize safety practices commensurate with risk of biting/stinging insects, wild/feral/pet animals. ☒ For poisonous plants (poison ivy/oak/sumac/etc.), minimize exposed skin area, wear coveralls, use barrier cream/wash (Technu products or similar), as appropriate. For biological exposure hazards, use protective measures commensurate with hazard: ☒ Minor-moderate hazard - use ordinary hygiene practices, protective gloves, hand washing. ☐ Moderate-severe hazard - add protective clothing, respirator, decon, as appropriate. ☐ Bloodborne pathogen (human infectious agents) - implement “Universal Precautions”
☐	HAZARDOUS NOISE	☐ Hearing protection is used when exposed to excessive noise levels (greater than 85 dBA over an 8-hour work period, or intermittent….)
☐	OVERHEAD HAZARDS, FALLING OBJECTS	☐ Wear hardhat when exposed to overhead hazards, “bump” hazards, falling objects ☐ Cordon off hazard zones, route access/egress around hazards of falling objects ☐ Secure objects from falling ☐ Provide overhead protection (canopy) to protect public pedestrians, workers
☐	ILLUMINATION ☐ Night work ☐ Indoor work	☐ Make site-specific arrangements for illumination of work areas and access routes.
2. BOATING, WATER, WET LOCATIONS, FLOOD, ETC. – CHECK IF NOT APPLICABLE: ☒		
Site-Specific Comments:		
☐	WATER HAZARDS ☐ Drowning, hypothermia ☐ Boat, barge, raft ☐ Wading, wetland, mud/silt ☐ Dam release, flood, tide ☐ Diving	☐ Wear appropriate Coast Guard-approved Personal Flotation Device (PFD) ☐ Bring emergency rescue equipment (ring buoy, reaching device, flares) ☐ Use fuel safety practices, fire extinguisher present in boat ☐ See site-specific safety comments above.
3. VIOLENCE, PUBLIC PROTECTION, WORKING ALONE – SPECIAL MEASURES – CHECK IF NOT ANTICIPATED: ☐		
Site-Specific Comments:		
☐	PERSONAL SECURITY, HIGH CRIME AREA	☐ Employ standard precautions, which may include: conduct work only during daylight hours, use buddy system, avoid parking in secluded location, lock vehicles, hide valuable items in vehicles from plain view ☐ See site-specific safety comments above for project-specific security measures.
☐	PUBLIC AT RISK, SITE SECURITY	☐ Provide safe pedestrian route around work areas, use appropriate barriers, signs, warning devices. ☐ Provide covers over excavation, secure fencing, overnight protection ☐ Provide protection from overhead hazards (canopy, etc.) where public at risk of overhead hazards ☐ Provide secure locked storage of hazardous chemicals, hazardous equipment, etc.
☒	WORKING ALONE	☒ Establish “check in” procedure with supervisor or project manager (arrival, mid-day, departure) ☒ Additional measures, as appropriate for the working conditions.
4. DRIVING, TRAFFIC, TRANSPORTATION HAZARDS – CHECK IF NOT APPLICABLE: ☐		
Site-Specific Comments:		
☒	DRIVING HAZARDS ☒ Routine work travel ☐ Unfamiliar location ☐ Unfamiliar vehicle ☒ Overnight travel, distance	☒ Use routine safe/defensive driving practices (seat belts, safe speeds, eyes ahead, no tailgating, limit distractions, no texting, safe cell phone use, clear windows, account for weather/road conditions, adequate sleep, other measures as appropriate). ☒ Plan travel route before driving (assemble maps, enter destination in GPS). ☐ Familiarize yourself with vehicle operational controls before operating unfamiliar vehicle.

	HAZARD	HAZARD CONTROLS (check all that apply and comment as required)
☒	WORKERS EXPOSED TO TRAFFIC HAZARDS ☒ In/near public or private roadway ☒ Parking lot, driveway ☐ Worksite, construction site traffic	☒ Workers to wear reflective vests where exposed to traffic hazards. ☒ Where possible, park vehicles as protective shield from oncoming traffic. ☒ Configure work area and support vehicles to minimize worker exposure to traffic hazards. ☐ DOT signal devices will be used to re-route vehicles around work area, site entrances/exits. ☐ Flaggers will be used and have DOT Flagger Training; police detail where appropriate or required. ☒ Park vehicles in secure location away from heavy equipment use or other site operations. ☐ Mark temporary roadways clearly, provide berms/stop logs where needed.
☐	RAILROAD/AIRPORT HAZARD	☐ Coordinate with rail company/airport and implement required safety measures ☐ Site workers to receive safety training for railroad/airport work.
☒	OFF-ROAD DRIVING, USE OF ALL-TERRAIN VEHICLE	☒ For off road driving, do not exceed capability of vehicle ☐ Follow ATV specific procedures for training, safety equipment, operation.
☐	TRANSPORTING MATERIALS, TOWING/HAULING LOADS	☐ Ensure load is firmly secured (rope, straps, load configuration) to prevent shifting during travel. ☐ For trailer use, verify signal/braking lights operational, rear-view mirrors effective, hitch/safety chains secure.
5. UTILITY-RELATED HAZARDS (for underground/overhead work) – CHECK IF NOT APPLICABLE: ☒		
Site-Specific Comments:		
☐	OVERHEAD UTILITIES	☐ Maintain proper clearance, employ other appropriate precautions for the conditions.
☐	UNDERGROUND UTILITIES	☐ Confirm appropriate underground utility clearance procedures have been completed prior to ground penetrations, and employ other utility clearance/locator practices, as appropriate for conditions.
6. ELECTRICAL HAZARDS – CHECK IF NOT APPLICABLE: ☒		
Site-Specific Comments:		
☐	WORKERS EXPOSED TO: ☐ Voltage < 50 v ☐ Voltage 50-600v ☐ Voltage > 600v ☐ AC ☐ DC ☐ 3-phase ☐ Battery and/or solar power ☐ Capacitor/Transformer	☐ Implement electrical safe work practices commensurate with the work to be performed, pertaining to the following (as applicable): – Worker training/qualification – Electrical equipment and hazards, safe design features – Electrical safe work practices – Grounding, use of GFCIs – Electrical equipment installation, operation, maintenance, repair – Arc flash protection – Electrical equipment diagnostics
☐	BASIC ELECTRICAL HAZARDS ☐ Equipment/tool use/operation ☐ Use of extension cords	☐ Control water-related hazards, in a manner appropriate for the job tasks/equipment/tool. ☐ Use extension cords/power cords properly, prevent damage, take out of service if damaged. ☐ Inspect tool/equipment/extension cords/power cords before each use. ☐ Use GFCI-protected outlet or portable GFCI in wet locations, outdoors, basements ☐ Ensure live parts are guarded, enclosures secure. ☐ Enclosures, circuits properly labeled.
☐	LOCKOUT/TAGOUT OF ELECTRICAL ENERGY	☐ Implement control-of-hazardous-energy practices (lockout/tagout), provide lockout/tagout locks and devices, training workers, designate “authorized” personnel, notify “affected” personnel
7. FALL HAZARDS – CHECK IF NOT ANTICIPATED: ☒		
Site-Specific Comments:		
☐	WORKING AT HEIGHTS ☐ Roof, skylight ☐ Elevated platform ☐ Holes, side opening ☐ Retaining wall, cliff, ledge ☐ Trench, excavation ☐ Protruding rebar	☐ Ensure guardrails present ☐ Use personal fall apparatus (PFA) ☐ Use tether or positioning device ☐ Restrict access to hazard (barriers, tape, sign) ☐ Ensure covers in place over holes ☐ Watch person ☐ Use fall protection net ☐ Restrict access beneath work to protect other site personnel from overhead hazards ☐ Install caps on protruding rebar
☐	LADDERS / STAIRS ☐ Extension ladders ☐ Step ladders ☐ Fixed ladders ☐ Stairs	☐ Provide instruction/review pertaining to safe ladder use ☐ Extension ladders are properly footed, secured, setup at proper angle ☐ Stepladders are set on level ground or properly shimmed with spreaders locked. ☐ Stairs have proper rise over run and stairs >4 steps or 4' have guardrails. ☐ Never use a step ladder as a straight ladder. All straight ladders shall be extended three rungs past leading edge. Never use metal ladders while working with electricity.

	HAZARD	HAZARD CONTROLS (check all that apply and comment as required)
☐	AERIAL LIFT ☐ Scissor lift ☐ Extensible boom ☐ Articulated boom ☐ Vertical Lift ("Genie")	☐ Operators are sufficiently trained, experienced and qualified. ☐ Equipment is inspected after mobilization and is in good condition. ☐ Harness & Lanyard worn whenever operating the lift (scissor lifts may be excepted) ☐ Overhead and surface obstructions are reviewed with operators prior to use.
☐	SCAFFOLD ☐ Supported scaffold ☐ Suspended scaffold ☐ Free-standing/mobile scaffold	☐ Identify/coordinate operations with competent person ☐ Supported scaffold level, stable, proper attachments, tiebacks, planking, ☐ Suspended scaffolds anchored properly ☐ Guardrails present above 10 feet or personal fall apparatus used. ☐ Proper means of accessing scaffold (proper ladders, stair tower). ☐ Total height of free-standing scaffold not to exceed four times the minimum base dimension.
8. TOOLS, EQUIPMENT, MACHINERY – CHECK IF NOT APPLICABLE: ☒		
Site-Specific Comments:		
☒	HAND TOOLS Eye injury, puncture/bruise/ laceration hazard	☒ Use proper tool for the job, maintain tools in good condition (no damage, cutting tools sharp, etc.) use appropriate PPE for hand/eye/body protection, plan for safe "follow through" motion, use vise/clamp/work surface to hold/stabilize work piece
☐	POWER TOOLS ☐ Eye/hand/body injury ☐ Fuel-related hazards ☐ Inhalation hazard ☐ Noise ☐ Sparks, heat, fire hazard ☐ Electrical hazards	☐ For all power tools: – Inspect tools to ensure safe operating condition before each use. – Use tool in accordance with manufacturer's specifications. – Use PPE or other safety practices, as appropriate, for eye/hearing/hand/head/body protection – Provide training or verify operator qualification for use of power tool. – Stay clear of hazard zone, "line of fire" when working near where power tools are used. ☐ Use safety practices for refueling, fuel handling/transport/storage. ☐ Use respirators, ventilation, wet methods, other appropriate means to control inhalation hazard. ☐ For spark/heat generating tool, control fire hazards, segregate combustible/flammable materials. ☐ For electrical hazards, see # 6, "Electrical Hazards".
☐	WELDING, CUTTING ☐ Gas welding/cutting ☐ Arc welding/cutting	☐ Hot work permit system to be implemented. ☐ Operator properly protected (eye protection, clothing, apron, etc.) ☐ Fire hazard controls (watcher, fire extinguisher, water, isolate combustibles) ☐ Protect nearby personnel from hazardous UV, IR light (shielding, curtain) ☐ Electrical safe work practices for arc welding ☐ Gas cylinder safe practices (secured, upright, caps on when not in use, prevent damage).
☐	EQUIPMENT/MACHINERY ☐ Point-of-operation hazards ☐ Pinch points, moving parts ☐ 'Struck-by,' 'caught between' ☐ Hot surfaces, heat ☐ Extension cords, flexible wire ☐ Fuel related (gas or liquid) ☐ Hydraulic pressure ☐ Compressed air/gas ☐ Kinetic, stored energy ☐ Noise ☐ Lockout/tagout ☐ Emissions, discharge gases ☐ Working at heights, falls ☐ Lifting, repetitive motion ☐ Illumination ☐ Electrical (see below)	☐ *Working Near* Equipment/Machinery ☐ Work at safe distance/restrict access, ensure guards in place, heed warning signs ☐ Implement measures necessary for adequate illumination ☐ Control exposue to emission/discharge gases (ventilation, PPE, other means). ☐ Ensure safe practices for fuels/fluids/machine-related hazardous materials ☐ Use PPE or other safety practices for eye/hearing/hand/head/body protection ☐ Segregate combustible materials from hot surfaces/hot exhaust (minimum 3 feet) ☐ Operation/Maintenance/Repair of Equipment/Machinery (see applicable control measures above) ☐ Orient/locate equipment for safe access during operation and maintenance ☐ Use equipment/machinery in accordance with manufacturer's specifications ☐ Use safe lifting practices, minimize repetitive motion hazards ☐ Ensure point-of-operation, mechanical power transmission, other moving parts are guarded with protective devices; do not override interlocks, guards, protective devices ☐ Secure long hair/loose clothing/hanging jewelry near moving/rotating parts ☐ Ensure appropriate warning signs are in place and heeded ☐ Use safe practices for fueling, fuel transport & storage. ☐ Operate fuel-powered equipment in well ventilated location. ☐ Incorporate safety provisions/safe work practices for compressed air, pressurized systems (pneumatic/hydraulic), stored energy ☐ Implement control-of-hazardous-energy practices (lockout/tagout), designate "authorized" personnel, notify "affected" personnel ☐ Protect from fall hazards (safe ladder use, personal fall protection, guardrails, other) ☐
☐	ELECTRICAL HAZARDS	☐ Implement provisions of # 6, "Electrical Hazards"
9. MANUAL MATERIAL HANDLING, MATERIAL STORAGE – CHECK IF NOT APPLICABLE: ☒		

	HAZARD	HAZARD CONTROLS (check all that apply and comment as required)
Site-Specific Comments: Cooler Lifting		
☒	LIFTING / ERGONOMIC Musculoskeletal strain, repetitive motion injury	☒ Use proper manual lifting techniques (straight back, bend at knees, firm grasp, firm footing). ☒ Seek assistance for lifting heavy objects (>50 lbs.) ☐ Use mechanical lifting equipment to reduce manual material handling hazard ☒ For repetitive motion activities, take breaks, switch hands, share task with others, employ other safe practices appropriate for the specific task(s).
☐	STORAGE OF MATERIALS See Sect. 12 for Chemical Storage	☐ Store materials in stable manner that prevents tipping, sliding, rolling, falling over. ☐ Materials stored in tiers to be stacked, racked, blocked, interlocked or otherwise secured to prevent sliding, falling or collapse ☐ Do not exceed load limits of racks, platform; ensure racks are stable, robust, secure ☐ On scaffold, do not store materials in excess of supplies needed for immediate use ☐ Ensure stored materials do not block aisles, passageways ☐ For used lumber, remove nails before stacking, and stack to be stable and self supporting, no higher than 20 feet (or 16 feet if lumber is to be handled manually) ☐ Debris will be removed regularly from storage area and place in designated area or disposed.
10. CONSTRUCTION OPERATIONS, HEAVY EQUIPMENT, HEAVY VEHICLES – CHECK IF NOT ANTICIPATED: ☒		
Site-Specific Comments:		
☐	HEAVY EQUIPMENT; CONSTRUCTION VEHICLES Hazards: Struck By, Run-Over, Caught In Between (pinch points), Roll Over, Fluid Leaks	☐ Trained/qualified persons operate all heavy equipment. ☐ No passengers on moving/operating equipment except where passenger seat/restraint is present. ☐ Equipment inspected upon mobilization and daily; maintained in good repair, backup alarms ☐ All leaks or defective safety equipment will be repaired before use. ☐ Operators required to use seatbelts. ☐ Eye contact with operator and use of hand signals prior to approaching near equipment. ☐ High visibility vests are required of all personnel in work area. ☐ Max. safe slope for each vehicle will be followed. ☐ Personnel to stay clear of swing radius of equipment. ☐ Spill equipment available for fuel and hydraulic fluid leaks. ☐ Equipment locked, secured, brakes set, buckets/forks lowered, when not in use.
☐	CRANES Overhead hazards – utility lines, swing radius, falling objects, wire ropes and hoisting equipment ☐ Overbalancing – high winds, outrigger placement, overloading, safe slope ☐ Struck By, Run-Over, Caught In Between (pinch points), Roll Over, Fluid Leaks	**In addition to general safety practices for heavy equipment (above), as applicable:** ☐ Only qualified persons operate cranes (certificate required). ☐ A Critical Lift Plan & Checklist prepared/executed (HS 506) prior to mobilization. ☐ Equipment will be inspected prior to mobilization and a Crane Pre-Operational Safety Checklist (see EHS 506) will be completed and signed by crane operator. ☐ Crane operator will remain at the controls at all times during operation. ☐ Crane operation must be performed under the direction of an appointed signal person at all times. ☐ Communication between crane operator and signal person will be maintained through standard hand signals or voice communication equipment. Radio equipment, if used, will be equipped with a dedicated channel. ☐ Lifting or lowering will not exceed 100ft/minute. Lowering must be controlled i.e. no free fall. ☐ Stop work will be issued whenever hoisting equipment is exposed to high winds. ☐ Outriggers will be fully extended/locked with a firm footing within the maximum safe slope (<1%). ☐ Crane to be on level, stable base, dunnage used when necessary. ☐ Total weight of load not to exceed 50% of rated capacity for the crane radius and configuration. ☐ Rigging procedures – see Hoisting, Lifting, Rigging, below. ☐ Suspended personnel lifting is prohibited (unless per approved “man-lift” equipment). ☐ No personnel permitted beneath suspended loads.
☐	HOISTING, LIFTING, RIGGING ☐ Crane ☐ Drill rig ☐ Loader, excavator, etc. ☐ Mechanical, electrical hoist	☐ Identify, coordinate with competent person. ☐ Rigging directly to the forks of a lull, forklift, or front loader equipped forks is prohibited. ☐ Do not exceed loading limits of equipment. ☐ A Critical Lift Checklist (see EHS 506) will be completed and signed prior to crane mobilization. ☐ Rigging, wire rope and hoisting equipment will be inspected and maintained on a weekly basis. ☐ Crane hooks will be equipped with safety latches.
☐	FORKLIFT Hazards: Struck By, Run-Over, Caught In Between (pinch points), Roll Over, Fluid Leaks	**In addition to general safety practices for heavy equipment (above), as applicable:** ☐ Qualified operater, per established forklift training (certificate is required) ☐ Equipment inspected daily and documented on Forklift Preoperation Inspection Checklist ☐ Operators required to use seatbelts, and adhere to safe operating procedures.

	HAZARD	HAZARD CONTROLS (check all that apply and comment as required)
		☐ Do not exceed lifting load limits. ☐ Forklift shall not be moved/driven with empty forks in raised position. ☐ When not in use, forks lowered, brake set, controls in neutral, key removed.
☐	EXCAVATION/TRENCHING ☐ Max Depth ≥ 20' ☐ Max Depth ≥ 5' ☐ Max Depth <5' with potential cave-in hazard ☐ Potential permit-required confined space at depth ≥ 4' ☐ Underground utilities ☐ Overhead utilities ☐ Structures/foundations ☐ Falls into excavations	☐ Activities under supervision/oversight of competent person ☐ Sloping & shoring for excavations ≥20' are approved by a professional engineer ☐ Sloping & shoring for excavations ≥5' when persons are exposed to cave-in. ☐ Sloping & shoring for shallow (<5') excavations with cave-in hazard ☐ Excavations ≥ 4' are classified as a non-permit confined space ☐ Excavations ≥ 4' are classified as Alternate Entry or Permit-Required (see confined space) ☐ Implement underground utility clearance procedures. ☐ Hand digging within 3' of utility locations. ☐ Excavations to be protected by perimeter fencing (not barricade tape) ☐ Use trench boxes in accordance with proper procedures. ☐ Workers in trenches to be within 25 feet of ladder or sloped entryway.
☐	DRILLING ☐ Struck By, Run-Over, Caught In Between (pinch points), Roll Over, Fluid Leaks ☐ Underground utilities, aboveground ☐ Spills ☐ See Equipment/Machinery	☐ Contractor inspects drill rig daily before use. ☐ Drill rig equipped with operational emergency stop. ☐ Highpressure lines equipped with whip checks. ☐ High visibility vests, hard hats are being worn near the equipment. ☐ Operators and helpers will maintain a safe distance to moving parts. Individuals working near moving or rotating parts will secure loose hair, clothing, and equipment. ☐ Drill rigs will only be moved with masts lowered. Masts will be erected with outriggers fully extended when equipped with outriggers. ☐ Max. safe slope for rig will be followed, drill rig leveled, appropriate blocking/cribbing as needed. ☐ Spinning parts of the rig are guarded when possible, no loose clothing being worn near the rig. ☐ Follow underground utility clearance procedures. ☐ Area is surveyed for overhead utilities, safe clearance distance maintained. ☐ Hearing protection is used when working near the rig. ☐ Spill equipment is available for fuel and hydraulic fluid leaks.
☐	DEMOLITION	☐ Develop/implement demolition safety plan
☐	BLASTING	☐ Develop/implement blasting safety plan
11. CONFINED SPACES, HAZARDOUS ENCLOSED or INDOOR SPACES – CHECK IF NOT APPLICABLE: ☒		
Site-Specific Comments:		
☐	CONFINED SPACE(S) ☐ Permit required ☐ Non-permit required Potential/actual hazards: ☐ Atmospheric hazards: ☐ Flammable/explosive ☐ Oxygen deficiency ☐ Hydrogen sulfide ☐ Other toxic ☐ Combustible dust ☐ Electrical ☐ Mechanical, engulfment, entrapment, stored energy	☐ For personnel <u>working near confined</u> spaces: – Confined spaces have been identified, labeled. – Communication system in place to prevent unauthorized entry. ☐ For <u>permit-required confined space entry</u>, see separate entry permit. – All entrants, attendants, supervisors are trained/qualified. – Hazards properly characterized – Necessary equipment for safe entry utilized (access, retrieval, air monitoring) – Arrangements for rescue team have been made. ☐ For entry into a <u>non-permit</u> confined space, see site specific procedures delineated above in "site-specific comments," or see alternate/attached safety work plan.
☐	ENCLOSED/INDOOR SPACE(S) ☐ Outfall, culvert ☐ Tunnel, shaft, gallery ☐ Machine/equipment pit/vault ☐ Basement/Sub-basement ☐ Crawl space entry ☐ Indoor equipment/drilling	*<u>For indoor use of gasoline/propane/diesel equipment:</u>* ☐ Duct exhaust to outdoors, and/or introduce fresh air using ventilation/blowers/fans. ☐ Perform air monitoring (see section on Air Monitoring) *<u>For entry into potentially hazardous indoor or enclosed spaces:</u>* ☐ Ventilate and/or perform air monitoring for anticipated hazards. ☐ If space classified as confined space, follow confined space entry requirements (above).
12. COMMERCIAL CHEMICAL PRODUCTS USED AT WORK SITE – CHECK IF NOT APPLICABLE: ☐		
Site-Specific Comments: Alconox, Isopropyl Alcohol, Nitric Acid		

	HAZARD	HAZARD CONTROLS (check all that apply and comment as required)
☒	PRODUCTS REGULATED BY HAZARD COMMUNICATION STANDARD	☒ Safety Data Sheets available, either on site or readily available within same work shift ☒ Containers labelled properly ☒ Workers trained on hazards ☒ For subcontractor use of chemical products, coordinate/discuss during safety meetings.
☐	COMPRESSED GAS(ES):	☐ Secure cylinders upright, caps on when not in use, handle with care, prevent damage ☐ Propane cylinders not in use must be stored outdoors in cage or similar secure enclosure. ☐ Ensure acetylene cylinders NOT secured to steel arc welding bench ☐ Store/use in a manner to prevent asphyxiation hazard ☐ Segregate oxygen and fuel gases by distance (20') or barrier ☐ Control ignition sources, no smoking signage ☐ Use/store in a manner to control inhalation exposure hazards, PPE, air monitoring.
☐	FLAMM./COMBUST. LIQ.	☐ Proper storage (flam. storage cabinets, other storage precautions) ☐ Control ignition sources ☐ Grounding and bonding where appropriate
☐	CORROSIVES	☐ Handle with care, use appropriate eye/face/skin protection ☐ Eyewash, deluge shower, drench hose, hand washing (with water), as appropriate
☐	TOXIC	☐ For toxic substances, use/store in a manner to control exposure hazards (inhalation, ingestion, skin contact, skin absorption; use PPE as appropriate, conduct air monitoring as appropriate.
☐	CHEMICAL STORAGE	☐ Chemical storage cabinet, cage, storage room, or similar ☐ Incompatible chemicals segregated ☐ Secondary containment ☐ Safety equipment will be located near chemical storage.

13. CHEMICAL HAZARDS FROM ON-SITE CONTAMINANTS, OPERATIONS, EMISSIONS – CHECK IF N/A: ☐

Site-Specific Comments:

CHECK AS APPROPRIATE BELOW. PROVIDE ADDITIONAL INFO. AS APPROPRIATE, IN SITE-SPECIFIC HAZARD ANALYSIS ABOVE.

☒ Soil/groundwater contaminants (historical release)	☐ Oxygen deficiency	☐ Asbestos
☐ Recent release, known high concentrations	☒ Chlorinated VOCs (volatile org. cpds.)	☐ Lead paint
☐ Former chemical disposal site, landfill	☒ BTEX, petroleum derived VOCs	☐ Pesticides, herbicides, fungicides
☐ Urban fill, residual contaminants	☐ Fuel oils, petroleum, waste oil, lubricants	☐ Sensitizers
☐ Containerized waste (drums, process equipment)	☒ Metals, metal compounds, metal dusts	☐ Radioactive contaminants
☐ Buried drums (known or potential)	☐ Elemental mercury	☐ Other:
☐ Large containers, potential for spills	☒ Polyaromatic hydrocarbons (PAHs)	
☐ Emissions from active industrial processes	☒ Polychlorinated biphenyls (PCBs)	
☐ Emissions from welding/cutting/hot work	☐ Potential for flammable vapors	
☐ Carbon monoxide (vehicle/equipment exhaust)	☐ Potential for flammable gas (methane)	
☐ Contaminated building surfaces	☐ Corrosive, acids/caustics, strong irritants	
☐ Unexploded ordnance	☐ Sulfides, hydrogen sulfide (H2S)	
☐ Explosive dust	☐ Cyanides, hydrogen cyanide (HCN)	

☐	FOR SITE REGULATED AS "UNCONTROLLED HAZ. WASTE SITE," e.g. **REGULATED BY HAZWOPER** (OSHA 29 CFR 1910.120) – Establish work zones & site control plan (Exclusion Zone - EZ, Contaminant Reduction Zone - CRZ, Support Zone - SZ) – Workers to be aware of and trained on hazards per OSHA Hazard Communication Standard. – Include site map/figure depicting work locations and other relevant site-specific information. – Site workers in EZ or CRZ to have OSHA 40-hour training, current 8-hour refresher, 3 days supervised field expience. – Site workers in EZ or CRZ to participate in Medical Monitoring program. – "Peripheral" site workers, engaged on-site, with no hazardous exposure: 24 hr. training required. – Site supervisor(s) required to have 8-hr. Supervisor training. – Implement site-specific procedures for worker protection through engineering controls, work practices, personal protective equipment (PPE), air monitoring, decontamination, spill containment (see Sections B and C, "Health and Safety Equipment/Gear" and "Air Monitoring" – Include emergency response program in H&S plan.
☒	FOR SITE WITH CHEMICAL CONTAMINANTS BUT **NOT REGULATED BY HAZWOPER** – Workers to be aware of and trained on hazards per OSHA Hazard Communication Standard – Implement appropriate controls to minimize worker exposure (engineering controls, work practices) to levels below OSHA PELs. – Use PPE as needed (see B, "Health and Safety Equipment/Gear"). – Conduct air monitoring or personal air sampling to monitor and/or evaluate worker exposure (see Section C, "Air Monitoring").

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PRE-WORK TASK HAZARD ANALYSIS (THA)

HAZARD	HAZARD CONTROLS (check all that apply and comment as required)
☐	ATMOSPHERIC HAZARDS GENERATED BY EXHAUST FROM OPERATING EQUIPMENT ☐ Position work upwind of exhaust source ☐ Use blowers, fans to dissipate atmospheric hazards ☐ Conduct air monitoring (see Section C, "Air Monitoring").
☐	OFF-SITE MIGRATION OF CONTAMINANTS ☐ Implement controls to minimize hazard migration (dust suppression, covers, foam, etc.) ☐ Community/perimeter air monitoring is not anticipated with the current scope of work. ☐ Community/perimeter air monitoring to be conducted per perimeter air monitoring plan.

EMERGENCY RESPONSE **(911 Service is Available ☒ Yes ☐ No)** ☒ Verify wireless coverage at site, use alternate communication procedures as needed.

Emergency Medical Treatment - Hospital Name: Hospital Address:	St Joseph's Hospital 555 E. Market St Elmira NY 14901	**Number:**	607.733.6541
Urgent Care Med. Treatment - Clinic Name: Occupational Clinic Address:	Elmira Urgent Care 306 W. Water St., Elmira, NY 14905	**Number:**	607.732.1100
Fire Department Name	West Elmira Fire Department	**Number:**	911
Spill Response:	West Elmira Fire Department	**Number:**	911
Client Representative Name::	Kevin Krueger	**Office Number:** **Cell Number:**	(651) 687-2210
Geosyntec **Project Manager** Name:	Aron Krasnopoler	**Office Number:** **Cell Number:**	(410) 381-4333 (202)-550-7724
Geosyntec **Corporate H&S** Name:	Dale Prokopchak	**Office Number:** **Cell Number:**	804 332 6376 (804) 349-8067

Emergency Response Comments:

Date:	
Project Name: Former Scott Technologies Site	
THA Title: Groundwater Sampling	
Subcontractor Name(s):	
Geosyntec Representative (reviewed by):	**Michael Hansen**
Subcontractor Foreman/Supervisor Signature (authorize):	
Crew Signatures (acknowledge):	
Print Name	**Signature**

PLEASE RETURN A COPY OF THIS SIGNED PAGE TO GEOSYNTEC PROJECT MGR., SUPERINTENDENT UPON REVIEW AND ACKOWLEDGMENT BY THE CREW MEMBERS. ALL NEW CREW MEMBERS SHALL BE ORIENTATED THE SAME AND A SUBMITTAL OF A NEW SIGN IN SHEET SHALL BE COMPLETED.

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PRE-WORK TASK HAZARD ANALYSIS (THA)

TASK/ACTIVITY:	Stormwater Structure Inspection	**Date:**	10/21/2014
Project Name:	Former Scott Technologies Site	**Client Name:**	Unisys Corporation
Project Number:	MN0832	**Geosyntec Proj. Mngr.:**	Aron Krasnopoler
Project Address:	1051 Sourth Main Street, Elmira, New York	**Geosyntec Proj. Dir.:**	Paul Brookner
Task Description:	Storm sewer system will be inspected for structural integrity, hydraulic connections and the presence of accumulated fine-grained material. If present, the depth fo the material will be measured, to the extent practical, and recorded. If an adequate volume of material is present, a composite sample for laboratory analyses will be collected.		

A. SUMMARY OF SITE-SPECIFIC TASK HAZARD ANALYSIS

Site-Specific Comments:

Sub-Tasks, Activities	Hazards	Hazard Controls
Task 1: Mobilize to Site	-Driving -Mobilization to and around unfamiliar facility	- Drive carefully to facility, be well rested and avoid distracted driving. - Review scope of work.
Task 2: Locate storm sewer system	-Slips/trips/falls -Heat/cold stress -Biohazards: snakes, bees, spider, ticks, poison ivy	-Pay close attention to foot placement; slow deliberate movement. -Dress for weather conditions. Apply sunscreen if needed. -Beaware of surroundings and avoid biohazards.
Task 3: Inspect the storm sewer system. Do not enter the storm sewer system.	-Same hazards noted above for Task 2. -lifting/removing lid of storm sewer system -falling in storm sewer system Potential contaminant exposure: VOCs, PCBs, SVOCs	-Same hazard controls noted above for Task 2. -don level D personal protective equipment (PPE). PPE will include: safety glasses, safety vests, steel toe boots, and nitrile gloves. -Avoid direct contact with contaminated matrices and/or equipment. -Use safe lifting practices for the storm sewer system -Keep center of gravity outside of the storm sewer system and close the storm sewer system when observations are complete. -Do not break the storm sewer system.
Task 4: If necessary, collect fine-grained sample from the storm sewer system using a reach sampler or similar device. Do not enter the storm sewer system.	-Same hazards as Task 3. -Potential contaminant exposure: VOCs, PCBs, SVOCs -Splash hazards	-Continue to wear level D PPE and minimize contact with water. -Do not break the storm sewer system.

B. HEALTH AND SAFETY EQUIPMENT/GEAR

Site-Specific Comments:

☒	PERSONAL PROTECTIVE EQUIPMENT (PPE)**:**	Level(s) of Protection (for chemical hazards):	☐ Level D (standard work clothes, no chemical protective clothing) ☒ Modified Level D (chemical protective clothing in addition to standard work clothes) ☐ Level C (air purifying respirator or dust mask, with chemical protective clothing) ☐ Level B or A (air supplied respirator, chemical protective suit)

		☒ Hard-toed boots/shoes ☐ Hardhat ☐ Noise/hearing protection ☒ High-visibility/reflective vest ☒ Work gloves ☒ Eye/face protection ☒ Safety glasses with side shields ☐ Goggles ☐ Face shield ☐ Other: ☒ Chemical protective clothing ☒ Gloves, type: Nitrile ☐ Coveralls, type: ☐ Outer boots, boot covers ☐ Other:	☐ Respiratory Protection ☐ Disposable n-95 face mask ☐ Half-face air-purifying respirator ☐ Full-face air-purifying respirator ☐ Resp-cartridge, type: ☐ Other: ☐ Personal flotation device ☐ Personal fall apparatus ☐ Fire retardant clothing ☐ EH (Electrical Hazard) rated boots, gloves ☐ Other:
☒	OTHER H&S EQUIPMENT and GEAR:	☒ Fire extinguisher ☐ Caution tape ☒ Traffic control warning devices ☐ Warning signs or placards ☐ Decon supplies for personal decon ☐ Portable ground fault circuit interrupter (GFCI)	☐ Lockout/tagout equipment ☐ Ventilation equipment (fan, blower) ☒ First aid kit ☒ Vehicle emergency kit (flares, lights, reflective device) ☐ Other:

C. AIR MONITORING – CHECK IF NOT APPLICABLE: ☒

Site-Specific Comments:

☐	INSTRUMENT(S), EQUIPMENT	☐ PID, Lamp energy: eV ☐ FID ☐ Carbon monoxide detector ☐ Hydrogen sulfide detector ☐ Oxygen (O_2) detector	☐ Flammable gas (LEL) detector ☐ Particulate (dust) detector ☐ Calibration kit for each detector type ☐ Others:

☐	ACTION LEVELS FOR **O2/LEL**	☐ Oxygen	≤19.5% - provide ventilation to raise oxygen to acceptable levels, or utilize Level B. ≥23.0% - provide ventilation to lower oxygen to acceptable levels, or utilize Level B and implement controls for fire hazards, control ignition sources.
		☐ LEL	Confirm at least 12% oxygen is present to ensure accuracy of LEL readings. At <10% LEL - Continue working, continue to monitor LEL levels At ≥10% LEL- Immediately withdraw from area. Resume work ONLY after LEL readings reduced to <10% through passive dissipation, or active vapor control measures.

☐	ACTION LEVELS FOR **TOXICS** (sustained breathing zone concentrations)	**Parameters**	**Level D, Modified D**	**Use levels C or B, as indicated below, OR take action to reduce breathing zone level to concentration acceptable for Level D.**
		☐ VOCs	< ppm	ppm to ppm: Level C (air purifying respirator) > ppm: Level B (air-supplied respirator)
		☐ Carbon Monoxide	< 35 ppm	≥35 ppm - Level B (air-supplied respirator)
		☐ Hydrogen Sulfide	< 10 ppm	≥10 ppm - Level B (air-supplied respirator)
		☐ Total Dust	< mg/m^3	> mg/m^3 - Level C (air-purifying respirator)
		☐		
		☐		

HAZARD	HAZARD CONTROLS (check all that apply and comment as required)
1. PREMISES/ENVIRONMENTAL HAZARDS	
Site-Specific Comments: Open storm sewer system will be blocked by traffic cones and/or caution tape. A dedicated watch person may also be used.	
☒ LOCATION HAZARDS ☒ Outdoor field work ☒ Urban, suburban ☐ Rural, remote location ☐ Indoor field work ☐ Operating facility ☐ Vacant facility ☐ Water hazards	☒ Use routine safety precautions commensurate with routine work environment conditions ☐ For non-routine, unique, or severe location hazards, see site-specific safety comments above. ☐ For water-related work, see #2, “Water Hazards” ☐ For worksite violence/security risks, see #3, “Violence, Security, Working Alone” ☒ For transportation related hazards, see #5, “Worksite Traffic, Vehicle, Transportation Hazards” ☒ For utility-related hazards, see # 6, “Utility-Related Hazards ☒ For atmospheric hazards in enclosed, indoor, or confined spaces, see # 11 “Confined Spaces or Hazardous Enclosed/Indoor Spaces”

	HAZARD	HAZARD CONTROLS (check all that apply and comment as required)
☒	WALKING/WORKING SURFACES, HOUSEKEEPING ☒ Uneven, rough terrain, riprap ☒ Slippery surfaces ☒ Holes, pits, openings ☐ Puncture, foot hazards	☒ Keep work areas clean, orderly, dispose of trash/debris, maintain sanitary conditions. ☒ Walkways are cleared of equipment, excavated material, tools and debris, snow ☒ Holes, pits, openings to be covered or otherwise marked or guarded ☐ Apply absorbent, salt or sand, for traction/slip resistance on slippery/icy/wet surfaces ☒ Wear proper work boots/shoes with ankle support and/or traction, as appropriate for conditions
☒	TEMPERATURE/WEATHER ☐ Heat Stress ☒ Cold Stress ☒ Severe Weather ☒ Lightning	☒ Heat/Cold stress are monitored in accordance with Geosyntec procedures EHS 124 & EHS 125 ☐ Provide sufficient fluids, shade, breaks, other precautions as appropriate to adderss heat hazards. ☒ Provide protection from sun (sun screen, shaded brake area). ☒ For cold stress, wear multiple layers, protect from wind/wet, frequent break in warm location. ☐ In high wind, discontinue working at heights (e.g. on ladders, scaffold, aerial lift, similar). ☒ Use precautions for lightning, thunderstorm, hale, tornado (monitor weather, “30/30 rule,” shelter)
☒	BIOLOGICAL HAZARDS ☒ Insects, spiders, ticks ☐ Wild/feral/pet animals ☐ Mold, fungi ☒ Poisonous plants ☐ Bird Guano ☐ Infectious, wastewater, sewer ☐ Bloodborne pathogens	☒ Utilize safety practices commensurate with risk of biting/stinging insects, wild/feral/pet animals. ☒ For poisonous plants (poison ivy/oak/sumac/etc.), minimize exposed skin area, wear coveralls, use barrier cream/wash (Technu products or similar), as appropriate. For biological exposure hazards, use protective measures commensurate with hazard: ☒ Minor-moderate hazard - use ordinary hygiene practices, protective gloves, hand washing. ☐ Moderate-severe hazard - add protective clothing, respirator, decon, as appropriate. ☐ Bloodborne pathogen (human infectious agents) - implement “Universal Precautions”
☐	HAZARDOUS NOISE	☐ Hearing protection is used when exposed to excessive noise levels (greater than 85 dBA over an 8-hour work period, or intermittent….)
☐	OVERHEAD HAZARDS, FALLING OBJECTS	☐ Wear hardhat when exposed to overhead hazards, “bump” hazards, falling objects ☐ Cordon off hazard zones, route access/egress around hazards of falling objects ☐ Secure objects from falling ☐ Provide overhead protection (canopy) to protect public pedestrians, workers
☐	ILLUMINATION ☐ Night work ☐ Indoor work	☐ Make site-specific arrangements for illumination of work areas and access routes.
2. BOATING, WATER, WET LOCATIONS, FLOOD, ETC. – CHECK IF NOT APPLICABLE: ☒		
Site-Specific Comments:		
☐	WATER HAZARDS ☐ Drowning, hypothermia ☐ Boat, barge, raft ☐ Wading, wetland, mud/silt ☐ Dam release, flood, tide ☐ Diving	☐ Wear appropriate Coast Guard-approved Personal Flotation Device (PFD) ☐ Bring emergency rescue equipment (ring buoy, reaching device, flares) ☐ Use fuel safety practices, fire extinguisher present in boat ☐ See site-specific safety comments above.
3. VIOLENCE, PUBLIC PROTECTION, WORKING ALONE – SPECIAL MEASURES – CHECK IF NOT ANTICIPATED: ☒		
Site-Specific Comments:		
☐	PERSONAL SECURITY, HIGH CRIME AREA	☐ Employ standard precautions, which may include: conduct work only during daylight hours, use buddy system, avoid parking in secluded location, lock vehicles, hide valuable items in vehicles from plain view ☐ See site-specific safety comments above for project-specific security measures.
☐	PUBLIC AT RISK, SITE SECURITY	☐ Provide safe pedestrian route around work areas, use appropriate barriers, signs, warning devices. ☐ Provide covers over excavation, secure fencing, overnight protection ☐ Provide protection from overhead hazards (canopy, etc.) where public at risk of overhead hazards ☐ Provide secure locked storage of hazardous chemicals, hazardous equipment, etc.
☐	WORKING ALONE	☐ Establish “check in” procedure with supervisor or project manager (arrival, mid-day, departure) ☐ Additional measures, as appropriate for the working conditions.
4. DRIVING, TRAFFIC, TRANSPORTATION HAZARDS – CHECK IF NOT APPLICABLE: ☐		
Site-Specific Comments:		
☒	DRIVING HAZARDS ☒ Routine work travel ☐ Unfamiliar location ☐ Unfamiliar vehicle ☒ Overnight travel, distance	☒ Use routine safe/defensive driving practices (seat belts, safe speeds, eyes ahead, no tailgating, limit distractions, no texting, safe cell phone use, clear windows, account for weather/road conditions, adequate sleep, other measures as appropriate). ☒ Plan travel route before driving (assemble maps, enter destination in GPS). ☐ Familiarize yourself with vehicle operational controls before operating unfamiliar vehicle.

HAZARD		HAZARD CONTROLS (check all that apply and comment as required)
☒	WORKERS EXPOSED TO TRAFFIC HAZARDS ☒ In/near public or private roadway ☒ Parking lot, driveway ☐ Worksite, construction site traffic	☒ Workers to wear reflective vests where exposed to traffic hazards. ☒ Where possible, park vehicles as protective shield from oncoming traffic. ☒ Configure work area and support vehicles to minimize worker exposure to traffic hazards. ☐ DOT signal devices will be used to re-route vehicles around work area, site entrances/exits. ☐ Flaggers will be used and have DOT Flagger Training; police detail where appropriate or required. ☒ Park vehicles in secure location away from heavy equipment use or other site operations. ☐ Mark temporary roadways clearly, provide berms/stop logs where needed.
☐	RAILROAD/AIRPORT HAZARD	☐ Coordinate with rail company/airport and implement required safety measures ☐ Site workers to receive safety training for railroad/airport work.
☐	OFF-ROAD DRIVING, USE OF ALL-TERRAIN VEHICLE	☐ For off road driving, do not exceed capability of vehicle ☐ Follow ATV specific procedures for training, safety equipment, operation.
☐	TRANSPORTING MATERIALS, TOWING/HAULING LOADS	☐ Ensure load is firmly secured (rope, straps, load configuration) to prevent shifting during travel. ☐ For trailer use, verify signal/braking lights operational, rear-view mirrors effective, hitch/safety chains secure.
5. UTILITY-RELATED HAZARDS (for underground/overhead work) – CHECK IF NOT APPLICABLE: ☒		
Site-Specific Comments:		
☐	OVERHEAD UTILITIES	☐ Maintain proper clearance, employ other appropriate precautions for the conditions.
☐	UNDERGROUND UTILITIES	☐ Confirm appropriate underground utility clearance procedures have been completed prior to ground penetrations, and employ other utility clearance/locator practices, as appropriate for conditions.
6. ELECTRICAL HAZARDS – CHECK IF NOT APPLICABLE: ☒		
Site-Specific Comments:		
☐	WORKERS EXPOSED TO: ☐ Voltage < 50 v ☐ Voltage 50-600v ☐ Voltage > 600v ☐ AC ☐ DC ☐ 3-phase ☐ Battery and/or solar power ☐ Capacitor/Transformer	☐ Implement electrical safe work practices commensurate with the work to be performed, pertaining to the following (as applicable): – Worker training/qualification – Electrical equipment and hazards, safe design features – Electrical safe work practices – Grounding, use of GFCIs – Electrical equipment installation, operation, maintenance, repair – Arc flash protection – Electrical equipment diagnostics
☐	BASIC ELECTRICAL HAZARDS ☐ Equipment/tool use/operation ☐ Use of extension cords	☐ Control water-related hazards, in a manner appropriate for the job tasks/equipment/tool. ☐ Use extension cords/power cords properly, prevent damage, take out of service if damaged. ☐ Inspect tool/equipment/extension cords/power cords before each use. ☐ Use GFCI-protected outlet or portable GFCI in wet locations, outdoors, basements ☐ Ensure live parts are guarded, enclosures secure. ☐ Enclosures, circuits properly labeled.
☐	LOCKOUT/TAGOUT OF ELECTRICAL ENERGY	☐ Implement control-of-hazardous-energy practices (lockout/tagout), provide lockout/tagout locks and devices, training workers, designate “authorized” personnel, notify “affected” personnel
7. FALL HAZARDS – CHECK IF NOT ANTICIPATED: ☐		
Site-Specific Comments:		
☒	WORKING AT HEIGHTS ☐ Roof, skylight ☐ Elevated platform ☒ Holes, side opening ☐ Retaining wall, cliff, ledge ☐ Trench, excavation ☐ Protruding rebar	☐ Ensure guardrails present ☐ Use personal fall apparatus (PFA) ☐ Use tether or positioning device ☒ Restrict access to hazard (barriers, tape, sign) ☐ Ensure covers in place over holes ☒ Watch person ☐ Use fall protection net ☐ Restrict access beneath work to protect other site personnel from overhead hazards ☐ Install caps on protruding rebar
☐	LADDERS / STAIRS ☐ Extension ladders ☐ Step ladders ☐ Fixed ladders ☐ Stairs	☐ Provide instruction/review pertaining to safe ladder use ☐ Extension ladders are properly footed, secured, setup at proper angle ☐ Stepladders are set on level ground or properly shimmed with spreaders locked. ☐ Stairs have proper rise over run and stairs >4 steps or 4' have guardrails. ☐ Never use a step ladder as a straight ladder. All straight ladders shall be extended three rungs past leading edge. Never use metal ladders while working with electricity.

