INVENTUM ENGINEERING, PC

Corrective Measures
Groundwater Treatment Design Report

Brownfield Cleanup Program Site #C915230

Buffalo Color Corporation Site

Area A

1337 South Park Avenue

Buffalo, NY

April 19, 2023

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SUITE C
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Engineering Certification

I, John P. Black certify that I am currently a NYS registered professional engineer as defined in 6 NYCRR Part 375 and that this Corrective Measures Groundwater Treatment Design Report was prepared in accordance with all applicable statutes and regulations and in substantial conformance with the NYSDEC Technical Guidance for Site Investigation and Remediation (DER-10) and that all activities producing the data were performed in full accordance with NYSDEC-approved work plans and any NYSDEC-approved modifications.

Respectfully Submitted,

Inventum Engineering, P.C.

John P. Black, P.E.

Date: April 13, 2023

License No: 062818-1

Seal:

1 Introduction

On behalf of HDC Holdings LLC (HDC) and South Buffalo Development LLC (SBD), Inventum Engineering, P.C. (Inventum) has prepared this Corrective Measures Groundwater Treatment Design Report for Area A (Site) of the former Buffalo Color Corporation (BCC) property located at 1337 South Park Avenue in the City of Buffalo, County of Erie, New York. The Site is one of five areas that comprised the former BCC, which produced dyes and organic chemicals until it filed for bankruptcy protection in 2005.

Area A is situated on 10.029 acres and bounded by South Park Avenue to the north, the Buffalo River to the east, former/abandoned railroad tracks on an elevated embankment to the south, and active railroad lines to the west (Figure 1). The northeast corner of the Site is adjacent to a bridge abutment for the South Park Avenue bridge that extends over the Buffalo River. There are four buildings on the property; an unoccupied office building near South Park Avenue, two metal framed and sided warehouse structures used for dry storage, and the groundwater treatment plant structure.

SBD entered into a Brownfield Cleanup Agreement (BCA, Index No. B9-0783-08-06) with the New York State Department of Environmental Conservation (NYSDEC) in April 2009 to investigate and remediate the 10.029-acre Area A Site (Site No. C915230). The following is a summary of the Remedial Actions (RAs) performed at the Site:

- A vertical hydraulic barrier (VHB) consisting of slag, cement, and bentonite was installed using slurry trench and jet grout methods was constructed along the river.
- The pre-existing Area A groundwater extraction and treatment facility (GWTF), which was installed in 2006 as an Interim Corrective Measure (ICM), was repurposed to extract groundwater for treatment and to provide hydraulic control behind the VHB.
- TheArea A riverbank was stabilized through closure of the former water intake structure, establishment of vegetation along segments of the riverbanks, and stabilization of existing concrete retaining walls to remain in place.
- Installation of an integrated Site-wide cover system to prevent human exposure to remaining soils containing compounds of concern at the Site.
- Abandonment/plugging of unused process sewers and installation of a new storm sewer conveyance system.
- Execution and recording of an environmental easement to restrict land use and address further exposure to any remaining contamination at the Site.
- Development and implementation of an SMP for longer term management of the site remedy.

The GWTF was initially constructed in 1996 to treat the groundwater recovered from the adjacent BCC Area D (NYSDEC Site No. 915012). Five (5) existing extraction wells (EW-1 through EW-5) Figure 1, which had been installed in 2006, were repurposed to provide hydraulic control of Area A. Upgrades to the GWTF were made under an agreement with the NYSDEC when the Area A extraction wells were connected to the existing treatment facility. Full-time pumping from the Area A extraction wells commenced in December 2007. The VHB was constructed between October 2012 and December 2013. Construction and connection of the Area A extraction system and VHB is documented in the December 2013 Final Engineering Report (FER)[1]. Operations and Maintenance procedures are documented in the March 2015

[1] Final Engineering Report. Buffalo Color Site – Area A/B. Erie County, New York. MACTEC Engineering and Consulting, P.C. December 2013

NYSDEC approved Operation, Maintenance and Monitoring (OM&M) manual[2] and performance metrics are reported in annual Periodic Review Reports (PRRs).

The extraction wells (EW-1 through EW-5) and the GWTF are currently operating, and treated waters are discharged to the Buffalo Sewer Authority (BSA) under BSA Permit No. 20-06-BU109. The existing GWTF layout is shown on Figure 2.

1.1 Approved Corrective Measures

Corrective Measures have been approved by the NYSDEC[3] to existing Engineering Controls (ECs) that were identified in the July 29, 2020 PRR for the reporting period of October 5, 2018 to October 5, 2019. The approved corrective measures include upgrades/updates to the GWTF to allow for long-term operation.

Specifically, there is periodically an apparent outward gradient along the Buffalo River near the north end of Area A. Table 1 shows groundwater elevation monitoring data collected during the October 5, 2021 to October 5, 2022 reporting period from the six (6) observations well pairs installed on the interior and exterior of the VHB.

Inventum notes that while there may be a measured gradient at times, due to the presence of the VHB, it is unlikely the small and periodic outward gradient has induced any flow from the site to the river. Groundwater elevation contours from water level elevations collected in September 2022 show groundwater capture along the interior of the VHB (Figure 3).

1.2 Corrective Measure Objectives

The corrective measure objective is to reestablish consistent inward hydraulic gradients along the Buffalo River. To achieve the corrective measure objective, upgrades/updates to the GWTF will be made to prepare for long-term operation and provide a significant increase in the treatment capacity.

Four (4) new extraction wells (EW-4A, EW-6, EW-7, and EW-8; Table 2) were installed at the approximate locations shown on Figure 1 in May 2020. Operation of these four (4) new wells at pumping rates as low as 5 gallons per minute (gpm) combined with operation of two existing extraction wells (EW-1 and EW-2) at their current extraction rates were shown in the December 2020 Corrective Measures Evaluation[4] to induce an inward gradient across the VHB.

The GWTF currently operates at a capacity of approximately 388,000 gallons per month (Q4 2021 – Q3 2022 Average). The existing BSA discharge permit allows a maximum daily discharge of 50,000 gallons per day (gpd) which is equivalent to approximately 1.5 million gallons per month. The upgraded system will include operation of pumps in extraction wells EW-1, EW-2, EW-4A, EW-6, EW-7, and EW-8 at a total combined design flow rate of 42 gpm (minimum) to 100 gpm (maximum). A new permit application will be filed in May 2023 to allow the increased discharge. The BSA has indicated the existing BSA discharge permit, which expires on May 31, 2023, may be extended during the period the new system is constructed.

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[2] Former Buffalo Corporation Color Sites Areas A and D Groundwater Extraction System OM&M Manual. Buffalo Color Areas A and D. Buffalo, New York. MACTEC Engineering and Consulting, P.C. Updated March 2015.
[3] Inventum Engineering, P.C. *Corrective Measures Work Plan Groundwater Treatment*, Brownfield Cleanup Program Site #C915230, Buffalo Color Corporation Site, Area A, 1337 South Park Avenue, Buffalo, New York, June 21, 2022.
[4] Inventum Engineering, P.C. *Corrective Measures Evaluation*, Brownfield Cleanup Program Site #C915230, Buffalo Color Corporation Site, Area A, 1337 South Park Avenue, Buffalo, New York, December 18, 2020.