	HAZARD	HAZARD CONTROLS (check all that apply and comment as required)
☐	AERIAL LIFT ☐ Scissor lift ☐ Extensible boom ☐ Articulated boom ☐ Vertical Lift ("Genie")	☐ Operators are sufficiently trained, experienced and qualified. ☐ Equipment is inspected after mobilization and is in good condition. ☐ Harness & Lanyard worn whenever operating the lift (scissor lifts may be excepted) ☐ Overhead and surface obstructions are reviewed with operators prior to use.
☐	SCAFFOLD ☐ Supported scaffold ☐ Suspended scaffold ☐ Free-standing/mobile scaffold	☐ Identify/coordinate operations with competent person ☐ Supported scaffold level, stable, proper attachments, tiebacks, planking, ☐ Suspended scaffolds anchored properly ☐ Guardrails present above 10 feet or personal fall apparatus used. ☐ Proper means of accessing scaffold (proper ladders, stair tower). ☐ Total height of free-standing scaffold not to exceed four times the minimum base dimension.
8. TOOLS, EQUIPMENT, MACHINERY – CHECK IF NOT APPLICABLE: ☒		
Site-Specific Comments:		
☐	HAND TOOLS Eye injury, puncture/bruise/ laceration hazard	☐ Use proper tool for the job, maintain tools in good condition (no damage, cutting tools sharp, etc.) use appropriate PPE for hand/eye/body protection, plan for safe "follow through" motion, use vise/clamp/work surface to hold/stabilize work piece
☐	POWER TOOLS ☐ Eye/hand/body injury ☐ Fuel-related hazards ☐ Inhalation hazard ☐ Noise ☐ Sparks, heat, fire hazard ☐ Electrical hazards	☐ For all power tools: – Inspect tools to ensure safe operating condition before each use. – Use tool in accordance with manufacturer's specifications. – Use PPE or other safety practices, as appropriate, for eye/hearing/hand/head/body protection – Provide training or verify operator qualification for use of power tool. – Stay clear of hazard zone, "line of fire" when working near where power tools are used. ☐ Use safety practices for refueling, fuel handling/transport/storage. ☐ Use respirators, ventilation, wet methods, other appropriate means to control inhalation hazard. ☐ For spark/heat generating tool, control fire hazards, segregate combustible/flammable materials. ☐ For electrical hazards, see # 6, "Electrical Hazards".
☐	WELDING, CUTTING ☐ Gas welding/cutting ☐ Arc welding/cutting	☐ Hot work permit system to be implemented. ☐ Operator properly protected (eye protection, clothing, apron, etc.) ☐ Fire hazard controls (watcher, fire extinguisher, water, isolate combustibles) ☐ Protect nearby personnel from hazardous UV, IR light (shielding, curtain) ☐ Electrical safe work practices for arc welding ☐ Gas cylinder safe practices (secured, upright, caps on when not in use, prevent damage).
☐	EQUIPMENT/MACHINERY ☐ Point-of-operation hazards ☐ Pinch points, moving parts ☐ 'Struck-by,' 'caught between' ☐ Hot surfaces, heat ☐ Extension cords, flexible wire ☐ Fuel related (gas or liquid) ☐ Hydraulic pressure ☐ Compressed air/gas ☐ Kinetic, stored energy ☐ Noise ☐ Lockout/tagout ☐ Emissions, discharge gases ☐ Working at heights, falls ☐ Lifting, repetitive motion ☐ Illumination ☐ Electrical (see below)	☐ *Working Near* Equipment/Machinery ☐ Work at safe distance/restrict access, ensure guards in place, heed warning signs ☐ Implement measures necessary for adequate illumination ☐ Control exposue to emission/discharge gases (ventilation, PPE, other means). ☐ Ensure safe practices for fuels/fluids/machine-related hazardous materials ☐ Use PPE or other safety practices for eye/hearing/hand/head/body protection ☐ Segregate combustible materials from hot surfaces/hot exhaust (minimum 3 feet) ☐ Operation/Maintenance/Repair of Equipment/Machinery (see applicable control measures above) ☐ Orient/locate equipment for safe access during operation and maintenance ☐ Use equipment/machinery in accordance with manufacturer's specifications ☐ Use safe lifting practices, minimize repetitive motion hazards ☐ Ensure point-of-operation, mechanical power transmission, other moving parts are guarded with protective devices; do not override interlocks, guards, protective devices ☐ Secure long hair/loose clothing/hanging jewelry near moving/rotating parts ☐ Ensure appropriate warning signs are in place and heeded ☐ Use safe practices for fueling, fuel transport & storage. ☐ Operate fuel-powered equipment in well ventilated location. ☐ Incorporate safety provisions/safe work practices for compressed air, pressurized systems (pneumatic/hydraulic), stored energy ☐ Implement control-of-hazardous-energy practices (lockout/tagout), designate "authorized" personnel, notify "affected" personnel ☐ Protect from fall hazards (safe ladder use, personal fall protection, guardrails, other) ☐
☐	ELECTRICAL HAZARDS	☐ Implement provisions of # 6, "Electrical Hazards"
9. MANUAL MATERIAL HANDLING, MATERIAL STORAGE – CHECK IF NOT APPLICABLE: ☐		

	HAZARD	HAZARD CONTROLS (check all that apply and comment as required)
Site-Specific Comments:		
☒	LIFTING / ERGONOMIC Musculoskeletal strain, repetitive motion injury	☒ Use proper manual lifting techniques (straight back, bend at knees, firm grasp, firm footing). ☒ Seek assistance for lifting heavy objects (>50 lbs.) ☐ Use mechanical lifting equipment to reduce manual material handling hazard ☐ For repetitive motion activities, take breaks, switch hands, share task with others, employ other safe practices appropriate for the specific task(s).
☐	STORAGE OF MATERIALS See Sect. 12 for Chemical Storage	☐ Store materials in stable manner that prevents tipping, sliding, rolling, falling over. ☐ Materials stored in tiers to be stacked, racked, blocked, interlocked or otherwise secured to prevent sliding, falling or collapse ☐ Do not exceed load limits of racks, platform; ensure racks are stable, robust, secure ☐ On scaffold, do not store materials in excess of supplies needed for immediate use ☐ Ensure stored materials do not block aisles, passageways ☐ For used lumber, remove nails before stacking, and stack to be stable and self supporting, no higher than 20 feet (or 16 feet if lumber is to be handled manually) ☐ Debris will be removed regularly from storage area and place in designated area or disposed.
10. CONSTRUCTION OPERATIONS, HEAVY EQUIPMENT, HEAVY VEHICLES – CHECK IF NOT ANTICIPATED: ☒		
Site-Specific Comments:		
☐	HEAVY EQUIPMENT; CONSTRUCTION VEHICLES Hazards: Struck By, Run-Over, Caught In Between (pinch points), Roll Over, Fluid Leaks	☐ Trained/qualified persons operate all heavy equipment. ☐ No passengers on moving/operating equipment except where passenger seat/restraint is present. ☐ Equipment inspected upon mobilization and daily; maintained in good repair, backup alarms ☐ All leaks or defective safety equipment will be repaired before use. ☐ Operators required to use seatbelts. ☐ Eye contact with operator and use of hand signals prior to approaching near equipment. ☐ High visibility vests are required of all personnel in work area. ☐ Max. safe slope for each vehicle will be followed. ☐ Personnel to stay clear of swing radius of equipment. ☐ Spill equipment available for fuel and hydraulic fluid leaks. ☐ Equipment locked, secured, brakes set, buckets/forks lowered, when not in use.
☐	CRANES Overhead hazards – utility lines, swing radius, falling objects, wire ropes and hoisting equipment ☐ Overbalancing – high winds, outrigger placement, overloading, safe slope ☐ Struck By, Run-Over, Caught In Between (pinch points), Roll Over, Fluid Leaks	**In addition to general safety practices for heavy equipment (above), as applicable:** ☐ Only qualified persons operate cranes (certificate required). ☐ A Critical Lift Plan & Checklist prepared/executed (HS 506) prior to mobilization. ☐ Equipment will be inspected prior to mobilization and a Crane Pre-Operational Safety Checklist (see EHS 506) will be completed and signed by crane operator. ☐ Crane operator will remain at the controls at all times during operation. ☐ Crane operation must be performed under the direction of an appointed signal person at all times. ☐ Communication between crane operator and signal person will be maintained through standard hand signals or voice communication equipment. Radio equipment, if used, will be equipped with a dedicated channel. ☐ Lifting or lowering will not exceed 100ft/minute. Lowering must be controlled i.e. no free fall. ☐ Stop work will be issued whenever hoisting equipment is exposed to high winds. ☐ Outriggers will be fully extended/locked with a firm footing within the maximum safe slope (<1%). ☐ Crane to be on level, stable base, dunnage used when necessary. ☐ Total weight of load not to exceed 50% of rated capacity for the crane radius and configuration. ☐ Rigging procedures – see Hoisting, Lifting, Rigging, below. ☐ Suspended personnel lifting is prohibited (unless per approved “man-lift” equipment). ☐ No personnel permitted beneath suspended loads.
☐	HOISTING, LIFTING, RIGGING ☐ Crane ☐ Drill rig ☐ Loader, excavator, etc. ☐ Mechanical, electrical hoist	☐ Identify, coordinate with competent person. ☐ Rigging directly to the forks of a lull, forklift, or front loader equipped forks is prohibited. ☐ Do not exceed loading limits of equipment. ☐ A Critical Lift Checklist (see EHS 506) will be completed and signed prior to crane mobilization. ☐ Rigging, wire rope and hoisting equipment will be inspected and maintained on a weekly basis. ☐ Crane hooks will be equipped with safety latches.
☐	FORKLIFT Hazards: Struck By, Run-Over, Caught In Between (pinch points), Roll Over, Fluid Leaks	**In addition to general safety practices for heavy equipment (above), as applicable:** ☐ Qualified operater, per established forklift training (certificate is required) ☐ Equipment inspected daily and documented on Forklift Preoperation Inspection Checklist ☐ Operators required to use seatbelts, and adhere to safe operating procedures.

	HAZARD	HAZARD CONTROLS (check all that apply and comment as required)
		☐ Do not exceed lifting load limits. ☐ Forklift shall not be moved/driven with empty forks in raised position. ☐ When not in use, forks lowered, brake set, controls in neutral, key removed.
☐	EXCAVATION/TRENCHING ☐ Max Depth ≥ 20' ☐ Max Depth ≥ 5' ☐ Max Depth <5' with potential cave-in hazard ☐ Potential permit-required confined space at depth ≥ 4' ☐ Underground utilities ☐ Overhead utilities ☐ Structures/foundations ☐ Falls into excavations	☐ Activities under supervision/oversight of competent person ☐ Sloping & shoring for excavations ≥20' are approved by a professional engineer ☐ Sloping & shoring for excavations ≥5' when persons are exposed to cave-in. ☐ Sloping & shoring for shallow (<5') excavations with cave-in hazard ☐ Excavations ≥ 4' are classified as a non-permit confined space ☐ Excavations ≥ 4' are classified as Alternate Entry or Permit-Required (see confined space) ☐ Implement underground utility clearance procedures. ☐ Hand digging within 3' of utility locations. ☐ Excavations to be protected by perimeter fencing (not barricade tape) ☐ Use trench boxes in accordance with proper procedures. ☐ Workers in trenches to be within 25 feet of ladder or sloped entryway.
☐	DRILLING ☐ Struck By, Run-Over, Caught In Between (pinch points), Roll Over, Fluid Leaks ☐ Underground utilities, aboveground ☐ Spills ☐ See Equipment/Machinery	☐ Contractor inspects drill rig daily before use. ☐ Drill rig equipped with operational emergency stop. ☐ Highpressure lines equipped with whip checks. ☐ High visibility vests, hard hats are being worn near the equipment. ☐ Operators and helpers will maintain a safe distance to moving parts. Individuals working near moving or rotating parts will secure loose hair, clothing, and equipment. ☐ Drill rigs will only be moved with masts lowered. Masts will be erected with outriggers fully extended when equipped with outriggers. ☐ Max. safe slope for rig will be followed, drill rig leveled, appropriate blocking/cribbing as needed. ☐ Spinning parts of the rig are guarded when possible, no loose clothing being worn near the rig. ☐ Follow underground utility clearance procedures. ☐ Area is surveyed for overhead utilities, safe clearance distance maintained. ☐ Hearing protection is used when working near the rig. ☐ Spill equipment is available for fuel and hydraulic fluid leaks.
☐	DEMOLITION	☐ Develop/implement demolition safety plan
☐	BLASTING	☐ Develop/implement blasting safety plan
11. CONFINED SPACES, HAZARDOUS ENCLOSED or INDOOR SPACES – CHECK IF NOT APPLICABLE: ☒		
Site-Specific Comments: Storm sewer system must not be entered by Geosyntec.		
☐	CONFINED SPACE(S) ☐ Permit required ☐ Non-permit required Potential/actual hazards: ☐ Atmospheric hazards: ☐ Flammable/explosive ☐ Oxygen deficiency ☐ Hydrogen sulfide ☐ Other toxic ☐ Combustible dust ☐ Electrical ☐ Mechanical, engulfment, entrapment, stored energy	☐ For personnel <u>working near confined</u> spaces: – Confined spaces have been identified, labeled. – Communication system in place to prevent unauthorized entry. ☐ For <u>permit-required confined space entry</u>, see separate entry permit. – All entrants, attendants, supervisors are trained/qualified. – Hazards properly characterized – Necessary equipment for safe entry utilized (access, retrieval, air monitoring) – Arrangements for rescue team have been made. ☐ For entry into a <u>non-permit</u> confined space, see site specific procedures delineated above in "site-specific comments," or see alternate/attached safety work plan.
☐	ENCLOSED/INDOOR SPACE(S) ☐ Outfall, culvert ☐ Tunnel, shaft, gallery ☐ Machine/equipment pit/vault ☐ Basement/Sub-basement ☐ Crawl space entry ☐ Indoor equipment/drilling	*<u>For indoor use of gasoline/propane/diesel equipment:</u>* ☐ Duct exhaust to outdoors, and/or introduce fresh air using ventilation/blowers/fans. ☐ Perform air monitoring (see section on Air Monitoring) *<u>For entry into potentially hazardous indoor or enclosed spaces:</u>* ☐ Ventilate and/or perform air monitoring for anticipated hazards. ☐ If space classified as confined space, follow confined space entry requirements (above).
12. COMMERCIAL CHEMICAL PRODUCTS USED AT WORK SITE – CHECK IF NOT APPLICABLE: ☒		
Site-Specific Comments:		

	HAZARD	HAZARD CONTROLS (check all that apply and comment as required)
☐	PRODUCTS REGULATED BY HAZARD COMMUNICATION STANDARD	☐ Safety Data Sheets available, either on site or readily available within same work shift ☐ Containers labelled properly ☐ Workers trained on hazards ☐ For subcontractor use of chemical products, coordinate/discuss during safety meetings.
☐	COMPRESSED GAS(ES):	☐ Secure cylinders upright, caps on when not in use, handle with care, prevent damage ☐ Propane cylinders not in use must be stored outdoors in cage or similar secure enclosure. ☐ Ensure acetylene cylinders NOT secured to steel arc welding bench ☐ Store/use in a manner to prevent asphyxiation hazard ☐ Segregate oxygen and fuel gases by distance (20') or barrier ☐ Control ignition sources, no smoking signage ☐ Use/store in a manner to control inhalation exposure hazards, PPE, air monitoring.
☐	FLAMM./COMBUST. LIQ.	☐ Proper storage (flam. storage cabinets, other storage precautions) ☐ Control ignition sources ☐ Grounding and bonding where appropriate
☐	CORROSIVES	☐ Handle with care, use appropriate eye/face/skin protection ☐ Eyewash, deluge shower, drench hose, hand washing (with water), as appropriate
☐	TOXIC	☐ For toxic substances, use/store in a manner to control exposure hazards (inhalation, ingestion, skin contact, skin absorption; use PPE as appropriate, conduct air monitoring as appropriate.
☐	CHEMICAL STORAGE	☐ Chemical storage cabinet, cage, storage room, or similar ☐ Incompatible chemicals segregated ☐ Secondary containment ☐ Safety equipment will be located near chemical storage.

13. CHEMICAL HAZARDS FROM ON-SITE CONTAMINANTS, OPERATIONS, EMISSIONS – CHECK IF N/A: ☐

Site-Specific Comments:

CHECK AS APPROPRIATE BELOW. PROVIDE ADDITIONAL INFO. AS APPROPRIATE, IN SITE-SPECIFIC HAZARD ANALYSIS ABOVE.

☒ Soil/groundwater contaminants (historical release)	☐ Oxygen deficiency	☐ Asbestos
☐ Recent release, known high concentrations	☒ Chlorinated VOCs (volatile org. cpds.)	☐ Lead paint
☐ Former chemical disposal site, landfill	☒ BTEX, petroleum derived VOCs	☐ Pesticides, herbicides, fungicides
☐ Urban fill, residual contaminants	☐ Fuel oils, petroleum, waste oil, lubricants	☐ Sensitizers
☐ Containerized waste (drums, process equipment)	☒ Metals, metal compounds, metal dusts	☐ Radioactive contaminants
☐ Buried drums (known or potential)	☐ Elemental mercury	☐ Other:
☐ Large containers, potential for spills	☒ Polyaromatic hydrocarbons (PAHs)	
☐ Emissions from active industrial processes	☒ Polychlorinated biphenyls (PCBs)	
☐ Emissions from welding/cutting/hot work	☐ Potential for flammable vapors	
☐ Carbon monoxide (vehicle/equipment exhaust)	☐ Potential for flammable gas (methane)	
☐ Contaminated building surfaces	☐ Corrosive, acids/caustics, strong irritants	
☐ Unexploded ordnance	☐ Sulfides, hydrogen sulfide (H2S)	
☐ Explosive dust	☐ Cyanides, hydrogen cyanide (HCN)	

☐	FOR SITE REGULATED AS "UNCONTROLLED HAZ. WASTE SITE," e.g. **REGULATED BY HAZWOPER** (OSHA 29 CFR 1910.120) – Establish work zones & site control plan (Exclusion Zone - EZ, Contaminant Reduction Zone - CRZ, Support Zone - SZ) – Workers to be aware of and trained on hazards per OSHA Hazard Communication Standard. – Include site map/figure depicting work locations and other relevant site-specific information. – Site workers in EZ or CRZ to have OSHA 40-hour training, current 8-hour refresher, 3 days supervised field expience. – Site workers in EZ or CRZ to participate in Medical Monitoring program. – "Peripheral" site workers, engaged on-site, with no hazardous exposure: 24 hr. training required. – Site supervisor(s) required to have 8-hr. Supervisor training. – Implement site-specific procedures for worker protection through engineering controls, work practices, personal protective equipment (PPE), air monitoring, decontamination, spill containment (see Sections B and C, "Health and Safety Equipment/Gear" and "Air Monitoring" – Include emergency response program in H&S plan.
☒	FOR SITE WITH CHEMICAL CONTAMINANTS BUT **NOT REGULATED BY HAZWOPER** – Workers to be aware of and trained on hazards per OSHA Hazard Communication Standard – Implement appropriate controls to minimize worker exposure (engineering controls, work practices) to levels below OSHA PELs. – Use PPE as needed (see B, "Health and Safety Equipment/Gear"). – Conduct air monitoring or personal air sampling to monitor and/or evaluate worker exposure (see Section C, "Air Monitoring").

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PRE-WORK TASK HAZARD ANALYSIS (THA)

HAZARD		HAZARD CONTROLS (check all that apply and comment as required)
☐	ATMOSPHERIC HAZARDS GENERATED BY EXHAUST FROM OPERATING EQUIPMENT ☐ Position work upwind of exhaust source ☐ Use blowers, fans to dissipate atmospheric hazards ☐ Conduct air monitoring (see Section C, "Air Monitoring").	
☐	OFF-SITE MIGRATION OF CONTAMINANTS	☐ Implement controls to minimize hazard migration (dust suppression, covers, foam, etc.) ☐ Community/perimeter air monitoring is not anticipated with the current scope of work. ☐ Community/perimeter air monitoring to be conducted per perimeter air monitoring plan.

EMERGENCY RESPONSE **(911 Service is Available ☒ Yes ☐ No)** ☒ Verify wireless coverage at site, use alternate communication procedures as needed.

Emergency Medical Treatment - Hospital Name: Hospital Address:	St Joseph's Hospital 555 E. Market St Elmira NY 14901	**Number:**	607.733.6541
Urgent Care Med. Treatment - Clinic Name: Occupational Clinic Address:	Elmira Urgent Care 306 W. Water St., Elmira, NY 14905	**Number:**	607.732.1100
Fire Department Name	West Elmira Fire Department	**Number:**	911
Spill Response:	West Elmira Fire Department	**Number:**	911
Client Representative Name::	Kevin Krueger	**Office Number:** **Cell Number:**	(651) 687-2210
Geosyntec **Project Manager** Name:	Aron Krasnopoler	**Office Number:** **Cell Number:**	(410) 381-4333 (202)-550-7724
Geosyntec **Corporate H&S** Name:	Dale Prokopchak	**Office Number:** **Cell Number:**	804 332 6376 (804) 349-8067

Emergency Response Comments:

Date:	
Project Name: Former Scott Technologies Site	
THA Title: Stormwater Structure Inspection	
Subcontractor Name(s):	
Geosyntec Representative (reviewed by):	**Michael Hansen**
Subcontractor Foreman/Supervisor Signature (authorize):	
Crew Signatures (acknowledge):	
Print Name	**Signature**

PLEASE RETURN A COPY OF THIS SIGNED PAGE TO GEOSYNTEC PROJECT MGR., SUPERINTENDENT UPON REVIEW AND ACKOWLEDGMENT BY THE CREW MEMBERS. ALL NEW CREW MEMBERS SHALL BE ORIENTATED THE SAME AND A SUBMITTAL OF A NEW SIGN IN SHEET SHALL BE COMPLETED.

Appendix C: Summary of Chemical Hazards

Petroleum Hydrocarbons

Petroleum hydrocarbons likely at the site include tar and/or fuel-related materials in soils and sediments. Gasoline, diesel, oil, and heavier hydrocarbons, such as grease, may be present. Volatile components of gasoline include benzene, toluene, ethylbenzene, and xylenes (BTEX).

The primary exposure routes for petroleum hydrocarbons during site activities are inhalation, dermal contact, and ingestion of contaminated soil, sediment, dust, or water. Lighter petroleum hydrocarbons such as gasoline and benzene readily volatilize and are primarily an inhalation concern, whereas the primary route of exposure to heavier petroleum hydrocarbons such as aromatic hydrocarbons, oil, and grease is dermal contact. The target organs primarily affected by prolonged exposure to petroleum hydrocarbons are the respiratory system, central nervous system, kidneys, liver, and skin. Prolonged dermal contact with petroleum hydrocarbons can cause irritation or dermatitis. The BTEX compounds are known or suspected human carcinogens.

Petroleum hydrocarbons such as gasoline are also flammable and can be a physical hazard when present in high concentrations. Combustion of petroleum hydrocarbons can produce carbon dioxide, carbon monoxide, aldehydes, fumes, smoke (particulate matter) and other products of incomplete combustion. Intentional and inadvertent combustion of petroleum hydrocarbons is not expected during sampling activities; however, personnel will evacuate the area should a fire occur. The table below summarizes BTEX exposure limits.

Chemical Name	PEL[1]	TLV[2]
Benzene	1	0.5
Toluene	200	50
Ethylbenzene	100	100
Xylene	100	100

[1] OSHA Permissible Exposure Limit (in parts per million)
[2] ACGIH Threshold Limit Value (in parts per million)

Polycyclic Aromatic Hydrocarbons (PAHs)

PAHs are produced during combustion events due to inadequate oxidation of fuel. PAHs in the pure state are yellowish crystalline solids. They are found in coal tar and in products of incomplete combustion. These chemicals have varying degrees of potency for causing cancer, with benzo(a)pyrene being among the most potent. The PAHs are evaluated collectively as COAL TAR PITCH VOLATILES. Coal tar pitch volatiles may cause photo-sensitization and a rash where sunlight strikes the skin. Exposure may also cause cancer of lungs, skin, bladder or kidneys. Benzo(b)fluoranthene, benzo(j)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, chrysene, and indeno(1,2,3,c,d)pyrene have been identified as carcinogenic.

This information on PAH compounds is presented for site contaminant awareness. While the potential for site personnel sustaining significant inhalation exposures to volatilized PAH compounds during the site activities of this project is minimal, there is the potential for inhalation of PAH-contaminated dust, and handling of contaminated soils presents skin exposure hazards. Use of dust suppression techniques (as appropriate) and the proper use of the PPE will adequately protect personnel. Some significant PAH compounds include:

- Anthracene
- Benzo(a)pyrene Benzo(a)anthracene
- Chrysene Benzo(b)fluoranthene
- Fluoranthene Benzo(k)fluoranthene
- Fluorene Benzo(g,h,i)perylene
- Indeno(1,2,3,c,d)pyrene Benzo(d,e,f)phenanthrene
- Phenanthrene

OSHA PEL for coal tar pitch volatiles is 0.2 mg/m3 and NIOSH REL is 0.1 mg/m^3 , TLV 0.2 mg/m3 is for 8 hour time weighted average (TWA).

PCBs

PCBs are carcinogenic chlorinated hydrocarbons. Potential exposure routes are through inhalation, skin absorption, ingestion and skin or eye contact and may irritate eyes, cause acne, cause liver damage or have reproductive effects. Carcinogenic effects such as tumors and leukemia have been observed in animals. The OSHA permissible exposure limit (PEL) for 8-hour time-weighted average (TWA) is 1 mg/m^3 (skin). The NIOSH PEL is 0.001 mg/m^3.

RCRA Metals

These metals include arsenic, barium, cadmium, chrome, mercury, selenium, and silver. Heavy metals are known to cause neurologic effects (lead, mercury), kidney damage (cadmium), and respiratory damage (arsenic, cadmium). Oral and respiratory exposures should be minimized. The table below summarizes exposure limits.

Chemical Name	PEL[1]	TLV[2]
Arsenic	0.01	0.01
Lead	0.05	0.05
Mercury	0.01	0.25

[1] OSHA Permissible Exposure Limit (PEL) in parts per million
[2] ACGIH Threshold Limit Value (TLV) in parts per million

Chlorinated Solvents/Volatile Organic Compounds (VOCs)

Chlorinated VOCs are widely used as solvents in industrial operations such as degreasing, manufacturing, cleaning and dry cleaning, and are also present in household products and automotive fluids. They readily form vapors which can accumulate in indoor air spaces (i.e., via migration through the subsurface) and react with ozone to form sub-micron sized particles with the potential to cause adverse respiratory health effects. Free product releases (via surface or subsurface discharges or inadequate disposal) can migrate downward to significant depths and through fine-grained deposits to groundwater, and can persist as wide-scale sources of vapor plumes for long periods of time.

Several chlorinated hydrocarbons have been identified in soil and groundwater at the site including perchloroethylene (PCE), trichloroethylene (TCE), and 1,2-dichloroethane (DCA). The likely routes of exposure to chlorinated solvents include inhalation, ingestion and direct contact with the skin or eye. The toxicity of chlorinated solvents varies; many affect the CNS and some are identified as carcinogens. PCE can affect the CNS and cause irritation of the skin, eyes, and upper respiratory tract. TCE can depress the CNS, affect kidneys, liver, and lungs and can cause rapid and irregular heartbeat. Toxic effects are increased when combined with alcohol, caffeine, and other drugs. DCA can cause CNS depression and damage to the liver, kidneys, heart, and digestive system. Eye contact with DCA can cause irritation and serious injury if not removed promptly. DCA and TCE are flammable liquids; the LEL of both solvents are approximately 6% and their flash points are less than 100°F. PCE is not considered flammable. These chlorinated solvents are only slightly soluble in water.

Exposure levels will be maintained below OSHA PEL or NIOSH REL as shown in the table below.

Chemical Name	PEL[1]	REL[2]
1,2 DCA	50	1
TCE	100	Ca
PCE	100	Ca

[1] OSHA Permissible Exposure Limit (PEL) in parts per million
[2] ACGIH Threshold Limit Value (TLV) in parts per million
Ca - Carcinogenic

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Appendix D: Air Monitoring

Applies to Task: ☒ ① ☐ ② ☐ ③ ☐ ④ ☐ ⑤ ☐ ⑥ ☐ ⑦ ☐ ⑧

☒ *Photoionization Detector (PID)*

Brand/Model No.: MiniRAE 3000 eV:10.6

Monitoring Frequency: Breathing Space

Breathing Zone Reading (ppm)	Action
_____ to _____	Level D PPE
_____ to _____	Level C PPE
Greater than __ Sustained at 50 ppmv	Stop work. Evacuate the area. If upon return, levels still exceed the action level, stop work and implement engineering controls.

Note: _____

☐ *Oxygen (O_2) Meter*

Brand/Model No.: _____

Monitoring Frequency: _____

Reading (%)	Action
Less than 19.5	Stop work. Evacuate the area.
19.5 to 23.5	Continue to work with caution.
Greater than 23.5	Stop work. Evacuate the area.

Note: _____

☐ *Explosimeter*

Brand/Model No.: _____

Monitoring Frequency: _____

Source (% LEL)

Reading	Action
1 to 10	Continue with caution.
Greater than 10	Stop work. Evacuate the area. If upon return, if concentration still exceeds 10% LEL, ventilate until concentration is back to <10% LEL.

Note: _____

☐ *Flame Ionization Detector (FID)*

Brand/Model No.: _____

Monitoring Frequency: _____

Breathing Zone Reading (ppm)	Action
_____ to _____	Level D PPE
_____ to _____	Level C PPE
Greater than _____	Stop work. Evacuate the area. If upon return, levels still exceed ___, stop work and implement engineering controls.

Note: _____

☐ *Chemical Detector Tube*

Brand/Model No.: _____

Monitoring Frequency: _____

Breathing Zone Reading (ppm)	Action
_____ to _____	Level D PPE
_____ to _____	Level C PPE
Greater than _____	Stop work. Evacuate the area. If upon return, levels still exceed ___, stop work and implement engineering controls.

Note: _____

☐ *Other*

Brand/Model No.: _____

Monitoring Frequency: _____

Breathing Zone Reading	Action
_____ to _____	Level D PPE
_____ to _____	Level C PPE
Greater than _____	Stop work. Evacuate the area. If upon return, levels still exceed ___, stop work and implement engineering controls.

Note: _____

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Appendix E: Personal Protective Equipment

	Task ①	Task ②	Task ③	Task ④	Task ⑤	Task ⑥	Task ⑦	Task ⑧
Potential PPE Level per Task:	☒ D ☐ C	☒ D ☐ C	☒ D ☐ C	☒ D ☐ C	☒ D ☐ C	☐ D ☐ C	☐ D ☐ C	☐ D ☐ C

Modified Level D		***Level C***	
Equipment	***Material/Type***	***Equipment***	***Material/Type***
☒ Safety glasses		☐ Full-face air-purifying respirator	Cartridge Type:
☒ Hard-toed boots		☐ Half-mask air-purifying respirator	Cartridge Type:
☐ Protective clothing		☐ Safety glasses	
☒ Hard hat*		☐ Hard-toed boots	
☒ Hearing protection*		☐ Protective clothing	
☒ High-visibility vest*		☐ Hard hat	
☐ Outer boots*		☐ Hearing protection*	
☒ Outer gloves*	Nitrile, Leather	☐ High-visibility vest*	
☐ Other:		☐ Outer boots*	
		☐ Outer gloves*	
		☐ Inner gloves*	
		☐ Other:	

* PPE items may be downgraded (only with concurrence of SHSO and PM)

Appendix F: Safety Data Sheets

Included in this HASP	Chemical
☐	Acetone
☒	Alconox
☐	Ammonia
☒	Bentonite
☒	Diesel Fuel Oil No. 2-D
☐	Gasoline
☐	Helium
☐	Hexane
☒	Hydrochloric Acid
☐	Hydrogen
☒	Isobutylene Calibration Gas
☒	Isopropyl Alcohol
☐	KB-1
☐	Methane Calibration Gas
☒	Nitric Acid
☐	Permanganate
☐	Portland Cement
☐	Sulfuric Acid
☐	Other: _____
☐	Other: _____
☐	Other: _____
☐	Other: _____

Note: SDSs are for chemicals that used to perform project work, not site contaminants.

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SAFETY DATA SHEETS

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PRE-WORK TASK HAZARD ANALYSIS (THA)

TASK/ACTIVITY:	DPT Borings for Soil Sample Collection	**Date:**	7/18/2014
Project Name:	Former Sperry Remington Site North	**Client Name:**	Unisys Corporation
Project Number:	MN0832	**Geosyntec Proj. Mngr.:**	Aron Krasnopoler
Project Address:	777 Sourth Main Street, Elmira, New York	**Geosyntec Proj. Dir.:**	Paul Brookner
Task Description:	Collect soil samples from 0 to 3 feet below ground surface via direct-push technology (DPT) for laboratory analyses		

A. SUMMARY OF SITE-SPECIFIC TASK HAZARD ANALYSIS

Site-Specific Comments:

Sub-Tasks, Activities	Hazards	Hazard Controls
Task 1: Mobilize to Site	-Driving -Mobilization to and around unfamiliar facility	- Drive carefully to facility, be well rested and avoid distracted driving. - Review scope of work.
Task 2: Locate Soil Sampling Locations and clear drilling locations for above-ground and underground utiliiites. Locate sampling locations. Place pin flags at all sampling locations. Boring location will be documented by GPS.	-Slips/trips/falls -Heat/cold stress -Biohazards: snakes, bees, spider, ticks, poison ivy	-Pay close attention to foot placement; slow deliberate movement. -Dress for weather conditions. Apply sunscreen if needed. -Beaware of surroundings and avoid biohazards.
Task 3: Conduct DPT drilling and soil sampling	-Same hazards noted above for Task 2. -Drill Rig Hazards -Sharp edges on knife and on acetate sleeves used with DPT sampling. -Potential contaminant exposure: VOCs, PCBs, SVOCs	-Same hazard controls noted above for Task 2. -Before entering work area, don level D personal protective equipment (PPE). PPE will include: hard hat, safety glasses, safety vests, steel toe boots, nitrile gloves; and ear plugs or ear muffs. -Avoid being in close proximity to drilling rig. -Have a private utility locator clear each boring location for underground utiltities. -Avoid direct contact with contaminated matrices. -Pay close attention to the sharp edges and wear hand protection, such as leather gloves, if necessary.
Task 4: Sample Collection, Labeling and Packing Homogenize samples in decontaminated stainless steel or disposable mixing containers. Place the homogenized sample in the laboratory-supplied sample containers and label the bottles. Pack samples in cooler with ice and proper quality assurance samples.	-Potential contaminant exposure: VOCs, PCBs, SVOCs -Back strain when transporting coolers full of collected samples packed with ice.	-Continue to wear level D PPE and minimize contact with sample material. -Use proper lifting techniques. Get assistance when possible, especially for containers heavier than 49 lbs.
Task 5: Equipment Decontamination Decontaminate equipment that will be reused (e.g. hand auger, trowel, et. al.)	-Slips, Trips, and Falls -Hand injuries during handling of equipment. -Potential contaminant exposure: VOCs, PCBs, SVOCs -Splash hazards	-Pay close attention to foot placement; slow deliberate movement. -Pay close attention to the sharp edge of steel hand trowel to avoid cutting or other injuries of hands. -Continue to wear level D PPE and minimize contact with water.
Task 6: Demobilization Demobilize from Site, making sure all work areas are clean and orderly	-Driving	-Drive carefully and avoid distracted driving. If too exhausted to drive safely back to the office make arrangements to stay at hotel.

B. HEALTH AND SAFETY EQUIPMENT/GEAR

Site-Specific Comments:

☒	PERSONAL PROTECTIVE EQUIPMENT (PPE)**:**	Level(s) of Protection (for chemical hazards):	☐ Level D (standard work clothes, no chemical protective clothing) ☒ Modified Level D (chemical protective clothing in addition to standard work clothes) ☐ Level C (air purifying respirator or dust mask, with chemical protective clothing) ☐ Level B or A (air supplied respirator, chemical protective suit)

		☒ Hard-toed boots/shoes ☒ Hardhat ☒ Noise/hearing protection ☒ High-visibility/reflective vest ☒ Work gloves ☒ Eye/face protection ☒ Safety glasses with side shields ☐ Goggles ☐ Face shield ☐ Other: ☒ Chemical protective clothing ☒ Gloves, type: Nitrile ☐ Coveralls, type: ☐ Outer boots, boot covers ☐ Other:	☐ Respiratory Protection ☐ Disposable n-95 face mask ☐ Half-face air-purifying respirator ☐ Full-face air-purifying respirator ☐ Resp-cartridge, type: ☐ Other: ☐ Personal flotation device ☐ Personal fall apparatus ☐ Fire retardant clothing ☐ EH (Electrical Hazard) rated boots, gloves ☐ Other:
☒	OTHER H&S EQUIPMENT and GEAR:	☒ Fire extinguisher ☒ Caution tape ☒ Traffic control warning devices ☐ Warning signs or placards ☐ Decon supplies for personal decon ☐ Portable ground fault circuit interrupter (GFCI)	☐ Lockout/tagout equipment ☐ Ventilation equipment (fan, blower) ☒ First aid kit ☒ Vehicle emergency kit (flares, lights, reflective device) ☐ Other:

C. AIR MONITORING – CHECK IF NOT APPLICABLE: ☐

Site-Specific Comments:

☒	INSTRUMENT(S), EQUIPMENT	☒ PID, Lamp energy: 10.6 eV ☐ FID ☐ Carbon monoxide detector ☐ Hydrogen sulfide detector ☐ Oxygen (O_2) detector	☐ Flammable gas (LEL) detector ☐ Particulate (dust) detector ☐ Calibration kit for each detector type ☐ Others:

☐	ACTION LEVELS FOR **O2/LEL**	☐ Oxygen	≤19.5% - provide ventilation to raise oxygen to acceptable levels, or utilize Level B. ≥23.0% - provide ventilation to lower oxygen to acceptable levels, or utilize Level B and implement controls for fire hazards, control ignition sources.
		☐ LEL	Confirm at least 12% oxygen is present to ensure accuracy of LEL readings. At <10% LEL - Continue working, continue to monitor LEL levels At ≥10% LEL- Immediately withdraw from area. Resume work ONLY after LEL readings reduced to <10% through passive dissipation, or active vapor control measures.

		Parameters	**Level D, Modified D**	**Use levels C or B, as indicated below, OR take action to reduce breathing zone level to concentration acceptable for Level D.**
☒	ACTION LEVELS FOR **TOXICS** (sustained breathing zone concentrations)	☒ VOCs	< 50 ppm	> 50 ppm: Stop work, evacuate the area. If upon return, levels still exceed the action level, stop work and implement engineering controls.
		☐ Carbon Monoxide	< 35 ppm	≥35 ppm - Level B (air-supplied respirator)
		☐ Hydrogen Sulfide	< 10 ppm	≥10 ppm - Level B (air-supplied respirator)
		☐ Total Dust	< mg/m^3	> mg/m^3 - Level C (air-purifying respirator)
		☐		
		☐		

HAZARD	**HAZARD CONTROLS (check all that apply and comment as required)**
1. PREMISES/ENVIRONMENTAL HAZARDS	
Site-Specific Comments:	
☒ LOCATION HAZARDS ☒ Outdoor field work ☒ Urban, suburban ☐ Rural, remote location ☐ Indoor field work ☐ Operating facility ☐ Vacant facility ☐ Water hazards	☒ Use routine safety precautions commensurate with routine work environment conditions ☐ For non-routine, unique, or severe location hazards, see site-specific safety comments above. ☐ For water-related work, see #2, “Water Hazards” ☐ For worksite violence/security risks, see #3, “Violence, Security, Working Alone” ☒ For transportation related hazards, see #5, “Worksite Traffic, Vehicle, Transportation Hazards” ☒ For utility-related hazards, see # 6, “Utility-Related Hazards ☐ For atmospheric hazards in enclosed, indoor, or confined spaces, see # 11 “Confined Spaces or Hazardous Enclosed/Indoor Spaces”

	HAZARD	HAZARD CONTROLS (check all that apply and comment as required)
☒	WALKING/WORKING SURFACES, HOUSEKEEPING ☒ Uneven, rough terrain, riprap ☒ Slippery surfaces ☐ Holes, pits, openings ☐ Puncture, foot hazards	☒ Keep work areas clean, orderly, dispose of trash/debris, maintain sanitary conditions. ☒ Walkways are cleared of equipment, excavated material, tools and debris, snow ☐ Holes, pits, openings to be covered or otherwise marked or guarded ☐ Apply absorbent, salt or sand, for traction/slip resistance on slippery/icy/wet surfaces ☒ Wear proper work boots/shoes with ankle support and/or traction, as appropriate for conditions
☒	TEMPERATURE/WEATHER ☒ Heat Stress ☒ Cold Stress ☒ Severe Weather ☒ Lightning	☒ Heat/Cold stress are monitored in accordance with Geosyntec procedures EHS 124 & EHS 125 ☒ Provide sufficient fluids, shade, breaks, other precautions as appropriate to adderss heat hazards. ☒ Provide protection from sun (sun screen, shaded brake area). ☐ For cold stress, wear multiple layers, protect from wind/wet, frequent break in warm location. ☐ In high wind, discontinue working at heights (e.g. on ladders, scaffold, aerial lift, similar). ☒ Use precautions for lightning, thunderstorm, hale, tornado (monitor weather, “30/30 rule,” shelter)
☒	BIOLOGICAL HAZARDS ☒ Insects, spiders, ticks ☐ Wild/feral/pet animals ☐ Mold, fungi ☒ Poisonous plants ☐ Bird Guano ☐ Infectious, wastewater, sewer ☐ Bloodborne pathogens	☒ Utilize safety practices commensurate with risk of biting/stinging insects, wild/feral/pet animals. ☒ For poisonous plants (poison ivy/oak/sumac/etc.), minimize exposed skin area, wear coveralls, use barrier cream/wash (Technu products or similar), as appropriate. For biological exposure hazards, use protective measures commensurate with hazard: ☒ Minor-moderate hazard - use ordinary hygiene practices, protective gloves, hand washing. ☐ Moderate-severe hazard - add protective clothing, respirator, decon, as appropriate. ☐ Bloodborne pathogen (human infectious agents) - implement “Universal Precautions”
☒	HAZARDOUS NOISE	☒ Hearing protection is used when exposed to excessive noise levels (greater than 85 dBA over an 8-hour work period, or intermittent….)
☐	OVERHEAD HAZARDS, FALLING OBJECTS	☐ Wear hardhat when exposed to overhead hazards, “bump” hazards, falling objects ☐ Cordon off hazard zones, route access/egress around hazards of falling objects ☐ Secure objects from falling ☐ Provide overhead protection (canopy) to protect public pedestrians, workers
☐	ILLUMINATION ☐ Night work ☐ Indoor work	☐ Make site-specific arrangements for illumination of work areas and access routes.
2. BOATING, WATER, WET LOCATIONS, FLOOD, ETC. – CHECK IF NOT APPLICABLE: ☒		
Site-Specific Comments:		
☐	WATER HAZARDS ☐ Drowning, hypothermia ☐ Boat, barge, raft ☐ Wading, wetland, mud/silt ☐ Dam release, flood, tide ☐ Diving	☐ Wear appropriate Coast Guard-approved Personal Flotation Device (PFD) ☐ Bring emergency rescue equipment (ring buoy, reaching device, flares) ☐ Use fuel safety practices, fire extinguisher present in boat ☐ See site-specific safety comments above.
3. VIOLENCE, PUBLIC PROTECTION, WORKING ALONE – SPECIAL MEASURES – CHECK IF NOT ANTICIPATED: ☒		
Site-Specific Comments:		
☐	PERSONAL SECURITY, HIGH CRIME AREA	☐ Employ standard precautions, which may include: conduct work only during daylight hours, use buddy system, avoid parking in secluded location, lock vehicles, hide valuable items in vehicles from plain view ☐ See site-specific safety comments above for project-specific security measures.
☐	PUBLIC AT RISK, SITE SECURITY	☐ Provide safe pedestrian route around work areas, use appropriate barriers, signs, warning devices. ☐ Provide covers over excavation, secure fencing, overnight protection ☐ Provide protection from overhead hazards (canopy, etc.) where public at risk of overhead hazards ☐ Provide secure locked storage of hazardous chemicals, hazardous equipment, etc.
☐	WORKING ALONE	☐ Establish “check in” procedure with supervisor or project manager (arrival, mid-day, departure) ☐ Additional measures, as appropriate for the working conditions.
4. DRIVING, TRAFFIC, TRANSPORTATION HAZARDS – CHECK IF NOT APPLICABLE: ☐		
Site-Specific Comments:		
☒	DRIVING HAZARDS ☒ Routine work travel ☐ Unfamiliar location ☐ Unfamiliar vehicle ☒ Overnight travel, distance	☒ Use routine safe/defensive driving practices (seat belts, safe speeds, eyes ahead, no tailgating, limit distractions, no texting, safe cell phone use, clear windows, account for weather/road conditions, adequate sleep, other measures as appropriate). ☒ Plan travel route before driving (assemble maps, enter destination in GPS). ☐ Familiarize yourself with vehicle operational controls before operating unfamiliar vehicle.

HAZARD		HAZARD CONTROLS (check all that apply and comment as required)
☒	WORKERS EXPOSED TO TRAFFIC HAZARDS ☒ In/near public or private roadway ☒ Parking lot, driveway ☐ Worksite, construction site traffic	☒ Workers to wear reflective vests where exposed to traffic hazards. ☒ Where possible, park vehicles as protective shield from oncoming traffic. ☐ Configure work area and support vehicles to minimize worker exposure to traffic hazards. ☐ DOT signal devices will be used to re-route vehicles around work area, site entrances/exits. ☐ Flaggers will be used and have DOT Flagger Training; police detail where appropriate or required. ☒ Park vehicles in secure location away from heavy equipment use or other site operations. ☐ Mark temporary roadways clearly, provide berms/stop logs where needed.
☐	RAILROAD/AIRPORT HAZARD	☐ Coordinate with rail company/airport and implement required safety measures ☐ Site workers to receive safety training for railroad/airport work.
☐	OFF-ROAD DRIVING, USE OF ALL-TERRAIN VEHICLE	☐ For off road driving, do not exceed capability of vehicle ☐ Follow ATV specific procedures for training, safety equipment, operation.
☐	TRANSPORTING MATERIALS, TOWING/HAULING LOADS	☐ Ensure load is firmly secured (rope, straps, load configuration) to prevent shifting during travel. ☐ For trailer use, verify signal/braking lights operational, rear-view mirrors effective, hitch/safety chains secure.
5. UTILITY-RELATED HAZARDS (for underground/overhead work) – CHECK IF NOT APPLICABLE: ☐		
Site-Specific Comments: Be aware of piping for sprinkler system on football field.		
☒	OVERHEAD UTILITIES	☒ Maintain proper clearance, employ other appropriate precautions for the conditions.
☒	UNDERGROUND UTILITIES	☒ Confirm appropriate underground utility clearance procedures have been completed prior to ground penetrations, and employ other utility clearance/locator practices, as appropriate for conditions.
6. ELECTRICAL HAZARDS – CHECK IF NOT APPLICABLE: ☒		
Site-Specific Comments:		
☐	WORKERS EXPOSED TO: ☐ Voltage < 50 v ☐ Voltage 50-600v ☐ Voltage > 600v ☐ AC ☐ DC ☐ 3-phase ☐ Battery and/or solar power ☐ Capacitor/Transformer	☐ Implement electrical safe work practices commensurate with the work to be performed, pertaining to the following (as applicable): - Worker training/qualification - Electrical equipment and hazards, safe design features - Electrical safe work practices - Grounding, use of GFCIs - Electrical equipment installation, operation, maintenance, repair - Arc flash protection - Electrical equipment diagnostics
☐	BASIC ELECTRICAL HAZARDS ☐ Equipment/tool use/operation ☐ Use of extension cords	☐ Control water-related hazards, in a manner appropriate for the job tasks/equipment/tool. ☐ Use extension cords/power cords properly, prevent damage, take out of service if damaged. ☐ Inspect tool/equipment/extension cords/power cords before each use. ☐ Use GFCI-protected outlet or portable GFCI in wet locations, outdoors, basements ☐ Ensure live parts are guarded, enclosures secure. ☐ Enclosures, circuits properly labeled.
☐	LOCKOUT/TAGOUT OF ELECTRICAL ENERGY	☐ Implement control-of-hazardous-energy practices (lockout/tagout), provide lockout/tagout locks and devices, training workers, designate “authorized” personnel, notify “affected” personnel
7. FALL HAZARDS – CHECK IF NOT ANTICIPATED: ☒		
Site-Specific Comments:		
☐	WORKING AT HEIGHTS ☐ Roof, skylight ☐ Elevated platform ☐ Holes, side opening ☐ Retaining wall, cliff, ledge ☐ Trench, excavation ☐ Protruding rebar	☐ Ensure guardrails present ☐ Use personal fall apparatus (PFA) ☐ Use tether or positioning device ☐ Restrict access to hazard (barriers, tape, sign) ☐ Ensure covers in place over holes ☐ Watch person ☐ Use fall protection net ☐ Restrict access beneath work to protect other site personnel from overhead hazards ☐ Install caps on protruding rebar
☐	LADDERS / STAIRS ☐ Extension ladders ☐ Step ladders ☐ Fixed ladders ☐ Stairs	☐ Provide instruction/review pertaining to safe ladder use ☐ Extension ladders are properly footed, secured, setup at proper angle ☐ Stepladders are set on level ground or properly shimmed with spreaders locked. ☐ Stairs have proper rise over run and stairs >4 steps or 4' have guardrails. ☐ Never use a step ladder as a straight ladder. All straight ladders shall be extended three rungs past leading edge. Never use metal ladders while working with electricity.

	HAZARD	HAZARD CONTROLS (check all that apply and comment as required)
☐	AERIAL LIFT ☐ Scissor lift ☐ Extensible boom ☐ Articulated boom ☐ Vertical Lift ("Genie")	☐ Operators are sufficiently trained, experienced and qualified. ☐ Equipment is inspected after mobilization and is in good condition. ☐ Harness & Lanyard worn whenever operating the lift (scissor lifts may be excepted) ☐ Overhead and surface obstructions are reviewed with operators prior to use.
☐	SCAFFOLD ☐ Supported scaffold ☐ Suspended scaffold ☐ Free-standing/mobile scaffold	☐ Identify/coordinate operations with competent person ☐ Supported scaffold level, stable, proper attachments, tiebacks, planking, ☐ Suspended scaffolds anchored properly ☐ Guardrails present above 10 feet or personal fall apparatus used. ☐ Proper means of accessing scaffold (proper ladders, stair tower). ☐ Total height of free-standing scaffold not to exceed four times the minimum base dimension.
8. TOOLS, EQUIPMENT, MACHINERY – CHECK IF NOT APPLICABLE: ☐		
Site-Specific Comments:		
☒	HAND TOOLS Eye injury, puncture/bruise/ laceration hazard	☒ Use proper tool for the job, maintain tools in good condition (no damage, cutting tools sharp, etc.) use appropriate PPE for hand/eye/body protection, plan for safe "follow through" motion, use vise/clamp/work surface to hold/stabilize work piece
☐	POWER TOOLS ☐ Eye/hand/body injury ☐ Fuel-related hazards ☐ Inhalation hazard ☐ Noise ☐ Sparks, heat, fire hazard ☐ Electrical hazards	☐ For all power tools: - Inspect tools to ensure safe operating condition before each use. - Use tool in accordance with manufacturer's specifications. - Use PPE or other safety practices, as appropriate, for eye/hearing/hand/head/body protection - Provide training or verify operator qualification for use of power tool. - Stay clear of hazard zone, "line of fire" when working near where power tools are used. ☐ Use safety practices for refueling, fuel handling/transport/storage. ☐ Use respirators, ventilation, wet methods, other appropriate means to control inhalation hazard. ☐ For spark/heat generating tool, control fire hazards, segregate combustible/flammable materials. ☐ For electrical hazards, see # 6, "Electrical Hazards".
☐	WELDING, CUTTING ☐ Gas welding/cutting ☐ Arc welding/cutting	☐ Hot work permit system to be implemented. ☐ Operator properly protected (eye protection, clothing, apron, etc.) ☐ Fire hazard controls (watcher, fire extinguisher, water, isolate combustibles) ☐ Protect nearby personnel from hazardous UV, IR light (shielding, curtain) ☐ Electrical safe work practices for arc welding ☐ Gas cylinder safe practices (secured, upright, caps on when not in use, prevent damage).
☒	EQUIPMENT/MACHINERY ☒ Point-of-operation hazards ☒ Pinch points, moving parts ☒ 'Struck-by,' 'caught between' ☐ Hot surfaces, heat ☐ Extension cords, flexible wire ☒ Fuel related (gas or liquid) ☐ Hydraulic pressure ☐ Compressed air/gas ☐ Kinetic, stored energy ☒ Noise ☐ Lockout/tagout ☒ Emissions, discharge gases ☐ Working at heights, falls ☐ Lifting, repetitive motion ☐ Illumination ☐ Electrical (see below)	☒ *Working Near* Equipment/Machinery ☒ Work at safe distance/restrict access, ensure guards in place, heed warning signs ☒ Implement measures necessary for adequate illumination ☒ Control exposue to emission/discharge gases (ventilation, PPE, other means). ☒ Ensure safe practices for fuels/fluids/machine-related hazardous materials ☒ Use PPE or other safety practices for eye/hearing/hand/head/body protection ☒ Segregate combustible materials from hot surfaces/hot exhaust (minimum 3 feet) ☐ Operation/Maintenance/Repair of Equipment/Machinery (see applicable control measures above) ☐ Orient/locate equipment for safe access during operation and maintenance ☐ Use equipment/machinery in accordance with manufacturer's specifications ☐ Use safe lifting practices, minimize repetitive motion hazards ☐ Ensure point-of-operation, mechanical power transmission, other moving parts are guarded with protective devices; do not override interlocks, guards, protective devices ☐ Secure long hair/loose clothing/hanging jewelry near moving/rotating parts ☐ Ensure appropriate warning signs are in place and heeded ☐ Use safe practices for fueling, fuel transport & storage. ☐ Operate fuel-powered equipment in well ventilated location. ☐ Incorporate safety provisions/safe work practices for compressed air, pressurized systems (pneumatic/hydraulic), stored energy ☐ Implement control-of-hazardous-energy practices (lockout/tagout), designate "authorized" personnel, notify "affected" personnel ☐ Protect from fall hazards (safe ladder use, personal fall protection, guardrails, other) ☐
☐	ELECTRICAL HAZARDS	☐ Implement provisions of # 6, "Electrical Hazards"
9. MANUAL MATERIAL HANDLING, MATERIAL STORAGE – CHECK IF NOT APPLICABLE: ☐		

	HAZARD	HAZARD CONTROLS (check all that apply and comment as required)
Site-Specific Comments: Drum Handling and Sample Coolers		
☒	LIFTING / ERGONOMIC Musculoskeletal strain, repetitive motion injury	☒ Use proper manual lifting techniques (straight back, bend at knees, firm grasp, firm footing). ☒ Seek assistance for lifting heavy objects (>50 lbs.) ☐ Use mechanical lifting equipment to reduce manual material handling hazard ☒ For repetitive motion activities, take breaks, switch hands, share task with others, employ other safe practices appropriate for the specific task(s).
☐	STORAGE OF MATERIALS See Sect. 12 for Chemical Storage	☐ Store materials in stable manner that prevents tipping, sliding, rolling, falling over. ☐ Materials stored in tiers to be stacked, racked, blocked, interlocked or otherwise secured to prevent sliding, falling or collapse ☐ Do not exceed load limits of racks, platform; ensure racks are stable, robust, secure ☐ On scaffold, do not store materials in excess of supplies needed for immediate use ☐ Ensure stored materials do not block aisles, passageways ☐ For used lumber, remove nails before stacking, and stack to be stable and self supporting, no higher than 20 feet (or 16 feet if lumber is to be handled manually) ☐ Debris will be removed regularly from storage area and place in designated area or disposed.
10. CONSTRUCTION OPERATIONS, HEAVY EQUIPMENT, HEAVY VEHICLES – CHECK IF NOT ANTICIPATED: ☒		
Site-Specific Comments: DPT Drilling Rig		
☒	HEAVY EQUIPMENT; CONSTRUCTION VEHICLES Hazards: Struck By, Run-Over, Caught In Between (pinch points), Roll Over, Fluid Leaks	☒ Trained/qualified persons operate all heavy equipment. ☒ No passengers on moving/operating equipment except where passenger seat/restraint is present. ☒ Equipment inspected upon mobilization and daily; maintained in good repair, backup alarms ☐ All leaks or defective safety equipment will be repaired before use. ☒ Operators required to use seatbelts. ☒ Eye contact with operator and use of hand signals prior to approaching near equipment. ☒ High visibility vests are required of all personnel in work area. ☒ Max. safe slope for each vehicle will be followed. ☒ Personnel to stay clear of swing radius of equipment. ☒ Spill equipment available for fuel and hydraulic fluid leaks. ☒ Equipment locked, secured, brakes set, buckets/forks lowered, when not in use.
☐	CRANES Overhead hazards – utility lines, swing radius, falling objects, wire ropes and hoisting equipment ☐ Overbalancing – high winds, outrigger placement, overloading, safe slope ☐ Struck By, Run-Over, Caught In Between (pinch points), Roll Over, Fluid Leaks	**In addition to general safety practices for heavy equipment (above), as applicable:** ☐ Only qualified persons operate cranes (certificate required). ☐ A Critical Lift Plan & Checklist prepared/executed (HS 506) prior to mobilization. ☐ Equipment will be inspected prior to mobilization and a Crane Pre-Operational Safety Checklist (see EHS 506) will be completed and signed by crane operator. ☐ Crane operator will remain at the controls at all times during operation. ☐ Crane operation must be performed under the direction of an appointed signal person at all times. ☐ Communication between crane operator and signal person will be maintained through standard hand signals or voice communication equipment. Radio equipment, if used, will be equipped with a dedicated channel. ☐ Lifting or lowering will not exceed 100ft/minute. Lowering must be controlled i.e. no free fall. ☐ Stop work will be issued whenever hoisting equipment is exposed to high winds. ☐ Outriggers will be fully extended/locked with a firm footing within the maximum safe slope (<1%). ☐ Crane to be on level, stable base, dunnage used when necessary. ☐ Total weight of load not to exceed 50% of rated capacity for the crane radius and configuration. ☐ Rigging procedures – see Hoisting, Lifting, Rigging, below. ☐ Suspended personnel lifting is prohibited (unless per approved “man-lift” equipment). ☐ No personnel permitted beneath suspended loads.
☐	HOISTING, LIFTING, RIGGING ☐ Crane ☐ Drill rig ☐ Loader, excavator, etc. ☐ Mechanical, electrical hoist	☐ Identify, coordinate with competent person. ☐ Rigging directly to the forks of a lull, forklift, or front loader equipped forks is prohibited. ☐ Do not exceed loading limits of equipment. ☐ A Critical Lift Checklist (see EHS 506) will be completed and signed prior to crane mobilization. ☐ Rigging, wire rope and hoisting equipment will be inspected and maintained on a weekly basis. ☐ Crane hooks will be equipped with safety latches.
☐	FORKLIFT Hazards: Struck By, Run-Over, Caught In Between (pinch points), Roll Over, Fluid Leaks	**In addition to general safety practices for heavy equipment (above), as applicable:** ☐ Qualified operater, per established forklift training (certificate is required) ☐ Equipment inspected daily and documented on Forklift Preoperation Inspection Checklist ☐ Operators required to use seatbelts, and adhere to safe operating procedures.

	HAZARD	HAZARD CONTROLS (check all that apply and comment as required)
		☐ Do not exceed lifting load limits. ☐ Forklift shall not be moved/driven with empty forks in raised position. ☐ When not in use, forks lowered, brake set, controls in neutral, key removed.
☐	EXCAVATION/TRENCHING ☐ Max Depth ≥ 20' ☐ Max Depth ≥ 5' ☐ Max Depth <5' with potential cave-in hazard ☐ Potential permit-required confined space at depth ≥ 4' ☐ Underground utilities ☐ Overhead utilities ☐ Structures/foundations ☐ Falls into excavations	☐ Activities under supervision/oversight of competent person ☐ Sloping & shoring for excavations ≥20' are approved by a professional engineer ☐ Sloping & shoring for excavations ≥5' when persons are exposed to cave-in. ☐ Sloping & shoring for shallow (<5') excavations with cave-in hazard ☐ Excavations ≥ 4' are classified as a non-permit confined space ☐ Excavations ≥ 4' are classified as Alternate Entry or Permit-Required (see confined space) ☐ Implement underground utility clearance procedures. ☐ Hand digging within 3' of utility locations. ☐ Excavations to be protected by perimeter fencing (not barricade tape) ☐ Use trench boxes in accordance with proper procedures. ☐ Workers in trenches to be within 25 feet of ladder or sloped entryway.
☒	DRILLING ☒ Struck By, Run-Over, Caught In Between (pinch points), Roll Over, Fluid Leaks ☒ Underground utilities, aboveground ☒ Spills ☒ See Equipment/Machinery	☒ Contractor inspects drill rig daily before use. ☒ Drill rig equipped with operational emergency stop. ☒ Highpressure lines equipped with whip checks. ☒ High visibility vests, hard hats are being worn near the equipment. ☒ Operators and helpers will maintain a safe distance to moving parts. Individuals working near moving or rotating parts will secure loose hair, clothing, and equipment. ☒ Drill rigs will only be moved with masts lowered. Masts will be erected with outriggers fully extended when equipped with outriggers. ☒ Max. safe slope for rig will be followed, drill rig leveled, appropriate blocking/cribbing as needed. ☒ Spinning parts of the rig are guarded when possible, no loose clothing being worn near the rig. ☒ Follow underground utility clearance procedures. ☒ Area is surveyed for overhead utilities, safe clearance distance maintained. ☒ Hearing protection is used when working near the rig. ☒ Spill equipment is available for fuel and hydraulic fluid leaks.
☐	DEMOLITION	☐ Develop/implement demolition safety plan
☐	BLASTING	☐ Develop/implement blasting safety plan
11. CONFINED SPACES, HAZARDOUS ENCLOSED or INDOOR SPACES – CHECK IF NOT APPLICABLE: ☒		
Site-Specific Comments:		
☐	CONFINED SPACE(S) ☐ Permit required ☐ Non-permit required Potential/actual hazards: ☐ Atmospheric hazards: ☐ Flammable/explosive ☐ Oxygen deficiency ☐ Hydrogen sulfide ☐ Other toxic ☐ Combustible dust ☐ Electrical ☐ Mechanical, engulfment, entrapment, stored energy	☐ For personnel <u>working near confined</u> spaces: - Confined spaces have been identified, labeled. - Communication system in place to prevent unauthorized entry. ☐ For <u>permit-required confined space entry</u>, see separate entry permit. - All entrants, attendants, supervisors are trained/qualified. - Hazards properly characterized - Necessary equipment for safe entry utilized (access, retrieval, air monitoring) - Arrangements for rescue team have been made. ☐ For entry into a <u>non-permit</u> confined space, see site specific procedures delineated above in "site-specific comments," or see alternate/attached safety work plan.
☐	ENCLOSED/INDOOR SPACE(S) ☐ Outfall, culvert ☐ Tunnel, shaft, gallery ☐ Machine/equipment pit/vault ☐ Basement/Sub-basement ☐ Crawl space entry ☐ Indoor equipment/drilling	*<u>For indoor use of gasoline/propane/diesel equipment:</u>* ☐ Duct exhaust to outdoors, and/or introduce fresh air using ventilation/blowers/fans. ☐ Perform air monitoring (see section on Air Monitoring) *<u>For entry into potentially hazardous indoor or enclosed spaces:</u>* ☐ Ventilate and/or perform air monitoring for anticipated hazards. ☐ If space classified as confined space, follow confined space entry requirements (above).
12. COMMERCIAL CHEMICAL PRODUCTS USED AT WORK SITE – CHECK IF NOT APPLICABLE: ☐		
Site-Specific Comments: Alconox, Isopropyl Alcohol, Nitric Acid, etc.		

	HAZARD	HAZARD CONTROLS (check all that apply and comment as required)
☒	PRODUCTS REGULATED BY HAZARD COMMUNICATION STANDARD	☒ Safety Data Sheets available, either on site or readily available within same work shift ☒ Containers labelled properly ☒ Workers trained on hazards ☒ For subcontractor use of chemical products, coordinate/discuss during safety meetings.
☒	COMPRESSED GAS(ES): Isosbutylene Calibration Gas for PID	☒ Secure cylinders upright, caps on when not in use, handle with care, prevent damage ☐ Propane cylinders not in use must be stored outdoors in cage or similar secure enclosure. ☐ Ensure acetylene cylinders NOT secured to steel arc welding bench ☐ Store/use in a manner to prevent asphyxiation hazard ☐ Segregate oxygen and fuel gases by distance (20') or barrier ☐ Control ignition sources, no smoking signage ☐ Use/store in a manner to control inhalation exposure hazards, PPE, air monitoring.
☐	FLAMM./COMBUST. LIQ.	☐ Proper storage (flam. storage cabinets, other storage precautions) ☐ Control ignition sources ☐ Grounding and bonding where appropriate
☐	CORROSIVES	☐ Handle with care, use appropriate eye/face/skin protection ☐ Eyewash, deluge shower, drench hose, hand washing (with water), as appropriate
☐	TOXIC	☐ For toxic substances, use/store in a manner to control exposure hazards (inhalation, ingestion, skin contact, skin absorption; use PPE as appropriate, conduct air monitoring as appropriate.
☐	CHEMICAL STORAGE	☐ Chemical storage cabinet, cage, storage room, or similar ☐ Incompatible chemicals segregated ☐ Secondary containment ☐ Safety equipment will be located near chemical storage.

13. CHEMICAL HAZARDS FROM ON-SITE CONTAMINANTS, OPERATIONS, EMISSIONS – CHECK IF N/A: ☐

Site-Specific Comments:

CHECK AS APPROPRIATE BELOW. PROVIDE ADDITIONAL INFO. AS APPROPRIATE, IN SITE-SPECIFIC HAZARD ANALYSIS ABOVE.

☒ Soil/groundwater contaminants (historical release)	☐ Oxygen deficiency	☐ Asbestos
☐ Recent release, known high concentrations	☒ Chlorinated VOCs (volatile org. cpds.)	☐ Lead paint
☐ Former chemical disposal site, landfill	☒ BTEX, petroleum derived VOCs	☐ Pesticides, herbicides, fungicides
☐ Urban fill, residual contaminants	☐ Fuel oils, petroleum, waste oil, lubricants	☐ Sensitizers
☐ Containerized waste (drums, process equipment)	☒ Metals, metal compounds, metal dusts	☐ Radioactive contaminants
☐ Buried drums (known or potential)	☐ Elemental mercury	☐ Other:
☐ Large containers, potential for spills	☒ Polyaromatic hydrocarbons (PAHs)	
☐ Emissions from active industrial processes	☒ Polychlorinated biphenyls (PCBs)	
☐ Emissions from welding/cutting/hot work	☐ Potential for flammable vapors	
☐ Carbon monoxide (vehicle/equipment exhaust)	☐ Potential for flammable gas (methane)	
☐ Contaminated building surfaces	☐ Corrosive, acids/caustics, strong irritants	
☐ Unexploded ordnance	☐ Sulfides, hydrogen sulfide (H2S)	
☐ Explosive dust	☐ Cyanides, hydrogen cyanide (HCN)	

☐	FOR SITE REGULATED AS "UNCONTROLLED HAZ. WASTE SITE," e.g. **REGULATED BY HAZWOPER** (OSHA 29 CFR 1910.120) - Establish work zones & site control plan (Exclusion Zone - EZ, Contaminant Reduction Zone - CRZ, Support Zone - SZ) - Workers to be aware of and trained on hazards per OSHA Hazard Communication Standard. - Include site map/figure depicting work locations and other relevant site-specific information. - Site workers in EZ or CRZ to have OSHA 40-hour training, current 8-hour refresher, 3 days supervised field expience. - Site workers in EZ or CRZ to participate in Medical Monitoring program. - "Peripheral" site workers, engaged on-site, with no hazardous exposure: 24 hr. training required. - Site supervisor(s) required to have 8-hr. Supervisor training. - Implement site-specific procedures for worker protection through engineering controls, work practices, personal protective equipment (PPE), air monitoring, decontamination, spill containment (see Sections B and C, "Health and Safety Equipment/Gear" and "Air Monitoring" - Include emergency response program in H&S plan.
☒	FOR SITE WITH CHEMICAL CONTAMINANTS BUT **NOT REGULATED BY HAZWOPER** - Workers to be aware of and trained on hazards per OSHA Hazard Communication Standard - Implement appropriate controls to minimize worker exposure (engineering controls, work practices) to levels below OSHA PELs. - Use PPE as needed (see B, "Health and Safety Equipment/Gear"). - Conduct air monitoring or personal air sampling to monitor and/or evaluate worker exposure (see Section C, "Air Monitoring").

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PRE-WORK TASK HAZARD ANALYSIS (THA)

HAZARD		HAZARD CONTROLS (check all that apply and comment as required)
☐	ATMOSPHERIC HAZARDS GENERATED BY EXHAUST FROM OPERATING EQUIPMENT ☐ Position work upwind of exhaust source ☐ Use blowers, fans to dissipate atmospheric hazards ☐ Conduct air monitoring (see Section C, "Air Monitoring").	
☐	OFF-SITE MIGRATION OF CONTAMINANTS	☐ Implement controls to minimize hazard migration (dust suppression, covers, foam, etc.) ☐ Community/perimeter air monitoring is not anticipated with the current scope of work. ☐ Community/perimeter air monitoring to be conducted per perimeter air monitoring plan.

EMERGENCY RESPONSE **(911 Service is Available ☒ Yes ☐ No)** ☒ Verify wireless coverage at site, use alternate communication procedures as needed.

Emergency Medical Treatment - Hospital Name: Hospital Address:	St Joseph's Hospital 555 E. Market St Elmira NY 14901	**Number:**	607.733.6541
Urgent Care Med. Treatment - Clinic Name: Occupational Clinic Address:	Elmira Urgent Care 306 W. Water St., Elmira, NY 14905	**Number:**	607.732.1100
Fire Department Name	West Elmira Fire Department	**Number:**	911
Spill Response:	West Elmira Fire Department	**Number:**	911
Client Representative Name::	Kevin Krueger	**Office Number:** **Cell Number:**	(651) 687-2210
Geosyntec **Project Manager** Name:	Aron Krasnopoler	**Office Number:** **Cell Number:**	(410) 381-4333 (202)-550-7724
Geosyntec **Corporate H&S** Name:	Dale Prokopchak	**Office Number:** **Cell Number:**	804 332 6376 (804) 349-8067

Emergency Response Comments:

Date:	
Project Name: Former Sperry Remington Site North	
THA Title: DPT Borings for Soil Sample Collection	
Subcontractor Name(s):	
Geosyntec Representative (reviewed by):	**Michael Hansen**
Subcontractor Foreman/Supervisor Signature (authorize):	
Crew Signatures (acknowledge):	
Print Name	**Signature**

PLEASE RETURN A COPY OF THIS SIGNED PAGE TO GEOSYNTEC PROJECT MGR., SUPERINTENDENT UPON REVIEW AND ACKOWLEDGMENT BY THE CREW MEMBERS. ALL NEW CREW MEMBERS SHALL BE ORIENTATED THE SAME AND A SUBMITTAL OF A NEW SIGN IN SHEET SHALL BE COMPLETED.

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PRE-WORK TASK HAZARD ANALYSIS (THA)

TASK/ACTIVITY:	Hand Augering for Shallow Soil Sample Collection	**Date:**	7/18/2014
Project Name:	Former Sperry Remington Site North	**Client Name:**	Unisys Corporation
Project Number:	MN0832	**Geosyntec Proj. Mngr.:**	Aron Krasnopoler
Project Address:	777 Sourth Main Street, Elmira, New York	**Geosyntec Proj. Dir.:**	Paul Brookner
Task Description:	Collect surface soil samples from 0 to 2 inches below ground surface via hand augering for laboratory analyses		

A. SUMMARY OF SITE-SPECIFIC TASK HAZARD ANALYSIS

Site-Specific Comments:

Sub-Tasks, Activities	Hazards	Hazard Controls
Task 1: Mobilize to Site	-Driving -Mobilization to and around unfamiliar facility	- Drive carefully to facility, be well rested and avoid distracted driving. - Review scope of work.
Task 2: Locate Soil Sampling Locations Locate sampling locations. Place pin flags at all sampling locations. Boring location will be documented by GPS.	-Slips/trips/falls -Heat/cold stress -Biohazards: snakes, bees, spider, ticks, poison ivy	-Pay close attention to foot placement; slow deliberate movement. -Dress for weather conditions. Apply sunscreen if needed. -Beaware of surroundings and avoid biohazards.
Task 3: Surface Soil Sampling A decontaminated stainless steel hand auger or hand trowel will be used to collect each near surface soil sample.	-Same hazards noted above for Task 2. -Potential hand and back injuries. -Potential contaminant exposure: VOCs, PCBs, SVOCs	-Same hazard controls noted above for Task 2. -Before entering work area, don level D personal protective equipment (PPE). PPE will include: hard hat, safety glasses, safety vests, steel toe boots, nitrile gloves, and ear plugs or ear muffs. -Wear leather work gloves and safety glasses. -Avoid direct contact with contaminated matrices. -Pay close attention to the sharp edge of steel hand trowel to avoid cutting or other injuries to hands.
Task 4: Sample Collection, Labeling and Packing Homogenize samples in decontaminated stainless steel or disposable mixing containers. Place the homogenized sample in the laboratory-supplied sample containers and label the bottles. Pack samples in cooler with ice and proper quality assurance samples.	-Potential contaminant exposure: VOCs, PCBs, SVOCs -Back strain when transporting coolers full of collected samples packed with ice.	-Continue to wear level D PPE and minimize contact with sample material. -Use proper lifting techniques. Get assistance when possible, especially for containers heavier than 49 lbs.
Task 5: Equipment Decontamination Decontaminate equipment that will be reused (e.g. hand auger, trowel, et. al.)	-Slips, Trips, and Falls -Hand injuries during handling of equipment. -Potential contaminant exposure: VOCs, PCBs, SVOCs -Splash hazards	-Pay close attention to foot placement; slow deliberate movement. -Pay close attention to the sharp edge of steel hand trowel to avoid cutting or other injuries of hands. -Continue to wear level D PPE and minimize contact with water.
Task 6: Demobilization Demobilize from Site, making sure all work areas are clean and orderly	-Driving	-Drive carefully and avoid distracted driving. If too exhausted to drive safely back to the office make arrangements to stay at hotel.

B. HEALTH AND SAFETY EQUIPMENT/GEAR

Site-Specific Comments:

☒	PERSONAL PROTECTIVE EQUIPMENT (PPE)**:**	Level(s) of Protection (for chemical hazards):	☐ Level D (standard work clothes, no chemical protective clothing) ☒ Modified Level D (chemical protective clothing in addition to standard work clothes) ☐ Level C (air purifying respirator or dust mask, with chemical protective clothing) ☐ Level B or A (air supplied respirator, chemical protective suit)

		☒ Hard-toed boots/shoes ☒ Hardhat ☐ Noise/hearing protection ☒ High-visibility/reflective vest ☒ Work gloves, leather ☒ Eye/face protection ☒ Safety glasses with side shields ☐ Goggles ☐ Face shield ☐ Other: ☒ Chemical protective clothing ☒ Gloves, type: Nitrile ☐ Coveralls, type: ☐ Outer boots, boot covers ☐ Other:	☐ Respiratory Protection ☐ Disposable n-95 face mask ☐ Half-face air-purifying respirator ☐ Full-face air-purifying respirator ☐ Resp-cartridge, type: ☐ Other: ☐ Personal flotation device ☐ Personal fall apparatus ☐ Fire retardant clothing ☐ EH (Electrical Hazard) rated boots, gloves ☐ Other:
☒	OTHER H&S EQUIPMENT and GEAR:	☒ Fire extinguisher ☐ Caution tape ☒ Traffic control warning devices ☐ Warning signs or placards ☐ Decon supplies for personal decon ☐ Portable ground fault circuit interrupter (GFCI)	☐ Lockout/tagout equipment ☐ Ventilation equipment (fan, blower) ☒ First aid kit ☒ Vehicle emergency kit (flares, lights, reflective device) ☐ Other:

C. AIR MONITORING – CHECK IF NOT APPLICABLE: ☒

Site-Specific Comments:

☐	INSTRUMENT(S), EQUIPMENT	☐ PID, Lamp energy: eV ☐ FID ☐ Carbon monoxide detector ☐ Hydrogen sulfide detector ☐ Oxygen (O_2) detector	☐ Flammable gas (LEL) detector ☐ Particulate (dust) detector ☐ Calibration kit for each detector type ☐ Others:

☐	ACTION LEVELS FOR **O2/LEL**	☐ Oxygen	≤19.5% - provide ventilation to raise oxygen to acceptable levels, or utilize Level B. ≥23.0% - provide ventilation to lower oxygen to acceptable levels, or utilize Level B and implement controls for fire hazards, control ignition sources.
		☐ LEL	Confirm at least 12% oxygen is present to ensure accuracy of LEL readings. At <10% LEL - Continue working, continue to monitor LEL levels At ≥10% LEL- Immediately withdraw from area. Resume work ONLY after LEL readings reduced to <10% through passive dissipation, or active vapor control measures.

☐	ACTION LEVELS FOR **TOXICS** (sustained breathing zone concentrations)	**Parameters**	**Level D, Modified D**	**Use levels C or B, as indicated below, OR take action to reduce breathing zone level to concentration acceptable for Level D.**
		☐ VOCs	< ppm	ppm to ppm: Level C (air purifying respirator) > ppm: Level B (air-supplied respirator)
		☐ Carbon Monoxide	< 35 ppm	≥35 ppm - Level B (air-supplied respirator)
		☐ Hydrogen Sulfide	< 10 ppm	≥10 ppm - Level B (air-supplied respirator)
		☐ Total Dust	< mg/m^3	> mg/m^3 - Level C (air-purifying respirator)
		☐		
		☐		

HAZARD		HAZARD CONTROLS (check all that apply and comment as required)
1. PREMISES/ENVIRONMENTAL HAZARDS		
Site-Specific Comments:		
☒	LOCATION HAZARDS ☒ Outdoor field work ☒ Urban, suburban ☐ Rural, remote location ☐ Indoor field work ☐ Operating facility ☐ Vacant facility ☐ Water hazards	☒ Use routine safety precautions commensurate with routine work environment conditions ☐ For non-routine, unique, or severe location hazards, see site-specific safety comments above. ☐ For water-related work, see #2, “Water Hazards” ☐ For worksite violence/security risks, see #3, “Violence, Security, Working Alone” ☒ For transportation related hazards, see #5, “Worksite Traffic, Vehicle, Transportation Hazards” ☒ For utility-related hazards, see # 6, “Utility-Related Hazards ☐ For atmospheric hazards in enclosed, indoor, or confined spaces, see # 11 “Confined Spaces or Hazardous Enclosed/Indoor Spaces”

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PRE-WORK TASK HAZARD ANALYSIS (THA)

	HAZARD	HAZARD CONTROLS (check all that apply and comment as required)
☒	WALKING/WORKING SURFACES, HOUSEKEEPING ☒ Uneven, rough terrain, riprap ☒ Slippery surfaces ☐ Holes, pits, openings ☐ Puncture, foot hazards	☒ Keep work areas clean, orderly, dispose of trash/debris, maintain sanitary conditions. ☒ Walkways are cleared of equipment, excavated material, tools and debris, snow ☐ Holes, pits, openings to be covered or otherwise marked or guarded ☐ Apply absorbent, salt or sand, for traction/slip resistance on slippery/icy/wet surfaces ☒ Wear proper work boots/shoes with ankle support and/or traction, as appropriate for conditions
☒	TEMPERATURE/WEATHER ☒ Heat Stress ☒ Cold Stress ☒ Severe Weather ☒ Lightning	☒ Heat/Cold stress are monitored in accordance with Geosyntec procedures EHS 124 & EHS 125 ☒ Provide sufficient fluids, shade, breaks, other precautions as appropriate to adderss heat hazards. ☒ Provide protection from sun (sun screen, shaded brake area). ☐ For cold stress, wear multiple layers, protect from wind/wet, frequent break in warm location. ☐ In high wind, discontinue working at heights (e.g. on ladders, scaffold, aerial lift, similar). ☒ Use precautions for lightning, thunderstorm, hale, tornado (monitor weather, “30/30 rule,” shelter)
☒	BIOLOGICAL HAZARDS ☒ Insects, spiders, ticks ☐ Wild/feral/pet animals ☐ Mold, fungi ☒ Poisonous plants ☐ Bird Guano ☐ Infectious, wastewater, sewer ☐ Bloodborne pathogens	☒ Utilize safety practices commensurate with risk of biting/stinging insects, wild/feral/pet animals. ☒ For poisonous plants (poison ivy/oak/sumac/etc.), minimize exposed skin area, wear coveralls, use barrier cream/wash (Technu products or similar), as appropriate. For biological exposure hazards, use protective measures commensurate with hazard: ☒ Minor-moderate hazard - use ordinary hygiene practices, protective gloves, hand washing. ☐ Moderate-severe hazard - add protective clothing, respirator, decon, as appropriate. ☐ Bloodborne pathogen (human infectious agents) - implement “Universal Precautions”
☐	HAZARDOUS NOISE	☐ Hearing protection is used when exposed to excessive noise levels (greater than 85 dBA over an 8-hour work period, or intermittent….)
☐	OVERHEAD HAZARDS, FALLING OBJECTS	☐ Wear hardhat when exposed to overhead hazards, “bump” hazards, falling objects ☐ Cordon off hazard zones, route access/egress around hazards of falling objects ☐ Secure objects from falling ☐ Provide overhead protection (canopy) to protect public pedestrians, workers
☐	ILLUMINATION ☐ Night work ☐ Indoor work	☐ Make site-specific arrangements for illumination of work areas and access routes.
2. BOATING, WATER, WET LOCATIONS, FLOOD, ETC. – CHECK IF NOT APPLICABLE: ☒		
Site-Specific Comments:		
☐	WATER HAZARDS ☐ Drowning, hypothermia ☐ Boat, barge, raft ☐ Wading, wetland, mud/silt ☐ Dam release, flood, tide ☐ Diving	☐ Wear appropriate Coast Guard-approved Personal Flotation Device (PFD) ☐ Bring emergency rescue equipment (ring buoy, reaching device, flares) ☐ Use fuel safety practices, fire extinguisher present in boat ☐ See site-specific safety comments above.
3. VIOLENCE, PUBLIC PROTECTION, WORKING ALONE – SPECIAL MEASURES – CHECK IF NOT ANTICIPATED: ☒		
Site-Specific Comments:		
☐	PERSONAL SECURITY, HIGH CRIME AREA	☐ Employ standard precautions, which may include: conduct work only during daylight hours, use buddy system, avoid parking in secluded location, lock vehicles, hide valuable items in vehicles from plain view ☐ See site-specific safety comments above for project-specific security measures.
☐	PUBLIC AT RISK, SITE SECURITY	☐ Provide safe pedestrian route around work areas, use appropriate barriers, signs, warning devices. ☐ Provide covers over excavation, secure fencing, overnight protection ☐ Provide protection from overhead hazards (canopy, etc.) where public at risk of overhead hazards ☐ Provide secure locked storage of hazardous chemicals, hazardous equipment, etc.
☐	WORKING ALONE	☐ Establish “check in” procedure with supervisor or project manager (arrival, mid-day, departure) ☐ Additional measures, as appropriate for the working conditions.
4. DRIVING, TRAFFIC, TRANSPORTATION HAZARDS – CHECK IF NOT APPLICABLE: ☐		
Site-Specific Comments:		
☒	DRIVING HAZARDS ☒ Routine work travel ☐ Unfamiliar location ☐ Unfamiliar vehicle ☒ Overnight travel, distance	☒ Use routine safe/defensive driving practices (seat belts, safe speeds, eyes ahead, no tailgating, limit distractions, no texting, safe cell phone use, clear windows, account for weather/road conditions, adequate sleep, other measures as appropriate). ☒ Plan travel route before driving (assemble maps, enter destination in GPS). ☐ Familiarize yourself with vehicle operational controls before operating unfamiliar vehicle.

HAZARD		HAZARD CONTROLS (check all that apply and comment as required)
☒	WORKERS EXPOSED TO TRAFFIC HAZARDS ☒ In/near public or private roadway ☒ Parking lot, driveway ☐ Worksite, construction site traffic	☒ Workers to wear reflective vests where exposed to traffic hazards. ☒ Where possible, park vehicles as protective shield from oncoming traffic. ☒ Configure work area and support vehicles to minimize worker exposure to traffic hazards. ☐ DOT signal devices will be used to re-route vehicles around work area, site entrances/exits. ☐ Flaggers will be used and have DOT Flagger Training; police detail where appropriate or required. ☒ Park vehicles in secure location away from heavy equipment use or other site operations. ☐ Mark temporary roadways clearly, provide berms/stop logs where needed.
☐	RAILROAD/AIRPORT HAZARD	☐ Coordinate with rail company/airport and implement required safety measures ☐ Site workers to receive safety training for railroad/airport work.
☐	OFF-ROAD DRIVING, USE OF ALL-TERRAIN VEHICLE	☐ For off road driving, do not exceed capability of vehicle ☐ Follow ATV specific procedures for training, safety equipment, operation.
☐	TRANSPORTING MATERIALS, TOWING/HAULING LOADS	☐ Ensure load is firmly secured (rope, straps, load configuration) to prevent shifting during travel. ☐ For trailer use, verify signal/braking lights operational, rear-view mirrors effective, hitch/safety chains secure.
5. UTILITY-RELATED HAZARDS (for underground/overhead work) – CHECK IF NOT APPLICABLE: ☒		
Site-Specific Comments:		
☐	OVERHEAD UTILITIES	☐ Maintain proper clearance, employ other appropriate precautions for the conditions.
☐	UNDERGROUND UTILITIES	☐ Confirm appropriate underground utility clearance procedures have been completed prior to ground penetrations, and employ other utility clearance/locator practices, as appropriate for conditions.
6. ELECTRICAL HAZARDS – CHECK IF NOT APPLICABLE: ☒		
Site-Specific Comments:		
☐	WORKERS EXPOSED TO: ☐ Voltage < 50 v ☐ Voltage 50-600v ☐ Voltage > 600v ☐ AC ☐ DC ☐ 3-phase ☐ Battery and/or solar power ☐ Capacitor/Transformer	☐ Implement electrical safe work practices commensurate with the work to be performed, pertaining to the following (as applicable): - Worker training/qualification - Electrical equipment and hazards, safe design features - Electrical safe work practices - Grounding, use of GFCIs - Electrical equipment installation, operation, maintenance, repair - Arc flash protection - Electrical equipment diagnostics
☐	BASIC ELECTRICAL HAZARDS ☐ Equipment/tool use/operation ☐ Use of extension cords	☐ Control water-related hazards, in a manner appropriate for the job tasks/equipment/tool. ☐ Use extension cords/power cords properly, prevent damage, take out of service if damaged. ☐ Inspect tool/equipment/extension cords/power cords before each use. ☐ Use GFCI-protected outlet or portable GFCI in wet locations, outdoors, basements ☐ Ensure live parts are guarded, enclosures secure. ☐ Enclosures, circuits properly labeled.
☐	LOCKOUT/TAGOUT OF ELECTRICAL ENERGY	☐ Implement control-of-hazardous-energy practices (lockout/tagout), provide lockout/tagout locks and devices, training workers, designate “authorized” personnel, notify “affected” personnel
7. FALL HAZARDS – CHECK IF NOT ANTICIPATED: ☒		
Site-Specific Comments:		
☐	WORKING AT HEIGHTS ☐ Roof, skylight ☐ Elevated platform ☐ Holes, side opening ☐ Retaining wall, cliff, ledge ☐ Trench, excavation ☐ Protruding rebar	☐ Ensure guardrails present ☐ Use personal fall apparatus (PFA) ☐ Use tether or positioning device ☐ Restrict access to hazard (barriers, tape, sign) ☐ Ensure covers in place over holes ☐ Watch person ☐ Use fall protection net ☐ Restrict access beneath work to protect other site personnel from overhead hazards ☐ Install caps on protruding rebar
☐	LADDERS / STAIRS ☐ Extension ladders ☐ Step ladders ☐ Fixed ladders ☐ Stairs	☐ Provide instruction/review pertaining to safe ladder use ☐ Extension ladders are properly footed, secured, setup at proper angle ☐ Stepladders are set on level ground or properly shimmed with spreaders locked. ☐ Stairs have proper rise over run and stairs >4 steps or 4' have guardrails. ☐ Never use a step ladder as a straight ladder. All straight ladders shall be extended three rungs past leading edge. Never use metal ladders while working with electricity.