2 Bench-Scale Treatability Testing

A treatability test was conducted in accordance with the approved CM Work Plan. The existing primary treatment process/design (equalization, mechanical filtration, and carbon filtration) have been demonstrably successful over many years at meeting BSA discharge requirements and was used as the starting point for conceptual design of the replacement higher volume treatment system.

The following additional treatment processes were evaluated based on improving the management and efficiency of the OM&M of the proposed system based on experience with the existing system and data generated as part of the corrective measures evaluation:

- Chemical sequestration of Iron, Manganese, and Calcium at the treatment system influent or within the treatment processes; and
- Oil/Water Separation (OWS) to prevent premature plugging/fouling of filtration and treatment from Light Non-Aqueous Phase Liquid (LNAPL) that may be drawn into the system.

2.1 Sample Collection

Representative 1-gallon samples were collected from each of the proposed extraction wells (EW-1, EW-2, EW-4A, EW-6, EW-7, and EW-8) and of the Area D (Site No. 915012) influent.

The extraction wells that are not currently in operation (EW-4A, EW-6, EW-7, and EW-8) were purged a minimum of three well volumes with a submersible pump prior to sampling. Water quality readings of pH, temperature, oxidation-reduction potential (ORP), dissolved oxygen (DO), and turbidity were collected at intervals during the purge process and recorded in a field notebook (Appendix A). Purge water was temporarily contained in 5-gallon drums and processed through the GWTF upon completion.

Samples from the wells currently in operation (EW-1 and EW-2) were collected directly from a sample tap on the influent piping in the GWTF. The sample from the Area D influent was also collected from a sample tap on the influent piping in the GWTF.

The purge water and the sample collected at EW-7 contained LNAPL (Photo 1, Appendix C). LNAPL was also identified in EW-7 during the initial well installation and development in May and June 2020. The combined sample (Groundwater and LNAPL) was submitted for treatability testing.

The collected 1-gallon samples were shipped under chain-of-custody to Ground/Water Treatment & Technology's (GWTT) treatability laboratory in Wharton, New Jersey. A representative composite sample was created using equal volumes of the six individual well point sources from Area A and the Area D influent and utilized for the treatability study.

2.2 Laboratory Analysis

Laboratory analysis of the representative composite sample was conducted at multiple stages during the design process. A representative influent sample was analyzed for each of the parameters required under the existing BSA discharge permit[5]. Additionally, the influent sample was analyzed for several treatment

[5] Inventum met with a representative from the BSA at the BCP Site on June 16, 2022 to discuss the GWTF upgrades and potential permit modifications required. Preliminarily, the BSA did not anticipate any additional discharge

indicator parameters not required by the discharge permit including Total Calcium, Total Iron, and Oil and Grease. These parameters were added to aid in the design of treatment process options (chemical sequestering and oil/water separation) that are not part of the existing operations but will be incorporated into the GWTF upgrades. A final effluent sample was analyzed for each of the same parameters following treatment through each of the defined treatment processes.

The influent and effluent treatability sampling results are summarized in Table 3 and Table 6. The influent sampling results are also compared to sampling data from individual wellheads for those parameters (Metals, Volatile Organic Compounds [VOCs], and Semi-Volatile Organic Compounds [SVOCs]) routinely collected as part of the SMP requirements (Table 4). Also included in Table 4 are the results of VOC samples collected from the influent to the existing system GAC vessels in May 2022, November 2022, and December 2022[6]. The comparisons are provided as a reference to document the representativeness of the composited influent sample showing a similar constituent and concentration profile to the routine SMP sampling. It is recognized that the benzene and chlorobenzene in the composited influent is notably lower than the concentrations detected in the individual well samples (Table 4). It was anticipated that there would be some volatile loss due to the sample collection and composite mixing, but the samples are suitable for the design of the system given the historical data and redundancies built into the process.

Laboratory analysis was also conducted on samples collected after several of the evaluated process options. These results are discussed further in the sections below.

All laboratory analysis was conducted by Alpha Analytical of Westborough, MA and the laboratory data reports are provided for reference in Appendix B.

2.3 Treatability Testing Program

The existing GWTF consists of equalization, mechanical filtration using disposable bag filters, mechanical filtration using multimedia filtration vessels, and granular activated carbon (GAC) filtration (Figure 2). Based on the successful operation of this system since 2015, this was the baseline for the upgraded conceptual system design simulated by the treatability testing program along with the addition of Oil/Water Separation (OWS) at the inlet of the treatment system to reduce LNAPL from entering the primary treatment train and chemical sequestration to improve the efficiency of the mechanical filtration processes.

2.3.1 Oil/Water Separation

LNAPL was identified in measurable quantities in EW-7 during the well installation and during collection of the treatability testing sample. Oil and Grease (EPA Method 1664B) was run as a surrogate to quantify the removal of LNAPL. The composite was processed through an OWS bench scale unit operation to model the full-scale reduction of the concentration of oil and grease that will occur in the upgraded treatment system prior to processing through the remaining treatment processes.

The influent composite sample contained an oil and grease concentration of 31 milligrams per liter (mg/L). The post-OWS sample contained a concentration of 7.7 mg/L which is an approximately 75-percent reduction in oil and grease. A photo depicting the amount of LNAPL in the composite sample after processing through the OWS is shown for reference in Appendix C.

monitoring parameters would be required under a new permit as the source area and treatment processes would likely remain the same and the upgrades are primarily to increase system treatment capacity.

[6] Routine GWTF samples collected to monitor GAC treatment efficiency and GAC replacement frequency.

2.3.2 Chemical Sequestration

Bench scale testing was conducted to determine the effectiveness of the addition of a sequestering agent to reduce the settling of certain metals in the treatment system and increase the efficiency of the downstream mechanical filtration process options. The GWTF has historically been operated by separately treating influent streams from the extraction wellheads (Figure 2) due to precipitation of metals that had occurred when the influent was combined into a single treatment stream[7]. Metals concentrations from the composite influent sample and historical observations indicate that the fouling is primarily caused by Iron with some influence from precipitating Manganese and Calcium. The optimal methodology to reduce these settling of these metals in the treatment system was identified by GWTT to add a sequestering agent to the influent prior to the increased level of oxidation that occur through pumping and treatment through the filtration/GAC unit modules.

Two separate sequestrants were tested, one that would sequester the dissolved metals solely, and one that would also sequester the carbonate forms of the dissolved metals. Redux Technologies products Redux 300 and Redux 345 were tested at doses of 25 mg/L, 50 mg/L, and 100 mg/L. Safety Data Sheets (SDS) for each of the products is provided for reference in Appendix D.

Subsamples of 400 mL of the composited influent were tested following the OWS bench-scale treatment. Total Iron was tested with Hach® test kits after introduction of the sequestering agent(s) at the noted doses and after a 24-hour reaction period to allow settling of solids. A control sample with no sequestrant addition was also tested after a 24-hour settling period. The test(s) were conducted on the clarified water and compared to the baseline result of 0.59 mg/L. Values greater than the baseline are indicative of allowing the iron to remain in solution and lowered risk of precipitating out through oxidation within the proposed EQ tank or the other proposed downstream process options.