	HAZARD	HAZARD CONTROLS (check all that apply and comment as required)
☐	AERIAL LIFT ☐ Scissor lift ☐ Extensible boom ☐ Articulated boom ☐ Vertical Lift ("Genie")	☐ Operators are sufficiently trained, experienced and qualified. ☐ Equipment is inspected after mobilization and is in good condition. ☐ Harness & Lanyard worn whenever operating the lift (scissor lifts may be excepted) ☐ Overhead and surface obstructions are reviewed with operators prior to use.
☐	SCAFFOLD ☐ Supported scaffold ☐ Suspended scaffold ☐ Free-standing/mobile scaffold	☐ Identify/coordinate operations with competent person ☐ Supported scaffold level, stable, proper attachments, tiebacks, planking, ☐ Suspended scaffolds anchored properly ☐ Guardrails present above 10 feet or personal fall apparatus used. ☐ Proper means of accessing scaffold (proper ladders, stair tower). ☐ Total height of free-standing scaffold not to exceed four times the minimum base dimension.
8. TOOLS, EQUIPMENT, MACHINERY – CHECK IF NOT APPLICABLE: ☐		
Site-Specific Comments:		
☒	HAND TOOLS Eye injury, puncture/bruise/ laceration hazard	☒ Use proper tool for the job, maintain tools in good condition (no damage, cutting tools sharp, etc.) use appropriate PPE for hand/eye/body protection, plan for safe "follow through" motion, use vise/clamp/work surface to hold/stabilize work piece
☐	POWER TOOLS ☐ Eye/hand/body injury ☐ Fuel-related hazards ☐ Inhalation hazard ☐ Noise ☐ Sparks, heat, fire hazard ☐ Electrical hazards	☐ For all power tools: - Inspect tools to ensure safe operating condition before each use. - Use tool in accordance with manufacturer's specifications. - Use PPE or other safety practices, as appropriate, for eye/hearing/hand/head/body protection - Provide training or verify operator qualification for use of power tool. - Stay clear of hazard zone, "line of fire" when working near where power tools are used. ☐ Use safety practices for refueling, fuel handling/transport/storage. ☐ Use respirators, ventilation, wet methods, other appropriate means to control inhalation hazard. ☐ For spark/heat generating tool, control fire hazards, segregate combustible/flammable materials. ☐ For electrical hazards, see # 6, "Electrical Hazards".
☐	WELDING, CUTTING ☐ Gas welding/cutting ☐ Arc welding/cutting	☐ Hot work permit system to be implemented. ☐ Operator properly protected (eye protection, clothing, apron, etc.) ☐ Fire hazard controls (watcher, fire extinguisher, water, isolate combustibles) ☐ Protect nearby personnel from hazardous UV, IR light (shielding, curtain) ☐ Electrical safe work practices for arc welding ☐ Gas cylinder safe practices (secured, upright, caps on when not in use, prevent damage).
☐	EQUIPMENT/MACHINERY ☐ Point-of-operation hazards ☐ Pinch points, moving parts ☐ 'Struck-by,' 'caught between' ☐ Hot surfaces, heat ☐ Extension cords, flexible wire ☐ Fuel related (gas or liquid) ☐ Hydraulic pressure ☐ Compressed air/gas ☐ Kinetic, stored energy ☐ Noise ☐ Lockout/tagout ☐ Emissions, discharge gases ☐ Working at heights, falls ☐ Lifting, repetitive motion ☐ Illumination ☐ Electrical (see below)	☐ *Working Near* Equipment/Machinery ☐ Work at safe distance/restrict access, ensure guards in place, heed warning signs ☐ Implement measures necessary for adequate illumination ☐ Control exposue to emission/discharge gases (ventilation, PPE, other means). ☐ Ensure safe practices for fuels/fluids/machine-related hazardous materials ☐ Use PPE or other safety practices for eye/hearing/hand/head/body protection ☐ Segregate combustible materials from hot surfaces/hot exhaust (minimum 3 feet) ☐ Operation/Maintenance/Repair of Equipment/Machinery (see applicable control measures above) ☐ Orient/locate equipment for safe access during operation and maintenance ☐ Use equipment/machinery in accordance with manufacturer's specifications ☐ Use safe lifting practices, minimize repetitive motion hazards ☐ Ensure point-of-operation, mechanical power transmission, other moving parts are guarded with protective devices; do not override interlocks, guards, protective devices ☐ Secure long hair/loose clothing/hanging jewelry near moving/rotating parts ☐ Ensure appropriate warning signs are in place and heeded ☐ Use safe practices for fueling, fuel transport & storage. ☐ Operate fuel-powered equipment in well ventilated location. ☐ Incorporate safety provisions/safe work practices for compressed air, pressurized systems (pneumatic/hydraulic), stored energy ☐ Implement control-of-hazardous-energy practices (lockout/tagout), designate "authorized" personnel, notify "affected" personnel ☐ Protect from fall hazards (safe ladder use, personal fall protection, guardrails, other) ☐
☐	ELECTRICAL HAZARDS	☐ Implement provisions of # 6, "Electrical Hazards"
9. MANUAL MATERIAL HANDLING, MATERIAL STORAGE – CHECK IF NOT APPLICABLE: ☐		

	HAZARD	HAZARD CONTROLS (check all that apply and comment as required)
Site-Specific Comments:		
☒	LIFTING / ERGONOMIC Musculoskeletal strain, repetitive motion injury	☒ Use proper manual lifting techniques (straight back, bend at knees, firm grasp, firm footing). ☒ Seek assistance for lifting heavy objects (>50 lbs.) ☐ Use mechanical lifting equipment to reduce manual material handling hazard ☒ For repetitive motion activities, take breaks, switch hands, share task with others, employ other safe practices appropriate for the specific task(s).
☐	STORAGE OF MATERIALS See Sect. 12 for Chemical Storage	☐ Store materials in stable manner that prevents tipping, sliding, rolling, falling over. ☐ Materials stored in tiers to be stacked, racked, blocked, interlocked or otherwise secured to prevent sliding, falling or collapse ☐ Do not exceed load limits of racks, platform; ensure racks are stable, robust, secure ☐ On scaffold, do not store materials in excess of supplies needed for immediate use ☐ Ensure stored materials do not block aisles, passageways ☐ For used lumber, remove nails before stacking, and stack to be stable and self supporting, no higher than 20 feet (or 16 feet if lumber is to be handled manually) ☐ Debris will be removed regularly from storage area and place in designated area or disposed.
10. CONSTRUCTION OPERATIONS, HEAVY EQUIPMENT, HEAVY VEHICLES – CHECK IF NOT ANTICIPATED: ☒		
Site-Specific Comments:		
☐	HEAVY EQUIPMENT; CONSTRUCTION VEHICLES Hazards: Struck By, Run-Over, Caught In Between (pinch points), Roll Over, Fluid Leaks	☐ Trained/qualified persons operate all heavy equipment. ☐ No passengers on moving/operating equipment except where passenger seat/restraint is present. ☐ Equipment inspected upon mobilization and daily; maintained in good repair, backup alarms ☐ All leaks or defective safety equipment will be repaired before use. ☐ Operators required to use seatbelts. ☐ Eye contact with operator and use of hand signals prior to approaching near equipment. ☐ High visibility vests are required of all personnel in work area. ☐ Max. safe slope for each vehicle will be followed. ☐ Personnel to stay clear of swing radius of equipment. ☐ Spill equipment available for fuel and hydraulic fluid leaks. ☐ Equipment locked, secured, brakes set, buckets/forks lowered, when not in use.
☐	CRANES Overhead hazards – utility lines, swing radius, falling objects, wire ropes and hoisting equipment ☐ Overbalancing – high winds, outrigger placement, overloading, safe slope ☐ Struck By, Run-Over, Caught In Between (pinch points), Roll Over, Fluid Leaks	**In addition to general safety practices for heavy equipment (above), as applicable:** ☐ Only qualified persons operate cranes (certificate required). ☐ A Critical Lift Plan & Checklist prepared/executed (HS 506) prior to mobilization. ☐ Equipment will be inspected prior to mobilization and a Crane Pre-Operational Safety Checklist (see EHS 506) will be completed and signed by crane operator. ☐ Crane operator will remain at the controls at all times during operation. ☐ Crane operation must be performed under the direction of an appointed signal person at all times. ☐ Communication between crane operator and signal person will be maintained through standard hand signals or voice communication equipment. Radio equipment, if used, will be equipped with a dedicated channel. ☐ Lifting or lowering will not exceed 100ft/minute. Lowering must be controlled i.e. no free fall. ☐ Stop work will be issued whenever hoisting equipment is exposed to high winds. ☐ Outriggers will be fully extended/locked with a firm footing within the maximum safe slope (<1%). ☐ Crane to be on level, stable base, dunnage used when necessary. ☐ Total weight of load not to exceed 50% of rated capacity for the crane radius and configuration. ☐ Rigging procedures – see Hoisting, Lifting, Rigging, below. ☐ Suspended personnel lifting is prohibited (unless per approved “man-lift” equipment). ☐ No personnel permitted beneath suspended loads.
☐	HOISTING, LIFTING, RIGGING ☐ Crane ☐ Drill rig ☐ Loader, excavator, etc. ☐ Mechanical, electrical hoist	☐ Identify, coordinate with competent person. ☐ Rigging directly to the forks of a lull, forklift, or front loader equipped forks is prohibited. ☐ Do not exceed loading limits of equipment. ☐ A Critical Lift Checklist (see EHS 506) will be completed and signed prior to crane mobilization. ☐ Rigging, wire rope and hoisting equipment will be inspected and maintained on a weekly basis. ☐ Crane hooks will be equipped with safety latches.
☐	FORKLIFT Hazards: Struck By, Run-Over, Caught In Between (pinch points), Roll Over, Fluid Leaks	**In addition to general safety practices for heavy equipment (above), as applicable:** ☐ Qualified operater, per established forklift training (certificate is required) ☐ Equipment inspected daily and documented on Forklift Preoperation Inspection Checklist ☐ Operators required to use seatbelts, and adhere to safe operating procedures.

	HAZARD	HAZARD CONTROLS (check all that apply and comment as required)
		☐ Do not exceed lifting load limits. ☐ Forklift shall not be moved/driven with empty forks in raised position. ☐ When not in use, forks lowered, brake set, controls in neutral, key removed.
☐	EXCAVATION/TRENCHING ☐ Max Depth ≥ 20' ☐ Max Depth ≥ 5' ☐ Max Depth <5' with potential cave-in hazard ☐ Potential permit-required confined space at depth ≥ 4' ☐ Underground utilities ☐ Overhead utilities ☐ Structures/foundations ☐ Falls into excavations	☐ Activities under supervision/oversight of competent person ☐ Sloping & shoring for excavations ≥20' are approved by a professional engineer ☐ Sloping & shoring for excavations ≥5' when persons are exposed to cave-in. ☐ Sloping & shoring for shallow (<5') excavations with cave-in hazard ☐ Excavations ≥ 4' are classified as a non-permit confined space ☐ Excavations ≥ 4' are classified as Alternate Entry or Permit-Required (see confined space) ☐ Implement underground utility clearance procedures. ☐ Hand digging within 3' of utility locations. ☐ Excavations to be protected by perimeter fencing (not barricade tape) ☐ Use trench boxes in accordance with proper procedures. ☐ Workers in trenches to be within 25 feet of ladder or sloped entryway.
☐	DRILLING ☐ Struck By, Run-Over, Caught In Between (pinch points), Roll Over, Fluid Leaks ☐ Underground utilities, aboveground ☐ Spills ☐ See Equipment/Machinery	☐ Contractor inspects drill rig daily before use. ☐ Drill rig equipped with operational emergency stop. ☐ Highpressure lines equipped with whip checks. ☐ High visibility vests, hard hats are being worn near the equipment. ☐ Operators and helpers will maintain a safe distance to moving parts. Individuals working near moving or rotating parts will secure loose hair, clothing, and equipment. ☐ Drill rigs will only be moved with masts lowered. Masts will be erected with outriggers fully extended when equipped with outriggers. ☐ Max. safe slope for rig will be followed, drill rig leveled, appropriate blocking/cribbing as needed. ☐ Spinning parts of the rig are guarded when possible, no loose clothing being worn near the rig. ☐ Follow underground utility clearance procedures. ☐ Area is surveyed for overhead utilities, safe clearance distance maintained. ☐ Hearing protection is used when working near the rig. ☐ Spill equipment is available for fuel and hydraulic fluid leaks.
☐	DEMOLITION	☐ Develop/implement demolition safety plan
☐	BLASTING	☐ Develop/implement blasting safety plan
11. CONFINED SPACES, HAZARDOUS ENCLOSED or INDOOR SPACES – CHECK IF NOT APPLICABLE: ☒		
Site-Specific Comments:		
☐	CONFINED SPACE(S) ☐ Permit required ☐ Non-permit required Potential/actual hazards: ☐ Atmospheric hazards: ☐ Flammable/explosive ☐ Oxygen deficiency ☐ Hydrogen sulfide ☐ Other toxic ☐ Combustible dust ☐ Electrical ☐ Mechanical, engulfment, entrapment, stored energy	☐ For personnel <u>working near confined</u> spaces: - Confined spaces have been identified, labeled. - Communication system in place to prevent unauthorized entry. ☐ For <u>permit-required confined space entry</u>, see separate entry permit. - All entrants, attendants, supervisors are trained/qualified. - Hazards properly characterized - Necessary equipment for safe entry utilized (access, retrieval, air monitoring) - Arrangements for rescue team have been made. ☐ For entry into a <u>non-permit</u> confined space, see site specific procedures delineated above in "site-specific comments," or see alternate/attached safety work plan.
☐	ENCLOSED/INDOOR SPACE(S) ☐ Outfall, culvert ☐ Tunnel, shaft, gallery ☐ Machine/equipment pit/vault ☐ Basement/Sub-basement ☐ Crawl space entry ☐ Indoor equipment/drilling	*<u>For indoor use of gasoline/propane/diesel equipment:</u>* ☐ Duct exhaust to outdoors, and/or introduce fresh air using ventilation/blowers/fans. ☐ Perform air monitoring (see section on Air Monitoring) *<u>For entry into potentially hazardous indoor or enclosed spaces:</u>* ☐ Ventilate and/or perform air monitoring for anticipated hazards. ☐ If space classified as confined space, follow confined space entry requirements (above).
12. COMMERCIAL CHEMICAL PRODUCTS USED AT WORK SITE – CHECK IF NOT APPLICABLE: ☐		
Site-Specific Comments:		

	HAZARD	HAZARD CONTROLS (check all that apply and comment as required)
☒	PRODUCTS REGULATED BY HAZARD COMMUNICATION STANDARD	☒ Safety Data Sheets available, either on site or readily available within same work shift ☒ Containers labelled properly ☒ Workers trained on hazards ☒ For subcontractor use of chemical products, coordinate/discuss during safety meetings.
☒	COMPRESSED GAS(ES): Isosbutylene Calibration Gas for PID	☒ Secure cylinders upright, caps on when not in use, handle with care, prevent damage ☐ Propane cylinders not in use must be stored outdoors in cage or similar secure enclosure. ☐ Ensure acetylene cylinders NOT secured to steel arc welding bench ☐ Store/use in a manner to prevent asphyxiation hazard ☐ Segregate oxygen and fuel gases by distance (20') or barrier ☐ Control ignition sources, no smoking signage ☐ Use/store in a manner to control inhalation exposure hazards, PPE, air monitoring.
☐	FLAMM./COMBUST. LIQ.	☐ Proper storage (flam. storage cabinets, other storage precautions) ☐ Control ignition sources ☐ Grounding and bonding where appropriate
☐	CORROSIVES	☐ Handle with care, use appropriate eye/face/skin protection ☐ Eyewash, deluge shower, drench hose, hand washing (with water), as appropriate
☐	TOXIC	☐ For toxic substances, use/store in a manner to control exposure hazards (inhalation, ingestion, skin contact, skin absorption; use PPE as appropriate, conduct air monitoring as appropriate.
☐	CHEMICAL STORAGE	☐ Chemical storage cabinet, cage, storage room, or similar ☐ Incompatible chemicals segregated ☐ Secondary containment ☐ Safety equipment will be located near chemical storage.

13. CHEMICAL HAZARDS FROM ON-SITE CONTAMINANTS, OPERATIONS, EMISSIONS – CHECK IF N/A: ☐

Site-Specific Comments:

CHECK AS APPROPRIATE BELOW. PROVIDE ADDITIONAL INFO. AS APPROPRIATE, IN SITE-SPECIFIC HAZARD ANALYSIS ABOVE.

☒ Soil/groundwater contaminants (historical release)	☐ Oxygen deficiency	☐ Asbestos
☐ Recent release, known high concentrations	☒ Chlorinated VOCs (volatile org. cpds.)	☐ Lead paint
☐ Former chemical disposal site, landfill	☒ BTEX, petroleum derived VOCs	☐ Pesticides, herbicides, fungicides
☐ Urban fill, residual contaminants	☐ Fuel oils, petroleum, waste oil, lubricants	☐ Sensitizers
☐ Containerized waste (drums, process equipment)	☒ Metals, metal compounds, metal dusts	☐ Radioactive contaminants
☐ Buried drums (known or potential)	☐ Elemental mercury	☐ Other:
☐ Large containers, potential for spills	☒ Polyaromatic hydrocarbons (PAHs)	
☐ Emissions from active industrial processes	☒ Polychlorinated biphenyls (PCBs)	
☐ Emissions from welding/cutting/hot work	☐ Potential for flammable vapors	
☐ Carbon monoxide (vehicle/equipment exhaust)	☐ Potential for flammable gas (methane)	
☐ Contaminated building surfaces	☐ Corrosive, acids/caustics, strong irritants	
☐ Unexploded ordnance	☐ Sulfides, hydrogen sulfide (H2S)	
☐ Explosive dust	☐ Cyanides, hydrogen cyanide (HCN)	

☐	FOR SITE REGULATED AS "UNCONTROLLED HAZ. WASTE SITE," e.g. **REGULATED BY HAZWOPER** (OSHA 29 CFR 1910.120) - Establish work zones & site control plan (Exclusion Zone - EZ, Contaminant Reduction Zone - CRZ, Support Zone - SZ) - Workers to be aware of and trained on hazards per OSHA Hazard Communication Standard. - Include site map/figure depicting work locations and other relevant site-specific information. - Site workers in EZ or CRZ to have OSHA 40-hour training, current 8-hour refresher, 3 days supervised field expience. - Site workers in EZ or CRZ to participate in Medical Monitoring program. - "Peripheral" site workers, engaged on-site, with no hazardous exposure: 24 hr. training required. - Site supervisor(s) required to have 8-hr. Supervisor training. - Implement site-specific procedures for worker protection through engineering controls, work practices, personal protective equipment (PPE), air monitoring, decontamination, spill containment (see Sections B and C, "Health and Safety Equipment/Gear" and "Air Monitoring" - Include emergency response program in H&S plan.
☒	FOR SITE WITH CHEMICAL CONTAMINANTS BUT **NOT REGULATED BY HAZWOPER** - Workers to be aware of and trained on hazards per OSHA Hazard Communication Standard - Implement appropriate controls to minimize worker exposure (engineering controls, work practices) to levels below OSHA PELs. - Use PPE as needed (see B, "Health and Safety Equipment/Gear"). - Conduct air monitoring or personal air sampling to monitor and/or evaluate worker exposure (see Section C, "Air Monitoring").

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PRE-WORK TASK HAZARD ANALYSIS (THA)

HAZARD		HAZARD CONTROLS (check all that apply and comment as required)
☐	ATMOSPHERIC HAZARDS GENERATED BY EXHAUST FROM OPERATING EQUIPMENT ☐ Position work upwind of exhaust source ☐ Use blowers, fans to dissipate atmospheric hazards ☐ Conduct air monitoring (see Section C, "Air Monitoring").	
☐	OFF-SITE MIGRATION OF CONTAMINANTS	☐ Implement controls to minimize hazard migration (dust suppression, covers, foam, etc.) ☐ Community/perimeter air monitoring is not anticipated with the current scope of work. ☐ Community/perimeter air monitoring to be conducted per perimeter air monitoring plan.

EMERGENCY RESPONSE **(911 Service is Available ☒ Yes ☐ No)** ☒ Verify wireless coverage at site, use alternate communication procedures as needed.

Emergency Medical Treatment - Hospital Name: Hospital Address:	St Joseph's Hospital 555 E. Market St Elmira NY 14901	**Number:**	607.733.6541
Urgent Care Med. Treatment - Clinic Name: Occupational Clinic Address:	Elmira Urgent Care 306 W. Water St., Elmira, NY 14905	**Number:**	607.732.1100
Fire Department Name	West Elmira Fire Department	**Number:**	911
Spill Response:	West Elmira Fire Department	**Number:**	911
Client Representative Name::	Kevin Krueger	**Office Number:** **Cell Number:**	(651) 687-2210
Geosyntec **Project Manager** Name:	Aron Krasnopoler	**Office Number:** **Cell Number:**	(410) 381-4333 (202)-550-7724
Geosyntec **Corporate H&S** Name:	Dale Prokopchak	**Office Number:** **Cell Number:**	804 332 6376 (804) 349-8067

Emergency Response Comments:

Date:	
Project Name: Former Sperry Remington Site North	
THA Title: Hand Augering for Shallow Soil Sample Collection	
Subcontractor Name(s):	
Geosyntec Representative (reviewed by):	**Michael Hansen**
Subcontractor Foreman/Supervisor Signature (authorize):	
Crew Signatures (acknowledge):	
Print Name	**Signature**

PLEASE RETURN A COPY OF THIS SIGNED PAGE TO GEOSYNTEC PROJECT MGR., SUPERINTENDENT UPON REVIEW AND ACKOWLEDGMENT BY THE CREW MEMBERS. ALL NEW CREW MEMBERS SHALL BE ORIENTATED THE SAME AND A SUBMITTAL OF A NEW SIGN IN SHEET SHALL BE COMPLETED.

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PRE-WORK TASK HAZARD ANALYSIS (THA)

TASK/ACTIVITY:	Monitoring Well Inspection and Synoptic Water Level Measurements	**Date:**	7/18/2014
Project Name:	Former Sperry Remington Site North	**Client Name:**	Unisys Corporation
Project Number:	MN0832	**Geosyntec Proj. Mngr.:**	Aron Krasnopoler
Project Address:	777 Sourth Main Street, Elmira, New York	**Geosyntec Proj. Dir.:**	Paul Brookner
Task Description:	Inspect existing monitoring wells and take depth to water and depth to bottom measurements at each location.		

A. SUMMARY OF SITE-SPECIFIC TASK HAZARD ANALYSIS

Site-Specific Comments: Some monitoring locations are in parking lot areas and may have traffic related hazards.

Sub-Tasks, Activities	Hazards	Hazard Controls
Task 1: Mobilize to Site	-Driving -Mobilization to and around unfamiliar facility	- Drive carefully to facility, be well rested and avoid distracted driving. - Review scope of work.
Task 2: Locate monitoring well	-Slips/trips/falls -Heat/cold stress -Biohazards: snakes, bees, spider, ticks, poison ivy -Potential contaminant exposure: VOCs, PCBs, SVOCs -Traffic	-Pay close attention to foot placement; slow deliberate movement. -Dress for weather conditions. Apply sunscreen if needed. -Beaware of surroundings and avoid biohazards. - don level D personal protective equipment (PPE). PPE will include: safety glasses, safety vests, steel toe boots, and nitrile gloves. - see traffic hazard controls
Task 3: Measure depth to water, depth to bottom, and complete monitoring well inspections.	-Same hazards noted above for Task 2. -Splash harzards. .	-Same hazard controls noted above for Task 2. -Avoid direct contact with contaminated matrices and/or equipment.
Task 4: Equipment Decontamination Decontaminate equipment that will be reused (e.g. water level indicator)	-Slips, Trips, and Falls -Potential contaminant exposure: VOCs, PCBs, SVOCs -Splash hazards	-Pay close attention to foot placement; slow deliberate movement. -Continue to wear level D PPE and minimize contact with water.
Task 5: Demobilization Demobilize from Site, making sure all work areas are clean and orderly.	-Driving	-Drive carefully and avoid distracted driving. If too exhausted to drive safely back to the office make arrangements to stay at hotel.

B. HEALTH AND SAFETY EQUIPMENT/GEAR

Site-Specific Comments:

☒	PERSONAL PROTECTIVE EQUIPMENT (PPE)**:**	Level(s) of Protection (for chemical hazards):	☐ Level D (standard work clothes, no chemical protective clothing) ☒ Modified Level D (chemical protective clothing in addition to standard work clothes) ☐ Level C (air purifying respirator or dust mask, with chemical protective clothing) ☐ Level B or A (air supplied respirator, chemical protective suit)

		☒ Hard-toed boots/shoes ☐ Hardhat ☐ Noise/hearing protection ☒ High-visibility/reflective vest ☒ Work gloves ☒ Eye/face protection ☒ Safety glasses with side shields ☐ Goggles ☐ Face shield ☐ Other: ☒ Chemical protective clothing ☒ Gloves, type: Nitrile ☐ Coveralls, type: ☐ Outer boots, boot covers ☐ Other:	☐ Respiratory Protection ☐ Disposable n-95 face mask ☐ Half-face air-purifying respirator ☐ Full-face air-purifying respirator ☐ Resp-cartridge, type: ☐ Other: ☐ Personal flotation device ☐ Personal fall apparatus ☐ Fire retardant clothing ☐ EH (Electrical Hazard) rated boots, gloves ☐ Other:
☒	OTHER H&S EQUIPMENT and GEAR:	☒ Fire extinguisher ☐ Caution tape ☒ Traffic control warning devices ☐ Warning signs or placards ☐ Decon supplies for personal decon ☐ Portable ground fault circuit interrupter (GFCI)	☐ Lockout/tagout equipment ☐ Ventilation equipment (fan, blower) ☒ First aid kit ☒ Vehicle emergency kit (flares, lights, reflective device) ☐ Other:

C. AIR MONITORING – CHECK IF NOT APPLICABLE: ☒

Site-Specific Comments:

☐	INSTRUMENT(S), EQUIPMENT	☐ PID, Lamp energy: eV ☐ FID ☐ Carbon monoxide detector ☐ Hydrogen sulfide detector ☐ Oxygen (O_2) detector	☐ Flammable gas (LEL) detector ☐ Particulate (dust) detector ☐ Calibration kit for each detector type ☐ Others:

☐	ACTION LEVELS FOR **O2/LEL**	☐ Oxygen	≤19.5% - provide ventilation to raise oxygen to acceptable levels, or utilize Level B. ≥23.0% - provide ventilation to lower oxygen to acceptable levels, or utilize Level B and implement controls for fire hazards, control ignition sources.
		☐ LEL	Confirm at least 12% oxygen is present to ensure accuracy of LEL readings. At <10% LEL - Continue working, continue to monitor LEL levels At ≥10% LEL- Immediately withdraw from area. Resume work ONLY after LEL readings reduced to <10% through passive dissipation, or active vapor control measures.

☐	ACTION LEVELS FOR **TOXICS** (sustained breathing zone concentrations)	**Parameters**	**Level D, Modified D**	**Use levels C or B, as indicated below, OR take action to reduce breathing zone level to concentration acceptable for Level D.**
		☐ VOCs	< ppm	ppm to ppm: Level C (air purifying respirator) > ppm: Level B (air-supplied respirator)
		☐ Carbon Monoxide	< 35 ppm	≥35 ppm - Level B (air-supplied respirator)
		☐ Hydrogen Sulfide	< 10 ppm	≥10 ppm - Level B (air-supplied respirator)
		☐ Total Dust	< mg/m^3	> mg/m^3 - Level C (air-purifying respirator)
		☐		
		☐		

HAZARD	HAZARD CONTROLS (check all that apply and comment as required)
1. PREMISES/ENVIRONMENTAL HAZARDS	
Site-Specific Comments:	
☒ LOCATION HAZARDS ☒ Outdoor field work ☒ Urban, suburban ☐ Rural, remote location ☐ Indoor field work ☐ Operating facility ☐ Vacant facility ☐ Water hazards	☒ Use routine safety precautions commensurate with routine work environment conditions ☐ For non-routine, unique, or severe location hazards, see site-specific safety comments above. ☐ For water-related work, see #2, “Water Hazards” ☐ For worksite violence/security risks, see #3, “Violence, Security, Working Alone” ☒ For transportation related hazards, see #5, “Worksite Traffic, Vehicle, Transportation Hazards” ☐ For utility-related hazards, see # 6, “Utility-Related Hazards ☐ For atmospheric hazards in enclosed, indoor, or confined spaces, see # 11 “Confined Spaces or Hazardous Enclosed/Indoor Spaces”

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PRE-WORK TASK HAZARD ANALYSIS (THA)

	HAZARD	HAZARD CONTROLS (check all that apply and comment as required)
☒	WALKING/WORKING SURFACES, HOUSEKEEPING ☒ Uneven, rough terrain, riprap ☒ Slippery surfaces ☐ Holes, pits, openings ☐ Puncture, foot hazards	☒ Keep work areas clean, orderly, dispose of trash/debris, maintain sanitary conditions. ☒ Walkways are cleared of equipment, excavated material, tools and debris, snow ☐ Holes, pits, openings to be covered or otherwise marked or guarded ☐ Apply absorbent, salt or sand, for traction/slip resistance on slippery/icy/wet surfaces ☒ Wear proper work boots/shoes with ankle support and/or traction, as appropriate for conditions
☒	TEMPERATURE/WEATHER ☒ Heat Stress ☒ Cold Stress ☒ Severe Weather ☒ Lightning	☒ Heat/Cold stress are monitored in accordance with Geosyntec procedures EHS 124 & EHS 125 ☒ Provide sufficient fluids, shade, breaks, other precautions as appropriate to adderss heat hazards. ☒ Provide protection from sun (sun screen, shaded brake area). ☐ For cold stress, wear multiple layers, protect from wind/wet, frequent break in warm location. ☐ In high wind, discontinue working at heights (e.g. on ladders, scaffold, aerial lift, similar). ☒ Use precautions for lightning, thunderstorm, hale, tornado (monitor weather, “30/30 rule,” shelter)
☒	BIOLOGICAL HAZARDS ☒ Insects, spiders, ticks ☐ Wild/feral/pet animals ☐ Mold, fungi ☒ Poisonous plants ☐ Bird Guano ☐ Infectious, wastewater, sewer ☐ Bloodborne pathogens	☒ Utilize safety practices commensurate with risk of biting/stinging insects, wild/feral/pet animals. ☒ For poisonous plants (poison ivy/oak/sumac/etc.), minimize exposed skin area, wear coveralls, use barrier cream/wash (Technu products or similar), as appropriate. For biological exposure hazards, use protective measures commensurate with hazard: ☒ Minor-moderate hazard - use ordinary hygiene practices, protective gloves, hand washing. ☐ Moderate-severe hazard - add protective clothing, respirator, decon, as appropriate. ☐ Bloodborne pathogen (human infectious agents) - implement “Universal Precautions”
☐	HAZARDOUS NOISE	☐ Hearing protection is used when exposed to excessive noise levels (greater than 85 dBA over an 8-hour work period, or intermittent….)
☐	OVERHEAD HAZARDS, FALLING OBJECTS	☐ Wear hardhat when exposed to overhead hazards, “bump” hazards, falling objects ☐ Cordon off hazard zones, route access/egress around hazards of falling objects ☐ Secure objects from falling ☐ Provide overhead protection (canopy) to protect public pedestrians, workers
☐	ILLUMINATION ☐ Night work ☐ Indoor work	☐ Make site-specific arrangements for illumination of work areas and access routes.
2. BOATING, WATER, WET LOCATIONS, FLOOD, ETC. – CHECK IF NOT APPLICABLE: ☒		
Site-Specific Comments:		
☐	WATER HAZARDS ☐ Drowning, hypothermia ☐ Boat, barge, raft ☐ Wading, wetland, mud/silt ☐ Dam release, flood, tide ☐ Diving	☐ Wear appropriate Coast Guard-approved Personal Flotation Device (PFD) ☐ Bring emergency rescue equipment (ring buoy, reaching device, flares) ☐ Use fuel safety practices, fire extinguisher present in boat ☐ See site-specific safety comments above.
3. VIOLENCE, PUBLIC PROTECTION, WORKING ALONE – SPECIAL MEASURES – CHECK IF NOT ANTICIPATED: ☐		
Site-Specific Comments:		
☐	PERSONAL SECURITY, HIGH CRIME AREA	☐ Employ standard precautions, which may include: conduct work only during daylight hours, use buddy system, avoid parking in secluded location, lock vehicles, hide valuable items in vehicles from plain view ☐ See site-specific safety comments above for project-specific security measures.
☐	PUBLIC AT RISK, SITE SECURITY	☐ Provide safe pedestrian route around work areas, use appropriate barriers, signs, warning devices. ☐ Provide covers over excavation, secure fencing, overnight protection ☐ Provide protection from overhead hazards (canopy, etc.) where public at risk of overhead hazards ☐ Provide secure locked storage of hazardous chemicals, hazardous equipment, etc.
☒	WORKING ALONE	☒ Establish “check in” procedure with supervisor or project manager (arrival, mid-day, departure) ☒ Additional measures, as appropriate for the working conditions.
4. DRIVING, TRAFFIC, TRANSPORTATION HAZARDS – CHECK IF NOT APPLICABLE: ☐		
Site-Specific Comments:		
☒	DRIVING HAZARDS ☒ Routine work travel ☐ Unfamiliar location ☐ Unfamiliar vehicle ☒ Overnight travel, distance	☒ Use routine safe/defensive driving practices (seat belts, safe speeds, eyes ahead, no tailgating, limit distractions, no texting, safe cell phone use, clear windows, account for weather/road conditions, adequate sleep, other measures as appropriate). ☒ Plan travel route before driving (assemble maps, enter destination in GPS). ☐ Familiarize yourself with vehicle operational controls before operating unfamiliar vehicle.

HAZARD		HAZARD CONTROLS (check all that apply and comment as required)
☒	WORKERS EXPOSED TO TRAFFIC HAZARDS ☒ In/near public or private roadway ☒ Parking lot, driveway ☐ Worksite, construction site traffic	☒ Workers to wear reflective vests where exposed to traffic hazards. ☒ Where possible, park vehicles as protective shield from oncoming traffic. ☒ Configure work area and support vehicles to minimize worker exposure to traffic hazards. ☐ DOT signal devices will be used to re-route vehicles around work area, site entrances/exits. ☐ Flaggers will be used and have DOT Flagger Training; police detail where appropriate or required. ☒ Park vehicles in secure location away from heavy equipment use or other site operations. ☐ Mark temporary roadways clearly, provide berms/stop logs where needed.
☐	RAILROAD/AIRPORT HAZARD	☐ Coordinate with rail company/airport and implement required safety measures ☐ Site workers to receive safety training for railroad/airport work.
☐	OFF-ROAD DRIVING, USE OF ALL-TERRAIN VEHICLE	☐ For off road driving, do not exceed capability of vehicle ☐ Follow ATV specific procedures for training, safety equipment, operation.
☐	TRANSPORTING MATERIALS, TOWING/HAULING LOADS	☐ Ensure load is firmly secured (rope, straps, load configuration) to prevent shifting during travel. ☐ For trailer use, verify signal/braking lights operational, rear-view mirrors effective, hitch/safety chains secure.
5. UTILITY-RELATED HAZARDS (for underground/overhead work) – CHECK IF NOT APPLICABLE: ☒		
Site-Specific Comments:		
☐	OVERHEAD UTILITIES	☐ Maintain proper clearance, employ other appropriate precautions for the conditions.
☐	UNDERGROUND UTILITIES	☐ Confirm appropriate underground utility clearance procedures have been completed prior to ground penetrations, and employ other utility clearance/locator practices, as appropriate for conditions.
6. ELECTRICAL HAZARDS – CHECK IF NOT APPLICABLE: ☒		
Site-Specific Comments:		
☐	WORKERS EXPOSED TO: ☐ Voltage < 50 v ☐ Voltage 50-600v ☐ Voltage > 600v ☐ AC ☐ DC ☐ 3-phase ☐ Battery and/or solar power ☐ Capacitor/Transformer	☐ Implement electrical safe work practices commensurate with the work to be performed, pertaining to the following (as applicable): - Worker training/qualification - Electrical equipment and hazards, safe design features - Electrical safe work practices - Grounding, use of GFCIs - Electrical equipment installation, operation, maintenance, repair - Arc flash protection - Electrical equipment diagnostics
☐	BASIC ELECTRICAL HAZARDS ☐ Equipment/tool use/operation ☐ Use of extension cords	☐ Control water-related hazards, in a manner appropriate for the job tasks/equipment/tool. ☐ Use extension cords/power cords properly, prevent damage, take out of service if damaged. ☐ Inspect tool/equipment/extension cords/power cords before each use. ☐ Use GFCI-protected outlet or portable GFCI in wet locations, outdoors, basements ☐ Ensure live parts are guarded, enclosures secure. ☐ Enclosures, circuits properly labeled.
☐	LOCKOUT/TAGOUT OF ELECTRICAL ENERGY	☐ Implement control-of-hazardous-energy practices (lockout/tagout), provide lockout/tagout locks and devices, training workers, designate “authorized” personnel, notify “affected” personnel
7. FALL HAZARDS – CHECK IF NOT ANTICIPATED: ☒		
Site-Specific Comments:		
☐	WORKING AT HEIGHTS ☐ Roof, skylight ☐ Elevated platform ☐ Holes, side opening ☐ Retaining wall, cliff, ledge ☐ Trench, excavation ☐ Protruding rebar	☐ Ensure guardrails present ☐ Use personal fall apparatus (PFA) ☐ Use tether or positioning device ☐ Restrict access to hazard (barriers, tape, sign) ☐ Ensure covers in place over holes ☐ Watch person ☐ Use fall protection net ☐ Restrict access beneath work to protect other site personnel from overhead hazards ☐ Install caps on protruding rebar
☐	LADDERS / STAIRS ☐ Extension ladders ☐ Step ladders ☐ Fixed ladders ☐ Stairs	☐ Provide instruction/review pertaining to safe ladder use ☐ Extension ladders are properly footed, secured, setup at proper angle ☐ Stepladders are set on level ground or properly shimmed with spreaders locked. ☐ Stairs have proper rise over run and stairs >4 steps or 4' have guardrails. ☐ Never use a step ladder as a straight ladder. All straight ladders shall be extended three rungs past leading edge. Never use metal ladders while working with electricity.

	HAZARD	HAZARD CONTROLS (check all that apply and comment as required)
☐	AERIAL LIFT ☐ Scissor lift ☐ Extensible boom ☐ Articulated boom ☐ Vertical Lift ("Genie")	☐ Operators are sufficiently trained, experienced and qualified. ☐ Equipment is inspected after mobilization and is in good condition. ☐ Harness & Lanyard worn whenever operating the lift (scissor lifts may be excepted) ☐ Overhead and surface obstructions are reviewed with operators prior to use.
☐	SCAFFOLD ☐ Supported scaffold ☐ Suspended scaffold ☐ Free-standing/mobile scaffold	☐ Identify/coordinate operations with competent person ☐ Supported scaffold level, stable, proper attachments, tiebacks, planking, ☐ Suspended scaffolds anchored properly ☐ Guardrails present above 10 feet or personal fall apparatus used. ☐ Proper means of accessing scaffold (proper ladders, stair tower). ☐ Total height of free-standing scaffold not to exceed four times the minimum base dimension.
8. TOOLS, EQUIPMENT, MACHINERY – CHECK IF NOT APPLICABLE: ☐		
Site-Specific Comments: May use hand tools to open monitoring wells		
☒	HAND TOOLS Eye injury, puncture/bruise/ laceration hazard	☒ Use proper tool for the job, maintain tools in good condition (no damage, cutting tools sharp, etc.) use appropriate PPE for hand/eye/body protection, plan for safe "follow through" motion, use vise/clamp/work surface to hold/stabilize work piece
☐	POWER TOOLS ☐ Eye/hand/body injury ☐ Fuel-related hazards ☐ Inhalation hazard ☐ Noise ☐ Sparks, heat, fire hazard ☐ Electrical hazards	☐ For all power tools: - Inspect tools to ensure safe operating condition before each use. - Use tool in accordance with manufacturer's specifications. - Use PPE or other safety practices, as appropriate, for eye/hearing/hand/head/body protection - Provide training or verify operator qualification for use of power tool. - Stay clear of hazard zone, "line of fire" when working near where power tools are used. ☐ Use safety practices for refueling, fuel handling/transport/storage. ☐ Use respirators, ventilation, wet methods, other appropriate means to control inhalation hazard. ☐ For spark/heat generating tool, control fire hazards, segregate combustible/flammable materials. ☐ For electrical hazards, see # 6, "Electrical Hazards".
☐	WELDING, CUTTING ☐ Gas welding/cutting ☐ Arc welding/cutting	☐ Hot work permit system to be implemented. ☐ Operator properly protected (eye protection, clothing, apron, etc.) ☐ Fire hazard controls (watcher, fire extinguisher, water, isolate combustibles) ☐ Protect nearby personnel from hazardous UV, IR light (shielding, curtain) ☐ Electrical safe work practices for arc welding ☐ Gas cylinder safe practices (secured, upright, caps on when not in use, prevent damage).
☐	EQUIPMENT/MACHINERY ☐ Point-of-operation hazards ☐ Pinch points, moving parts ☐ 'Struck-by,' 'caught between' ☐ Hot surfaces, heat ☐ Extension cords, flexible wire ☐ Fuel related (gas or liquid) ☐ Hydraulic pressure ☐ Compressed air/gas ☐ Kinetic, stored energy ☐ Noise ☐ Lockout/tagout ☐ Emissions, discharge gases ☐ Working at heights, falls ☐ Lifting, repetitive motion ☐ Illumination ☐ Electrical (see below)	☐ *Working Near* Equipment/Machinery ☐ Work at safe distance/restrict access, ensure guards in place, heed warning signs ☐ Implement measures necessary for adequate illumination ☐ Control exposue to emission/discharge gases (ventilation, PPE, other means). ☐ Ensure safe practices for fuels/fluids/machine-related hazardous materials ☐ Use PPE or other safety practices for eye/hearing/hand/head/body protection ☐ Segregate combustible materials from hot surfaces/hot exhaust (minimum 3 feet) ☐ Operation/Maintenance/Repair of Equipment/Machinery (see applicable control measures above) ☐ Orient/locate equipment for safe access during operation and maintenance ☐ Use equipment/machinery in accordance with manufacturer's specifications ☐ Use safe lifting practices, minimize repetitive motion hazards ☐ Ensure point-of-operation, mechanical power transmission, other moving parts are guarded with protective devices; do not override interlocks, guards, protective devices ☐ Secure long hair/loose clothing/hanging jewelry near moving/rotating parts ☐ Ensure appropriate warning signs are in place and heeded ☐ Use safe practices for fueling, fuel transport & storage. ☐ Operate fuel-powered equipment in well ventilated location. ☐ Incorporate safety provisions/safe work practices for compressed air, pressurized systems (pneumatic/hydraulic), stored energy ☐ Implement control-of-hazardous-energy practices (lockout/tagout), designate "authorized" personnel, notify "affected" personnel ☐ Protect from fall hazards (safe ladder use, personal fall protection, guardrails, other) ☐
☐	ELECTRICAL HAZARDS	☐ Implement provisions of # 6, "Electrical Hazards"
9. MANUAL MATERIAL HANDLING, MATERIAL STORAGE – CHECK IF NOT APPLICABLE: ☒		

	HAZARD	HAZARD CONTROLS (check all that apply and comment as required)
Site-Specific Comments:		
☐	LIFTING / ERGONOMIC Musculoskeletal strain, repetitive motion injury	☐ Use proper manual lifting techniques (straight back, bend at knees, firm grasp, firm footing). ☐ Seek assistance for lifting heavy objects (>50 lbs.) ☐ Use mechanical lifting equipment to reduce manual material handling hazard ☐ For repetitive motion activities, take breaks, switch hands, share task with others, employ other safe practices appropriate for the specific task(s).
☐	STORAGE OF MATERIALS See Sect. 12 for Chemical Storage	☐ Store materials in stable manner that prevents tipping, sliding, rolling, falling over. ☐ Materials stored in tiers to be stacked, racked, blocked, interlocked or otherwise secured to prevent sliding, falling or collapse ☐ Do not exceed load limits of racks, platform; ensure racks are stable, robust, secure ☐ On scaffold, do not store materials in excess of supplies needed for immediate use ☐ Ensure stored materials do not block aisles, passageways ☐ For used lumber, remove nails before stacking, and stack to be stable and self supporting, no higher than 20 feet (or 16 feet if lumber is to be handled manually) ☐ Debris will be removed regularly from storage area and place in designated area or disposed.
10. CONSTRUCTION OPERATIONS, HEAVY EQUIPMENT, HEAVY VEHICLES – CHECK IF NOT ANTICIPATED: ☒		
Site-Specific Comments:		
☐	HEAVY EQUIPMENT; CONSTRUCTION VEHICLES Hazards: Struck By, Run-Over, Caught In Between (pinch points), Roll Over, Fluid Leaks	☐ Trained/qualified persons operate all heavy equipment. ☐ No passengers on moving/operating equipment except where passenger seat/restraint is present. ☐ Equipment inspected upon mobilization and daily; maintained in good repair, backup alarms ☐ All leaks or defective safety equipment will be repaired before use. ☐ Operators required to use seatbelts. ☐ Eye contact with operator and use of hand signals prior to approaching near equipment. ☐ High visibility vests are required of all personnel in work area. ☐ Max. safe slope for each vehicle will be followed. ☐ Personnel to stay clear of swing radius of equipment. ☐ Spill equipment available for fuel and hydraulic fluid leaks. ☐ Equipment locked, secured, brakes set, buckets/forks lowered, when not in use.
☐	CRANES Overhead hazards – utility lines, swing radius, falling objects, wire ropes and hoisting equipment ☐ Overbalancing – high winds, outrigger placement, overloading, safe slope ☐ Struck By, Run-Over, Caught In Between (pinch points), Roll Over, Fluid Leaks	**In addition to general safety practices for heavy equipment (above), as applicable:** ☐ Only qualified persons operate cranes (certificate required). ☐ A Critical Lift Plan & Checklist prepared/executed (HS 506) prior to mobilization. ☐ Equipment will be inspected prior to mobilization and a Crane Pre-Operational Safety Checklist (see EHS 506) will be completed and signed by crane operator. ☐ Crane operator will remain at the controls at all times during operation. ☐ Crane operation must be performed under the direction of an appointed signal person at all times. ☐ Communication between crane operator and signal person will be maintained through standard hand signals or voice communication equipment. Radio equipment, if used, will be equipped with a dedicated channel. ☐ Lifting or lowering will not exceed 100ft/minute. Lowering must be controlled i.e. no free fall. ☐ Stop work will be issued whenever hoisting equipment is exposed to high winds. ☐ Outriggers will be fully extended/locked with a firm footing within the maximum safe slope (<1%). ☐ Crane to be on level, stable base, dunnage used when necessary. ☐ Total weight of load not to exceed 50% of rated capacity for the crane radius and configuration. ☐ Rigging procedures – see Hoisting, Lifting, Rigging, below. ☐ Suspended personnel lifting is prohibited (unless per approved “man-lift” equipment). ☐ No personnel permitted beneath suspended loads.
☐	HOISTING, LIFTING, RIGGING ☐ Crane ☐ Drill rig ☐ Loader, excavator, etc. ☐ Mechanical, electrical hoist	☐ Identify, coordinate with competent person. ☐ Rigging directly to the forks of a lull, forklift, or front loader equipped forks is prohibited. ☐ Do not exceed loading limits of equipment. ☐ A Critical Lift Checklist (see EHS 506) will be completed and signed prior to crane mobilization. ☐ Rigging, wire rope and hoisting equipment will be inspected and maintained on a weekly basis. ☐ Crane hooks will be equipped with safety latches.
☐	FORKLIFT Hazards: Struck By, Run-Over, Caught In Between (pinch points), Roll Over, Fluid Leaks	**In addition to general safety practices for heavy equipment (above), as applicable:** ☐ Qualified operater, per established forklift training (certificate is required) ☐ Equipment inspected daily and documented on Forklift Preoperation Inspection Checklist ☐ Operators required to use seatbelts, and adhere to safe operating procedures.

	HAZARD	HAZARD CONTROLS (check all that apply and comment as required)
		☐ Do not exceed lifting load limits. ☐ Forklift shall not be moved/driven with empty forks in raised position. ☐ When not in use, forks lowered, brake set, controls in neutral, key removed.
☐	EXCAVATION/TRENCHING ☐ Max Depth ≥ 20' ☐ Max Depth ≥ 5' ☐ Max Depth <5' with potential cave-in hazard ☐ Potential permit-required confined space at depth ≥ 4' ☐ Underground utilities ☐ Overhead utilities ☐ Structures/foundations ☐ Falls into excavations	☐ Activities under supervision/oversight of competent person ☐ Sloping & shoring for excavations ≥20' are approved by a professional engineer ☐ Sloping & shoring for excavations ≥5' when persons are exposed to cave-in. ☐ Sloping & shoring for shallow (<5') excavations with cave-in hazard ☐ Excavations ≥ 4' are classified as a non-permit confined space ☐ Excavations ≥ 4' are classified as Alternate Entry or Permit-Required (see confined space) ☐ Implement underground utility clearance procedures. ☐ Hand digging within 3' of utility locations. ☐ Excavations to be protected by perimeter fencing (not barricade tape) ☐ Use trench boxes in accordance with proper procedures. ☐ Workers in trenches to be within 25 feet of ladder or sloped entryway.
☐	DRILLING ☐ Struck By, Run-Over, Caught In Between (pinch points), Roll Over, Fluid Leaks ☐ Underground utilities, aboveground ☐ Spills ☐ See Equipment/Machinery	☐ Contractor inspects drill rig daily before use. ☐ Drill rig equipped with operational emergency stop. ☐ Highpressure lines equipped with whip checks. ☐ High visibility vests, hard hats are being worn near the equipment. ☐ Operators and helpers will maintain a safe distance to moving parts. Individuals working near moving or rotating parts will secure loose hair, clothing, and equipment. ☐ Drill rigs will only be moved with masts lowered. Masts will be erected with outriggers fully extended when equipped with outriggers. ☐ Max. safe slope for rig will be followed, drill rig leveled, appropriate blocking/cribbing as needed. ☐ Spinning parts of the rig are guarded when possible, no loose clothing being worn near the rig. ☐ Follow underground utility clearance procedures. ☐ Area is surveyed for overhead utilities, safe clearance distance maintained. ☐ Hearing protection is used when working near the rig. ☐ Spill equipment is available for fuel and hydraulic fluid leaks.
☐	DEMOLITION	☐ Develop/implement demolition safety plan
☐	BLASTING	☐ Develop/implement blasting safety plan
11. CONFINED SPACES, HAZARDOUS ENCLOSED or INDOOR SPACES – CHECK IF NOT APPLICABLE: ☒		
Site-Specific Comments:		
☐	CONFINED SPACE(S) ☐ Permit required ☐ Non-permit required Potential/actual hazards: ☐ Atmospheric hazards: ☐ Flammable/explosive ☐ Oxygen deficiency ☐ Hydrogen sulfide ☐ Other toxic ☐ Combustible dust ☐ Electrical ☐ Mechanical, engulfment, entrapment, stored energy	☐ For personnel <u>working near confined</u> spaces: - Confined spaces have been identified, labeled. - Communication system in place to prevent unauthorized entry. ☐ For <u>permit-required confined space entry</u>, see separate entry permit. - All entrants, attendants, supervisors are trained/qualified. - Hazards properly characterized - Necessary equipment for safe entry utilized (access, retrieval, air monitoring) - Arrangements for rescue team have been made. ☐ For entry into a <u>non-permit</u> confined space, see site specific procedures delineated above in "site-specific comments," or see alternate/attached safety work plan.
☐	ENCLOSED/INDOOR SPACE(S) ☐ Outfall, culvert ☐ Tunnel, shaft, gallery ☐ Machine/equipment pit/vault ☐ Basement/Sub-basement ☐ Crawl space entry ☐ Indoor equipment/drilling	*<u>For indoor use of gasoline/propane/diesel equipment:</u>* ☐ Duct exhaust to outdoors, and/or introduce fresh air using ventilation/blowers/fans. ☐ Perform air monitoring (see section on Air Monitoring) *<u>For entry into potentially hazardous indoor or enclosed spaces:</u>* ☐ Ventilate and/or perform air monitoring for anticipated hazards. ☐ If space classified as confined space, follow confined space entry requirements (above).
12. COMMERCIAL CHEMICAL PRODUCTS USED AT WORK SITE – CHECK IF NOT APPLICABLE: ☐		
Site-Specific Comments: Alconox		

	HAZARD	HAZARD CONTROLS (check all that apply and comment as required)
☒	PRODUCTS REGULATED BY HAZARD COMMUNICATION STANDARD	☒ Safety Data Sheets available, either on site or readily available within same work shift ☒ Containers labelled properly ☒ Workers trained on hazards ☒ For subcontractor use of chemical products, coordinate/discuss during safety meetings.
☐	COMPRESSED GAS(ES):	☐ Secure cylinders upright, caps on when not in use, handle with care, prevent damage ☐ Propane cylinders not in use must be stored outdoors in cage or similar secure enclosure. ☐ Ensure acetylene cylinders NOT secured to steel arc welding bench ☐ Store/use in a manner to prevent asphyxiation hazard ☐ Segregate oxygen and fuel gases by distance (20') or barrier ☐ Control ignition sources, no smoking signage ☐ Use/store in a manner to control inhalation exposure hazards, PPE, air monitoring.
☐	FLAMM./COMBUST. LIQ.	☐ Proper storage (flam. storage cabinets, other storage precautions) ☐ Control ignition sources ☐ Grounding and bonding where appropriate
☐	CORROSIVES	☐ Handle with care, use appropriate eye/face/skin protection ☐ Eyewash, deluge shower, drench hose, hand washing (with water), as appropriate
☐	TOXIC	☐ For toxic substances, use/store in a manner to control exposure hazards (inhalation, ingestion, skin contact, skin absorption; use PPE as appropriate, conduct air monitoring as appropriate.
☐	CHEMICAL STORAGE	☐ Chemical storage cabinet, cage, storage room, or similar ☐ Incompatible chemicals segregated ☐ Secondary containment ☐ Safety equipment will be located near chemical storage.

13. CHEMICAL HAZARDS FROM ON-SITE CONTAMINANTS, OPERATIONS, EMISSIONS – CHECK IF N/A: ☐

Site-Specific Comments:

CHECK AS APPROPRIATE BELOW. PROVIDE ADDITIONAL INFO. AS APPROPRIATE, IN SITE-SPECIFIC HAZARD ANALYSIS ABOVE.

☒ Soil/groundwater contaminants (historical release)	☐ Oxygen deficiency	☐ Asbestos
☐ Recent release, known high concentrations	☒ Chlorinated VOCs (volatile org. cpds.)	☐ Lead paint
☐ Former chemical disposal site, landfill	☒ BTEX, petroleum derived VOCs	☐ Pesticides, herbicides, fungicides
☐ Urban fill, residual contaminants	☐ Fuel oils, petroleum, waste oil, lubricants	☐ Sensitizers
☐ Containerized waste (drums, process equipment)	☒ Metals, metal compounds, metal dusts	☐ Radioactive contaminants
☐ Buried drums (known or potential)	☐ Elemental mercury	☐ Other:
☐ Large containers, potential for spills	☒ Polyaromatic hydrocarbons (PAHs)	
☐ Emissions from active industrial processes	☒ Polychlorinated biphenyls (PCBs)	
☐ Emissions from welding/cutting/hot work	☐ Potential for flammable vapors	
☐ Carbon monoxide (vehicle/equipment exhaust)	☐ Potential for flammable gas (methane)	
☐ Contaminated building surfaces	☐ Corrosive, acids/caustics, strong irritants	
☐ Unexploded ordnance	☐ Sulfides, hydrogen sulfide (H2S)	
☐ Explosive dust	☐ Cyanides, hydrogen cyanide (HCN)	

☐	FOR SITE REGULATED AS "UNCONTROLLED HAZ. WASTE SITE," e.g. **REGULATED BY HAZWOPER** (OSHA 29 CFR 1910.120) - Establish work zones & site control plan (Exclusion Zone - EZ, Contaminant Reduction Zone - CRZ, Support Zone - SZ) - Workers to be aware of and trained on hazards per OSHA Hazard Communication Standard. - Include site map/figure depicting work locations and other relevant site-specific information. - Site workers in EZ or CRZ to have OSHA 40-hour training, current 8-hour refresher, 3 days supervised field expience. - Site workers in EZ or CRZ to participate in Medical Monitoring program. - "Peripheral" site workers, engaged on-site, with no hazardous exposure: 24 hr. training required. - Site supervisor(s) required to have 8-hr. Supervisor training. - Implement site-specific procedures for worker protection through engineering controls, work practices, personal protective equipment (PPE), air monitoring, decontamination, spill containment (see Sections B and C, "Health and Safety Equipment/Gear" and "Air Monitoring" - Include emergency response program in H&S plan.
☒	FOR SITE WITH CHEMICAL CONTAMINANTS BUT **NOT REGULATED BY HAZWOPER** - Workers to be aware of and trained on hazards per OSHA Hazard Communication Standard - Implement appropriate controls to minimize worker exposure (engineering controls, work practices) to levels below OSHA PELs. - Use PPE as needed (see B, "Health and Safety Equipment/Gear"). - Conduct air monitoring or personal air sampling to monitor and/or evaluate worker exposure (see Section C, "Air Monitoring").

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PRE-WORK TASK HAZARD ANALYSIS (THA)

HAZARD	HAZARD CONTROLS (check all that apply and comment as required)
☐	ATMOSPHERIC HAZARDS GENERATED BY EXHAUST FROM OPERATING EQUIPMENT ☐ Position work upwind of exhaust source ☐ Use blowers, fans to dissipate atmospheric hazards ☐ Conduct air monitoring (see Section C, "Air Monitoring").
☐	OFF-SITE MIGRATION OF CONTAMINANTS ☐ Implement controls to minimize hazard migration (dust suppression, covers, foam, etc.) ☐ Community/perimeter air monitoring is not anticipated with the current scope of work. ☐ Community/perimeter air monitoring to be conducted per perimeter air monitoring plan.

EMERGENCY RESPONSE **(911 Service is Available ☒ Yes ☐ No)** ☒ Verify wireless coverage at site, use alternate communication procedures as needed.

Emergency Medical Treatment - Hospital Name: Hospital Address:	St Joseph's Hospital 555 E. Market St Elmira NY 14901	**Number:**	607.733.6541
Urgent Care Med. Treatment - Clinic Name: Occupational Clinic Address:	Elmira Urgent Care 306 W. Water St., Elmira, NY 14905	**Number:**	607.732.1100
Fire Department Name	West Elmira Fire Department	**Number:**	911
Spill Response:	West Elmira Fire Department	**Number:**	911
Client Representative Name::	Kevin Krueger	**Office Number:** **Cell Number:**	(651) 687-2210
Geosyntec **Project Manager** Name:	Aron Krasnopoler	**Office Number:** **Cell Number:**	(410) 381-4333 (202)-550-7724
Geosyntec **Corporate H&S** Name:	Dale Prokopchak	**Office Number:** **Cell Number:**	804 332 6376 (804) 349-8067

Emergency Response Comments:

Date:	
Project Name: Former Sperry Remington Site North	
THA Title: Monitoring Well Inspections and Synoptic Water Level Measurements	
Subcontractor Name(s):	
Geosyntec Representative (reviewed by):	**Michael Hansen**
Subcontractor Foreman/Supervisor Signature (authorize):	
Crew Signatures (acknowledge):	

Print Name	Signature

PLEASE RETURN A COPY OF THIS SIGNED PAGE TO GEOSYNTEC PROJECT MGR., SUPERINTENDENT UPON REVIEW AND ACKOWLEDGMENT BY THE CREW MEMBERS. ALL NEW CREW MEMBERS SHALL BE ORIENTATED THE SAME AND A SUBMITTAL OF A NEW SIGN IN SHEET SHALL BE COMPLETED.

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PRE-WORK TASK HAZARD ANALYSIS (THA)

TASK/ACTIVITY:	Groundwater Sampling	**Date:**	7/18/2014
Project Name:	Former Sperry Remington Site North	**Client Name:**	Unisys Corporation
Project Number:	MN0832	**Geosyntec Proj. Mngr.:**	Aron Krasnopoler
Project Address:	777 Sourth Main Street, Elmira, New York	**Geosyntec Proj. Dir.:**	Paul Brookner
Task Description:	Collect groundwater samples via low-flow sampling procedures from site monitoring wells.		

A. SUMMARY OF SITE-SPECIFIC TASK HAZARD ANALYSIS

Site-Specific Comments: Submersible electric centrifugal pumps (e.g. mega monsoon) are expected to be used for sampling.

Sub-Tasks, Activities	Hazards	Hazard Controls
Task 1: Mobilize to Site	-Driving -Mobilization to and around unfamiliar facility	- Drive carefully to facility, be well rested and avoid distracted driving. - Review scope of work.
Task 2: Locate sampling location and measure depth to water.	-Slips/trips/falls -Heat/cold stress -Biohazards: snakes, bees, spider, ticks, poison ivy -Potential contaminant exposure: VOCs, PCBs, SVOCs	-Pay close attention to foot placement; slow deliberate movement. -Dress for weather conditions. Apply sunscreen if needed. -Beaware of surroundings and avoid biohazards. - don level D personal protective equipment (PPE). PPE will include: safety glasses, safety vests, steel toe boots, and nitrile gloves.
Task 3: Groundwater Sampling Collect groundwater sample from monitoring well using low-flow sampling procedures.	-Same hazards noted above for Task 2. -Splash harzards. .	-Same hazard controls noted above for Task 2. -Avoid direct contact with contaminated matrices.
Task 4: Sample Labeling and Packing	-Potential contaminant exposure: VOCs, PCBs, SVOCs -Back strain when transporting coolers full of collected samples packed with ice.	-Continue to wear level D PPE and minimize contact with sample material. -Use proper lifting techniques. Get assistance when possible, especially for containers heavier than 49 lbs.
Task 5: Equipment Decontamination Decontaminate equipment that will be reused (e.g. pump, water level indicator, et. al.)	-Slips, Trips, and Falls -Potential contaminant exposure: VOCs, PCBs, SVOCs -Splash hazards	-Pay close attention to foot placement; slow deliberate movement. -Continue to wear level D PPE and minimize contact with water.
Task 6: Demobilization Demobilize from Site, making sure all work areas are clean and orderly.	-Driving	-Drive carefully and avoid distracted driving. If too exhausted to drive safely back to the office make arrangements to stay at hotel.

B. HEALTH AND SAFETY EQUIPMENT/GEAR

Site-Specific Comments:

☒	PERSONAL PROTECTIVE EQUIPMENT (PPE)**:**	Level(s) of Protection (for chemical hazards):	☐ Level D (standard work clothes, no chemical protective clothing) ☒ Modified Level D (chemical protective clothing in addition to standard work clothes) ☐ Level C (air purifying respirator or dust mask, with chemical protective clothing) ☐ Level B or A (air supplied respirator, chemical protective suit)

		☒ Hard-toed boots/shoes ☐ Hardhat ☐ Noise/hearing protection ☒ High-visibility/reflective vest ☒ Work gloves ☒ Eye/face protection ☒ Safety glasses with side shields ☐ Goggles ☐ Face shield ☐ Other: ☒ Chemical protective clothing ☒ Gloves, type: Nitrile ☐ Coveralls, type: ☐ Outer boots, boot covers ☐ Other:	☐ Respiratory Protection ☐ Disposable n-95 face mask ☐ Half-face air-purifying respirator ☐ Full-face air-purifying respirator ☐ Resp-cartridge, type: ☐ Other: ☐ Personal flotation device ☐ Personal fall apparatus ☐ Fire retardant clothing ☐ EH (Electrical Hazard) rated boots, gloves ☐ Other:
☒	OTHER H&S EQUIPMENT and GEAR:	☒ Fire extinguisher ☐ Caution tape ☒ Traffic control warning devices ☐ Warning signs or placards ☐ Decon supplies for personal decon ☐ Portable ground fault circuit interrupter (GFCI)	☐ Lockout/tagout equipment ☐ Ventilation equipment (fan, blower) ☒ First aid kit ☒ Vehicle emergency kit (flares, lights, reflective device) ☐ Other:

C. AIR MONITORING – CHECK IF NOT APPLICABLE: ☒

Site-Specific Comments:

☐	INSTRUMENT(S), EQUIPMENT	☐ PID, Lamp energy: eV ☐ FID ☐ Carbon monoxide detector ☐ Hydrogen sulfide detector ☐ Oxygen (O_2) detector	☐ Flammable gas (LEL) detector ☐ Particulate (dust) detector ☐ Calibration kit for each detector type ☐ Others:

☐	ACTION LEVELS FOR **O2/LEL**	☐ Oxygen	≤19.5% - provide ventilation to raise oxygen to acceptable levels, or utilize Level B. ≥23.0% - provide ventilation to lower oxygen to acceptable levels, or utilize Level B and implement controls for fire hazards, control ignition sources.
		☐ LEL	Confirm at least 12% oxygen is present to ensure accuracy of LEL readings. At <10% LEL - Continue working, continue to monitor LEL levels At ≥10% LEL- Immediately withdraw from area. Resume work ONLY after LEL readings reduced to <10% through passive dissipation, or active vapor control measures.

☐	ACTION LEVELS FOR **TOXICS** (sustained breathing zone concentrations)	**Parameters**	**Level D, Modified D**	**Use levels C or B, as indicated below, OR take action to reduce breathing zone level to concentration acceptable for Level D.**
		☐ VOCs	< ppm	ppm to ppm: Level C (air purifying respirator) > ppm: Level B (air-supplied respirator)
		☐ Carbon Monoxide	< 35 ppm	≥35 ppm - Level B (air-supplied respirator)
		☐ Hydrogen Sulfide	< 10 ppm	≥10 ppm - Level B (air-supplied respirator)
		☐ Total Dust	< mg/m^3	> mg/m^3 - Level C (air-purifying respirator)
		☐		
		☐		

HAZARD	HAZARD CONTROLS (check all that apply and comment as required)
1. PREMISES/ENVIRONMENTAL HAZARDS	
Site-Specific Comments:	
☒ LOCATION HAZARDS ☒ Outdoor field work ☒ Urban, suburban ☐ Rural, remote location ☐ Indoor field work ☐ Operating facility ☐ Vacant facility ☐ Water hazards	☒ Use routine safety precautions commensurate with routine work environment conditions ☐ For non-routine, unique, or severe location hazards, see site-specific safety comments above. ☐ For water-related work, see #2, “Water Hazards” ☐ For worksite violence/security risks, see #3, “Violence, Security, Working Alone” ☒ For transportation related hazards, see #5, “Worksite Traffic, Vehicle, Transportation Hazards” ☒ For utility-related hazards, see # 6, “Utility-Related Hazards ☐ For atmospheric hazards in enclosed, indoor, or confined spaces, see # 11 “Confined Spaces or Hazardous Enclosed/Indoor Spaces”

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PRE-WORK TASK HAZARD ANALYSIS (THA)

	HAZARD	HAZARD CONTROLS (check all that apply and comment as required)
☒	WALKING/WORKING SURFACES, HOUSEKEEPING ☒ Uneven, rough terrain, riprap ☒ Slippery surfaces ☐ Holes, pits, openings ☐ Puncture, foot hazards	☒ Keep work areas clean, orderly, dispose of trash/debris, maintain sanitary conditions. ☒ Walkways are cleared of equipment, excavated material, tools and debris, snow ☐ Holes, pits, openings to be covered or otherwise marked or guarded ☐ Apply absorbent, salt or sand, for traction/slip resistance on slippery/icy/wet surfaces ☒ Wear proper work boots/shoes with ankle support and/or traction, as appropriate for conditions
☒	TEMPERATURE/WEATHER ☒ Heat Stress ☒ Cold Stress ☒ Severe Weather ☒ Lightning	☒ Heat/Cold stress are monitored in accordance with Geosyntec procedures EHS 124 & EHS 125 ☒ Provide sufficient fluids, shade, breaks, other precautions as appropriate to adderss heat hazards. ☒ Provide protection from sun (sun screen, shaded brake area). ☐ For cold stress, wear multiple layers, protect from wind/wet, frequent break in warm location. ☐ In high wind, discontinue working at heights (e.g. on ladders, scaffold, aerial lift, similar). ☒ Use precautions for lightning, thunderstorm, hale, tornado (monitor weather, “30/30 rule,” shelter)
☒	BIOLOGICAL HAZARDS ☒ Insects, spiders, ticks ☐ Wild/feral/pet animals ☐ Mold, fungi ☒ Poisonous plants ☐ Bird Guano ☐ Infectious, wastewater, sewer ☐ Bloodborne pathogens	☒ Utilize safety practices commensurate with risk of biting/stinging insects, wild/feral/pet animals. ☒ For poisonous plants (poison ivy/oak/sumac/etc.), minimize exposed skin area, wear coveralls, use barrier cream/wash (Technu products or similar), as appropriate. For biological exposure hazards, use protective measures commensurate with hazard: ☒ Minor-moderate hazard - use ordinary hygiene practices, protective gloves, hand washing. ☐ Moderate-severe hazard - add protective clothing, respirator, decon, as appropriate. ☐ Bloodborne pathogen (human infectious agents) - implement “Universal Precautions”
☐	HAZARDOUS NOISE	☐ Hearing protection is used when exposed to excessive noise levels (greater than 85 dBA over an 8-hour work period, or intermittent….)
☐	OVERHEAD HAZARDS, FALLING OBJECTS	☐ Wear hardhat when exposed to overhead hazards, “bump” hazards, falling objects ☐ Cordon off hazard zones, route access/egress around hazards of falling objects ☐ Secure objects from falling ☐ Provide overhead protection (canopy) to protect public pedestrians, workers
☐	ILLUMINATION ☐ Night work ☐ Indoor work	☐ Make site-specific arrangements for illumination of work areas and access routes.
2. BOATING, WATER, WET LOCATIONS, FLOOD, ETC. – CHECK IF NOT APPLICABLE: ☒		
Site-Specific Comments:		
☐	WATER HAZARDS ☐ Drowning, hypothermia ☐ Boat, barge, raft ☐ Wading, wetland, mud/silt ☐ Dam release, flood, tide ☐ Diving	☐ Wear appropriate Coast Guard-approved Personal Flotation Device (PFD) ☐ Bring emergency rescue equipment (ring buoy, reaching device, flares) ☐ Use fuel safety practices, fire extinguisher present in boat ☐ See site-specific safety comments above.
3. VIOLENCE, PUBLIC PROTECTION, WORKING ALONE – SPECIAL MEASURES – CHECK IF NOT ANTICIPATED: ☐		
Site-Specific Comments:		
☐	PERSONAL SECURITY, HIGH CRIME AREA	☐ Employ standard precautions, which may include: conduct work only during daylight hours, use buddy system, avoid parking in secluded location, lock vehicles, hide valuable items in vehicles from plain view ☐ See site-specific safety comments above for project-specific security measures.
☐	PUBLIC AT RISK, SITE SECURITY	☐ Provide safe pedestrian route around work areas, use appropriate barriers, signs, warning devices. ☐ Provide covers over excavation, secure fencing, overnight protection ☐ Provide protection from overhead hazards (canopy, etc.) where public at risk of overhead hazards ☐ Provide secure locked storage of hazardous chemicals, hazardous equipment, etc.
☒	WORKING ALONE	☒ Establish “check in” procedure with supervisor or project manager (arrival, mid-day, departure) ☒ Additional measures, as appropriate for the working conditions.
4. DRIVING, TRAFFIC, TRANSPORTATION HAZARDS – CHECK IF NOT APPLICABLE: ☐		
Site-Specific Comments:		
☒	DRIVING HAZARDS ☒ Routine work travel ☐ Unfamiliar location ☐ Unfamiliar vehicle ☒ Overnight travel, distance	☒ Use routine safe/defensive driving practices (seat belts, safe speeds, eyes ahead, no tailgating, limit distractions, no texting, safe cell phone use, clear windows, account for weather/road conditions, adequate sleep, other measures as appropriate). ☒ Plan travel route before driving (assemble maps, enter destination in GPS). ☐ Familiarize yourself with vehicle operational controls before operating unfamiliar vehicle.

	HAZARD	HAZARD CONTROLS (check all that apply and comment as required)
☒	WORKERS EXPOSED TO TRAFFIC HAZARDS ☒ In/near public or private roadway ☒ Parking lot, driveway ☐ Worksite, construction site traffic	☒ Workers to wear reflective vests where exposed to traffic hazards. ☒ Where possible, park vehicles as protective shield from oncoming traffic. ☒ Configure work area and support vehicles to minimize worker exposure to traffic hazards. ☐ DOT signal devices will be used to re-route vehicles around work area, site entrances/exits. ☐ Flaggers will be used and have DOT Flagger Training; police detail where appropriate or required. ☒ Park vehicles in secure location away from heavy equipment use or other site operations. ☐ Mark temporary roadways clearly, provide berms/stop logs where needed.
☐	RAILROAD/AIRPORT HAZARD	☐ Coordinate with rail company/airport and implement required safety measures ☐ Site workers to receive safety training for railroad/airport work.
☒	OFF-ROAD DRIVING, USE OF ALL-TERRAIN VEHICLE	☒ For off road driving, do not exceed capability of vehicle ☐ Follow ATV specific procedures for training, safety equipment, operation.
☐	TRANSPORTING MATERIALS, TOWING/HAULING LOADS	☐ Ensure load is firmly secured (rope, straps, load configuration) to prevent shifting during travel. ☐ For trailer use, verify signal/braking lights operational, rear-view mirrors effective, hitch/safety chains secure.
5. UTILITY-RELATED HAZARDS (for underground/overhead work) – CHECK IF NOT APPLICABLE: ☒		
Site-Specific Comments:		
☐	OVERHEAD UTILITIES	☐ Maintain proper clearance, employ other appropriate precautions for the conditions.
☐	UNDERGROUND UTILITIES	☐ Confirm appropriate underground utility clearance procedures have been completed prior to ground penetrations, and employ other utility clearance/locator practices, as appropriate for conditions.
6. ELECTRICAL HAZARDS – CHECK IF NOT APPLICABLE: ☒		
Site-Specific Comments:		
☐	WORKERS EXPOSED TO: ☐ Voltage < 50 v ☐ Voltage 50-600v ☐ Voltage > 600v ☐ AC ☐ DC ☐ 3-phase ☐ Battery and/or solar power ☐ Capacitor/Transformer	☐ Implement electrical safe work practices commensurate with the work to be performed, pertaining to the following (as applicable): - Worker training/qualification - Electrical equipment and hazards, safe design features - Electrical safe work practices - Grounding, use of GFCIs - Electrical equipment installation, operation, maintenance, repair - Arc flash protection - Electrical equipment diagnostics
☐	BASIC ELECTRICAL HAZARDS ☐ Equipment/tool use/operation ☐ Use of extension cords	☐ Control water-related hazards, in a manner appropriate for the job tasks/equipment/tool. ☐ Use extension cords/power cords properly, prevent damage, take out of service if damaged. ☐ Inspect tool/equipment/extension cords/power cords before each use. ☐ Use GFCI-protected outlet or portable GFCI in wet locations, outdoors, basements ☐ Ensure live parts are guarded, enclosures secure. ☐ Enclosures, circuits properly labeled.
☐	LOCKOUT/TAGOUT OF ELECTRICAL ENERGY	☐ Implement control-of-hazardous-energy practices (lockout/tagout), provide lockout/tagout locks and devices, training workers, designate “authorized” personnel, notify “affected” personnel
7. FALL HAZARDS – CHECK IF NOT ANTICIPATED: ☒		
Site-Specific Comments:		
☐	WORKING AT HEIGHTS ☐ Roof, skylight ☐ Elevated platform ☐ Holes, side opening ☐ Retaining wall, cliff, ledge ☐ Trench, excavation ☐ Protruding rebar	☐ Ensure guardrails present ☐ Use personal fall apparatus (PFA) ☐ Use tether or positioning device ☐ Restrict access to hazard (barriers, tape, sign) ☐ Ensure covers in place over holes ☐ Watch person ☐ Use fall protection net ☐ Restrict access beneath work to protect other site personnel from overhead hazards ☐ Install caps on protruding rebar
☐	LADDERS / STAIRS ☐ Extension ladders ☐ Step ladders ☐ Fixed ladders ☐ Stairs	☐ Provide instruction/review pertaining to safe ladder use ☐ Extension ladders are properly footed, secured, setup at proper angle ☐ Stepladders are set on level ground or properly shimmed with spreaders locked. ☐ Stairs have proper rise over run and stairs >4 steps or 4' have guardrails. ☐ Never use a step ladder as a straight ladder. All straight ladders shall be extended three rungs past leading edge. Never use metal ladders while working with electricity.

	HAZARD	HAZARD CONTROLS (check all that apply and comment as required)
☐	AERIAL LIFT ☐ Scissor lift ☐ Extensible boom ☐ Articulated boom ☐ Vertical Lift ("Genie")	☐ Operators are sufficiently trained, experienced and qualified. ☐ Equipment is inspected after mobilization and is in good condition. ☐ Harness & Lanyard worn whenever operating the lift (scissor lifts may be excepted) ☐ Overhead and surface obstructions are reviewed with operators prior to use.
☐	SCAFFOLD ☐ Supported scaffold ☐ Suspended scaffold ☐ Free-standing/mobile scaffold	☐ Identify/coordinate operations with competent person ☐ Supported scaffold level, stable, proper attachments, tiebacks, planking, ☐ Suspended scaffolds anchored properly ☐ Guardrails present above 10 feet or personal fall apparatus used. ☐ Proper means of accessing scaffold (proper ladders, stair tower). ☐ Total height of free-standing scaffold not to exceed four times the minimum base dimension.
8. TOOLS, EQUIPMENT, MACHINERY – CHECK IF NOT APPLICABLE: ☒		
Site-Specific Comments:		
☒	HAND TOOLS Eye injury, puncture/bruise/ laceration hazard	☒ Use proper tool for the job, maintain tools in good condition (no damage, cutting tools sharp, etc.) use appropriate PPE for hand/eye/body protection, plan for safe "follow through" motion, use vise/clamp/work surface to hold/stabilize work piece
☐	POWER TOOLS ☐ Eye/hand/body injury ☐ Fuel-related hazards ☐ Inhalation hazard ☐ Noise ☐ Sparks, heat, fire hazard ☐ Electrical hazards	☐ For all power tools: - Inspect tools to ensure safe operating condition before each use. - Use tool in accordance with manufacturer's specifications. - Use PPE or other safety practices, as appropriate, for eye/hearing/hand/head/body protection - Provide training or verify operator qualification for use of power tool. - Stay clear of hazard zone, "line of fire" when working near where power tools are used. ☐ Use safety practices for refueling, fuel handling/transport/storage. ☐ Use respirators, ventilation, wet methods, other appropriate means to control inhalation hazard. ☐ For spark/heat generating tool, control fire hazards, segregate combustible/flammable materials. ☐ For electrical hazards, see # 6, "Electrical Hazards".
☐	WELDING, CUTTING ☐ Gas welding/cutting ☐ Arc welding/cutting	☐ Hot work permit system to be implemented. ☐ Operator properly protected (eye protection, clothing, apron, etc.) ☐ Fire hazard controls (watcher, fire extinguisher, water, isolate combustibles) ☐ Protect nearby personnel from hazardous UV, IR light (shielding, curtain) ☐ Electrical safe work practices for arc welding ☐ Gas cylinder safe practices (secured, upright, caps on when not in use, prevent damage).
☐	EQUIPMENT/MACHINERY ☐ Point-of-operation hazards ☐ Pinch points, moving parts ☐ 'Struck-by,' 'caught between' ☐ Hot surfaces, heat ☐ Extension cords, flexible wire ☐ Fuel related (gas or liquid) ☐ Hydraulic pressure ☐ Compressed air/gas ☐ Kinetic, stored energy ☐ Noise ☐ Lockout/tagout ☐ Emissions, discharge gases ☐ Working at heights, falls ☐ Lifting, repetitive motion ☐ Illumination ☐ Electrical (see below)	☐ *Working Near* Equipment/Machinery ☐ Work at safe distance/restrict access, ensure guards in place, heed warning signs ☐ Implement measures necessary for adequate illumination ☐ Control exposue to emission/discharge gases (ventilation, PPE, other means). ☐ Ensure safe practices for fuels/fluids/machine-related hazardous materials ☐ Use PPE or other safety practices for eye/hearing/hand/head/body protection ☐ Segregate combustible materials from hot surfaces/hot exhaust (minimum 3 feet) ☐ Operation/Maintenance/Repair of Equipment/Machinery (see applicable control measures above) ☐ Orient/locate equipment for safe access during operation and maintenance ☐ Use equipment/machinery in accordance with manufacturer's specifications ☐ Use safe lifting practices, minimize repetitive motion hazards ☐ Ensure point-of-operation, mechanical power transmission, other moving parts are guarded with protective devices; do not override interlocks, guards, protective devices ☐ Secure long hair/loose clothing/hanging jewelry near moving/rotating parts ☐ Ensure appropriate warning signs are in place and heeded ☐ Use safe practices for fueling, fuel transport & storage. ☐ Operate fuel-powered equipment in well ventilated location. ☐ Incorporate safety provisions/safe work practices for compressed air, pressurized systems (pneumatic/hydraulic), stored energy ☐ Implement control-of-hazardous-energy practices (lockout/tagout), designate "authorized" personnel, notify "affected" personnel ☐ Protect from fall hazards (safe ladder use, personal fall protection, guardrails, other) ☐
☐	ELECTRICAL HAZARDS	☐ Implement provisions of # 6, "Electrical Hazards"
9. MANUAL MATERIAL HANDLING, MATERIAL STORAGE – CHECK IF NOT APPLICABLE: ☒		

	HAZARD	HAZARD CONTROLS (check all that apply and comment as required)
Site-Specific Comments: Cooler Lifting		
☒	LIFTING / ERGONOMIC Musculoskeletal strain, repetitive motion injury	☒ Use proper manual lifting techniques (straight back, bend at knees, firm grasp, firm footing). ☒ Seek assistance for lifting heavy objects (>50 lbs.) ☐ Use mechanical lifting equipment to reduce manual material handling hazard ☒ For repetitive motion activities, take breaks, switch hands, share task with others, employ other safe practices appropriate for the specific task(s).
☐	STORAGE OF MATERIALS See Sect. 12 for Chemical Storage	☐ Store materials in stable manner that prevents tipping, sliding, rolling, falling over. ☐ Materials stored in tiers to be stacked, racked, blocked, interlocked or otherwise secured to prevent sliding, falling or collapse ☐ Do not exceed load limits of racks, platform; ensure racks are stable, robust, secure ☐ On scaffold, do not store materials in excess of supplies needed for immediate use ☐ Ensure stored materials do not block aisles, passageways ☐ For used lumber, remove nails before stacking, and stack to be stable and self supporting, no higher than 20 feet (or 16 feet if lumber is to be handled manually) ☐ Debris will be removed regularly from storage area and place in designated area or disposed.
10. CONSTRUCTION OPERATIONS, HEAVY EQUIPMENT, HEAVY VEHICLES – CHECK IF NOT ANTICIPATED: ☒		
Site-Specific Comments:		
☐	HEAVY EQUIPMENT; CONSTRUCTION VEHICLES Hazards: Struck By, Run-Over, Caught In Between (pinch points), Roll Over, Fluid Leaks	☐ Trained/qualified persons operate all heavy equipment. ☐ No passengers on moving/operating equipment except where passenger seat/restraint is present. ☐ Equipment inspected upon mobilization and daily; maintained in good repair, backup alarms ☐ All leaks or defective safety equipment will be repaired before use. ☐ Operators required to use seatbelts. ☐ Eye contact with operator and use of hand signals prior to approaching near equipment. ☐ High visibility vests are required of all personnel in work area. ☐ Max. safe slope for each vehicle will be followed. ☐ Personnel to stay clear of swing radius of equipment. ☐ Spill equipment available for fuel and hydraulic fluid leaks. ☐ Equipment locked, secured, brakes set, buckets/forks lowered, when not in use.
☐	CRANES Overhead hazards – utility lines, swing radius, falling objects, wire ropes and hoisting equipment ☐ Overbalancing – high winds, outrigger placement, overloading, safe slope ☐ Struck By, Run-Over, Caught In Between (pinch points), Roll Over, Fluid Leaks	**In addition to general safety practices for heavy equipment (above), as applicable:** ☐ Only qualified persons operate cranes (certificate required). ☐ A Critical Lift Plan & Checklist prepared/executed (HS 506) prior to mobilization. ☐ Equipment will be inspected prior to mobilization and a Crane Pre-Operational Safety Checklist (see EHS 506) will be completed and signed by crane operator. ☐ Crane operator will remain at the controls at all times during operation. ☐ Crane operation must be performed under the direction of an appointed signal person at all times. ☐ Communication between crane operator and signal person will be maintained through standard hand signals or voice communication equipment. Radio equipment, if used, will be equipped with a dedicated channel. ☐ Lifting or lowering will not exceed 100ft/minute. Lowering must be controlled i.e. no free fall. ☐ Stop work will be issued whenever hoisting equipment is exposed to high winds. ☐ Outriggers will be fully extended/locked with a firm footing within the maximum safe slope (<1%). ☐ Crane to be on level, stable base, dunnage used when necessary. ☐ Total weight of load not to exceed 50% of rated capacity for the crane radius and configuration. ☐ Rigging procedures – see Hoisting, Lifting, Rigging, below. ☐ Suspended personnel lifting is prohibited (unless per approved “man-lift” equipment). ☐ No personnel permitted beneath suspended loads.
☐	HOISTING, LIFTING, RIGGING ☐ Crane ☐ Drill rig ☐ Loader, excavator, etc. ☐ Mechanical, electrical hoist	☐ Identify, coordinate with competent person. ☐ Rigging directly to the forks of a lull, forklift, or front loader equipped forks is prohibited. ☐ Do not exceed loading limits of equipment. ☐ A Critical Lift Checklist (see EHS 506) will be completed and signed prior to crane mobilization. ☐ Rigging, wire rope and hoisting equipment will be inspected and maintained on a weekly basis. ☐ Crane hooks will be equipped with safety latches.
☐	FORKLIFT Hazards: Struck By, Run-Over, Caught In Between (pinch points), Roll Over, Fluid Leaks	**In addition to general safety practices for heavy equipment (above), as applicable:** ☐ Qualified operater, per established forklift training (certificate is required) ☐ Equipment inspected daily and documented on Forklift Preoperation Inspection Checklist ☐ Operators required to use seatbelts, and adhere to safe operating procedures.