The results were good for both Redux products at a dosage of 50 mg/L, but the Redux 345 performed marginally better in the bench-scale testing:

Redux Volume (µL)	**Dosage (mg/L)**	**Total Iron (mg/L)**
Baseline – Post-OWS		
N/A	N/A	0.59
Control - No Sequestrant Addition		
0	0	0.28
Redux 300		
10	25	0.40
20	50	0.52
40	100	0.60
Redux 345		

[7] Final Engineering Report. Buffalo Color Site – Area A/B. Erie County, New York. MACTEC Engineering and Consulting, P.C. December 2013

10	25	0.42
20	50	**0.63**
40	100	0.60

Table 2.1: Chemical Sequestration Test Results

It should be noted that a final dosage determination will be made during system startup on "fresh" water to account for any variability in the bench scale results because of oxidation of metals that may have occurred during shipment and storage for the treatability test. A startup testing protocol is provided in further sections of this design report.

2.3.3 Mechanical Filtration

Bench scale testing was conducted to determine the minimum degree of filtration required to minimize Total Suspended Solids (TSS) carryover prior to the GAC unit operation. The composited influent sample post-OWS and post-Sequestrant addition (Redux 345 dosage of 50 mg/L) was processed through a 20-micron equivalent filter followed by a 5-micron equivalent filter (see photos; Appendix C).

A sample was analyzed for Total Metals after filtration (Table 5) and compared to the composited influent concentration. Dissolved metals were not analyzed on the post-filtration sample as the mechanical filtration operation is only capable of reduction of the particulate fraction.

There was a minimum of 78-percent reduction in TSS concentration (to non-detect) after the bag filter and sand filtration:

Parameter	Process Location	Result
TSS	Influent	23 mg/L
	Post-OWS/Bag Filters/Multimedia Filter	ND (<5 mg/L)

Table 2.2: Mechanical Filtration Test Results

The concentration of metals was also reduced (Table 5) because of both the mechanical filtration and chemical sequestrant addition.

2.3.4 Granular Activated Carbon Adsorption

The final unit operation tested was adsorption of organic compounds using GAC. As mentioned previously, GAC, along with the other unit operations, has been demonstrably successful in meeting BSA discharge requirements in the existing treatment facility. The goal of the GAC treatability test was to confirm the viability at the increased flow rates, determine equipment sizing, and estimate GAC consumption for O&M planning.

The design parameters for the GAC treatability were identical to the full-scale treatment system design which are a system flow rate of 100 gallons per minute (gpm), Empty Bed Contact Time (EBCT) of 5 minutes, and a service flow rate of 3 to 6 gpm per sq.ft. The bench scale testing apparatus included a 2-inch diameter column filled with 18-inches of GAC to simulate full-scale unit operations (see photographs; Appendix C). The influent composite sample (post-OWS, Sequestration, and filtration) was pumped through the assembly at a flow rate of 185 milliliters per minute (mL/min) to simulate a 5-minute EBCT.

A sample was collected from the effluent of the GAC unit operation and served as the post-treatment compliance verification sample (Table 6). The sample was analyzed in accordance with the existing BSA discharge requirements. As noted previously, in discussion with the BSA on the proposed system upgrades they did not anticipate any changes to the compliance parameter list. All the parameters in the bench-scale effluent sample met the BSA discharge criteria[8].

A photograph showing the water clarity through each stage of the bench-scale testing is provided for reference in Appendix C.

[8] Acetone and Diethyl phthalate were detected in the effluent sample at concentrations attributable to laboratory contamination.

3 Groundwater Treatment System Process Design

The bench-scale treatability test confirmed that the existing GWTF unit operations (mechanical filtration and GAC) along with the addition of two new unit operations (OWS and Sequestration) can serve as the design basis for meeting the BSA discharge criteria at the maximum design treatment capacity of 100 gpm.

General specifications for each of the unit operations are discussed in the sub-sections below. A preliminary upgraded GWTF system layout is shown on Figure 4.

Final conceptual design drawings for the upgraded GWTF are provided in Appendix E. Additional final drawing sets will be shared with the NYSDEC as they are finalized. These include the final building and foundation plans and final upgraded system plans (electrical, controls, and process piping).

3.1 Oil Water Separation

An Oil/Water Separator with a 100-gpm capacity will be the first stage of the treatment process. Conveyance piping from each of the six extraction wellheads will be routed to a manifold upstream of the OWS. LNAPL has only been detected in measurable quantity at EW-7; however, routine SMP inspections have noted intermittent LNAPL globules in EW-5[9] indicating the potential presence in the vicinity of the EW-4A, EW-7, and EW-8 drawdown areas. The manifold will allow for flexibility should LNAPL be pulled into the extraction radius of influence at new extraction wells EW-4A or EW-8. The manifold will also allow the GWTF operator the flexibility to by-pass the OWS based on the characteristics at each individual wellhead. The initial operating period of the system will include routing the flow from all Area A wells to the OWS. Monitoring during that period will include periodic check at the extraction well heads to determine if LNAPL is present. The revised O&M and SMP will include a monitoring program at the extraction wellheads to determine if flow from individual wells can bypass the OWS. LNAPL has never been observed from the Area D effluent, and therefore the Area D extraction wells will not be plumbed into the OWS.

A 55-gallon oil storage container will be staged adjacent to the OWS to collect the separated NAPL for offsite disposal. The collected NAPL will be periodically disposed of or recycled in accordance with local, state, and federal regulations. Samples of the NAPL will be collected for disposal profiling during system start-up and after a sufficient volume of material has been generated for preparation of a waste profile.

3.2 Equalization and Chemical Sequestration

The treated water from the OWS will flow into a 5,000-gallon (nominal) equalization (EQ) tank which will normalize flow from each extraction well (including Area D when pumping) and serve as a pump suction tank for the downstream treatment processes. The manifold installed upstream of the OWS will also allow the operator to by-pass flow from individual extraction wells that are free of NAPL directly into the EQ tank. Bypassing the OWS with LNAPL free influent will increase the treatment time for the flow in the OWS. The water from the Area D extraction wells will flow directly into the EQ tank bypassing the OWS. The EQ tank will also accept flow from the downstream Decant Tank (Figure 4). The Decant Tank will contain backwash water from the multimedia filters and GAC units.

A chemical sequestering agent (Redux 345, or equivalent) will be dosed into the EQ tank to keep metals (primarily iron and calcium based on treatability testing and historical documentation) in solution. The control of the sequestering agent will be paced by the flow entering the EQ tank and will also be able to be

[9] Inventum Engineering, P.C. January 2023. Buffalo Color Corporation Site Areas A & B Site Management Periodic Review Report – October 5, 2021 to October 5, 2022.

manually adjusted by O&M personnel based upon influent water quality. The sequestering agent will be stored within a containment area located adjacent to the EQ tank in either a permanent tank or vendor supplied drums. Preliminary consumption estimates at a dosing of 50 mg/L range from 2 to 7 gallons per day (gpd)[10] based on an anticipated periodic system flow range of 30 to 100 gpm.

3.3 Mechanical Filtration

The upgraded GWTF mechanical filtration process operations will consists of a bag filter skid and a multi-media filter assembly. The dry daily solids removal is estimated to be between 6 and 21 pounds per day (lbs/day) based on an anticipated periodic system flow range of 30 to 100 gpm.