	HAZARD	HAZARD CONTROLS (check all that apply and comment as required)
		☐ Do not exceed lifting load limits. ☐ Forklift shall not be moved/driven with empty forks in raised position. ☐ When not in use, forks lowered, brake set, controls in neutral, key removed.
☐	EXCAVATION/TRENCHING ☐ Max Depth ≥ 20' ☐ Max Depth ≥ 5' ☐ Max Depth <5' with potential cave-in hazard ☐ Potential permit-required confined space at depth ≥ 4' ☐ Underground utilities ☐ Overhead utilities ☐ Structures/foundations ☐ Falls into excavations	☐ Activities under supervision/oversight of competent person ☐ Sloping & shoring for excavations ≥20' are approved by a professional engineer ☐ Sloping & shoring for excavations ≥5' when persons are exposed to cave-in. ☐ Sloping & shoring for shallow (<5') excavations with cave-in hazard ☐ Excavations ≥ 4' are classified as a non-permit confined space ☐ Excavations ≥ 4' are classified as Alternate Entry or Permit-Required (see confined space) ☐ Implement underground utility clearance procedures. ☐ Hand digging within 3' of utility locations. ☐ Excavations to be protected by perimeter fencing (not barricade tape) ☐ Use trench boxes in accordance with proper procedures. ☐ Workers in trenches to be within 25 feet of ladder or sloped entryway.
☐	DRILLING ☐ Struck By, Run-Over, Caught In Between (pinch points), Roll Over, Fluid Leaks ☐ Underground utilities, aboveground ☐ Spills ☐ See Equipment/Machinery	☐ Contractor inspects drill rig daily before use. ☐ Drill rig equipped with operational emergency stop. ☐ Highpressure lines equipped with whip checks. ☐ High visibility vests, hard hats are being worn near the equipment. ☐ Operators and helpers will maintain a safe distance to moving parts. Individuals working near moving or rotating parts will secure loose hair, clothing, and equipment. ☐ Drill rigs will only be moved with masts lowered. Masts will be erected with outriggers fully extended when equipped with outriggers. ☐ Max. safe slope for rig will be followed, drill rig leveled, appropriate blocking/cribbing as needed. ☐ Spinning parts of the rig are guarded when possible, no loose clothing being worn near the rig. ☐ Follow underground utility clearance procedures. ☐ Area is surveyed for overhead utilities, safe clearance distance maintained. ☐ Hearing protection is used when working near the rig. ☐ Spill equipment is available for fuel and hydraulic fluid leaks.
☐	DEMOLITION	☐ Develop/implement demolition safety plan
☐	BLASTING	☐ Develop/implement blasting safety plan
11. CONFINED SPACES, HAZARDOUS ENCLOSED or INDOOR SPACES – CHECK IF NOT APPLICABLE: ☒		
Site-Specific Comments:		
☐	CONFINED SPACE(S) ☐ Permit required ☐ Non-permit required Potential/actual hazards: ☐ Atmospheric hazards: ☐ Flammable/explosive ☐ Oxygen deficiency ☐ Hydrogen sulfide ☐ Other toxic ☐ Combustible dust ☐ Electrical ☐ Mechanical, engulfment, entrapment, stored energy	☐ For personnel <u>working near confined</u> spaces: - Confined spaces have been identified, labeled. - Communication system in place to prevent unauthorized entry. ☐ For <u>permit-required confined space entry</u>, see separate entry permit. - All entrants, attendants, supervisors are trained/qualified. - Hazards properly characterized - Necessary equipment for safe entry utilized (access, retrieval, air monitoring) - Arrangements for rescue team have been made. ☐ For entry into a <u>non-permit</u> confined space, see site specific procedures delineated above in "site-specific comments," or see alternate/attached safety work plan.
☐	ENCLOSED/INDOOR SPACE(S) ☐ Outfall, culvert ☐ Tunnel, shaft, gallery ☐ Machine/equipment pit/vault ☐ Basement/Sub-basement ☐ Crawl space entry ☐ Indoor equipment/drilling	*<u>For indoor use of gasoline/propane/diesel equipment:</u>* ☐ Duct exhaust to outdoors, and/or introduce fresh air using ventilation/blowers/fans. ☐ Perform air monitoring (see section on Air Monitoring) *<u>For entry into potentially hazardous indoor or enclosed spaces:</u>* ☐ Ventilate and/or perform air monitoring for anticipated hazards. ☐ If space classified as confined space, follow confined space entry requirements (above).
12. COMMERCIAL CHEMICAL PRODUCTS USED AT WORK SITE – CHECK IF NOT APPLICABLE: ☐		
Site-Specific Comments: Alconox, Isopropyl Alcohol, Nitric Acid		

	HAZARD	HAZARD CONTROLS (check all that apply and comment as required)
☒	PRODUCTS REGULATED BY HAZARD COMMUNICATION STANDARD	☒ Safety Data Sheets available, either on site or readily available within same work shift ☒ Containers labelled properly ☒ Workers trained on hazards ☒ For subcontractor use of chemical products, coordinate/discuss during safety meetings.
☐	COMPRESSED GAS(ES):	☐ Secure cylinders upright, caps on when not in use, handle with care, prevent damage ☐ Propane cylinders not in use must be stored outdoors in cage or similar secure enclosure. ☐ Ensure acetylene cylinders NOT secured to steel arc welding bench ☐ Store/use in a manner to prevent asphyxiation hazard ☐ Segregate oxygen and fuel gases by distance (20') or barrier ☐ Control ignition sources, no smoking signage ☐ Use/store in a manner to control inhalation exposure hazards, PPE, air monitoring.
☐	FLAMM./COMBUST. LIQ.	☐ Proper storage (flam. storage cabinets, other storage precautions) ☐ Control ignition sources ☐ Grounding and bonding where appropriate
☐	CORROSIVES	☐ Handle with care, use appropriate eye/face/skin protection ☐ Eyewash, deluge shower, drench hose, hand washing (with water), as appropriate
☐	TOXIC	☐ For toxic substances, use/store in a manner to control exposure hazards (inhalation, ingestion, skin contact, skin absorption; use PPE as appropriate, conduct air monitoring as appropriate.
☐	CHEMICAL STORAGE	☐ Chemical storage cabinet, cage, storage room, or similar ☐ Incompatible chemicals segregated ☐ Secondary containment ☐ Safety equipment will be located near chemical storage.

13. CHEMICAL HAZARDS FROM ON-SITE CONTAMINANTS, OPERATIONS, EMISSIONS – CHECK IF N/A: ☐

Site-Specific Comments:

CHECK AS APPROPRIATE BELOW. PROVIDE ADDITIONAL INFO. AS APPROPRIATE, IN SITE-SPECIFIC HAZARD ANALYSIS ABOVE.

☒ Soil/groundwater contaminants (historical release)	☐ Oxygen deficiency	☐ Asbestos
☐ Recent release, known high concentrations	☒ Chlorinated VOCs (volatile org. cpds.)	☐ Lead paint
☐ Former chemical disposal site, landfill	☒ BTEX, petroleum derived VOCs	☐ Pesticides, herbicides, fungicides
☐ Urban fill, residual contaminants	☐ Fuel oils, petroleum, waste oil, lubricants	☐ Sensitizers
☐ Containerized waste (drums, process equipment)	☒ Metals, metal compounds, metal dusts	☐ Radioactive contaminants
☐ Buried drums (known or potential)	☐ Elemental mercury	☐ Other:
☐ Large containers, potential for spills	☒ Polyaromatic hydrocarbons (PAHs)	
☐ Emissions from active industrial processes	☒ Polychlorinated biphenyls (PCBs)	
☐ Emissions from welding/cutting/hot work	☐ Potential for flammable vapors	
☐ Carbon monoxide (vehicle/equipment exhaust)	☐ Potential for flammable gas (methane)	
☐ Contaminated building surfaces	☐ Corrosive, acids/caustics, strong irritants	
☐ Unexploded ordnance	☐ Sulfides, hydrogen sulfide (H2S)	
☐ Explosive dust	☐ Cyanides, hydrogen cyanide (HCN)	

☐	FOR SITE REGULATED AS "UNCONTROLLED HAZ. WASTE SITE," e.g. **REGULATED BY HAZWOPER** (OSHA 29 CFR 1910.120) - Establish work zones & site control plan (Exclusion Zone - EZ, Contaminant Reduction Zone - CRZ, Support Zone - SZ) - Workers to be aware of and trained on hazards per OSHA Hazard Communication Standard. - Include site map/figure depicting work locations and other relevant site-specific information. - Site workers in EZ or CRZ to have OSHA 40-hour training, current 8-hour refresher, 3 days supervised field expience. - Site workers in EZ or CRZ to participate in Medical Monitoring program. - "Peripheral" site workers, engaged on-site, with no hazardous exposure: 24 hr. training required. - Site supervisor(s) required to have 8-hr. Supervisor training. - Implement site-specific procedures for worker protection through engineering controls, work practices, personal protective equipment (PPE), air monitoring, decontamination, spill containment (see Sections B and C, "Health and Safety Equipment/Gear" and "Air Monitoring" - Include emergency response program in H&S plan.
☒	FOR SITE WITH CHEMICAL CONTAMINANTS BUT **NOT REGULATED BY HAZWOPER** - Workers to be aware of and trained on hazards per OSHA Hazard Communication Standard - Implement appropriate controls to minimize worker exposure (engineering controls, work practices) to levels below OSHA PELs. - Use PPE as needed (see B, "Health and Safety Equipment/Gear"). - Conduct air monitoring or personal air sampling to monitor and/or evaluate worker exposure (see Section C, "Air Monitoring").

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PRE-WORK TASK HAZARD ANALYSIS (THA)

HAZARD		HAZARD CONTROLS (check all that apply and comment as required)
☐	ATMOSPHERIC HAZARDS GENERATED BY EXHAUST FROM OPERATING EQUIPMENT ☐ Position work upwind of exhaust source ☐ Use blowers, fans to dissipate atmospheric hazards ☐ Conduct air monitoring (see Section C, "Air Monitoring").	
☐	OFF-SITE MIGRATION OF CONTAMINANTS	☐ Implement controls to minimize hazard migration (dust suppression, covers, foam, etc.) ☐ Community/perimeter air monitoring is not anticipated with the current scope of work. ☐ Community/perimeter air monitoring to be conducted per perimeter air monitoring plan.

EMERGENCY RESPONSE **(911 Service is Available ☒ Yes ☐ No)** ☒ Verify wireless coverage at site, use alternate communication procedures as needed.

Emergency Medical Treatment - Hospital Name: Hospital Address:	St Joseph's Hospital 555 E. Market St Elmira NY 14901	**Number:**	607.733.6541
Urgent Care Med. Treatment - Clinic Name: Occupational Clinic Address:	Elmira Urgent Care 306 W. Water St., Elmira, NY 14905	**Number:**	607.732.1100
Fire Department Name	West Elmira Fire Department	**Number:**	911
Spill Response:	West Elmira Fire Department	**Number:**	911
Client Representative Name::	Kevin Krueger	**Office Number:** **Cell Number:**	(651) 687-2210
Geosyntec **Project Manager** Name:	Aron Krasnopoler	**Office Number:** **Cell Number:**	(410) 381-4333 (202)-550-7724
Geosyntec **Corporate H&S** Name:	Dale Prokopchak	**Office Number:** **Cell Number:**	804 332 6376 (804) 349-8067

Emergency Response Comments:

Date:	
Project Name: Former Sperry Remington Site North	
THA Title: Groundwater Sampling	
Subcontractor Name(s):	
Geosyntec Representative (reviewed by):	**Michael Hansen**
Subcontractor Foreman/Supervisor Signature (authorize):	
Crew Signatures (acknowledge):	
Print Name	**Signature**

PLEASE RETURN A COPY OF THIS SIGNED PAGE TO GEOSYNTEC PROJECT MGR., SUPERINTENDENT UPON REVIEW AND ACKOWLEDGMENT BY THE CREW MEMBERS. ALL NEW CREW MEMBERS SHALL BE ORIENTATED THE SAME AND A SUBMITTAL OF A NEW SIGN IN SHEET SHALL BE COMPLETED.

Geosyntec consultants

PRE-WORK TASK HAZARD ANALYSIS (THA)

TASK/ACTIVITY:	Stormwater Structure Inspection	**Date:**	7/18/2014
Project Name:	Former Sperry Remington Site North	**Client Name:**	Unisys Corporation
Project Number:	MN0832	**Geosyntec Proj. Mngr.:**	Aron Krasnopoler
Project Address:	777 Sourth Main Street, Elmira, New York	**Geosyntec Proj. Dir.:**	Paul Brookner
Task Description:	Manhole SW-73 will be inspected for structural integrity, hydraulic connections to the storm sewer system and the presence of accumulated fine-grained material. If present, the depth fo the material will be measured, to the extent practical, and recorded. If an adequate volume of material is present, a composite sample for laboratory analyses will be collected.		

A. SUMMARY OF SITE-SPECIFIC TASK HAZARD ANALYSIS

Site-Specific Comments:

Sub-Tasks, Activities	Hazards	Hazard Controls
Task 1: Mobilize to Site	-Driving -Mobilization to and around unfamiliar facility	- Drive carefully to facility, be well rested and avoid distracted driving. - Review scope of work.
Task 2: Locate SW-73 Manhole	-Slips/trips/falls -Heat/cold stress -Biohazards: snakes, bees, spider, ticks, poison ivy	-Pay close attention to foot placement; slow deliberate movement. -Dress for weather conditions. Apply sunscreen if needed. -Beaware of surroundings and avoid biohazards.
Task 3: Remove manhole lid and inspect conditions in sump from ground surface. Do not enter the manhole.	-Same hazards noted above for Task 2. -lifting/removing manhole lid -falling in manhole/sump Potential contaminant exposure: VOCs, PCBs, SVOCs	-Same hazard controls noted above for Task 2. -don level D personal protective equipment (PPE). PPE will include: safety glasses, safety vests, steel toe boots, and nitrile gloves. -Avoid direct contact with contaminated matrices and/or equipment. -Use safe lifting practices for manhole -Keep center of gravity outside of manhole and close manhole when observations are complete. -Do not break plane of manhole
Task 4: If necessary, collect fine-grained sample from the manhole using a reach sampler or similar device. Do not enter the manhole.	-Same hazards as Task 3. -Potential contaminant exposure: VOCs, PCBs, SVOCs -Splash hazards	-Continue to wear level D PPE and minimize contact with water. -Do not break plane of manhole

B. HEALTH AND SAFETY EQUIPMENT/GEAR

Site-Specific Comments:

☒ PERSONAL PROTECTIVE EQUIPMENT (PPE):

Level(s) of Protection (for chemical hazards):

- ☐ Level D (standard work clothes, no chemical protective clothing)
- ☒ Modified Level D (chemical protective clothing in addition to standard work clothes)
- ☐ Level C (air purifying respirator or dust mask, with chemical protective clothing)
- ☐ Level B or A (air supplied respirator, chemical protective suit)

- ☒ Hard-toed boots/shoes
- ☐ Hardhat
- ☐ Noise/hearing protection
- ☒ High-visibility/reflective vest
- ☒ Work gloves
- ☒ Eye/face protection
  - ☒ Safety glasses with side shields
  - ☐ Goggles
  - ☐ Face shield
  - ☐ Other:
- ☒ Chemical protective clothing
  - ☒ Gloves, type: Nitrile
  - ☐ Coveralls, type:
  - ☐ Outer boots, boot covers
  - ☐ Other:

- ☐ Respiratory Protection
  - ☐ Disposable n-95 face mask
  - ☐ Half-face air-purifying respirator
  - ☐ Full-face air-purifying respirator
  - ☐ Resp-cartridge, type:
  - ☐ Other:
- ☐ Personal flotation device
- ☐ Personal fall apparatus
- ☐ Fire retardant clothing
- ☐ EH (Electrical Hazard) rated boots, gloves
- ☐ Other:

☒	OTHER H&S EQUIPMENT and GEAR:	☒ Fire extinguisher ☐ Caution tape ☒ Traffic control warning devices ☐ Warning signs or placards ☐ Decon supplies for personal decon ☐ Portable ground fault circuit interrupter (GFCI)	☐ Lockout/tagout equipment ☐ Ventilation equipment (fan, blower) ☒ First aid kit ☒ Vehicle emergency kit (flares, lights, reflective device) ☐ Other:

C. AIR MONITORING – CHECK IF NOT APPLICABLE: ☒

Site-Specific Comments:

☐	INSTRUMENT(S), EQUIPMENT	☐ PID, Lamp energy: eV ☐ FID ☐ Carbon monoxide detector ☐ Hydrogen sulfide detector ☐ Oxygen (O_2) detector	☐ Flammable gas (LEL) detector ☐ Particulate (dust) detector ☐ Calibration kit for each detector type ☐ Others:

☐	ACTION LEVELS FOR **O2/LEL**	☐ Oxygen	≤19.5% - provide ventilation to raise oxygen to acceptable levels, or utilize Level B. ≥23.0% - provide ventilation to lower oxygen to acceptable levels, or utilize Level B and implement controls for fire hazards, control ignition sources.
		☐ LEL	Confirm at least 12% oxygen is present to ensure accuracy of LEL readings. At <10% LEL - Continue working, continue to monitor LEL levels At ≥10% LEL- Immediately withdraw from area. Resume work ONLY after LEL readings reduced to <10% through passive dissipation, or active vapor control measures.

☐	ACTION LEVELS FOR **TOXICS** (sustained breathing zone concentrations)	**Parameters**	**Level D, Modified D**	**Use levels C or B, as indicated below, OR take action to reduce breathing zone level to concentration acceptable for Level D.**
		☐ VOCs	< ppm	ppm to ppm: Level C (air purifying respirator) > ppm: Level B (air-supplied respirator)
		☐ Carbon Monoxide	< 35 ppm	≥35 ppm - Level B (air-supplied respirator)
		☐ Hydrogen Sulfide	< 10 ppm	≥10 ppm - Level B (air-supplied respirator)
		☐ Total Dust	< mg/m^3	> mg/m^3 - Level C (air-purifying respirator)
		☐		
		☐		

HAZARD	HAZARD CONTROLS (check all that apply and comment as required)
1. PREMISES/ENVIRONMENTAL HAZARDS	
Site-Specific Comments: Open Manholes will be blocked by traffic cones and/or caution tape. A dedicated watch person may also be used.	
☒ LOCATION HAZARDS ☒ Outdoor field work ☒ Urban, suburban ☐ Rural, remote location ☐ Indoor field work ☐ Operating facility ☐ Vacant facility ☐ Water hazards	☒ Use routine safety precautions commensurate with routine work environment conditions ☐ For non-routine, unique, or severe location hazards, see site-specific safety comments above. ☐ For water-related work, see #2, "Water Hazards" ☐ For worksite violence/security risks, see #3, "Violence, Security, Working Alone" ☒ For transportation related hazards, see #5, "Worksite Traffic, Vehicle, Transportation Hazards" ☒ For utility-related hazards, see # 6, "Utility-Related Hazards ☒ For atmospheric hazards in enclosed, indoor, or confined spaces, see # 11 "Confined Spaces or Hazardous Enclosed/Indoor Spaces"
☒ WALKING/WORKING SURFACES, HOUSEKEEPING ☒ Uneven, rough terrain, riprap ☒ Slippery surfaces ☒ Holes, pits, openings ☐ Puncture, foot hazards	☒ Keep work areas clean, orderly, dispose of trash/debris, maintain sanitary conditions. ☒ Walkways are cleared of equipment, excavated material, tools and debris, snow ☒ Holes, pits, openings to be covered or otherwise marked or guarded ☐ Apply absorbent, salt or sand, for traction/slip resistance on slippery/icy/wet surfaces ☒ Wear proper work boots/shoes with ankle support and/or traction, as appropriate for conditions
☒ TEMPERATURE/WEATHER ☒ Heat Stress ☒ Cold Stress ☒ Severe Weather ☒ Lightning	☒ Heat/Cold stress are monitored in accordance with Geosyntec procedures EHS 124 & EHS 125 ☒ Provide sufficient fluids, shade, breaks, other precautions as appropriate to adderss heat hazards. ☒ Provide protection from sun (sun screen, shaded brake area). ☐ For cold stress, wear multiple layers, protect from wind/wet, frequent break in warm location. ☐ In high wind, discontinue working at heights (e.g. on ladders, scaffold, aerial lift, similar). ☒ Use precautions for lightning, thunderstorm, hale, tornado (monitor weather, "30/30 rule," shelter)
☒ BIOLOGICAL HAZARDS ☒ Insects, spiders, ticks ☐ Wild/feral/pet animals ☐ Mold, fungi ☒ Poisonous plants ☐ Bird Guano ☐ Infectious, wastewater, sewer	☒ Utilize safety practices commensurate with risk of biting/stinging insects, wild/feral/pet animals. ☒ For poisonous plants (poison ivy/oak/sumac/etc.), minimize exposed skin area, wear coveralls, use barrier cream/wash (Technu products or similar), as appropriate. For biological exposure hazards, use protective measures commensurate with hazard: ☒ Minor-moderate hazard - use ordinary hygiene practices, protective gloves, hand washing. ☐ Moderate-severe hazard - add protective clothing, respirator, decon, as appropriate. ☐ Bloodborne pathogen (human infectious agents) - implement "Universal Precautions"

	HAZARD	HAZARD CONTROLS (check all that apply and comment as required)
	☐ Bloodborne pathogens	
☐	HAZARDOUS NOISE	☐ Hearing protection is used when exposed to excessive noise levels (greater than 85 dBA over an 8-hour work period, or intermittent….)
☐	OVERHEAD HAZARDS, FALLING OBJECTS	☐ Wear hardhat when exposed to overhead hazards, "bump" hazards, falling objects ☐ Cordon off hazard zones, route access/egress around hazards of falling objects ☐ Secure objects from falling ☐ Provide overhead protection (canopy) to protect public pedestrians, workers
☐	ILLUMINATION ☐ Night work ☐ Indoor work	☐ Make site-specific arrangements for illumination of work areas and access routes.
2. BOATING, WATER, WET LOCATIONS, FLOOD, ETC. – CHECK IF NOT APPLICABLE: ☒		
Site-Specific Comments:		
☐	WATER HAZARDS ☐ Drowning, hypothermia ☐ Boat, barge, raft ☐ Wading, wetland, mud/silt ☐ Dam release, flood, tide ☐ Diving	☐ Wear appropriate Coast Guard-approved Personal Flotation Device (PFD) ☐ Bring emergency rescue equipment (ring buoy, reaching device, flares) ☐ Use fuel safety practices, fire extinguisher present in boat ☐ See site-specific safety comments above.
3. VIOLENCE, PUBLIC PROTECTION, WORKING ALONE – SPECIAL MEASURES – CHECK IF NOT ANTICIPATED: ☒		
Site-Specific Comments:		
☐	PERSONAL SECURITY, HIGH CRIME AREA	☐ Employ standard precautions, which may include: conduct work only during daylight hours, use buddy system, avoid parking in secluded location, lock vehicles, hide valuable items in vehicles from plain view ☐ See site-specific safety comments above for project-specific security measures.
☐	PUBLIC AT RISK, SITE SECURITY	☐ Provide safe pedestrian route around work areas, use appropriate barriers, signs, warning devices. ☐ Provide covers over excavation, secure fencing, overnight protection ☐ Provide protection from overhead hazards (canopy, etc.) where public at risk of overhead hazards ☐ Provide secure locked storage of hazardous chemicals, hazardous equipment, etc.
☐	WORKING ALONE	☐ Establish "check in" procedure with supervisor or project manager (arrival, mid-day, departure) ☐ Additional measures, as appropriate for the working conditions.
4. DRIVING, TRAFFIC, TRANSPORTATION HAZARDS – CHECK IF NOT APPLICABLE: ☐		
Site-Specific Comments:		
☒	DRIVING HAZARDS ☒ Routine work travel ☐ Unfamiliar location ☐ Unfamiliar vehicle ☒ Overnight travel, distance	☒ Use routine safe/defensive driving practices (seat belts, safe speeds, eyes ahead, no tailgating, limit distractions, no texting, safe cell phone use, clear windows, account for weather/road conditions, adequate sleep, other measures as appropriate). ☒ Plan travel route before driving (assemble maps, enter destination in GPS). ☐ Familiarize yourself with vehicle operational controls before operating unfamiliar vehicle.
☒	WORKERS EXPOSED TO TRAFFIC HAZARDS ☒ In/near public or private roadway ☒ Parking lot, driveway ☐ Worksite, construction site traffic	☒ Workers to wear reflective vests where exposed to traffic hazards. ☒ Where possible, park vehicles as protective shield from oncoming traffic. ☒ Configure work area and support vehicles to minimize worker exposure to traffic hazards. ☐ DOT signal devices will be used to re-route vehicles around work area, site entrances/exits. ☐ Flaggers will be used and have DOT Flagger Training; police detail where appropriate or required. ☒ Park vehicles in secure location away from heavy equipment use or other site operations. ☐ Mark temporary roadways clearly, provide berms/stop logs where needed.
☐	RAILROAD/AIRPORT HAZARD	☐ Coordinate with rail company/airport and implement required safety measures ☐ Site workers to receive safety training for railroad/airport work.
☐	OFF-ROAD DRIVING, USE OF ALL-TERRAIN VEHICLE	☐ For off road driving, do not exceed capability of vehicle ☐ Follow ATV specific procedures for training, safety equipment, operation.
☐	TRANSPORTING MATERIALS, TOWING/HAULING LOADS	☐ Ensure load is firmly secured (rope, straps, load configuration) to prevent shifting during travel. ☐ For trailer use, verify signal/braking lights operational, rear-view mirrors effective, hitch/safety chains secure.
5. UTILITY-RELATED HAZARDS (for underground/overhead work) – CHECK IF NOT APPLICABLE: ☒		
Site-Specific Comments:		
☐	OVERHEAD UTILITIES	☐ Maintain proper clearance, employ other appropriate precautions for the conditions.

HAZARD		HAZARD CONTROLS (check all that apply and comment as required)	
☐	UNDERGROUND UTILITIES	☐ Confirm appropriate underground utility clearance procedures have been completed prior to ground penetrations, and employ other utility clearance/locator practices, as appropriate for conditions.	
6. ELECTRICAL HAZARDS – CHECK IF NOT APPLICABLE: ☒			
Site-Specific Comments:			
☐	WORKERS EXPOSED TO: ☐ Voltage < 50 v ☐ Voltage 50-600v ☐ Voltage > 600v ☐ AC ☐ DC ☐ 3-phase ☐ Battery and/or solar power ☐ Capacitor/Transformer	☐ Implement electrical safe work practices commensurate with the work to be performed, pertaining to the following (as applicable): - Worker training/qualification - Electrical equipment and hazards, safe design features - Electrical safe work practices - Grounding, use of GFCIs - Electrical equipment installation, operation, maintenance, repair - Arc flash protection - Electrical equipment diagnostics	
☐	BASIC ELECTRICAL HAZARDS ☐ Equipment/tool use/operation ☐ Use of extension cords	☐ Control water-related hazards, in a manner appropriate for the job tasks/equipment/tool. ☐ Use extension cords/power cords properly, prevent damage, take out of service if damaged. ☐ Inspect tool/equipment/extension cords/power cords before each use. ☐ Use GFCI-protected outlet or portable GFCI in wet locations, outdoors, basements ☐ Ensure live parts are guarded, enclosures secure. ☐ Enclosures, circuits properly labeled.	
☐	LOCKOUT/TAGOUT OF ELECTRICAL ENERGY	☐ Implement control-of-hazardous-energy practices (lockout/tagout), provide lockout/tagout locks and devices, training workers, designate “authorized” personnel, notify “affected” personnel	
7. FALL HAZARDS – CHECK IF NOT ANTICIPATED: ☐			
Site-Specific Comments:			
☒	WORKING AT HEIGHTS ☐ Roof, skylight ☐ Elevated platform ☒ Holes, side opening ☐ Retaining wall, cliff, ledge ☐ Trench, excavation ☐ Protruding rebar	☐ Ensure guardrails present ☐ Use personal fall apparatus (PFA) ☐ Use tether or positioning device ☒ Restrict access to hazard (barriers, tape, sign) ☐ Ensure covers in place over holes ☒ Watch person	☐ Use fall protection net ☐ Restrict access beneath work to protect other site personnel from overhead hazards ☐ Install caps on protruding rebar
☐	LADDERS / STAIRS ☐ Extension ladders ☐ Step ladders ☐ Fixed ladders ☐ Stairs	☐ Provide instruction/review pertaining to safe ladder use ☐ Extension ladders are properly footed, secured, setup at proper angle ☐ Stepladders are set on level ground or properly shimmed with spreaders locked. ☐ Stairs have proper rise over run and stairs >4 steps or 4' have guardrails. ☐ Never use a step ladder as a straight ladder. All straight ladders shall be extended three rungs past leading edge. Never use metal ladders while working with electricity.	
☐	AERIAL LIFT ☐ Scissor lift ☐ Extensible boom ☐ Articulated boom ☐ Vertical Lift ("Genie")	☐ Operators are sufficiently trained, experienced and qualified. ☐ Equipment is inspected after mobilization and is in good condition. ☐ Harness & Lanyard worn whenever operating the lift (scissor lifts may be excepted) ☐ Overhead and surface obstructions are reviewed with operators prior to use.	
☐	SCAFFOLD ☐ Supported scaffold ☐ Suspended scaffold ☐ Free-standing/mobile scaffold	☐ Identify/coordinate operations with competent person ☐ Supported scaffold level, stable, proper attachments, tiebacks, planking, ☐ Suspended scaffolds anchored properly ☐ Guardrails present above 10 feet or personal fall apparatus used. ☐ Proper means of accessing scaffold (proper ladders, stair tower). ☐ Total height of free-standing scaffold not to exceed four times the minimum base dimension.	
8. TOOLS, EQUIPMENT, MACHINERY – CHECK IF NOT APPLICABLE: ☒			
Site-Specific Comments:			
☐	HAND TOOLS Eye injury, puncture/bruise/ laceration hazard	☐ Use proper tool for the job, maintain tools in good condition (no damage, cutting tools sharp, etc.) use appropriate PPE for hand/eye/body protection, plan for safe “follow through” motion, use vise/clamp/work surface to hold/stabilize work piece	

	HAZARD	HAZARD CONTROLS (check all that apply and comment as required)
☐	POWER TOOLS ☐ Eye/hand/body injury ☐ Fuel-related hazards ☐ Inhalation hazard ☐ Noise ☐ Sparks, heat, fire hazard ☐ Electrical hazards	☐ For all power tools: - Inspect tools to ensure safe operating condition before each use. - Use tool in accordance with manufacturer's specifications. - Use PPE or other safety practices, as appropriate, for eye/hearing/hand/head/body protection - Provide training or verify operator qualification for use of power tool. - Stay clear of hazard zone, "line of fire" when working near where power tools are used. ☐ Use safety practices for refueling, fuel handling/transport/storage. ☐ Use respirators, ventilation, wet methods, other appropriate means to control inhalation hazard. ☐ For spark/heat generating tool, control fire hazards, segregate combustible/flammable materials. ☐ For electrical hazards, see # 6, "Electrical Hazards".
☐	WELDING, CUTTING ☐ Gas welding/cutting ☐ Arc welding/cutting	☐ Hot work permit system to be implemented. ☐ Operator properly protected (eye protection, clothing, apron, etc.) ☐ Fire hazard controls (watcher, fire extinguisher, water, isolate combustibles) ☐ Protect nearby personnel from hazardous UV, IR light (shielding, curtain) ☐ Electrical safe work practices for arc welding ☐ Gas cylinder safe practices (secured, upright, caps on when not in use, prevent damage).
☐	EQUIPMENT/MACHINERY ☐ Point-of-operation hazards ☐ Pinch points, moving parts ☐ 'Struck-by,' 'caught between' ☐ Hot surfaces, heat ☐ Extension cords, flexible wire ☐ Fuel related (gas or liquid) ☐ Hydraulic pressure ☐ Compressed air/gas ☐ Kinetic, stored energy ☐ Noise ☐ Lockout/tagout ☐ Emissions, discharge gases ☐ Working at heights, falls ☐ Lifting, repetitive motion ☐ Illumination ☐ Electrical (see below)	☐ *Working Near* Equipment/Machinery ☐ Work at safe distance/restrict access, ensure guards in place, heed warning signs ☐ Implement measures necessary for adequate illumination ☐ Control exposue to emission/discharge gases (ventilation, PPE, other means). ☐ Ensure safe practices for fuels/fluids/machine-related hazardous materials ☐ Use PPE or other safety practices for eye/hearing/hand/head/body protection ☐ Segregate combustible materials from hot surfaces/hot exhaust (minimum 3 feet) ☐ Operation/Maintenance/Repair of Equipment/Machinery (see applicable control measures above) ☐ Orient/locate equipment for safe access during operation and maintenance ☐ Use equipment/machinery in accordance with manufacturer's specifications ☐ Use safe lifting practices, minimize repetitive motion hazards ☐ Ensure point-of-operation, mechanical power transmission, other moving parts are guarded with protective devices; do not override interlocks, guards, protective devices ☐ Secure long hair/loose clothing/hanging jewelry near moving/rotating parts ☐ Ensure appropriate warning signs are in place and heeded ☐ Use safe practices for fueling, fuel transport & storage. ☐ Operate fuel-powered equipment in well ventilated location. ☐ Incorporate safety provisions/safe work practices for compressed air, pressurized systems (pneumatic/hydraulic), stored energy ☐ Implement control-of-hazardous-energy practices (lockout/tagout), designate "authorized" personnel, notify "affected" personnel ☐ Protect from fall hazards (safe ladder use, personal fall protection, guardrails, other) ☐
☐	ELECTRICAL HAZARDS	☐ Implement provisions of # 6, "Electrical Hazards"
9. MANUAL MATERIAL HANDLING, MATERIAL STORAGE – CHECK IF NOT APPLICABLE: ☐		
Site-Specific Comments:		
☒	LIFTING / ERGONOMIC Musculoskeletal strain, repetitive motion injury	☒ Use proper manual lifting techniques (straight back, bend at knees, firm grasp, firm footing). ☒ Seek assistance for lifting heavy objects (>50 lbs.) ☐ Use mechanical lifting equipment to reduce manual material handling hazard ☐ For repetitive motion activities, take breaks, switch hands, share task with others, employ other safe practices appropriate for the specific task(s).
☐	STORAGE OF MATERIALS See Sect. 12 for Chemical Storage	☐ Store materials in stable manner that prevents tipping, sliding, rolling, falling over. ☐ Materials stored in tiers to be stacked, racked, blocked, interlocked or otherwise secured to prevent sliding, falling or collapse ☐ Do not exceed load limits of racks, platform; ensure racks are stable, robust, secure ☐ On scaffold, do not store materials in excess of supplies needed for immediate use ☐ Ensure stored materials do not block aisles, passageways ☐ For used lumber, remove nails before stacking, and stack to be stable and self supporting, no higher than 20 feet (or 16 feet if lumber is to be handled manually) ☐ Debris will be removed regularly from storage area and place in designated area or disposed.
10. CONSTRUCTION OPERATIONS, HEAVY EQUIPMENT, HEAVY VEHICLES – CHECK IF NOT ANTICIPATED: ☒		
Site-Specific Comments:		

	HAZARD	HAZARD CONTROLS (check all that apply and comment as required)
☐	HEAVY EQUIPMENT; CONSTRUCTION VEHICLES Hazards: Struck By, Run-Over, Caught In Between (pinch points), Roll Over, Fluid Leaks	☐ Trained/qualified persons operate all heavy equipment. ☐ No passengers on moving/operating equipment except where passenger seat/restraint is present. ☐ Equipment inspected upon mobilization and daily; maintained in good repair, backup alarms ☐ All leaks or defective safety equipment will be repaired before use. ☐ Operators required to use seatbelts. ☐ Eye contact with operator and use of hand signals prior to approaching near equipment. ☐ High visibility vests are required of all personnel in work area. ☐ Max. safe slope for each vehicle will be followed. ☐ Personnel to stay clear of swing radius of equipment. ☐ Spill equipment available for fuel and hydraulic fluid leaks. ☐ Equipment locked, secured, brakes set, buckets/forks lowered, when not in use.
☐	CRANES Overhead hazards – utility lines, swing radius, falling objects, wire ropes and hoisting equipment ☐ Overbalancing – high winds, outrigger placement, overloading, safe slope ☐ Struck By, Run-Over, Caught In Between (pinch points), Roll Over, Fluid Leaks	**In addition to general safety practices for heavy equipment (above), as applicable:** ☐ Only qualified persons operate cranes (certificate required). ☐ A Critical Lift Plan & Checklist prepared/executed (HS 506) prior to mobilization. ☐ Equipment will be inspected prior to mobilization and a Crane Pre-Operational Safety Checklist (see EHS 506) will be completed and signed by crane operator. ☐ Crane operator will remain at the controls at all times during operation. ☐ Crane operation must be performed under the direction of an appointed signal person at all times. ☐ Communication between crane operator and signal person will be maintained through standard hand signals or voice communication equipment. Radio equipment, if used, will be equipped with a dedicated channel. ☐ Lifting or lowering will not exceed 100ft/minute. Lowering must be controlled i.e. no free fall. ☐ Stop work will be issued whenever hoisting equipment is exposed to high winds. ☐ Outriggers will be fully extended/locked with a firm footing within the maximum safe slope (<1%). ☐ Crane to be on level, stable base, dunnage used when necessary. ☐ Total weight of load not to exceed 50% of rated capacity for the crane radius and configuration. ☐ Rigging procedures – see Hoisting, Lifting, Rigging, below. ☐ Suspended personnel lifting is prohibited (unless per approved “man-lift” equipment). ☐ No personnel permitted beneath suspended loads.
☐	HOISTING, LIFTING, RIGGING ☐ Crane ☐ Drill rig ☐ Loader, excavator, etc. ☐ Mechanical, electrical hoist	☐ Identify, coordinate with competent person. ☐ Rigging directly to the forks of a lull, forklift, or front loader equipped forks is prohibited. ☐ Do not exceed loading limits of equipment. ☐ A Critical Lift Checklist (see EHS 506) will be completed and signed prior to crane mobilization. ☐ Rigging, wire rope and hoisting equipment will be inspected and maintained on a weekly basis. ☐ Crane hooks will be equipped with safety latches.
☐	FORKLIFT Hazards: Struck By, Run-Over, Caught In Between (pinch points), Roll Over, Fluid Leaks	**In addition to general safety practices for heavy equipment (above), as applicable:** ☐ Qualified operater, per established forklift training (certificate is required) ☐ Equipment inspected daily and documented on Forklift Preoperation Inspection Checklist ☐ Operators required to use seatbelts, and adhere to safe operating procedures. ☐ Do not exceed lifting load limits. ☐ Forklift shall not be moved/driven with empty forks in raised position. ☐ When not in use, forks lowered, brake set, controls in neutral, key removed.
☐	EXCAVATION/TRENCHING ☐ Max Depth ≥ 20' ☐ Max Depth ≥ 5' ☐ Max Depth <5' with potential cave-in hazard ☐ Potential permit-required confined space at depth ≥ 4' ☐ Underground utilities ☐ Overhead utilities ☐ Structures/foundations ☐ Falls into excavations	☐ Activities under supervision/oversight of competent person ☐ Sloping & shoring for excavations ≥20' are approved by a professional engineer ☐ Sloping & shoring for excavations ≥5' when persons are exposed to cave-in. ☐ Sloping & shoring for shallow (<5') excavations with cave-in hazard ☐ Excavations ≥ 4' are classified as a non-permit confined space ☐ Excavations ≥ 4' are classified as Alternate Entry or Permit-Required (see confined space) ☐ Implement underground utility clearance procedures. ☐ Hand digging within 3' of utility locations. ☐ Excavations to be protected by perimeter fencing (not barricade tape) ☐ Use trench boxes in accordance with proper procedures. ☐ Workers in trenches to be within 25 feet of ladder or sloped entryway.

	HAZARD	HAZARD CONTROLS (check all that apply and comment as required)
☐	DRILLING ☐ Struck By, Run-Over, Caught In Between (pinch points), Roll Over, Fluid Leaks ☐ Underground utilities, aboveground ☐ Spills ☐ See Equipment/Machinery	☐ Contractor inspects drill rig daily before use. ☐ Drill rig equipped with operational emergency stop. ☐ Highpressure lines equipped with whip checks. ☐ High visibility vests, hard hats are being worn near the equipment. ☐ Operators and helpers will maintain a safe distance to moving parts. Individuals working near moving or rotating parts will secure loose hair, clothing, and equipment. ☐ Drill rigs will only be moved with masts lowered. Masts will be erected with outriggers fully extended when equipped with outriggers. ☐ Max. safe slope for rig will be followed, drill rig leveled, appropriate blocking/cribbing as needed. ☐ Spinning parts of the rig are guarded when possible, no loose clothing being worn near the rig. ☐ Follow underground utility clearance procedures. ☐ Area is surveyed for overhead utilities, safe clearance distance maintained. ☐ Hearing protection is used when working near the rig. ☐ Spill equipment is available for fuel and hydraulic fluid leaks.
☐	DEMOLITION	☐ Develop/implement demolition safety plan
☐	BLASTING	☐ Develop/implement blasting safety plan
11. CONFINED SPACES, HAZARDOUS ENCLOSED or INDOOR SPACES – CHECK IF NOT APPLICABLE: ☒		
Site-Specific Comments: Manhole must not be entered by Geosyntec.		
☐	CONFINED SPACE(S) ☐ Permit required ☐ Non-permit required Potential/actual hazards: ☐ Atmospheric hazards: ☐ Flammable/explosive ☐ Oxygen deficiency ☐ Hydrogen sulfide ☐ Other toxic ☐ Combustible dust ☐ Electrical ☐ Mechanical, engulfment, entrapment, stored energy	☐ For personnel <u>working near confined</u> spaces: - Confined spaces have been identified, labeled. - Communication system in place to prevent unauthorized entry. ☐ For <u>permit-required confined space entry</u>, see separate entry permit. - All entrants, attendants, supervisors are trained/qualified. - Hazards properly characterized - Necessary equipment for safe entry utilized (access, retrieval, air monitoring) - Arrangements for rescue team have been made. ☐ For entry into a <u>non-permit</u> confined space, see site specific procedures delineated above in "site-specific comments," or see alternate/attached safety work plan.
☐	ENCLOSED/INDOOR SPACE(S) ☐ Outfall, culvert ☐ Tunnel, shaft, gallery ☐ Machine/equipment pit/vault ☐ Basement/Sub-basement ☐ Crawl space entry ☐ Indoor equipment/drilling	*<u>For indoor use of gasoline/propane/diesel equipment:</u>* ☐ Duct exhaust to outdoors, and/or introduce fresh air using ventilation/blowers/fans. ☐ Perform air monitoring (see section on Air Monitoring) *<u>For entry into potentially hazardous indoor or enclosed spaces:</u>* ☐ Ventilate and/or perform air monitoring for anticipated hazards. ☐ If space classified as confined space, follow confined space entry requirements (above).
12. COMMERCIAL CHEMICAL PRODUCTS USED AT WORK SITE – CHECK IF NOT APPLICABLE: ☒		
Site-Specific Comments:		
☐	PRODUCTS REGULATED BY HAZARD COMMUNICATION STANDARD	☐ Safety Data Sheets available, either on site or readily available within same work shift ☐ Containers labelled properly ☐ Workers trained on hazards ☐ For subcontractor use of chemical products, coordinate/discuss during safety meetings.
☐	COMPRESSED GAS(ES):	☐ Secure cylinders upright, caps on when not in use, handle with care, prevent damage ☐ Propane cylinders not in use must be stored outdoors in cage or similar secure enclosure. ☐ Ensure acetylene cylinders NOT secured to steel arc welding bench ☐ Store/use in a manner to prevent asphyxiation hazard ☐ Segregate oxygen and fuel gases by distance (20') or barrier ☐ Control ignition sources, no smoking signage ☐ Use/store in a manner to control inhalation exposure hazards, PPE, air monitoring.
☐	FLAMM./COMBUST. LIQ.	☐ Proper storage (flam. storage cabinets, other storage precautions) ☐ Control ignition sources ☐ Grounding and bonding where appropriate

	HAZARD	HAZARD CONTROLS (check all that apply and comment as required)
☐	CORROSIVES	☐ Handle with care, use appropriate eye/face/skin protection ☐ Eyewash, deluge shower, drench hose, hand washing (with water), as appropriate
☐	TOXIC	☐ For toxic substances, use/store in a manner to control exposure hazards (inhalation, ingestion, skin contact, skin absorption; use PPE as appropriate, conduct air monitoring as appropriate.
☐	CHEMICAL STORAGE	☐ Chemical storage cabinet, cage, storage room, or similar ☐ Incompatible chemicals segregated ☐ Secondary containment ☐ Safety equipment will be located near chemical storage.

13. CHEMICAL HAZARDS FROM ON-SITE CONTAMINANTS, OPERATIONS, EMISSIONS – CHECK IF N/A: ☐

Site-Specific Comments:

CHECK AS APPROPRIATE BELOW. PROVIDE ADDITIONAL INFO. AS APPROPRIATE, IN SITE-SPECIFIC HAZARD ANALYSIS ABOVE.

☒ Soil/groundwater contaminants (historical release)	☐ Oxygen deficiency	☐ Asbestos
☐ Recent release, known high concentrations	☒ Chlorinated VOCs (volatile org. cpds.)	☐ Lead paint
☐ Former chemical disposal site, landfill	☒ BTEX, petroleum derived VOCs	☐ Pesticides, herbicides, fungicides
☐ Urban fill, residual contaminants	☐ Fuel oils, petroleum, waste oil, lubricants	☐ Sensitizers
☐ Containerized waste (drums, process equipment)	☒ Metals, metal compounds, metal dusts	☐ Radioactive contaminants
☐ Buried drums (known or potential)	☐ Elemental mercury	☐ Other:
☐ Large containers, potential for spills	☒ Polyaromatic hydrocarbons (PAHs)	
☐ Emissions from active industrial processes	☒ Polychlorinated biphenyls (PCBs)	
☐ Emissions from welding/cutting/hot work	☐ Potential for flammable vapors	
☐ Carbon monoxide (vehicle/equipment exhaust)	☐ Potential for flammable gas (methane)	
☐ Contaminated building surfaces	☐ Corrosive, acids/caustics, strong irritants	
☐ Unexploded ordnance	☐ Sulfides, hydrogen sulfide (H2S)	
☐ Explosive dust	☐ Cyanides, hydrogen cyanide (HCN)	

☐ FOR SITE REGULATED AS "UNCONTROLLED HAZ. WASTE SITE," e.g. **REGULATED BY HAZWOPER** (OSHA 29 CFR 1910.120)

- Establish work zones & site control plan (Exclusion Zone - EZ, Contaminant Reduction Zone - CRZ, Support Zone - SZ)
- Workers to be aware of and trained on hazards per OSHA Hazard Communication Standard.
- Include site map/figure depicting work locations and other relevant site-specific information.
- Site workers in EZ or CRZ to have OSHA 40-hour training, current 8-hour refresher, 3 days supervised field expience.
- Site workers in EZ or CRZ to participate in Medical Monitoring program.
- "Peripheral" site workers, engaged on-site, with no hazardous exposure: 24 hr. training required.
- Site supervisor(s) required to have 8-hr. Supervisor training.
- Implement site-specific procedures for worker protection through engineering controls, work practices, personal protective equipment (PPE), air monitoring, decontamination, spill containment (see Sections B and C, "Health and Safety Equipment/Gear" and "Air Monitoring"
- Include emergency response program in H&S plan.