3.3.1 Bag Filters

Water from the EQ tank will be pumped to a skid-mounted bag filter assembly to remove large solids and suspended particulates before the flow is further filtered downstream in the multimedia filter units. The transfer pump skid will be a duplex pump skid with a primary and backup pump plumbed in parallel. If the primary pump is taken down for maintenance or shuts down during operation the backup pump will engage to keep the fluid level in the EQ tank at a pre-designed operating level.

The bag filters will be installed in parallel with a 20-micron filter capacity. The design has three bag filters per housing. One housing will be in operation at any given time and the housings will be rotated to allow filter changeout. The bag filter housing assembly will be plumbed to allow gravity draining of the filter housings to a drain drum. The drainage drum will be connected to the decant tank to allow return of the water to the treatment train.

3.3.2 Multimedia Filters

A skid mounted multimedia filtration system with a 5-micron filtering efficiency will be installed downstream of the bag filter assembly. The multimedia filtration skid will consist of three vessels plumbed in parallel to further filter suspended solids from the process flow and protect the downstream GAC beds. The inlet and outlet of the multimedia filter housing will be equipped with pressure gauges to monitor differential pressure across the filter housing. The Programmable Logic Controller (PLC) system (or equivalent) will have the capability to automatically backwash the filters when the differential pressure reaches a pre-design pressure that could restrict flow through the filter media. Backwash water will be transferred to the decant tank and periodically pumped back to the EQ tank for treatment once the water in the decant tank reaches the design level and activates the transfer pump skid.

Backwash supply water for the multimedia filters will be treated water from the effluent tank. The multimedia filter assembly will be plumbed to allow gravity draining of the vessels to a drain drum. The drum will be connected to the decant tank and periodically pumped back to the EQ tank for treatment once the water in the decant tank reaches the design level and activates the transfer pump skid.

3.4 VOC Treatment Processes

GAC has effectively treated the water produced at the site since 2015. GAC will be installed as the primary VOC treatment process. One potential operational issue with the GAC is consumption. As an option, an air stripper may be installed ahead of the GAC in the process sequence to reduce the loading of the GAC.

[10] Based on a Redux 345 density of 8.98 pounds per gallon (lbs/gal).

3.4.1 Liquid Granular Activated Carbon

The water from the mechanical filtration unit operations, or air stripper if installed, will flow through a pair of LGAC vessels plumbed in series. A single GAC vessel rated to hold 2,000 lbs. of reactivated carbon is the minimum treatment requirement to maintain a minimum 5-minute EBCT at the maximum design flow rate of 100 gpm. The final conceptual design drawings in Appendix E show two (2) 2,000-lb GAC vessels plumbed in series to allow rotation of the lead and secondary units to facilitate spent media replacement if monitoring indicates breakthrough has occurred on the lead unit. Larger GAC vessels (5,000 to 10,000-lb) to minimize/balance changeout frequency will likely be installed based on the air stripper installation/specifications.

Routine monitoring of the GAC inlet and mid-point VOC concentrations will be conducted on a defined basis consistent with the startup and initial operations sampling outlined in this report and revised SMP and OM&M plans. An OM&M Plan will be prepared and submitted to the NYSDEC system start-up and an initial operation period. The OM&M Plan will contain specifications for the testing and replacement of GAC media.

The inlet and outlet of each GAC vessel will be equipped with a pressure gauge to monitor the differential pressure across the media and will be continuously monitored by the PLC. If the differential pressure across a vessel rises to the design pressure, i.e., water flow is could be restricted in the vessel, the flow can be routed to the other unit and the over pressure unit may either be taken off-line for media replacement or backwashed to reduce the flow restriction.

Backwash supply water for the GAC vessels will be treated water from the effluent tank. Backwash water will be transferred to the decant tank and periodically pumped back to the EQ tank once the level in the decant tank activates the transfer pump skid. The GAC vessels will be plumbed to allow gravity draining of the vessels to a collection sump or drain drum. The drainage sump/drum will be connected to the decant tank.

3.4.2 Air Stripper (Optional)

The proposed VOC treatment process operations includes the optional installation of an air stripper. The bench-scale study and actual operational data has shown that treatment with GAC is sufficient to meet the expected BSA discharge criteria; however, VOC removal with an air stripper prior to GAC treatment may be operationally beneficial to reduce GAC consumption, reduce GAC vessel sizing, and reduce carbon change-out frequency. The decision to install an air stripper will be based on further assessment of these long-term operational considerations.

A commercially available air stripper modeling tool[11] was used to estimate potential emissions from a 6-tray air stripper with a design flow rate of 100 gpm at an air flow of 320 cubic feet per minute (cfm). Influent VOC concentrations to the air stripper model were based on the (1) average of actual influent concentrations to the existing GAC tanks from samples collected in May 2022, November 2022, and December 2022 or (2) bench-scale treatability composite samples results if an analyte was not-detected in the influent GAC data (Table 4).

Parameter	Influent Concentration (ug/L)	Estimated Effluent	Estimated Emissions (lbs/hr)

[11] https://qedenv-modeler-slim.com/cgi-bin/api_model_1_0.pl.

		Concentration (ug/L	
Benzene	32	1.2	0.00154
Ethylbenzene	3	0.1	0.00015
Chlorobenzene	1526	105.7	0.07112
p-xylene	3	0.1	0.00014
Toluene	2	0.1	0.00010
Naphthalene	11	9	0.00010

Air strippers for remedial systems are defined as a trivial activity under 6NYCRR 201-3.3(c)(29). Benzene is the only High Toxicity Air Contaminant (HTAC) presumed to be potentially present at sufficient concentration to the air stripper influent based on the historical data (GWTF and SMP monitoring) and bench-scale testing. The estimated benzene mass emission of 0.00154 lbs./hr [13.5 pounds per year (lbs./year)] is well below the 100 lb./year and 0.011 lbs./hr emissions threshold requiring treatment as defined in 6NYCRR 212-2.2.

Similarly, the total non-HTAC VOC emissions of 0.073 lbs./hr is well below the emissions threshold of 0.5 lbs./hr that would require treatment. Inventum notes that these are conservative estimates as the calculated emissions values assume an average annual flow rate of 100 gpm and 100-percent system runtime, whereas the actual average annual flow rate and runtime will be less.

A final air emission model will be run based on the final equipment selection, operating protocols, and will be provided to the NYSDEC prior to any equipment installation. Space will be reserved in the new treatment building for Vapor Granular Activated Carbon (VGAC) vessels should routine system monitoring/sampling indicate a future need for air stripper emissions treatment.

3.5 Decant Tank

A 2,000-gallon decant tank will be installed to contain backwash water from the multimedia filters and GAC vessels. Backwash water accumulated in the decant tank will be periodically pumped back to the EQ tank via a dedicated transfer pump skid. The transfer pump skid will be a duplex pump skid with a primary and backup pump plumbed in parallel. If the primary pump is taken down for maintenance or shuts down during operation the backup pump will engage to keep the level in the decant tank below the design level.

The decant tank will be cleaned periodically to remove accumulated solids/sludge in accordance with the O&M Plan and monitoring by the operator. A sample of the solid/sludge will be collected after sufficient accumulation and tested and profiled for disposal.

3.6 Effluent Tank

Treated water processed through the GAC vessels will flow to a 5,000-gallon (nominal) effluent holding tank which will also serve as the backwash supply water holding tank. The treated effluent will be pumped to the BSA discharge manhole through an annually calibrated totalizing flow meter via a dedicated transfer pump skid. The transfer pump skid will be a duplex pump skid with a primary and backup pump plumbed in parallel. If the primary pump is taken down for maintenance or shuts down during operation the backup

pump will engage to keep the level in the effluent tank below the design level. A sample tap will be installed following the flow meter to allow collection of periodic samples of treated effluent for compliance with the BSA discharge permit.