☒ FOR SITE WITH CHEMICAL CONTAMINANTS BUT **NOT REGULATED BY HAZWOPER**

- Workers to be aware of and trained on hazards per OSHA Hazard Communication Standard
- Implement appropriate controls to minimize worker exposure (engineering controls, work practices) to levels below OSHA PELs.
- Use PPE as needed (see B, "Health and Safety Equipment/Gear").
- Conduct air monitoring or personal air sampling to monitor and/or evaluate worker exposure (see Section C, "Air Monitoring").

☐ ATMOSPHERIC HAZARDS GENERATED BY EXHAUST FROM OPERATING EQUIPMENT

☐ Position work upwind of exhaust source
☐ Use blowers, fans to dissipate atmospheric hazards
☐ Conduct air monitoring (see Section C, "Air Monitoring").

☐	OFF-SITE MIGRATION OF CONTAMINANTS	☐ Implement controls to minimize hazard migration (dust suppression, covers, foam, etc.) ☐ Community/perimeter air monitoring is not anticipated with the current scope of work. ☐ Community/perimeter air monitoring to be conducted per perimeter air monitoring plan.

EMERGENCY RESPONSE **(911 Service is Available ☒ Yes ☐ No)** ☒ Verify wireless coverage at site, use alternate communication procedures as needed.

Emergency Medical Treatment - Hospital Name: Hospital Address:	St Joseph's Hospital 555 E. Market St Elmira NY 14901	**Number:**	607.733.6541
Urgent Care Med. Treatment - Clinic Name: Occupational Clinic Address:	Elmira Urgent Care 306 W. Water St., Elmira, NY 14905	**Number:**	607.732.1100

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PRE-WORK TASK HAZARD ANALYSIS (THA)

HAZARD	HAZARD CONTROLS (check all that apply and comment as required)		
Fire Department Name	West Elmira Fire Department	**Number:**	911
Spill Response:	West Elmira Fire Department	**Number:**	911
Client Representative Name::	Kevin Krueger	**Office Number:**	(651) 687-2210
		Cell Number:	
Geosyntec **Project Manager** Name:	Aron Krasnopoler	**Office Number:**	(410) 381-4333
		Cell Number:	(202)-550-7724
Geosyntec **Corporate H&S** Name:	Dale Prokopchak	**Office Number:**	804 332 6376
		Cell Number:	(804) 349-8067
Emergency Response Comments:			

Date:	
Project Name: Former Sperry Remington Site North	
THA Title: Stormwater Structure Inspection	
Subcontractor Name(s):	
Geosyntec Representative (reviewed by):	**Michael Hansen**
Subcontractor Foreman/Supervisor Signature (authorize):	
Crew Signatures (acknowledge):	
Print Name	**Signature**

PLEASE RETURN A COPY OF THIS SIGNED PAGE TO GEOSYNTEC PROJECT MGR., SUPERINTENDENT UPON REVIEW AND ACKOWLEDGMENT BY THE CREW MEMBERS. ALL NEW CREW MEMBERS SHALL BE ORIENTATED THE SAME AND A SUBMITTAL OF A NEW SIGN IN SHEET SHALL BE COMPLETED.

Appendix C: Summary of Chemical Hazards

Petroleum Hydrocarbons

Petroleum hydrocarbons likely at the site include tar and/or fuel-related materials in soils and sediments. Gasoline, diesel, oil, and heavier hydrocarbons, such as grease, may be present. Volatile components of gasoline include benzene, toluene, ethylbenzene, and xylenes (BTEX).

The primary exposure routes for petroleum hydrocarbons during site activities are inhalation, dermal contact, and ingestion of contaminated soil, sediment, dust, or water. Lighter petroleum hydrocarbons such as gasoline and benzene readily volatilize and are primarily an inhalation concern, whereas the primary route of exposure to heavier petroleum hydrocarbons such as aromatic hydrocarbons, oil, and grease is dermal contact. The target organs primarily affected by prolonged exposure to petroleum hydrocarbons are the respiratory system, central nervous system, kidneys, liver, and skin. Prolonged dermal contact with petroleum hydrocarbons can cause irritation or dermatitis. The BTEX compounds are known or suspected human carcinogens.

Petroleum hydrocarbons such as gasoline are also flammable and can be a physical hazard when present in high concentrations. Combustion of petroleum hydrocarbons can produce carbon dioxide, carbon monoxide, aldehydes, fumes, smoke (particulate matter) and other products of incomplete combustion. Intentional and inadvertent combustion of petroleum hydrocarbons is not expected during sampling activities; however, personnel will evacuate the area should a fire occur. The table below summarizes BTEX exposure limits.

Chemical Name	PEL[1]	TLV[2]
Benzene	1	0.5
Toluene	200	50
Ethylbenzene	100	100
Xylene	100	100

[1] OSHA Permissible Exposure Limit (in parts per million)
[2] ACGIH Threshold Limit Value (in parts per million)

Polycyclic Aromatic Hydrocarbons (PAHs)

PAHs are produced during combustion events due to inadequate oxidation of fuel. PAHs in the pure state are yellowish crystalline solids. They are found in coal tar and in products of incomplete combustion. These chemicals have varying degrees of potency for causing cancer, with benzo(a)pyrene being among the most potent. The PAHs are evaluated collectively as COAL TAR PITCH VOLATILES. Coal tar pitch volatiles may cause photo-sensitization and a rash where sunlight strikes the skin. Exposure may also cause cancer of lungs, skin, bladder or kidneys. Benzo(b)fluoranthene, benzo(j)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, chrysene, and indeno(1,2,3,c,d)pyrene have been identified as carcinogenic.

This information on PAH compounds is presented for site contaminant awareness. While the potential for site personnel sustaining significant inhalation exposures to volatilized PAH compounds during the site activities of this project is minimal, there is the potential for inhalation of PAH-contaminated dust, and handling of contaminated soils presents skin exposure hazards. Use of dust suppression techniques (as appropriate) and the proper use of the PPE will adequately protect personnel. Some significant PAH compounds include:

- Anthracene
- Benzo(a)pyrene Benzo(a)anthracene
- Chrysene Benzo(b)fluoranthene
- Fluoranthene Benzo(k)fluoranthene
- Fluorene Benzo(g,h,i)perylene
- Indeno(1,2,3,c,d)pyrene Benzo(d,e,f)phenanthrene
- Phenanthrene

OSHA PEL for coal tar pitch volatiles is 0.2 mg/m3 and NIOSH REL is 0.1 mg/m^3 , TLV 0.2 mg/m3 is for 8 hour time weighted average (TWA).

PCBs

PCBs are carcinogenic chlorinated hydrocarbons. Potential exposure routes are through inhalation, skin absorption, ingestion and skin or eye contact and may irritate eyes, cause acne, cause liver damage or have reproductive effects. Carcinogenic effects such as tumors and leukemia have been observed in animals. The OSHA permissible exposure limit (PEL) for 8-hour time-weighted average (TWA) is 1 mg/m^3 (skin). The NIOSH PEL is 0.001 mg/m^3.

RCRA Metals

These metals include arsenic, barium, cadmium, chrome, mercury, selenium, and silver. Heavy metals are known to cause neurologic effects (lead, mercury), kidney damage (cadmium), and respiratory damage (arsenic, cadmium). Oral and respiratory exposures should be minimized. The table below summarizes exposure limits.

Chemical Name	PEL[1]	TLV[2]
Arsenic	0.01	0.01
Lead	0.05	0.05
Mercury	0.01	0.25

[1] OSHA Permissible Exposure Limit (PEL) in parts per million
[2] ACGIH Threshold Limit Value (TLV) in parts per million

Chlorinated Solvents/Volatile Organic Compounds (VOCs)

Chlorinated VOCs are widely used as solvents in industrial operations such as degreasing, manufacturing, cleaning and dry cleaning, and are also present in household products and automotive fluids. They readily form vapors which can accumulate in indoor air spaces (i.e., via migration through the subsurface) and react with ozone to form sub-micron sized particles with the potential to cause adverse respiratory health effects. Free product releases (via surface or subsurface discharges or inadequate disposal) can migrate downward to significant depths and through fine-grained deposits to groundwater, and can persist as wide-scale sources of vapor plumes for long periods of time.

Several chlorinated hydrocarbons have been identified in soil, indoor air vapor, and groundwater at the site including perchloroethylene (PCE), trichloroethylene (TCE), and 1,2-dichloroethane (DCA). The likely routes of exposure to chlorinated solvents include inhalation, ingestion and direct contact with the skin or eye. The toxicity of chlorinated solvents varies; many affect the CNS and some are identified as carcinogens. PCE can affect the CNS and cause irritation of the skin, eyes, and upper respiratory tract. TCE can depress the CNS, affect kidneys, liver, and lungs and can cause rapid and irregular heartbeat. Toxic effects are increased when combined with alcohol, caffeine, and other drugs. DCA can cause CNS depression and damage to the liver, kidneys, heart, and digestive system. Eye contact with DCA can cause irritation and serious injury if not removed promptly. DCA and TCE are flammable liquids; the LEL of both solvents are approximately 6% and their flash points are less than 100°F. PCE is not considered flammable. These chlorinated solvents are only slightly soluble in water.

Exposure levels will be maintained below OSHA PEL or NIOSH REL as shown in the table below.

Chemical Name	PEL[1]	REL[2]
1,2 DCA	50	1
TCE	100	Ca
PCE	100	Ca

[1] OSHA Permissible Exposure Limit (PEL) in parts per million
[2] ACGIH Threshold Limit Value (TLV) in parts per million
Ca - Carcinogenic

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Appendix D: Air Monitoring

Applies to Task: ☒ ① ☐ ② ☐ ③ ☐ ④ ☐ ⑤ ☐ ⑥ ☐ ⑦ ☐ ⑧

☒ *Photoionization Detector (PID)*

Brand/Model No.: MiniRAE 3000 eV:10.6

Monitoring Frequency: Breathing Space

Breathing Zone Reading (ppm)	Action
____ to ____	Level D PPE
____ to ____	Level C PPE
Greater than __ Sustained at 50 ppmv	Stop work. Evacuate the area. If upon return, levels still exceed the action level, stop work and implement engineering controls.

Note: _____

☐ *Oxygen (O_2) Meter*

Brand/Model No.: _____

Monitoring Frequency: _____

Reading (%)	Action
Less than 19.5	Stop work. Evacuate the area.
19.5 to 23.5	Continue to work with caution.
Greater than 23.5	Stop work. Evacuate the area.

Note: _____

☐ *Explosimeter*

Brand/Model No.: _____

Monitoring Frequency: _____

Source (% LEL)

Reading	Action
1 to 10	Continue with caution.
Greater than 10	Stop work. Evacuate the area. If upon return, if concentration still exceeds 10% LEL, ventilate until concentration is back to <10% LEL.

Note: _____

☐ *Flame Ionization Detector (FID)*

Brand/Model No.: _____

Monitoring Frequency: _____

Breathing Zone Reading (ppm)	Action
____ to ____	Level D PPE
____ to ____	Level C PPE
Greater than _____	Stop work. Evacuate the area. If upon return, levels still exceed ___, stop work and implement engineering controls.

Note: _____

☐ *Chemical Detector Tube*

Brand/Model No.: _____

Monitoring Frequency: _____

Breathing Zone Reading (ppm)	Action
____ to ____	Level D PPE
____ to ____	Level C PPE
Greater than _____	Stop work. Evacuate the area. If upon return, levels still exceed ___, stop work and implement engineering controls.

Note: _____

☐ *Other*

Brand/Model No.: _____

Monitoring Frequency: _____

Breathing Zone Reading	Action
____ to ____	Level D PPE
____ to ____	Level C PPE
Greater than _____	Stop work. Evacuate the area. If upon return, levels still exceed ___, stop work and implement engineering controls.

Note: _____

Appendix E: Personal Protective Equipment

	Task ①	Task ②	Task ③	Task ④	Task ⑤	Task ⑥	Task ⑦	Task ⑧
Potential PPE Level per Task:	☒ D ☐ C	☒ D ☐ C	☒ D ☐ C	☒ D ☐ C	☒ D ☐ C	☐ D ☐ C	☐ D ☐ C	☐ D ☐ C

Modified Level D		***Level C***	
Equipment	***Material/Type***	***Equipment***	***Material/Type***
☒ Safety glasses		☐ Full-face air-purifying respirator	Cartridge Type:
☒ Hard-toed boots		☐ Half-mask air-purifying respirator	Cartridge Type:
☐ Protective clothing		☐ Safety glasses	
☒ Hard hat*		☐ Hard-toed boots	
☒ Hearing protection*		☐ Protective clothing	
☒ High-visibility vest*		☐ Hard hat	
☐ Outer boots*		☐ Hearing protection*	
☒ Outer gloves*	Nitrile, Leather	☐ High-visibility vest*	
☐ Other:		☐ Outer boots*	
		☐ Outer gloves*	
		☐ Inner gloves*	
		☐ Other:	

* PPE items may be downgraded (only with concurrence of SHSO and PM)

Appendix F: Safety Data Sheets

Included in this HASP	Chemical
☐	Acetone
☒	Alconox
☐	Ammonia
☒	Bentonite
☒	Diesel Fuel Oil No. 2-D
☐	Gasoline
☐	Helium
☐	Hexane
☒	Hydrochloric Acid
☐	Hydrogen
☒	Isobutylene Calibration Gas
☒	Isopropyl Alcohol
☐	KB-1
☐	Methane Calibration Gas
☒	Nitric Acid
☐	Permanganate
☐	Portland Cement
☐	Sulfuric Acid
☐	Other: _____
☐	Other: _____
☐	Other: _____
☐	Other: _____

Note: SDSs are for chemicals that used to perform project work, not site contaminants.

ALCONOX MSDS

Section 1 : MANUFACTURER INFORMATION

Product name: Alconox

Supplier: Same as manufacturer.

Manufacturer: Alconox, Inc.
30 Glenn St.
Suite 309
White Plains, NY 10603.

Manufacturer emergency phone number: 800-255-3924.
813-248-0585 (outside of the United States).

Manufacturer: Alconox, Inc.
30 Glenn St.
Suite 309
White Plains, NY 10603.

Supplier MSDS date: 2009/04/20

D.O.T. Classification: Not regulated.

Section 2 : HAZARDOUS INGREDIENTS

C.A.S.	CONCENTRATION %	Ingredient Name	T.L.V.	LD/50	LC/50
25155-30-0	10-30	SODIUM DODECYLBENZENESULFONATE	NOT AVAILABLE	438 MG/KG RAT ORAL 1330 MG/KG MOUSE ORAL	NOT AVAILABLE
497-19-8	7-13	SODIUM CARBONATE	NOT AVAILABLE	4090 MG/KG RAT ORAL 6600 MG/KG MOUSE ORAL	2300 MG/M3/2H RAT INHALATION 1200 MG/M3/2H MOUSE INHALATION
7722-88-5	10-30	TETRASODIUM PYROPHOSPHATE	5 MG/M3	4000 MG/KG RAT ORAL 2980 MG/KG MOUSE ORAL	NOT AVAILABLE
7758-29-4	10-30	SODIUM PHOSPHATE	NOT AVAILABLE	3120 MG/KG RAT ORAL 3100 MG/KG MOUSE ORAL >4640 MG/KG RABBIT DERMAL	NOT AVAILABLE

Section 2A : ADDITIONAL INGREDIENT INFORMATION

Note: (supplier).
CAS# 497-19-8: LD50 4020 mg/kg - rat oral.
CAS# 7758-29-4: LD50 3100 mg/kg - rat oral.

Section 3 : PHYSICAL / CHEMICAL CHARACTERISTICS

Physical state: Solid

Appearance & odor: Almost odourless.
White granular powder.

Odor threshold (ppm): Not available.

Vapour pressure (mmHg): Not applicable.

Vapour density (air=1): Not applicable.

By weight: Not available.

Evaporation rate (butyl acetate = 1): Not applicable.

Boiling point (°C): Not applicable.

Freezing point (°C): Not applicable.

pH: (1% aqueous solution).
9.5

Specific gravity @ 20 °C: (water = 1).
0.85 - 1.10

Solubility in water (%): 100 - > 10% w/w

Coefficient of water\oil dist.: Not available.

VOC: None

Section 4 : FIRE AND EXPLOSION HAZARD DATA

Flammability: Not flammable.

Conditions of flammability: Surrounding fire.

Extinguishing media: Carbon dioxide, dry chemical, foam.
Water
Water fog.

Special procedures: Self-contained breathing apparatus required.
Firefighters should wear the usual protective gear.

Auto-ignition temperature: Not available.

Flash point (°C), method: None

Lower flammability limit (% vol): Not applicable.

Upper flammability limit (% vol): Not applicable.

Not available.

Sensitivity to mechanical impact: Not applicable.

Hazardous combustion products: Oxides of carbon (COx).
Hydrocarbons.

Rate of burning: Not available.

Explosive power: None

Section 5 : REACTIVITY DATA

Chemical stability: Stable under normal conditions.

Conditions of instability: None known.

Hazardous polymerization: Will not occur.

Incompatible substances: Strong acids.
Strong oxidizers.

Hazardous decomposition products: See hazardous combustion products.

Section 6 : HEALTH HAZARD DATA

Route of entry: Skin contact, eye contact, inhalation and ingestion.

Effects of Acute Exposure

Eye contact: May cause irritation.

Skin contact: Prolonged contact may cause irritation.

Inhalation: Airborne particles may cause irritation.

Ingestion: May cause vomiting and diarrhea.
May cause abdominal pain.
May cause gastric distress.

Effects of chronic exposure: Contains an ingredient which may be corrosive.

LD50 of product, species & route: > 5000 mg/kg rat oral.

LC50 of product, species & route: Not available for mixture, see the ingredients section.

Exposure limit of material: Not available for mixture, see the ingredients section.

Sensitization to product: Not available.

Carcinogenic effects: Not listed as a carcinogen.

Reproductive effects: Not available.

Teratogenicity: Not available.

Mutagenicity: Not available.

Synergistic materials: Not available.

Medical conditions aggravated by exposure: Not available.

First Aid

Skin contact: Remove contaminated clothing.
Wash thoroughly with soap and water.
Seek medical attention if irritation persists.

Eye contact: Check for and remove contact lenses.
Flush eyes with clear, running water for 15 minutes while holding eyelids open: if irritation persists, consult a physician.

Inhalation: Remove victim to fresh air.
Seek medical attention if symptoms persist.

Ingestion: Dilute with two glasses of water.
Never give anything by mouth to an unconscious person.
Do not induce vomiting, seek immediate medical attention.

Section 7 : PRECAUTIONS FOR SAFE HANDLING AND USE

Leak / Spill: Contain the spill.
Recover uncontaminated material for re-use.
Wear appropriate protective equipment.
Contaminated material should be swept or shoveled into appropriate waste container for disposal.

Waste disposal: In accordance with municipal, provincial and federal regulations.

Handling procedures and equipment: Protect against physical damage.
Avoid breathing dust.
Wash thoroughly after handling.
Keep out of reach of children.
Avoid contact with skin, eyes and clothing.
Launder contaminated clothing prior to reuse.

Storage requirements: Keep containers closed when not in use.
Store away from strong acids or oxidizers.
Store in a cool, dry and well ventilated area.

Section 8 : CONTROL MEASURES

Precautionary Measures

Gloves / Type:

Neoprene or rubber gloves.

Respiratory / Type:

If exposure limit is exceeded, wear a NIOSH approved respirator.

Eye / Type:

Safety glasses with side-shields.

Footwear / Type: Safety shoes per local regulations.

Clothing / Type: As required to prevent skin contact.

Other / Type: Eye wash capability should be in close proximity.

Ventilation requirements: Local exhaust at points of emission.

Material Safety Data Sheet

Version 3.0
Revision Date 12/29/2008
Print Date 06/16/2009

1. PRODUCT AND COMPANY IDENTIFICATION

Product name : Bentonite

Product Number : 285234
Brand : Sigma-Aldrich

Company : Sigma-Aldrich Canada, Ltd
2149 Winston Park Drive
OAKVILLE ON L6H 6J8
CANADA
Telephone : +1 9058299500
Fax : +1 9058299292
Emergency Phone # : 800-424-9300

2. COMPOSITION/INFORMATION ON INGREDIENTS

Synonyms : Montmorillonite

Formula : H2Al2O6Si
Molecular Weight : 180.1 g/mol

CAS-No.	EC-No.	Index-No.	Concentration
Bentonite a colloidal clay. consist primarily of montmorillonite			
1302-78-9	215-108-5	-	-

3. HAZARDS IDENTIFICATION

Emergency Overview

Target Organs

Lungs

WHMIS Classification

Not WHMIS controlled. Not WHMIS controlled.

HMIS Classification

Health Hazard: 0
Chronic Health Hazard: *
Flammability: 0
Physical hazards: 0

Potential Health Effects

Inhalation May be harmful if inhaled. May cause respiratory tract irritation.
Skin May be harmful if absorbed through skin. May cause skin irritation.
Eyes May cause eye irritation.
Ingestion May be harmful if swallowed.

4. FIRST AID MEASURES

If inhaled
If breathed in, move person into fresh air. If not breathing give artificial respiration

In case of skin contact
Wash off with soap and plenty of water.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water.

5. FIRE-FIGHTING MEASURES

Flammable properties

Flash point	not applicable
Ignition temperature	no data available

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

Special protective equipment for fire-fighters
Wear self contained breathing apparatus for fire fighting if necessary.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions
Avoid dust formation.

Environmental precautions
Do not let product enter drains.

Methods for cleaning up
Sweep up and shovel. Keep in suitable, closed containers for disposal.

7. HANDLING AND STORAGE

Handling
Provide appropriate exhaust ventilation at places where dust is formed. Normal measures for preventive fire protection.

Storage
Keep container tightly closed in a dry and well-ventilated place.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Contains no substances with occupational exposure limit values.

Personal protective equipment

Respiratory protection
Respiratory protection is not required. Where protection from nuisance levels of dusts are desired, use type N95 (US) or type P1 (EN 143) dust masks. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Hand protection
For prolonged or repeated contact use protective gloves.

Eye protection
Safety glasses

Hygiene measures
General industrial hygiene practice.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance

Form	granules
Colour	grey, beige

Safety data

pH	6.0 - 9.0
Melting point	no data available
Boiling point	no data available
Flash point	not applicable
Ignition temperature	no data available
Lower explosion limit	no data available
Upper explosion limit	no data available
Density	2.400 g/cm3
Water solubility	no data available

10. STABILITY AND REACTIVITY

Storage stability
Stable under recommended storage conditions.

Materials to avoid
Strong acids

Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Aluminum oxide, silicon oxides

11. TOXICOLOGICAL INFORMATION

Acute toxicity

LD50 Intravenous - rat - 35 mg/kg
Remarks: Lungs, Thorax, or Respiration:Acute pulmonary edema.

Irritation and corrosion

no data available

Sensitisation

no data available

Chronic exposure

Carcinogenicity - mouse - Oral
Tumorigenic:Equivocal tumorigenic agent by RTECS criteria. Liver:Tumors.

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

Signs and Symptoms of Exposure

Lung irritation, Asthma

Potential Health Effects

Inhalation	May be harmful if inhaled. May cause respiratory tract irritation.
Skin	May be harmful if absorbed through skin. May cause skin irritation.
Eyes	May cause eye irritation.
Ingestion	May be harmful if swallowed.
Target Organs	Lungs,

Additional Information
RTECS: CT9450000

12. ECOLOGICAL INFORMATION

Elimination information (persistence and degradability)

no data available

Ecotoxicity effects

Toxicity to fish	LC50 - Oncorhynchus mykiss (rainbow trout) - 19,000 mg/l - 96 h

Further information on ecology

no data available

13. DISPOSAL CONSIDERATIONS

Product
Observe all federal, state, and local environmental regulations.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
Not dangerous goods

IMDG
Not dangerous goods

IATA
Not dangerous goods

15. REGULATORY INFORMATION

DSL Status
All components of this product are on the Canadian DSL list.

WHMIS Classification

Not WHMIS controlled.	Not WHMIS controlled.

16. OTHER INFORMATION

Further information
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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Co., shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale.

M A T E R I A L S A F E T Y D A T A S H E E T

SECTION 1 - PRODUCT AND COMPANY IDENTIFICATION

Company: AccuStandard, Inc.
125 Market Street
New Haven, CT 06513

Date MSDS Printed: 1/31/2008
Preparation Date: 1/31/2008
Information Phone Number: 203-786-5290
Emergency Phone Number: 203-786-5290
Hours: Mon. to Fri. 8am-5pm EDT

Catalog Number: **FU-009-D-40X**
Product Name: Diesel Fuel
Synonyms: N/A
Formula: N/A
Molecular Weight: N/A

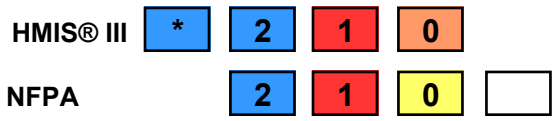
SECTION 2 - COMPOSITION / INFORMATION ON INGREDIENTS

Component(s) (1)	CAS #	Appr. %	ACGIH-TLV (mg/m3) TWA	ACGIH-TLV (mg/m3) STEL skin	OSHA-PEL (mg/m3) TWA	OSHA-PEL (mg/m3) STEL skin
#2 Diesel Fuel	68334-30-5	2.0				
Dichloromethane	75-09-2	98.00	174			

SECTION 3 - HAZARDS IDENTIFICATION

Health and Environmental Hazards/Symptoms of Exposure:

Exposure can cause headache, nausea, confusion, drowsiness, dizziness and/or vomiting. Causes depression of central nervous system. Effects may be delayed. Lachrymator. Suspect cancer hazard.



Potential Health Effects:

May be irritating to eyes.
May cause eye damage.
Irritating to skin.
May be harmful if absorbed through the skin.
May be irritating to mucous membrane and upper respiratory system.
May be harmful if inhaled.
Harmful if swallowed.

Routes of Entry:

Inhalation, ingestion or skin contact.

Carcinogenicity:

This product is or contains a component that is classified (ACGIH, IARC, NTP, OSHA) as a possible cancer hazard.

SECTION 4 - FIRST AID MEASURES

Emergency First Aid:

Get medical assistance for all cases of overexposure.
Skin contact: Immediately wash skin with soap and plenty of water. Remove contaminated clothing. Get medical attention if symptoms occur. Wash clothing before reuse.
Eye contact: Immediately flush with plenty of water. After initial flushing, remove contact lenses and continue flushing for at least 15 minutes. Assure adequate flushing by separating the eyelids with fingers.
Inhalation: Remove to fresh air. If not breathing, give artificial respiration or give oxygen by trained personnel. Seek immediate medical attention.
Ingestion: Do NOT induce vomiting. Call a physician or poison control center immediately. Never give anything by mouth to an unconscious person.

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SECTION 5 - FIRE FIGHTING MEASURES

Flammable Properties:

Flash Point: >230°F

Flammable Limits LEL (%): 12

Flammable Limits UEL (%): 23

Autoignition Temperature: 556°C

During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion.
Containers can build up pressure if exposed to heat.

Extinguishing Media:

Use alcohol foam, carbon dioxide, dry chemical, or water spray when fighting fires involving this material.

Fire Fighting Procedures:

As in any fire, wear self-contained breathing apparatus pressure demand, MSHA/NIOSH (approved or equivalent) and full protective

SECTION 6 - ACCIDENTAL RELEASE MEASURES

Spill Response:

Wear a self-contained breathing apparatus and appropriate personal protection. Stop leak if you can do so without risk. Ventilate area. Neutralize spill with soda ash or lime. Take up and containerize for proper disposal. Flush spill area with water. Keep combustibles away from spilled material. Comply with Federal, State, and local regulations.

SECTION 7 - HANDLING AND STORAGE

Store in a tightly closed container.

Store in a cool dry, well-ventilated area away from ignition sources.

Avoid breathing vapors or mists.

Use with adequate ventilation.

Do not get in eyes, on skin or clothing.

Avoid prolonged or repeated exposure.

This product should only by used by persons trained in the safe handling of hazardous chemicals.

SECTION 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering Controls and Personal Protection Equipment (PPE):

Respiratory Protection: If workplace exposure limit(s) of product or any component is exceeded (see TLV/PEL), a NIOSH/MSHA approved air supplied respirator is advised in absence of proper environmental control. OSHA regulations also permit other NIOSH/MSHA respirators (negative pressure type) under specified conditions (see your safety equipment supplier). Engineering and/or administrative controls should be implemented to reduce exposure.

Material must be handled or transferred in an approved fume hood or with equivalent ventilation.

Protective gloves must be worn to prevent skin contact.

(Polyethylene, polyvinyl chloride (PVC) or equivalent)

Safety glasses with side shields must be worn at all times.

General Hygiene Considerations:

Wash thoroughly after handling. Do not take internally. Eye wash and safety equipment should be readily available.

SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES

Appearance: Clear liquid

Odor: Ether-like odor

pH: N/A

Vapor Pressure: 353 mmHg (20 °C)

Vapor Density (Air = 1): 2.93 g/L

Boiling Point: 40 °C

Melting Point: -97 °C

Solubility in Water (%): Slight (1.3%)

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Specific Gravity (H_2O = 1): 1.326 g/cm3
Flash Point: >230°F
Explosion Limits (%): 12 to 23
Autoignition Temperature: 556°C
Percent Volatile: 99+
Evaporation Rate (BuAc = 1): 27.5
Molecular Weight: N/A
Molecular Formula: N/A

SECTION 10 - STABILITY AND REACTIVITY

Stability: Stable

Conditions To Avoid: Contact with ignition sources
Materials To Avoid: Bases
Oxidizers
Alkali metals; Aluminum, magnesium, sodium, potassium and lithium

Hazardous Decomposition: Hydrogen chloride gas (HCl); Phosgene; Chlorine
Hazardous Polymerization: Will not occur

SECTION 11 - TOXICOLOGICAL INFORMATION

See section 3 for specific toxicological information for the ingredients of this product.

SECTION 12 - ECOLOGICAL INFORMATION

By complying with sections 6 and 7 there will be no release to the environment.

SECTION 13 - DISPOSAL CONSIDERATIONS

Recycle or incinerate at any EPA approved facility or dispose in compliance with Federal, State and local regulations. Empty containers must be triple-rinsed prior to disposal.

SECTION 14 - TRANSPORT INFORMATION

DOT UN Number: UN1593 Shipping Class: 6.1 Packing Group: III POISON

SECTION 15 - REGULATORY INFORMATION

In addition to Federal and state regulations, local regulations may apply. Check with your local regulatory authorities.

All components are listed on the TSCA Inventory. **For laboratory, research and development use only. Not for manufacturing or commercial purposes.**
WARNING: This product contains chemical(s) known to the state of California to cause cancer.

SECTION 16 - OTHER INFORMATION

This document has been designed to meet the requirements of OSHA, ANSI and CHIPs regulations.

The statements contained herein are offered for informational purposes only and are based on technical data that we believe to be accurate. It is intended for use only by persons having the necessary technical skill and at their own discretion and risk. Since conditions and manner of use are outside our control, we make

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NO WARRANTY, EXPRESSED OR IMPLIED, OF MERCHANTABILITY, FITNESS OR OTHERWISE.

Legend : N/A = Not Available ND = Not Determined NR = Not Regulated

* * * End of Document * * *

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Material Safety Data Sheet
Hydrochloric acid

MSDS# 94460

Section 1 - Chemical Product and Company Identification

MSDS Name:	Hydrochloric acid
Catalog Numbers:	SA5-5, SA50-1, SA50-20, SA50-4, SA52-20, SA52-500, SA54-1, SA54-10, SA54-20, SA54-4, SA60-1, SA62-1
Synonyms:	Chlorohydric acid; Hydrogen chloride; Muriatic acid; Spirits of salt; Hydrochloride.

Company Identification:	Fisher Scientific One Reagent Lane Fair Lawn, NJ 07410
For information in the US, call:	201-796-7100
Emergency Number US:	201-796-7100
CHEMTREC Phone Number, US:	800-424-9300

Section 2 - Composition, Information on Ingredients

Risk Phrases: 34 37

CAS#:	7647-01-0
Chemical Name:	Hydrochloric acid
%:	<2.0
EINECS#:	231-595-7
Hazard Symbols:	C

Risk Phrases:

CAS#:	7732-18-5
Chemical Name:	Water
%:	>98
EINECS#:	231-791-2
Hazard Symbols:	

Text for R-phrases: see Section 16

Hazard Symbols:	None listed
Risk Phrases:	None listed

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Warning! May cause eye, skin, and respiratory tract irritation. Target Organs: No data found.

Potential Health Effects

Eye:	May cause eye irritation.
Skin:	May cause skin irritation.
Ingestion:	May cause irritation of the digestive tract.
Inhalation:	May cause respiratory tract irritation. Exposure to the mist and vapor may erode exposed teeth.
Chronic:	Prolonged or repeated skin contact may cause dermatitis. Repeated exposure may cause erosion of teeth. Repeated exposure to low concentrations of HCl vapor or mist may cause bleeding of nose and gums. Chronic bronchitis and gastritis have also been reported.

Section 4 - First Aid Measures

Eyes: In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical aid.

Skin: In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Get medical aid immediately. Wash clothing before reuse.

Ingestion: If swallowed, do NOT induce vomiting. Get medical aid immediately. If victim is fully conscious, give a cupful of water. Never give anything by mouth to an unconscious person.

Inhalation: If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.

Notes to Physician: Treat symptomatically and supportively.

Section 5 - Fire Fighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Not flammable, but reacts with most metals to form flammable hydrogen gas. Use water spray to keep fire-exposed containers cool. Containers may explode when heated.

Extinguishing Media: Substance is nonflammable; use agent most appropriate to extinguish surrounding fire.

Autoignition Temperature: Not applicable.

Flash Point: Not applicable.

Explosion Limits: Lower: Not available

Explosion Limits: Upper: Not available

NFPA Rating: health: 1; flammability: 0; instability: 1;

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.

Spills/Leaks: Avoid runoff into storm sewers and ditches which lead to waterways. Clean up spills immediately, observing precautions in the Protective Equipment section. Provide ventilation. Cover with dry earth, dry sand, or other non-combustible material followed with plastic sheet to minimize spreading and contact with water.

Section 7 - Handling and Storage

Handling: Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Use only in a well-ventilated area. Avoid contact with eyes, skin, and clothing. Keep container tightly closed. Avoid ingestion and inhalation. Discard contaminated shoes.

Storage: Store in a tightly closed container. Store in a cool, dry, well-ventilated area away from incompatible substances. Do not store in metal containers. Store away from alkalies.

Section 8 - Exposure Controls, Personal Protection

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Hydrochloric acid	2 ppm Ceiling	50 ppm IDLH	5 ppm Ceiling; 7 mg/m3 Ceiling
Water	none listed	none listed	none listed

OSHA Vacated PELs: Hydrochloric acid: None listed Water: None listed

Engineering Controls:

Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate general or local exhaust ventilation to keep airborne concentrations below the permissible exposure limits.

Exposure Limits

Personal Protective Equipment

Eyes: Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin:	Wear neoprene or polyvinyl chloride gloves to prevent exposure.
Clothing:	Wear appropriate protective clothing to prevent skin exposure.
Respirators:	A respiratory protection program that meets OSHA's 29 CFR 1910.134 and ANSI Z88.2 requirements or European Standard EN 149 must be followed whenever workplace conditions warrant respirator use.

Section 9 - Physical and Chemical Properties

Physical State:	Clear liquid
Color:	colorless to slight yellow
Odor:	Not available
pH:	0.10 (1.0N soln)
Vapor Pressure:	Not available
Vapor Density:	Not available
Evaporation Rate:	Not available
Viscosity:	Not available
Boiling Point:	Not available
Freezing/Melting Point:	Not available
Decomposition Temperature:	Not available
Solubility in water:	Soluble
Specific Gravity/Density:	Not available.
Molecular Formula:	HCl
Molecular Weight:	36.46

Section 10 - Stability and Reactivity

Chemical Stability:	Stable under normal temperatures and pressures.
Conditions to Avoid:	Excess heat.
Incompatibilities with Other Materials	Bases.
Hazardous Decomposition Products	Hydrogen chloride.
Hazardous Polymerization	Will not occur.

Section 11 - Toxicological Information

RTECS#:	CAS# 7647-01-0: MW4025000 MW4031000 CAS# 7732-18-5: ZC0110000
LD50/LC50:	RTECS: **CAS# 7647-01-0:** Inhalation, mouse: LC50 = 1108 ppm/1H; Inhalation, mouse: LC50 = 20487 mg/m3/5M; Inhalation, mouse: LC50 = 3940 mg/m3/30M; Inhalation, mouse: LC50 = 8300 mg/m3/30M; Inhalation, rat: LC50 = 3124 ppm/1H; Inhalation, rat: LC50 = 60938 mg/m3/5M; Inhalation, rat: LC50 = 7004 mg/m3/30M; Inhalation, rat: LC50 = 45000 mg/m3/5M; Inhalation, rat: LC50 = 8300 mg/m3/30M; Oral, rabbit: LD50 = 900 mg/kg; . RTECS: **CAS# 7732-18-5:** Oral, rat: LD50 = >90 mL/kg; .
Carcinogenicity:	Hydrochloric acid - IARC: Group 3 (not classifiable) Water - Not listed as a carcinogen by ACGIH, IARC, NTP, or CA Prop 65.
Other:	Rinsed with water test: Administration into the eye (rabbit) = 5 mg/30sec (Mild).

Section 12 - Ecological Information

Ecotoxicity:	Fish: Bluegill/Sunfish: 3.6 mg/L; 48 Hr; Lethal (unspecified) Fish: Bluegill/Sunfish: LD50; 96 Hr; pH 3.0-3.5

Section 13 - Disposal Considerations

Dispose of in a manner consistent with federal, state, and local regulations.

Section 14 - Transport Information

US DOT
Shipping Name: HYDROCHLORIC ACID
Hazard Class: 8
UN Number: UN1789
Packing Group: II
Canada TDG
Shipping Name: Not regulated as a hazardous material
Hazard Class:
UN Number:
Packing Group:

USA RQ: CAS# 7647-01-0: 5000 lb final RQ; 2270 kg final RQ

Section 15 - Regulatory Information

European/International Regulations

European Labeling in Accordance with EC Directives

Hazard Symbols:Not available

Risk Phrases:

Safety Phrases:

S 24/25 Avoid contact with skin and eyes.

WGK (Water Danger/Protection)

CAS# 7647-01-0: 1

CAS# 7732-18-5: Not available

Canada

CAS# 7647-01-0 is listed on Canada's DSL List

CAS# 7732-18-5 is listed on Canada's DSL List

Canadian WHMIS Classifications: Not controlled.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

CAS# 7647-01-0 is listed on Canada's Ingredient Disclosure List

CAS# 7732-18-5 is not listed on Canada's Ingredient Disclosure List.

US Federal

TSCA

CAS# 7647-01-0 is listed on the TSCA Inventory.

CAS# 7732-18-5 is listed on the TSCA Inventory.

Section 16 - Other Information

MSDS Creation Date: 12/19/2007

Revision #2 Date 7/20/2009

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantibility or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall the company be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential, or exemplary damages howsoever arising, even if the company has been advised of the possibility of such damages.

MATERIAL SAFETY DATA SHEET
29 CFR 1910.1200 OSHA Hazard
Communication Rule Format
Chem-Tel 24 Hour Emergency # 1-800-255-3924

MINE SAFETY APPLIANCES COMPANY
P.O. Box 426
Pittsburgh, PA 15230
PHONE (412) 967-3000

This product contains isobutylene, oxygen and nitrogen, substances subject to the Pennsylvania Worker and Community Right-To-Know Act.

PRODUCT IDENTITY

LABEL IDENTITY - MSA P/N 10028038 Calibration Check Gas, 100 ppm Isobutylene in Air

CHEMICAL NAME - Isobutylene, Oxygen, Nitrogen Mixture

ADDITIONAL IDENTITIES - MSA P/N 10028038 Calibration Gas

FORMULA - C_4H_8 in Air

APPLICABLE CHEMICAL CONTENTS

	ppm	TWA
Isobutylene (CAS 115-11-7)	100	None
Air	Balance	None

NOTE: Gas under pressure, 1000 PSIG at 70°F, Approx. 100 Liters gas at atmospheric pressure

PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE AND ODOR - Colorless odorless gas.

BOILING POINT - N/A

SPECIFIC GRAVITY (H_2O = 1) - N/A

VAPOR PRESSURE - N/A

PERCENT VOLATILE BY VOLUME - N/A

VAPOR DENSITY (AIR = 1) - > 1

SOLUBILITY IN WATER - Isobutylene - Insoluble
Oxygen - 3.2 cm^3/100 ml (25°C)
Nitrogen - 2.3 cm^3/100 ml (0°C)

N/A - Not Applicable

PHYSICAL HAZARD INFORMATION

PHYSICAL HAZARD - Compressed gas, 1000 PSIG at 70°F

CONDITIONS OR MATERIALS TO AVOID - None

FLASH POINT - N/A LEL - N/A UEL - N/A

EXTINGUISHING MEDIA - This calibration gas mixture is not flammable. Use extinguishing media appropriate to surrounding fire.

SPECIAL FIRE FIGHTING PROCEDURES - See Next Item

UNUSUAL FIRE AND EXPLOSION HAZARDS - Gas under pressure, 1000 PSIG at 70°F. Do not exceed 120°F.

HEALTH HAZARDS

HEALTH HAZARDS - None Known for 100 ppm Isobutylene in Air. Isobutylene Inhalation Rat LC50: 620 Gm/M^3/4H. Isobutylene Inhalation Mouse LC50: 415 gm/M^3/2H.

SIGNS AND SYMPTOMS OF EXPOSURE - N/A to this gas mixture.

PRIMARY ROUTES OF ENTRY - Inhalation

TARGET ORGANS - Isobutylene is an asphyxiant, which displaces oxygen in the environment..

MEDICAL CONDITIONS GENERALLY RECOGNIZED AS BEING AGGRAVATED BY EXPOSURE - No information

EXPOSURE LIMITS - None (ACGIH 2009)

CARCINOGENICITY DATA - Component gases are not listed by NIOSH RTECS, OSHA, NTP or IARC.

EMERGENCY AND FIRST AID PROCEDURES - None

SAFE HANDLING AND USE

HYGIENIC PRACTICES - Avoid breathing gas.

PROTECTIVE MEASURES DURING REPAIR AND MAINTENANCE OF CONTAMINATED EQUIPMENT - N/A

PROCEDURES FOR SPILL OR LEAK CLEANUP - Ventilate area

WASTE DISPOSAL - Do not puncture or incinerate cylinder. Before discarding cylinder, slowly release contents to a safe exhaust. Dispose of cylinder in accordance with local, state and federal regulations

STORAGE - Store in a cool, dry, well-ventilated area. Do not exceed 120°F.

CONTROL MEASURES

PERSONAL PROTECTIVE EQUIPMENT - Due to the limited amount of gas in the cylinder, and the low release rate employed in instrument calibration, respiratory protection is not indicated under conditions of intended use.

ENGINEERING CONTROLS - Mechanical ventilation is suitable.

WORK PRACTICES - Avoid breathing gas. Use in well-ventilated areas. Follow the calibration procedure detailed in the MSA instruction manual provided with the instrument under calibration.

DATE OF PREPARATION - Rev. 2, April 2009

WARNING: This is a hazardous chemical product. By following the directions and warnings provided with this product, the hazards associated with the use of this product can be greatly reduced but never entirely eliminated. Mine Safety Appliances Company makes no warranties, expressed or implied, with respect to this product and EXPRESSLY DISCLAIMS THE WARRANTY OF MERCHANTABILITY AND ANY WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE. Users assume all risks in handling, using or storing this product.