A separate backwash duplex pump skid with a primary and backup pump plumbed in parallel will be connected to the effluent tank. The pump skid will be plumbed into the GAC vessels and multimedia filter assembly to supply water for flushing the filtration units.

3.7 Control System Description

The following sub-section provides a discussion of the groundwater treatment control logic and functionality and are the minimum capabilities for the system.

3.7.1 Control Panel and Logic Overview

The control panel will be equipped with an industrial workstation from which the on-site operator can monitor and control all automated processes in the system. The system will be designed for automatic and unattended operation and will allow remote monitoring. The system will allow for datalogging of all analog process variables, discrete status variables, and alarms. The control system will be capable of sending text and e-mails to notify select operating and supervisory personnel of conditions requiring attention in accordance with the O&M Plan.

Software running on the operator's workstation will provide graphical images of the GWTF processes and equipment. Graphical control panels will be provided for:

- System-wide Start, Stop, and Reset;
- Motor push buttons for Start, Stop, Auto, and Manual;
- Real-time display of all analog inputs including individual extraction well groundwater influent flow rate, totalized gallons, and metering pump dosage rates (chemical sequestrant);
- Alarm conditions on a Process and Instruction Diagram (P&ID) formatted screen; and an
- Alarm summary screen with push buttons for alarm acknowledgement.

The control system will be programmed with ladder logic to implement interlocks, control system processes, cycle process equipment, initiate local and remote alarms, and safely start up and shut down the system.

3.7.2 Extraction Pump Control

The flow rate at each extraction well will be controlled automatically by the system based on maintaining a real-time minimum 0.5-foot inward head differential between exterior observation well OW-3E and interior observation well OW-3I.

The real-time head differential between exterior and interior observation wells were recorded during the corrective measures pumping test evaluation (Figure 5). This data showed that the drawdown response at OW-3I to a similar pumping rate was muted (e.g., less drawdown at similar pumping rate) compared to the interior observations well pairs further north and behind the concrete and sheet pile walls (OW-5I and OW-6I). As an example, there was an induced inward head differential of approximately 0.5 to 0.75-feet at OW-3I at a pumping rate of approximately 7 gpm during the test. Comparatively, the induced inward head differential at a similar pumping rate at OW-5I and OW-6I was on the order of 1.5 to 2-feet. This shows that the monitoring at the OW-3 well pair centrally located along the VHB can act as a surrogate for the minimum pumping requirements along the entire length of the wall.

Maintaining a real-time minimum 0.5-foot inward head differential between OW-3E and OW-3I and transposing that same flow rate across the other five extraction wells in the network should induce a consistent inward gradient across the length of the VHB. Inspections and water level gauging during the initial operating period and as part of the long-term SMP will be conducted to confirm the control plan.

Pressure transducers installed in OW-3E and OW-3I will be tied to the control system via direct 4-20 mA control wiring or wireless (radio frequency or modem based) connection. If the extraction well control system is in AUTO mode, the speed of the extraction well pumps will be automatically adjusted through an analog output to the pump controllers to maintain the head differential set point. The control system will also be designed to allow for manual control of the pump speed(s).

3.8 Treatment Building

A building will be constructed to house the upgraded GWTF. The building will be constructed near the existing building to minimize the need for additional trenching and piping. A preliminary layout is provided in Figure 4. This layout may be modified based on final equipment selection and building specifications. A single process room will be provided to house all treatment equipment (Figure 4). Additional working space may also be provided for OM&M personnel. Additional facility space may be provided to segregate electrical and process controls. The process room will be served by an overhead roll-up door. The facility dimensions will be based on final equipment selection; however, a structure with minimum dimensions of 50-feet by 30-feet is likely required.

The treatment building will be a pre-engineered metal building, enclosed with prefinished metal roofing and siding. The structure will be designed to allow attachment of pipe supports and have a minimum of 16-feet of clearance under the steel roof framing. The building will be equipped with a floor sump to prevent spills from exiting the building. The floor sump will have a pump piped to the EQ Tank and will be outfitted with level alarms. Actuation of the floor sump level alarms will notify O&M personnel and automatically shut off the extraction system if the sump pump should fail to maintain the sump water level.

New building foundations will be necessary; however, the type and specifications will be determined based on the final building type and dimensions. Any soils excavated for foundation construction will be managed in accordance with the Excavation Work Plan (EWP) and as further summarized in Section 4.3 of this document.

Local building permits required from the City of Buffalo will be obtained and provided in the construction completion report and annual PRR.

3.8.1 Existing Equipment

The existing treatment system will be decommissioned, and it is not anticipated that any of the equipment will be utilized in the upgraded system. Any water in the treatment system equipment and piping network will be drained as part of the decommissioning process. The drained water will be temporarily stored in a tank or totes and will be processed through the new system once online.

All treatment media requiring disposal (GAC and MMF material) will be profiled and disposed of in accordance with local, state, and federal regulations.

The ultimate disposition of the treatment equipment and treatment building have not been determined at this time. The holding tanks, bag filter assembly, and transfer pumps may be repurposed for use on other sites.

3.9 PFAS

Sampling of the GWTF effluent for emerging contaminants (PFAS and 1,4-Dioxane) is conducted by SBD on an annual basis as a component of existing site management requirements. The most recent sampling was conducted in September 2022 and reported in the January 13, 2023 Periodic Review Report (PRR) for the reporting period of October 5, 2021 to October 5, 2022. PFAS and 1,4-Dioxane were not detected at concentrations above any existing NYSDEC standards or guidance values promulgated at that time.

The NYSDEC has since issued an addendum to the New York State Ambient Water Quality Standards and Guidance Values[12] which established guidance values for Class GA Waters of 0.35 micrograms per liter (ug/L) for 1,4-Dioxane, 2.7 nanograms per liter (ng/L) for Perfluorooctane Sulfonic Acid (PFOS), and 6.7 ng/L for Perfluorooctanoic Acid (PFOA). The September 2022 effluent sampling results were below these new guidance values (Table 7). Furthermore, the September 2022 effluent sampling results are also below the Maximum Contaminant Levels (MCLs) [PFOA – 10 ng/L; PFOS – 10 ng/L; 1,4-Dioxane – 1 ug/L] adopted by NYSDOH.

There are no effluent limits for PFAS in the existing BSA discharge permit and the BSA's current State Pollutant Discharge Elimination System (SPDES) permit does not have a PFAS limit. Inventum understands that NYSDEC is working on proposing draft guidance to address emerging contaminants discharged through Publicly Owned Treatment Works (POTWs). To that end, an assessment was conducted of additional unit operations that may be required in the future for treatment of PFAS.

GAC is the most common treatment for ex-situ PFAS removal in groundwater. Ion exchange resins and reverse osmosis process operations have also been shown to be successful in PFAS removal. As described previously, the effluent samples collected in September 2022 were below any existing NYSDEC guidance values and the NYSDOH MCLs. It is assumed that any future discharge limitations from the BSA would be within this range of concentrations.

The existing GAC process operations appears to be effective at reducing PFAS concentrations in the effluent to below potential future discharge criteria (Table 7). No additional future process operations are anticipated at this time. The addition of a PFAS discharge limitation would likely entail additional O&M sampling of the influent into the GAC tanks to determine if those compounds alter the anticipated change out frequency of the material (i.e., determine breakthrough).

[12]NYSDEC. 2023 Addendum to June 1998 Division of Water Technical and Operational Guidance Series (TOGS) No. 1.1.1

4 Extraction System

The groundwater extraction system will consist of operation of extraction wells EW-1, EW-2, EW-4A, EW-6, EW-7, and EW-8 (Appendix E). EW-1 and EW-2 are existing wells and their assemblies (well vaults, conveyance piping, electrical and control wiring) will be minimally modified to connect to the upgraded GWTF. Extraction Wells EW-4A, EW-6, EW-7, and EW-8 will require new connections to the upgraded GWTF. Further details on each of the extraction wells is provided in the construction schedule below:

Well ID	Date Installed	Diameter (nominal)	Casing/Screen Construction	Total Depth (ft. bgs)	Screen Interval (ft. bgs)	
EW-1	June 2006	6-inch	Stainless Steel	32	22	27
EW-2	June 2006	6-inch	Stainless Steel	34	24	29
EW-4A	May 2020	4-inch	Sch 40. PVC	34.5	13.5	33.5
EW-6	May 2020	4-inch	Sch 40. PVC	37.5	15.5	35.5
EW-7	May 2020	4-inch	Sch 40. PVC	34.5	13.5	33.5
EW-8	May 2020	4-inch	Sch 40. PVC	34	13	33

Table 4.1: Extraction Well Construction Schedule

The existing operational extraction wells (EW-1 and EW-2) are enclosed in 4-foot diameter concrete vaults. From the well vault, the extracted water is conveyed to the GWTF via underground 1-inch diameter high density polyethylene (HDPE) piping. Each extraction well is piped separately and shares common trenching when practical (Appendix E). The existing trenching and piping will remain. There are small-sections of above-grade piping from EW-1 and EW-2 at the outdoor penetration to the existing GWTF and this is where splices will be made to connect into the upgraded GWTF.

The existing elevated piping from Area D will be buried from the existing below/above-grade transition and extended as necessary to connect to the new treatment building.

The piping from the existing extraction wells eliminated from the system (EW-3, EW-4, and EW-5) will remain in place and will be repurposed for the new extraction wells. The pumps will be removed from extraction wells EW-3, EW-4, and EW-5 and the well heads and all lateral piping into the idled wells will be capped . The pumps and all down well equipment will be removed and cleaned. The pumps may be repurposed for use on other Sites or held as temporary spares for the upgraded system.

The new extraction wells (EW-4A, EW-6, EW-7, and EW-8) will be enclosed in lockable nominal 48-inch square (min.) water-resistant steel skirted (48-inch depth) well vaults with assisted lift. The vaults will be rated to meet AASHTO H20 wheel loading.

4.1 Extraction Pumps

The extraction pumps installed in all wells (new and existing) will be Grundfos Redi-Flo 3 (Model 22Redi-Flo3-180, or equivalent) electric submersible pumps capable of maintaining a varying flow rate of 5 to 16 gpm at a maximum total dynamic head of 216 feet. Each extraction well will have a dedicated pump controller with a variable frequency drive (VFD) in the pump control panel at the GWTF. The flow rate at each extraction well will be controlled automatically by the system based on maintaining a real-time

minimum 0.5-foot inward head differential between exterior observation well OW-3E and interior observation well OW-3I.

The intake of each extraction pump will be set approximately 1 to 2-feet above the bottom the screened interval.

The existing well pumps in the Area D extraction wells will remain in place.

4.2 New Conveyance Piping

Water from the four new extraction wells (EW-4A, EW-6, EW-7, and EW-8) will be conveyed to the upgraded GWTF via underground 1-inch diameter piping. Each extraction well will be piped separately, but depending on location, will tie into and reuse existing piping from the three extraction wells removed from the system (Appendix E):

- EW-8 will be connected via a new lateral to the existing EW-4 location where it will tie into the existing line coming from EW-5;
- EW-7A will be connected via a new lateral to the existing EW-4 location where it will tie into the existing line from EW-4;
- EW-4A will be connected via a new lateral to the existing EW-3A location where it will tie into the existing line from EW-3A; and
- EW-6 will be connected via a new lateral to the GWTF.

The extraction well conveyance piping will transition to above-grade at the entrance to the new treatment building. All above-grade piping will be Schedule 80 PVC, heat-traced, and insulated.

The conveyance line network from the GWTF to the four new extraction wells will be pressure tested prior to backfill. Tie-in vaults will be installed at each location to enable access and maintenance of connection fittings between new and existing piping. Cleanout stations will be constructed at each new well vault to facilitate maintenance of the extraction lines. Electrical and control wiring conduit will be installed within the same trench as the conveyance piping.

Around new laterals, a bedding sand will be emplaced surrounding and above (min. 6-inches) the conveyance lines and conduit. Magnetic locating tape will be placed above all conveyance lines and conduit. The laterals will be installed a minimum of 30-inches below ground surface. The remaining backfill for the trench will consist of on-site soils approved for re-use in accordance with the BCP Site Excavation Work Plan (EWP) and as summarized in Section 4.3. The upper one foot of backfill will be consistent with the commercial use compliant cover-system and include a demarcation barrier.

Inventum will submit an Import Request Form to the NYSDEC for approval prior to importing any backfill material onto the BCP Site.

4.3 Trenching

Excavation and management of trench soils will be in accordance with the approved BCP Site EWP and Health and Safety Plan (HASP)[13]. These are included for reference in Appendix F and G. Plan and elevation typical details of the conveyance pipe trenching are provided in the drawings in Appendix E of this design report.

[13] Former Buffalo Color Corporation Site – Areas A and B. Site Management Plan. Buffalo, New York. NYSDEC Site # C915230. AMEC Environment and Infrastructure, Inc. May 2015.

The upper 1-foot of clean cover soils will be stripped along the entire length of the conveyance trench. These materials may be stockpiled on poly sheeting (min 10-mil thickness) and covered for re-use as the commercial/industrial use compliant cover after pipe installation and backfill.

Soils beneath the existing cover system along the trench line will be stockpiled on poly sheeting (min 10 mil thickness) and screened with a photoionization detector (PID) in accordance with the EWP. Excavated soils exhibiting any indications of "gross contamination" will be segregated and stockpiled separately from other material. The soil will be considered "grossly contaminated" if there are visual indications of NAPL or other separate phase materials and/or sustained PID readings of greater than 10 parts per million (ppm) above background over a 1-minute interval. Discolored soil will not be considered "grossly contaminated" absent any of the other indications. Grossly contaminated soil will not be reused as backfill. After all excavations are completed, identified grossly contaminated material will be sampled and profiled for off-site disposal in accordance with all local, state, and federal regulations.