Fisher Scientific

Material Safety Data Sheet

Isopropyl alcohol 70% in water

MSDS# 89530

Section 1 - Chemical Product and Company Identification

MSDS Name:	Isopropyl alcohol 70% in water
Catalog Numbers:	AC613190040, AC613245000, A459-1, A459-20, A459-4, A459-500, NC9761180
Synonyms:	Isopropanol; Dimethylcarbinol; sec-Propyl alcohol; Rubbing alcohol; Petrohol; 1-Methylethanol; 1-Methylethyl alcohol; 2-Hydroxypropane; 2-Propyl alcohol; Isopropyl alcohol; Propan-2-ol; IPA; 2-Propanol.
Company Identification:	Fisher Scientific One Reagent Lane Fair Lawn, NJ 07410
For information in the US, call:	201-796-7100
Emergency Number US:	201-796-7100
CHEMTREC Phone Number, US:	800-424-9300

Section 2 - Composition, Information on Ingredients

Risk Phrases: 11 36 67

CAS#:	67-63-0
Chemical Name:	Isopropyl alcohol
%:	70
EINECS#:	200-661-7
Hazard Symbols:	F Xi

Risk Phrases:

CAS#:	7732-18-5
Chemical Name:	Water
%:	30
EINECS#:	231-791-2
Hazard Symbols:	

Text for R-phrases: see Section 16

Hazard Symbols: Xi F

Risk Phrases: 11 36 67

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Warning! Flammable liquid and vapor. Prolonged or repeated contact causes defatting of the skin with irritation, dryness, and cracking. May cause central nervous system depression. Aspiration hazard if swallowed. Can enter lungs and cause damage. Breathing vapors may cause drowsiness and dizziness. Causes eye and respiratory tract irritation. Target Organs: Central nervous system, respiratory system, eyes, skin.

Potential Health Effects

Eye:	Produces irritation, characterized by a burning sensation, redness, tearing, inflammation, and possible corneal injury. May cause transient corneal injury.
Skin:	May cause irritation with pain and stinging, especially if the skin is abraded. Isopropanol has a low potential to cause allergic skin reactions; however, rare cases of allergic contact dermatitis have been reported. May be absorbed through intact skin.
Ingestion:	Causes gastrointestinal irritation with nausea, vomiting and diarrhea. May cause kidney damage. May cause central nervous system depression, characterized by excitement, followed by headache, dizziness, drowsiness, and nausea. Advanced stages may cause collapse, unconsciousness, coma and possible death due to respiratory failure. Aspiration of material into the lungs may cause chemical pneumonitis, which may be fatal.
Inhalation:	Inhalation of high concentrations may cause central nervous system effects characterized by nausea, headache, dizziness, unconsciousness and coma. May cause narcotic effects in high concentration. Causes upper respiratory tract irritation. Inhalation of vapors may cause drowsiness and dizziness.
Chronic:	Prolonged or repeated skin contact may cause defatting and dermatitis.

Section 4 - First Aid Measures

Eyes:	In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical aid.
Skin:	In case of contact, flush skin with plenty of water. Remove contaminated clothing and shoes. Get medical aid if irritation develops and persists. Wash clothing before reuse.
Ingestion:	Potential for aspiration if swallowed. Get medical aid immediately. Do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If vomiting occurs naturally, have victim lean forward.
Inhalation:	If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.
Notes to Physician:	Urine acetone test may be helpful in diagnosis. Hemodialysis should be considered in severe intoxication. Treat symptomatically and supportively.

Section 5 - Fire Fighting Measures

General Information:	As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Vapors may form an explosive mixture with air. Use water spray to keep fire-exposed containers cool. Flammable liquid and vapor. Vapors are heavier than air and may travel to a source of ignition and flash back. Vapors can spread along the ground and collect in low or confined areas.
Extinguishing Media:	Water may be ineffective. Do NOT use straight streams of water. For large fires, use dry chemical, carbon dioxide, alcohol-resistant foam, or water spray. For small fires, use carbon dioxide, dry chemical, dry sand, or alcohol-resistant foam. Cool containers with flooding quantities of water until well after fire is out.

Autoignition Temperature: 399 deg C (750.20 deg F)

Flash Point: 18 deg C (64.40 deg F)

Explosion Limits: Lower: 2.0 vol %

Explosion Limits: Upper: 12.7 @ 93.3°C

NFPA Rating: health: 1; flammability: 3; instability: 0;

Section 6 - Accidental Release Measures

General Information:	Use proper personal protective equipment as indicated in Section 8.
Spills/Leaks:	Absorb spill with inert material (e.g. vermiculite, sand or earth), then place in suitable container. Use water spray to dilute spill to a non-flammable mixture. Clean up spills immediately, observing precautions in the Protective Equipment section. Remove all sources of ignition. Use a spark-proof tool. Provide ventilation. A vapor suppressing foam may be used to reduce vapors.

Section 7 - Handling and Storage

Handling:	Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Ground and bond containers when transferring material. Use spark-proof tools and explosion proof equipment. Avoid contact with eyes, skin, and clothing. Empty containers retain product residue, (liquid and/or vapor), and can be dangerous.

Take precautionary measures against static discharges. Keep container tightly closed. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose empty containers to heat, sparks or open flames. Use only with adequate ventilation. Avoid breathing vapor or mist.

Storage: Keep away from sources of ignition. Store in a tightly closed container. Keep from contact with oxidizing materials. Store in a cool, dry, well-ventilated area away from incompatible substances.

Section 8 - Exposure Controls, Personal Protection

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Isopropyl alcohol	200 ppm; 400 ppm STEL	400 ppm TWA; 980 mg/m3 TWA 2000 ppm IDLH (10% LEL)	400 ppm TWA; 980 mg/m3 TWA
Water	none listed	none listed	none listed

OSHA Vacated PELs: Isopropyl alcohol: 400 ppm TWA; 980 mg/m3 TWA Water: None listed

Engineering Controls:

Use explosion-proof ventilation equipment. Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate general or local exhaust ventilation to keep airborne concentrations below the permissible exposure limits.

Exposure Limits

Personal Protective Equipment

Eyes: Wear chemical splash goggles.

Skin: Wear appropriate protective gloves to prevent skin exposure.

Clothing: Wear appropriate protective clothing to prevent skin exposure.

Respirators: A respiratory protection program that meets OSHA's 29 CFR 1910.134 and ANSI Z88.2 requirements or European Standard EN 149 must be followed whenever workplace conditions warrant respirator use.

Section 9 - Physical and Chemical Properties

Physical State: Liquid

Color: colorless

Odor: alcohol-like

pH: Not available

Vapor Pressure: 33 mm Hg @ 20 deg C

Vapor Density: 2.1 (Air=1)

Evaporation Rate: 1.7 (n-butyl acetate=1)

Viscosity: 2.27 mPas @ 20 deg C

Boiling Point: 82 deg C @ 760 mm Hg (179.60°F)

Freezing/Melting Point: -88 deg C (-126.40°F)

Decomposition Temperature: Not available

Solubility in water: Miscible

Specific Gravity/Density: 0.7850 (water=1)

Molecular Formula: C3H8O

Molecular Weight: 60.09

Section 10 - Stability and Reactivity

Chemical Stability: Stable.

Conditions to Avoid: Ignition sources, excess heat.

Incompatibilities with Other Materials: Strong oxidizing agents, strong acids, strong bases, amines, ammonia, ethylene oxide, isocyanates, acetaldehyde, chlorine, phosgene, Attacks some forms of plastics, rubbers, and coatings., aluminum at high temperatures.

Hazardous Decomposition Products: Carbon monoxide, carbon dioxide.

Hazardous Polymerization: Will not occur.

Section 11 - Toxicological Information

RTECS#: CAS# 67-63-0: NT8050000
CAS# 7732-18-5: ZC0110000

RTECS:
CAS# 67-63-0: Draize test, rabbit, eye: 100 mg Severe;
Draize test, rabbit, eye: 10 mg Moderate;
Draize test, rabbit, eye: 100 mg/24H Moderate;
Draize test, rabbit, skin: 500 mg Mild;
Inhalation, mouse: LC50 = 53000 mg/m3;
Inhalation, rat: LC50 = 16000 ppm/8H;
Inhalation, rat: LC50 = 72600 mg/m3;
Oral, mouse: LD50 = 3600 mg/kg;
Oral, mouse: LD50 = 3600 mg/kg;
Oral, rabbit: LD50 = 6410 mg/kg;
Oral, rat: LD50 = 5045 mg/kg;
Oral, rat: LD50 = 5000 mg/kg;
Skin, rabbit: LD50 = 12800 mg/kg;

LD50/LC50:

RTECS:
CAS# 7732-18-5: Oral, rat: LD50 = >90 mL/kg;

Carcinogenicity: Isopropyl alcohol - IARC: Group 3 (not classifiable)
Water - Not listed as a carcinogen by ACGIH, IARC, NTP, or CA Prop 65.

Other: See actual entry in RTECS for complete information.

Section 12 - Ecological Information

Ecotoxicity: Fish: Fathead Minnow: >1000 ppm; 96h; LC50
Daphnia: >1000 ppm; 96h; LC50
Fish: Gold orfe: 8970-9280 ppm; 48h; LC50

Section 13 - Disposal Considerations

Dispose of in a manner consistent with federal, state, and local regulations.

Section 14 - Transport Information

US DOT
Shipping Name: ISOPROPANOL
Hazard Class: 3
UN Number: UN1219
Packing Group: II
Canada TDG
Shipping Name: ISOPROPANOL
Hazard Class: 3
UN Number: UN1219
Packing Group: II

Section 15 - Regulatory Information

European/International Regulations

European Labeling in Accordance with EC Directives

Hazard Symbols: XI F

Risk Phrases:

R 11 Highly flammable.

R 36 Irritating to eyes.

R 67 Vapours may cause drowsiness and dizziness.

Safety Phrases:

S 7 Keep container tightly closed.

S 16 Keep away from sources of ignition - No smoking.

S 24/25 Avoid contact with skin and eyes.

S 26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.

WGK (Water Danger/Protection)

CAS# 67-63-0: 1

CAS# 7732-18-5: Not available

Canada

CAS# 67-63-0 is listed on Canada's DSL List

CAS# 7732-18-5 is listed on Canada's DSL List

Canadian WHMIS Classifications: B2, D2B

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

CAS# 67-63-0 is listed on Canada's Ingredient Disclosure List

CAS# 7732-18-5 is not listed on Canada's Ingredient Disclosure List.

US Federal

TSCA

CAS# 67-63-0 is listed on the TSCA Inventory.

CAS# 7732-18-5 is listed on the TSCA Inventory.

Section 16 - Other Information

MSDS Creation Date: 7/27/1999

Revision #12 Date 7/20/2009

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantibility or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall the company be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential, or exemplary damages howsoever arising, even if the company has been advised of the possibility of such damages.

Material Safety Data Sheet

Version 3.0
Revision Date 05/12/2009
Print Date 06/23/2009

1. PRODUCT AND COMPANY IDENTIFICATION

Product name : Nitric acid

Product Number : 258121
Brand : Sigma-Aldrich

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA
Telephone : +1 800-325-5832
Fax : +1 800-325-5052
Emergency Phone # : (314) 776-6555

2. COMPOSITION/INFORMATION ON INGREDIENTS

Formula : HNO3

CAS-No.	EC-No.	Index-No.	Concentration
Nitric acid			
7697-37-2	231-714-2	007-004-00-1	>= 90 %
Water			
7732-18-5	231-791-2	-	<= 10 %

3. HAZARDS IDENTIFICATION

Emergency Overview

OSHA Hazards
Target Organ Effect, Corrosive

Target Organs

Lungs, Teeth., Cardiovascular system.

HMIS Classification

Health Hazard: 3
Chronic Health Hazard: *
Flammability: 0
Physical hazards: 0

NFPA Rating

Health Hazard: 3
Fire: 0
Reactivity Hazard: 3
Special hazard.: OX

Potential Health Effects

Inhalation	May be harmful if inhaled. Material is extremely destructive to the tissue of the mucous membranes and upper respiratory tract.
Skin	May be harmful if absorbed through skin. Causes skin burns.
Eyes	Causes eye burns.
Ingestion	May be harmful if swallowed. Causes burns.

4. FIRST AID MEASURES

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing give artificial respiration Consult a physician.

In case of skin contact
Take off contaminated clothing and shoes immediately. Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Continue rinsing eyes during transport to hospital.Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

5. FIRE-FIGHTING MEASURES

Flammable properties

Flash point	no data available
Ignition temperature	no data available

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

Special protective equipment for fire-fighters
Wear self contained breathing apparatus for fire fighting if necessary.

Further information
Use water spray to cool unopened containers.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions
Use personal protective equipment. Avoid breathing vapors, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas.

Environmental precautions
Do not let product enter drains.

Methods for cleaning up
Contain spillage, and then collect with non-combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and place in container for disposal according to local / national regulations (see section 13).

7. HANDLING AND STORAGE

Handling
Avoid inhalation of vapour or mist.
Keep away from sources of ignition - No smoking. Keep away from combustible material.

Storage
Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Components with workplace control parameters

Components	CAS-No.	Value	Control parameters	Update	Basis
Nitric acid	7697-37-2	TWA	2 ppm	2007-01-01	USA. ACGIH Threshold Limit Values (TLV)
Remarks	Eye & Upper Respiratory Tract irritation Dental erosion				
		STEL	4 ppm	2007-01-01	USA. ACGIH Threshold Limit Values (TLV)
	Eye & Upper Respiratory Tract irritation Dental erosion				
		TWA	2 ppm 5 mg/m3	1989-01-19	USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000
		STEL	4 ppm 10 mg/m3	1989-01-19	USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000
		TWA	2 ppm 5 mg/m3	1997-08-04	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
	The value in mg/m3 is approximate.				

Personal protective equipment

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Hand protection
Handle with gloves.

Eye protection
Safety glasses

Skin and body protection
Choose body protection according to the amount and concentration of the dangerous substance at the work place.

Hygiene measures
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance

Form	liquid
Colour	colourless

Safety data

pH	< 1 at 20 °C (68 °F)
Melting point	no data available
Boiling point	100 °C (212 °F) at 1,013 hPa (760 mmHg)
Flash point	no data available
Ignition temperature	no data available
Lower explosion limit	no data available
Upper explosion limit	no data available
Vapour pressure	11 hPa (8 mmHg) at 20 °C (68 °F)
Density	1.4 g/cm3
Water solubility	completely soluble

10. STABILITY AND REACTIVITY

Storage stability
Stable under recommended storage conditions. Stable under recommended storage conditions.

Conditions to avoid
May discolor on exposure to air and light.

Materials to avoid
Alkali metals, Organic materials, Acetic anhydride, Acetonitrile, Alcohols, Acrylonitrile

Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - nitrogen oxides (NOx)

11. TOXICOLOGICAL INFORMATION

Acute toxicity

no data available

Irritation and corrosion

Skin - rabbit - Extremely corrosive and destructive to tissue. - Draize Test

Sensitisation

no data available

Chronic exposure

IARC:	No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.
ACGIH:	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.
NTP:	No component of this product present at levels greater than or equal to 0.1% is identified as

a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Developmental Toxicity - rat - Oral
Effects on Embryo or Fetus: Fetotoxicity (except death, e.g., stunted fetus).

Reproductive toxicity - rat - Oral
Effects on Newborn: Biochemical and metabolic.

Signs and Symptoms of Exposure

burning sensation, Cough, wheezing, laryngitis, Shortness of breath, spasm, inflammation and edema of the larynx, spasm, inflammation and edema of the bronchi, pneumonitis, pulmonary edema, Material is extremely destructive to tissue of the mucous membranes and upper respiratory tract, eyes, and skin.

Potential Health Effects

Inhalation	May be harmful if inhaled. Material is extremely destructive to the tissue of the mucous membranes and upper respiratory tract.
Skin	May be harmful if absorbed through skin. Causes skin burns.
Eyes	Causes eye burns.
Ingestion	May be harmful if swallowed. Causes burns.
Target Organs	Lungs, Teeth., Cardiovascular system.,

12. ECOLOGICAL INFORMATION

Elimination information (persistence and degradability)

no data available

Ecotoxicity effects

Toxicity to fish	LC50 - Asterias rubens - 100 - 330 mg/l - 48 h

Further information on ecology

May be harmful to aquatic organisms due to the shift of the pH.

13. DISPOSAL CONSIDERATIONS

Product
Observe all federal, state, and local environmental regulations. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN-Number: 2031 Class: 8 (5.1) Packing group: I
Proper shipping name: Nitric acid
Marine pollutant: No
Poison Inhalation Hazard: No

IMDG
UN-Number: 2031 Class: 8 (5.1) Packing group: I EMS-No: F-A, S-Q
Proper shipping name: NITRIC ACID
Marine pollutant: No

IATA
UN-Number: 2031 Class: 8 (5.1) Packing group: I
Proper shipping name: Nitric acid
IATA Passenger: Not permitted for transport

15. REGULATORY INFORMATION

OSHA Hazards
Target Organ Effect, Corrosive

DSL Status
All components of this product are on the Canadian DSL list.

SARA 302 Components

	CAS-No.	Revision Date
Nitric acid	7697-37-2	2007-07-01

SARA 313 Components

	CAS-No.	Revision Date
Nitric acid	7697-37-2	2007-07-01

SARA 311/312 Hazards
Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Nitric acid	7697-37-2	2007-07-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Water	7732-18-5	
Nitric acid	7697-37-2	2007-07-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
Water	7732-18-5	
Nitric acid	7697-37-2	2007-07-01

California Prop. 65 Components
This product does not contain any chemicals known to State of California to cause cancer, birth, or any other reproductive defects.

16. OTHER INFORMATION

Further information
Copyright 2009 Sigma-Aldrich Co. License granted to make unlimited paper copies for internal use only.
The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Co., shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale.

APPENDIX C
Community Air Monitoring Plan

Appendix 1A
New York State Department of Health
Generic Community Air Monitoring Plan

Overview

A Community Air Monitoring Plan (CAMP) requires real-time monitoring for volatile organic compounds (VOCs) and particulates (i.e., dust) at the downwind perimeter of each designated work area when certain activities are in progress at contaminated sites. The CAMP is not intended for use in establishing action levels for worker respiratory protection. Rather, its intent is to provide a measure of protection for the downwind community (i.e., off-site receptors including residences and businesses and on-site workers not directly involved with the subject work activities) from potential airborne contaminant releases as a direct result of investigative and remedial work activities. The action levels specified herein require increased monitoring, corrective actions to abate emissions, and/or work shutdown. Additionally, the CAMP helps to confirm that work activities did not spread contamination off-site through the air.

The generic CAMP presented below will be sufficient to cover many, if not most, sites. Specific requirements should be reviewed for each situation in consultation with NYSDOH to ensure proper applicability. In some cases, a separate site-specific CAMP or supplement may be required. Depending upon the nature of contamination, chemical- specific monitoring with appropriately-sensitive methods may be required. Depending upon the proximity of potentially exposed individuals, more stringent monitoring or response levels than those presented below may be required. Special requirements will be necessary for work within 20 feet of potentially exposed individuals or structures and for indoor work with co-located residences or facilities. These requirements should be determined in consultation with NYSDOH.

Reliance on the CAMP should not preclude simple, common-sense measures to keep VOCs, dust, and odors at a minimum around the work areas.

Community Air Monitoring Plan

Depending upon the nature of known or potential contaminants at each site, real-time air monitoring for VOCs and/or particulate levels at the perimeter of the exclusion zone or work area will be necessary. Most sites will involve VOC and particulate monitoring; sites known to be contaminated with heavy metals alone may only require particulate monitoring. If radiological contamination is a concern, additional monitoring requirements may be necessary per consultation with appropriate DEC/NYSDOH staff.

Continuous monitoring will be required for all ground intrusive activities and during the demolition of contaminated or potentially contaminated structures. Ground intrusive activities include, but are not limited to, soil/waste excavation and handling, test pitting or trenching, and the installation of soil borings or monitoring wells.

Periodic monitoring for VOCs will be required during non-intrusive activities such as the collection of soil and sediment samples or the collection of groundwater samples from existing monitoring wells. “Periodic” monitoring during sample collection might reasonably consist of taking a reading upon arrival at a sample location, monitoring while opening a well cap or

overturning soil, monitoring during well baling/purging, and taking a reading prior to leaving a sample location. In some instances, depending upon the proximity of potentially exposed individuals, continuous monitoring may be required during sampling activities. Examples of such situations include groundwater sampling at wells on the curb of a busy urban street, in the midst of a public park, or adjacent to a school or residence.

VOC Monitoring, Response Levels, and Actions

Volatile organic compounds (VOCs) must be monitored at the downwind perimeter of the immediate work area (i.e., the exclusion zone) on a continuous basis or as otherwise specified. Upwind concentrations should be measured at the start of each workday and periodically thereafter to establish background conditions, particularly if wind direction changes. The monitoring work should be performed using equipment appropriate to measure the types of contaminants known or suspected to be present. The equipment should be calibrated at least daily for the contaminant(s) of concern or for an appropriate surrogate. The equipment should be capable of calculating 15-minute running average concentrations, which will be compared to the levels specified below.

1. If the ambient air concentration of total organic vapors at the downwind perimeter of the work area or exclusion zone exceeds 5 parts per million (ppm) above background for the 15-minute average, work activities must be temporarily halted and monitoring continued. If the total organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background, work activities can resume with continued monitoring.

2. If total organic vapor levels at the downwind perimeter of the work area or exclusion zone persist at levels in excess of 5 ppm over background but less than 25 ppm, work activities must be halted, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. After these steps, work activities can resume provided that the total organic vapor level 200 feet downwind of the exclusion zone or half the distance to the nearest potential receptor or residential/commercial structure, whichever is less - but in no case less than 20 feet, is below 5 ppm over background for the 15-minute average.

3. If the organic vapor level is above 25 ppm at the perimeter of the work area, activities must be shutdown.

4. All 15-minute readings must be recorded and be available for State (DEC and NYSDOH) personnel to review. Instantaneous readings, if any, used for decision purposes should also be recorded.

Particulate Monitoring, Response Levels, and Actions

Particulate concentrations should be monitored continuously at the upwind and downwind perimeters of the exclusion zone at temporary particulate monitoring stations. The particulate monitoring should be performed using real-time monitoring equipment capable of measuring particulate matter less than 10 micrometers in size (PM-10) and capable of integrating over a period of 15 minutes (or less) for comparison to the airborne particulate action level. The equipment must be equipped with an audible alarm to indicate exceedance of the action level. In addition, fugitive dust migration should be visually assessed during all work activities.

1. If the downwind PM-10 particulate level is 100 micrograms per cubic meter (mcg/m^3) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques must be employed. Work may continue with dust suppression techniques provided that downwind PM-10 particulate levels do not exceed 150 mcg/m^3 above the upwind level and provided that no visible dust is migrating from the work area.

2. If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than 150 mcg/m^3 above the upwind level, work must be stopped and a re-evaluation of activities initiated. Work can resume provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 mcg/m^3 of the upwind level and in preventing visible dust migration.

3. All readings must be recorded and be available for State (DEC and NYSDOH) and County Health personnel to review.

December 2009

APPENIDX D
Citizen Participation Plan

Geosyntec consultants

engineers | scientists | innovators

CITIZEN PARTICIPATION PLAN

FORMER SCOTT TECHNOLOGIES SITE
1051 SOUTH MAIN STREET
CITY OF ELMIRA, CHEMUNG COUNTY, NY
NYSDEC PROJECT 808049

Prepared for
New York State Department of Environmental Conservation
Division of Environmental Remediation, Region 8
6274 East Avon-Lima Road
Avon, New York 14414-9519

Prepared by
Geosyntec Consultants, Inc.
10220 Old Columbia Road, Suite A
Columbia, Maryland 21046

Project Number MN0832

SEPTEMBER 2014

Agency Review Draft

Table of Contents

Appendices

1. Introduction and Overview

This document presents the Citizen Participation (CP) Plan for the Former Scott Technologies Site ("Site") located at 1051 South Main Street, Elmira, Chemung County (Figures 1 and 2, Appendix A). The Site is currently occupied by Southern Tier Commerce Center (STCC). On 16 July 2014, Unisys Corporation (Unisys), entered into an Order on Consent and Administrative Settlement (Consent Order) with New York State Department of Environmental Conservation (NYSDEC) to perform environmental site characterization at STCC. The Consent Order requires the development of a CP Plan for the site in accordance with ECL §27-1417 and 6 NYCRR sections 375-1.10 and 375-3.10. Unisys intends to keep the general public informed regarding its site characterization activities at STCC, and is working closely with NYSDEC, and New York State Department of Health (NYSDOH) in that regard. The CP plan outlines community outreach approaches that are likely to be employed to achieve community participation and receive community feedback with regard to environmental site characterization at STCC.

2. Site Background

2.1 Site History

The Site was used for heavy industry from the 1880s to 1977. From 1887 to 1909 B.W. Payne & Sons produced high speed steam engines. Morrow Manufacturing made drill-chucks, machine parts, and a line of tools from 1909 to 1935. Remington Rand manufactured typewriters from 1936 until the facility closed in 1972. The Site was deeded to the Chemung County Industrial Development Agency in 1973 and leased to Westinghouse in 1974. Westinghouse used the property primarily for warehousing activities. American LaFrance took over the Westinghouse lease of the Site in 1980 and manufactured and assembled fire engines from 1982 to 1985. Figgie International, Inc., the owner of American LaFrance, gained full title to the property from the Chemung County Industrial Agency in 1985, shortly before ceasing manufacturing activities at the property. A Figgie International, Inc. changed its name to Scott Technologies, Inc. (STI) in April 1998 (Businessweek). Equilibrium Equities, Inc. purchased the property from STI in November 2005 and redeveloped it as STCC.

STI entered into a Voluntary Cleanup Agreement with NYSDEC in January 1999 to conduct site investigation and remedial activities at the Site. Voluntary cleanup activities were declared by NYSDEC to have been completed in October 2006. Prior actions included the removal of four registered underground storage tanks (USTs) in 1993 (Versar, 1993) and voluntary investigations.

In 1988, a Preliminary Site Assessment report for the Former Remington Rand plan (Dames & Moore, 1988) was completed on behalf of Unisys and submitted by NYSDEC. In March 2010, Unisys entered into an Order on Consent and Administrative Settlement (the "Order") with NYSDEC for to perform a remedial investigation (RI) and feasibility study (FS) of the Former Sperry Remington Site (NYSDEC Site 0808043). Prior to entering into this Order, Unisys submitted a Brownfield Cleanup Program application to NYSDEC on 8 February 2008. The Former Sperry Remington Site consists of 0.28 acres located in the northeast corner of the Site (Figures 1 and 2, Appendix A). Unisys is currently implementing the approved RI/FS Work Plan and subsequent addenda for the Former Sperry Remington Site.

2.2 Project Summary

Unisys is developing and submitting a Work Plan to document environmental conditions at the Site with oversight of environmental characterization activities by NYSDEC and NYSDOH ("State Agencies"). Information collected during the site characterization will be summarized in a report. That information may conclude that no further action is needed at STCC to address environmental conditions, or it may suggest the need for additional characterization activities. After that report has been reviewed and its findings accepted by the State Agencies, public notice of those findings will take place.

3. Citizen Participation (CP) Activities

The CP program described in this section has been developed in accordance with the requirements of NYSDEC Program Policy Number 23, the Citizen Participation Handbook for Remedial Programs. Unisys will implement likely CP activities outlined in this section with oversight and input from NYSDEC and NYSDOH.

3.1 Document Repository

Documents pertaining to the site characterization and environmental studies at STCC will be made available for public review. The document repository will be maintained and available at a public building in order to provide convenient access to the public. For STCC characterization activities, a document repository will be established and maintained at the following two (2) locations:

Chemung County Library District
Central Library (Elmira)
101 East Church Street
Elmira, NY 14901
Attn: Owen Frank
Phone: (607) 733-9173
http://www.ccld.lib.ny.us/downtown.htm

NYSDEC Region 8
6274 East Avon-Lima Rd (Routes 5 and 20)
Avon, New York 14414-9519
Attn: Bart Putzig, P.E.
Hours: 8:30 - 4:45 M-F
Phone: (585) 226-2466 (call for appointment)

Those documents to be maintained in those repositories include, but are not limited to, the Consent Order, Fact Sheets, Site Characterization Work Plan, CP Plan, Site Characterization Report, and other materials (historical investigations, information sheets, notices, etc.).

3.2 Mailing List

A mailing list allows for quick and easy dissemination of information, which can be accessed conveniently by those individuals who are interested in obtaining that information. A mailing list will be compiled to distribute site information to interested entities including stakeholders, media outlets, and government officials (Appendix B).

3.3 Points of Contact

Below is a list of personnel who are the designated points of contact for the STCC site environmental characterization. The public is encouraged to contact them directly to obtain project-specific information.

Project Related Information
Tim Schneider
NYSDEC
Division of Environmental Remediation
6274 East Avon-Lima Road
Avon, NY 14414
585-226-5480
timothy.schneider@dec.ny.gov

Site Related Health Information
Dawn Hettrick, MPH
NYSDOH
Empire State Plaza, Corning Tower Room #1787
Albany, NY 12237
518-402-7860
beei@health.state.ny.us

Citizen Participation
Linda Vera
Regional Citizen Participation Specialist
NYSDEC
Division of Environmental Remediation
6274 East Avon-Lima Road
Avon, NY 14414
585-226-5324
linda.vera@dec.ny.gov

3.4 Print Media

Fact Sheets are an effective means of disseminating information to the public to raise awareness and enhance participation. At key milestones in the project, NYSDEC will prepare a Fact Sheet in accordance with NYSDEC Program Policy Number 23.

3.5 Website

Because most community members have access to internet at either home, work, or a public library, providing information through a project website is helpful in enhancing public outreach and making information available at all times. NYSDEC will establish a website for the project and identify the website address for the project in its Fact Sheets.

3.6 Summaries of Technical Reports

Report summaries are very useful in succinctly communicating main aspects of a project to the community in lay terms. Therefore, after each technical report has been finalized and approved by NYSDEC, a summary will be prepared in the form of a Fact Sheet and will be made available for public review.

3.7 Public Notices

As required by NYSDEC Program Policy, formal public notices will be published in a local newspaper with general circulation to inform community members of key milestones or events pertaining to the project. Public Notices will appear in a prominent position in the newspaper and adequate response time will be provided to allow for community participation and feedback.

3.8 Public Comment Period and Response to Comments

Public comments will be solicited on certain project documents as, and when, required by NYSDEC. Per NYSDEC policy, a public comment period is typically thirty to forty-five (30 to 45) days. Following the conclusion of a public comment period, NYSDEC and Unisys will compile comments received and provide responses in a formal Response to Comments document.

3.9 Meetings

To communicate major project schedules, activities, or milestones, public or town meetings will be organized as per NYSDEC's requirement. Those meetings will include an oral or poster presentation of project activities and milestones, and will include a discussion to solicit community feedback and address comments. Public meetings will be convened at locations convenient and central to the community, and the meeting time will be decided with input from community leaders. Meeting information will be published in a local newspaper and/or will be mailed to interested entities identified on the project mailing list.

3.10 Elected Local, State, and Federal Official Briefings

Local, state, and federal officials will be briefed as requested during project implementation and at key milestones. Those briefings will provide an opportunity for officials to be further informed about the project, get involved in the project, and resolve any concerns that they may have pertaining to project implementation. Contact information for relevant local, state and federal officials is included in the site mailing list provided in Appendix B.

3.11 CP Plan Revisions

Additional community needs or concerns that are not addressed in this CP plan may arise during project implementation. Unisys and NYSDEC will work together to identify those issues and update the CP plan as needed.

4. References

Advanced Geoservices Engineering, P.C.: Remedial Investigation/Feasibility Study Work Plan, Former Sperry Remington Facility, Industrial Outfall Site, Elmira, New York, NYSDEC SITE I.D. # 808043.

Businessweek, http://investing.businessweek.com/research/stocks/private/snapshot.asp?privcapId=271057

Dames & Moore, 1988, Preliminary Site Assessment, Remington Rand Plant, City of Elmira, Chemung County, New York.

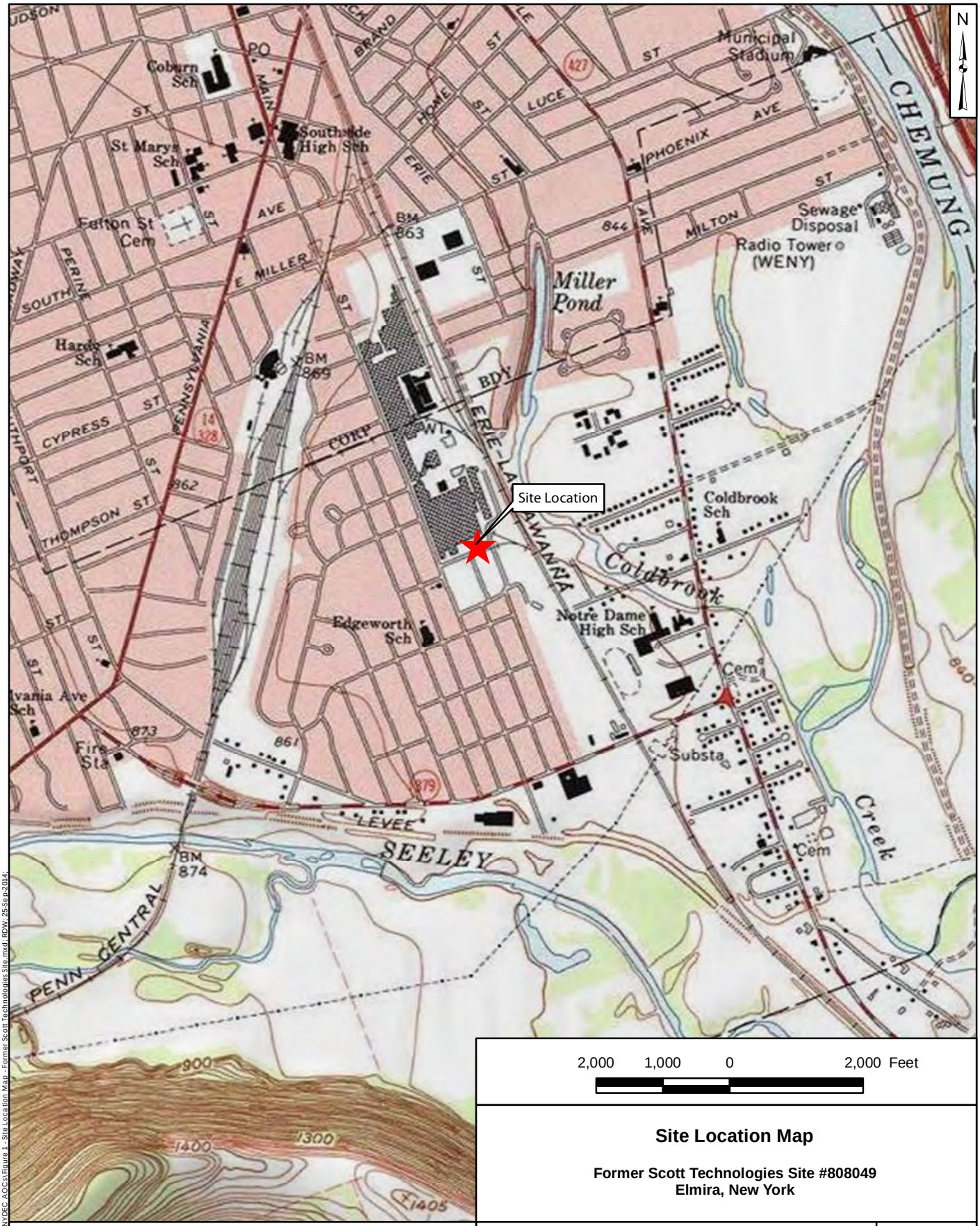
Geosyntec Consultants, Inc., 2013. Interim Remedial Measure Pre-Design Investigation Data Report, Former Sperry Remington Site (NYSDEC Site I.D. #808043), City of Elmira, Chemung County, NY.

NYSDEC, 2004 IIWA Report on Groundwater Chlorinated Solvent Investigation, Southside High School and Adjacent Properties, City of Elmira, Chemung County.

NYSDEC, 2010. *DER-23 / Citizen Participation Handbook for Remedial Programs*. DEC Program Policy, New York State Department of Environmental Conservation.

APPENDIX A

SITE LOCATION MAPS



2,000 1,000 0 2,000 Feet

Site Location Map

Former Scott Technologies Site #808049
Elmira, New York

Notes:
Topographic map accessed via ArcGIS Online and provided by National Geographic Society and i-cubed on 25 September 2014. Elmira, New York Quadrangle (1971, photorevised 1976) is shown.

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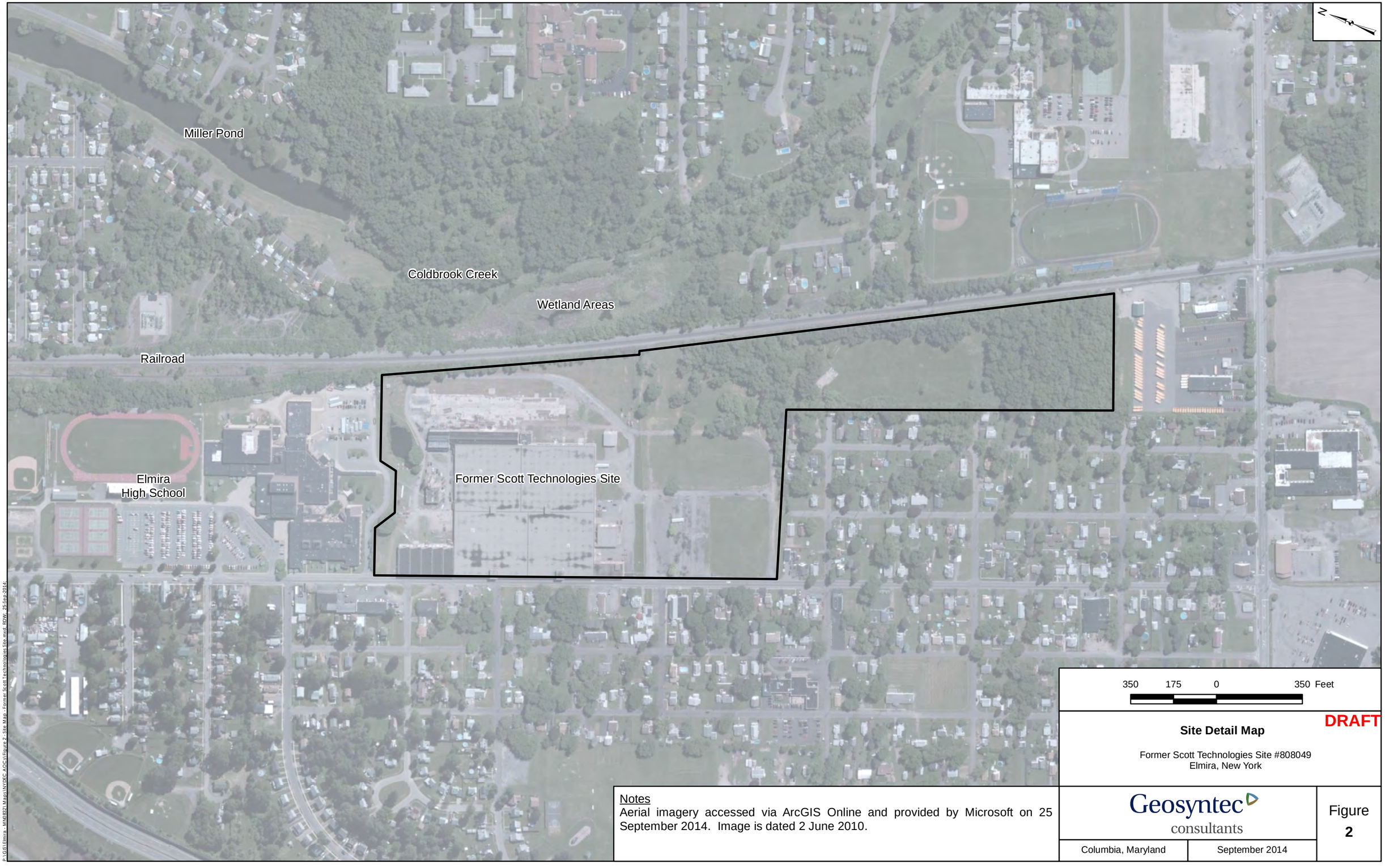
Figure 1

P:\GIS\Elmira - MN0832\Maps\NYDEC AOCs\Figure 1 - Site Location Map - Former Scott Technologies Site.mxd; RDW; 25-Sep-2014;



P:\GIS\Elmira - MM0803\Maps\NYDEC-AOC\Figure 2 - Site Map - Former Scott Technologies Site.mxd RDW 25-Sep-2014

DRAFT

Site Detail Map

Former Scott Technologies Site #808049
Elmira, New York

Notes
Aerial imagery accessed via ArcGIS Online and provided by Microsoft on 25 September 2014. Image is dated 2 June 2010.

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Figure **2**

APPENDIX B

SITE MAILING LIST

Property Owner

Southern Tier Commerce Center, LLC
c/o Equilibrium Equities, Inc.
Sentry Park West – Merion Towle Bldg.
1777 Sentry Parkway, Suite 200
Blue Bell, PA 19422

Adjacent Property Owners

Elmira High School – 777 S. Main Street, Elmira, New York
Hillary Austin
Superintendent
Elmira City School District
951 Hoffman Street,
Elmira, N.Y., 14905

Sara Lattin
President, Board of Education
Elmira City School District
469 Cypress Street,
Elmira, N.Y., 14904

Environmental Groups

Friends of the Chemung River Watershed
111 N. Main St.
Elmira, N.Y. 14901

Media

Stella Dupree, Managing Editor
The Leader
34 West Pulteney St.
Corning, N.Y., 14830

Lois Wilson, Managing Editor
Star-Gazette
201 Baldwin St., P.O. Box
Elmira, N.Y., 14902

News Director
WETM-TV
101 East Water Street

Elmira, N.Y., 14901

News Director
WENY-TV
474 Old Ithaca Road
Horseheads, N.Y., 14845

News Director
YNN
815 Erie Blvd. East
Syracuse, N.Y., 13210

Associated Press
Albany Bureau
P.O. Box 11010
Albany, N.Y., 12211

Local Officials

Honorable Susan J. Skidmore
Mayor - City of Elmira
Capitol - City Hall Third Floor
317 East Church Street
Elmira, N.Y., 14901
William D. Roe
Council Member – District 1
Capitol - City Hall Third Floor
317 East Church Street
Elmira, N.Y., 14901

Brent A. Stermer
Council Member – District 2
Capitol - City Hall Third Floor
317 East Church Street
Elmira, N.Y., 14901

Joseph H. Duffy
Council Member – District 3
Capitol - City Hall Third Floor
317 East Church Street
Elmira, N.Y., 14901

Nykole L. Parks
Council Member – District 4
Capitol - City Hall Third Floor

317 East Church Street
Elmira, N.Y., 14901

Daniel S. Royle
Council Member – District 5
Capitol - City Hall Third Floor
317 East Church Street
Elmira, N.Y., 14901

William M. McCarthy
Council Member – District 6
Capitol - City Hall Third Floor
317 East Church Street
Elmira, N.Y., 14901

Chemung County Officials

Honorable Thomas J. Santulli
County Executive
John H. Hazlett Building
203 Lake Street
P.O. Box 588
Elmira, N.Y., 14902

Honorable Donna L. Draxler
Chairman, County Legislature
John H. Hazlett Building
203 Lake Street
P.O. Box 588
Elmira, N.Y., 14902

Linda D. Palmer
Clerk, County Legislature
John H. Hazlett Building
203 Lake Street
P.O. Box 588
Elmira, N.Y., 14902

Bryan Maggs
County Attorney
John H. Hazlett Building
203 Lake Street
P.O. Box 588
Elmira, N.Y., 14902

State Officials

Paul D'Amato
Regional Director
NYSDEC Region 8
6274 East Avon-Lima Road
Avon, N.Y., 14414

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Regional Attorney
NYSDEC Region 8
6274 East Avon-Lima Road
Avon, N.Y., 14414

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Bureau Chief – Remediation Bureau
NYSDEC Office of General Counsel
625 Broadway
14th Floor
Albany, N.Y., 12233

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6274 East Avon-Lima Road
Avon, N.Y., 14414

Bart Putzig
Division of Environmental Remediation
NYSDEC Region 8
6274 East Avon-Lima Road
Avon, N.Y., 14414

Linda Vera
Regional Citizen Participation Specialist
NYSDEC Region 8
6274 East Avon-Lima Road
Avon, N.Y., 14414

Melissa A. Doroski, MPH
New York State Department of Health
Empire State Plaza, Corning Tower Room
#1787
Albany, N.Y., 12237

State Elected Officials

Senator Thomas F. O'Mara
938 Legislative Office Building
Albany, N.Y., 12248

Elmira District Office
333 East Water Street, Suite 301
Elmira, N.Y., 14902

Assemblyman Christopher S. Friend
938 Legislative Office Building
Albany, N.Y., 12248

476 Maple Street
P.O. Box 441
Big Flats, N.Y., 14814

Assemblyman Philip A. Palmesano
938 Legislative Office Building
Albany, N.Y., 12248

Federal Elected Officials

Honorable Charles Schumer
United States Senate
322 Hart Senate Building
Washington D.C., 20510

Honorable Kirsten Gillibrand
United States Senate
478 Russell
Washington, D.C., 20510

Congressman Tom Reed
United States House of Representatives
1504 Longworth House Office Building
Washington, D.C., 20515