Soils excavated beneath the cover system that is not "grossly contaminated" may be reused as backfill at depths greater than one foot except within the limits of the conveyance trenches. One composite sample will be collected from every 100 cubic yards of stockpiled soil intended for re-use as backfill beneath the cover system. The composite sample(s) will be analyzed for Target Compound List (TCL) VOCs, TCL SVOCs (including aniline), Polychlorinated Biphenyls (PCBs), and Target Analyte List (TAL) Metals. The soils will be considered to meet the Site-Specific Action Levels (SSALs) and allowed for re-use if concentrations meet the following parameters:

- Individual VOCs are less than the current 6 NYCRR Part 375 Commercial Use Soil Cleanup Objectives (SCOs);
- Total SVOCs are less than 500 ppm;
- Individual PCB Aroclors are less than the current Commercial Use SCOs; and
- Individual metals are less than 10 times (10x) the Commercial Use SCOs.

Soils that are not "grossly contaminated" but do not meet the SSALs and excess soils not intended for reuse as onsite backfill will be profiled for off-site disposal.

4.3.1 Vertical Hydraulic Barrier

A trench will be excavated across a section of the VHB between observation wells OW-3I and OW-3E to facilitate installation of control wiring to the transducer in OW-3E (Appendix E). The width and depth of the trench will be such that there will be no disturbance to the VHB at the crossing location. The conduit for the control wiring will be at a depth (2 to 3 feet bgs) above the cement-bentonite barrier. Excavation, stockpiling, and backfill of the trench will be in accordance with the EWP.

4.4 Air Monitoring

Perimeter air monitoring for VOCs and particulates will be conducted during all intrusive activities in accordance with the EWP and Community Air Monitoring Plan (CAMP; Appendix H). All VOC and particulate readings will be recorded and available for NYSDEC and NYSDOH review. If required, water will be used for dust suppression.

5 Startup

System startup will consist of a series of tests and procedures to confirm the GWTF is operating within the design range and achieving the CM objective of reestablishing consistent hydraulic gradients along the Buffalo River.

Startup testing logs will be maintained and provided as attachments to the completion report.

5.1 Commissioning

Pressure testing of all new and existing interior/exterior piping will be conducted. All 1-inch HDPE extraction well discharge piping will be pressure-checked at a sustained pressure between 140 and 150 pounds per square inch (psi) for a minimum of 1-hour. Pressure testing may be conducted in segments to allow progression of backfill.

Pressure testing of all prefabricated treatment components may be conducted offsite and by the vendor prior to shipment and delivery. This may include the bag filter, multimedia filter, and GAC skid-mounted assemblies.

Commissioning of the treatment system will include calibration, configuration, and testing of the associated process and control systems including all level switches, pressure switches, as well as alarm and remote connectivity/notification functionality. The effluent flow meter will be calibrated in accordance with BSA requirements.

5.2 Initial Operations

The initial operational period shall be the first 30 calendar days of full flow operation.

5.2.1 Hydraulic Control Monitoring

Transducers will be installed in interior/exterior observations well pairs OW-1, OW-3, and OW-6 and allowed to collect water level data for a period of 24-hours prior to full-scale operation. The transducers will be programmed to monitor and record water levels at 5-minute intervals during that period. Manual water level readings will also be collected periodically from each of the existing monitoring wells onsite (RFI-26 and ICM-101), the other observation well pairs (OW-2, OW-4, and OW-5), and the former extraction wells (EW-3A, EW-4, and EW-5).

The transducers will remain in the three observation well pairs (OW-1, OW-3, and OW-6) collecting water level data over the first 72-hours of full-scale operation. Manual water levels will also continue to be collected periodically from the existing monitoring wells, other observation well pairs, former extraction wells, and the Buffalo River stadia rod.

The primary goal of this initial transducer and manual water level monitoring is to observe the response of the exterior observation wells to fluctuations in river water levels as a guide to refining the set point in the permanent transducer in the OW-3 well pair that controls the extraction pump flow rates. The initial set point will be to maintain a 0.5-foot negative head differential between the interior and exterior well pair. The initial set point may be adjusted based on the water level monitoring to confirm hydraulic control has been reestablished across the entire length of the VHB. The water level data will also be utilized to document a baseline radius-of-influence for each extraction well.

Manual water level readings at all the observation well pairs, monitoring wells, and former extraction wells will be collected at intervals of 7-days and 30-days post-full-scale operation. Hydraulic control monitoring after 30-days will be in accordance with the SMP and O&M Plan.

5.2.2 Treatment System Sampling

Analytical samples (field and laboratory) will be collected during the initial startup and operations to confirm process unit functionality/efficiency and compliance with the BSA discharge permit. The proposed samples are summarized in the table below and will be documented in the O&M Plan:

Location	Collection Time	Analysis
Combined Area A Influent	After 24-hr Runtime After 15-calendar days Runtime	All BSA Discharge Parameters; Oil and Grease; Total and Dissolved Iron/Calcium
OWS Effluent	After 24-hr Runtime	Oil and Grease [Laboratory] Total Iron [HACH Method 8008]
Bag Filter Influent	After 24-hr Runtime	Total Iron [HACH Method 8008] Total Solids; Total Suspended Solids [Laboratory]
Bag Filter Influent	After Sequestrant Dosage Adjustment(s)	Total Iron [HACH Method 8008]
Multimedia Filter Effluent	After 24-hr Runtime	Total Solids; Total Suspended Solids [Laboratory]
GAC Influent	After 24-hr Runtime After 15-calendar days Runtime	VOCs/SVOCs [Laboratory Methods 624/625]
BSA Discharge	After 24-hr Runtime After 15-calendar days Runtime	All BSA Discharge Parameters
Air Stripper Discharge (*if installed*)	After 24-hr Runtime After 15-calendar days Runtime	VOCs (TO-15)
Air Stripper Discharge (*if installed*)	Hourly (min) during Startup	Photoionization Detector

Additional sampling may be conducted based on observations made during the commissioning and startup process and based on the results from the samples listed. All results will be tabulated and provided in the construction completion report along with the laboratory reports.

6 Schedule

An updated project schedule is provided in Figure 6 and includes an initial construction schedule. The construction schedule will be updated with additional details and provided with the 15-day EWP required notice to the NYSDEC prior to any intrusive activities. The 15-day notification will include a figure of all excavation locations.

6.1 BSA Permitting

The GWTF is currently operating, and treated waters are discharged to the BSA under Permit No. 20-06-BU109 which expires on May 31, 2023. The current discharge permit allows a maximum daily discharge of 50,000 gallons per day (gpd) approximately 1.5 million gallons per month. A new permit application will be submitted to the BSA to account for the production increase associated with the system upgrades. The permit application will request a 150,000 gpd maximum daily discharge limit.

Inventum has had discussions with the BSA on the permit modifications indicating there is sufficient treatment capacity within the BSA system. The discharge sampling requirements under the existing BSA permit reflect a broad range of constituents, and at the time of the discussions, the BSA personnel did not anticipate any additional parameters would be required just because of an increase in daily discharge.

The permit application for the upgraded system will be submitted in February 2023. Construction and startup of the upgraded system is not anticipated to occur (Figure 5) until after expiration of the existing permit. The existing permit will be renewed or extended for a period allowable by the BSA to enable continued operation of the existing system during the system upgrade construction.

6.2 Building Permits

Any building and/or demolition permits required by the City of Buffalo will be obtained prior to construction. Copies of these permits will be included in the construction completion report and annual PRR.

6.3 Construction Sequencing-

Construction of the upgraded system will proceed in several phases to minimize downtime of the existing system:

Phase 1

- Offsite assembly, testing, and shipping of skid-mounted unit operations;
- New treatment building construction. Connection to main electrical supply and BSA discharge force main;
- Groundwater treatment equipment installation and initial testing;
- Construction of new extraction well vaults (EW-4A, EW-6, EW-7, and EW-8) and splice vaults; and
- Trenching and construction of new conveyance laterals.

It is anticipated that there will be minimal downtime of the existing system during Phase 1. There may be a period of 24 to 72-hours where the system is down to allow for connection to the main electrical supply.

Phase 2

- Connection of new conveyance laterals to existing laterals;

- Installation of new pumps and control wiring (if necessary) to existing extraction wells EW-1 and EW-2;
- Connection of Area D piping to new treatment building;
- Connection of new and existing laterals to new treatment building; and
- System startup and testing.

It is anticipated that there may be a continuous period of 3 to 6-weeks where there is no groundwater extraction during Phase 2. Although there may be an outward gradient, it is unlikely there will be flow through the VHB during this limited period.

7 Reporting

Several phases of reporting will be completed following installation and full-scale operation of the upgraded groundwater treatment system (Figure 5). A summary of the post-construction documentation is provided in the subsections below.

7.1 Construction Completion Report

A Corrective Measures Construction Completion Report (CCR) will be prepared and submitted to the NYSDEC within 60-days after the initial 30-day startup/monitoring period. The CCR will consist of the following components:

- Design overview and documentation of remedial construction activities including a photo documentation log;
- Summary of unit operations treatment equipment specifications;
- Summary of extraction wells and piping construction/installation;
- Summary of the water level data before and during startup;
- Construction and inspection forms;
- Disposal manifests and import request forms;
- Summary of startup and commissioning procedures and findings;
- Tabular summary of field and laboratory data collected, and inclusion of all laboratory data reports;
- Tabular summary of CAMP monitoring data; and
- As-Built drawings.

The CCR will be certified by a licensed Professional Engineer in the State of New York.

7.2 Operations and Maintenance Manual

An O&M Manual will be prepared documenting the operations procedures for the upgraded groundwater treatment system. The O&M Manual will be submitted to the NYSDEC within 60-days after the initial 30-day startup/monitoring period. The O&M Manual will consist of the following components:

- A summary of the treatment system objectives, design overview, and requirements for O&M;
- A discussion of the system control logic and functionality;
- Procedures for the set-up/start-up of each piece of treatment equipment;
- A description of normal operating procedures including scenarios for startup, operation, and shutdown;
- General procedures for routine preventative maintenance, inspections, and of treatment equipment;
- Alarm and shutdown control operation and response;
- Manufacturer-specific O&M literature/manuals;
- Sampling and monitoring activities related to the routine operation of the treatment equipment;
- General discussion of the health and safety issues associated with the O&M of the treatment equipment;
- Recordkeeping and reporting requirements applicable to long-term O&M; and
- Relevant tables, drawings, and appendices including Safety Data Sheets (SDSs) for chemical sequestrants and templates for inspection/reporting forms.

7.3 BCP Site Documentation

An updated Final Engineering Report (FER) and Site Management Plan (SMP) will be prepared in accordance with DER-10[14] and submitted to the NYSDEC within 30-days of approval of the CCR and O&M Manual. The CCR will be included as an appendix to the FER and the O&M Manual will be included as an appendix to the SMP.

[14] NYSDEC, DER-10, Technical Guidance for Site Investigation and Remediation, Issued on May 3, 2010.

Tables

Table 1
Area A Hydrographs - October 2021 - October 2022
South Buffalo Development - Area A

Buffalo Color, Area A - Buffalo River Water Elevations (FASL), Observation Well Groundwater Elevations (FASL), Elevation Differentials (FT) & Extraction Well Network Totals (GAL)

Abbreviations: River Stadia Rod (RSR), Observation Well (OW), Elevation Differential (ED), Extraction Well (EW)

2021	RIVER	A-OW SET (1)			A-OW SET (2)			A-OW SET (3)			A-OW SET (4)			A-OW SET (5)			A-OW SET (6)			AVERAGES			A-EW					
Date	**RSR**	**1I**	**1E**	**1ED**	**2I**	**2E**	**2ED**	**3I**	**3E**	**3ED**	**4I**	**4E**	**4ED**	**5I**	**5E**	**5ED**	**6I**	**6E**	**6ED**	**I**	**E**	**ED**	**1**	**2**	**3A**	**4**	**5**	**TOTAL**
21-Jan	573.18	572.89	573.37	0.47	572.62	573.31	0.69	573.54	573.24	-0.30	573.77	573.12	-0.65	573.72	572.99	-0.73	573.74	573.18	-0.56	573.38	573.20	-0.18	404,808	23,163	14,068	31,855	24,600	498,494
26-Feb	572.58	571.53	571.97	0.43	571.42	573.45	2.03	572.78	572.36	-0.42	572.73	572.38	-0.35	572.80	572.50	-0.30	572.82	572.50	-0.32	572.35	572.52	0.18	465,512	24,394	14,600	27,143	25,181	556,830
31-Mar	572.58	572.01	572.59	0.57	571.82	572.58	0.76	572.88	572.52	-0.36	573.20	572.50	-0.70	573.30	572.55	-0.75	573.30	572.72	-0.58	572.75	572.57	-0.18	341,164	16,818	10,135	17,392	20,450	405,959
29-Apr	572.88	572.07	572.83	0.75	571.92	572.80	0.88	572.98	572.86	-0.12	573.19	572.84	-0.35	573.19	572.93	-0.26	573.20	572.91	-0.29	572.76	572.86	0.10	328,324	16,246	9,822	19,224	22,344	395,960
28-May	573.08	572.19	572.97	0.77	571.96	573.00	1.04	572.98	573.00	0.02	573.26	573.03	-0.23	573.32	573.10	-0.22	573.34	573.09	-0.25	572.84	573.03	0.19	411,060	20,976	11,991	20,317	26,282	490,626
30-Jun	573.28	572.14	573.13	0.98	571.97	573.18	1.21	572.98	573.15	0.17	573.22	573.15	-0.07	573.31	573.27	-0.04	573.35	573.26	-0.09	572.83	573.19	0.36	241,792	12,300	7,252	12,777	15,973	290,094
30-Jul	573.78	573.01	574.47	1.45	572.84	573.61	0.77	573.72	573.70	-0.02	574.04	573.75	-0.29	574.05	573.82	-0.23	574.07	573.71	-0.36	573.62	573.84	0.22	304,676	17,094	10,035	20,578	11,207	363,590
31-Aug	572.93	572.01	572.92	0.90	571.92	572.91	0.99	572.96	572.93	-0.03	573.27	572.86	-0.41	573.39	572.85	-0.54	573.37	572.96	-0.41	572.82	572.90	0.08	351,304	18,763	11,488	18,858	26,549	426,962
30-Sep	572.98	572.12	572.87	0.74	572.14	572.81	0.67	573.15	572.85	-0.30	573.51	572.85	-0.66	573.52	573.00	-0.52	573.52	573.01	-0.51	572.99	572.90	-0.10	270,532	13,769	8,640	11,748	17,803	322,492
29-Oct	573.78	574.17	573.84	-0.34	573.63	573.65	0.02	574.58	573.72	-0.86	574.90	573.76	-1.14	574.49	573.83	-0.66	574.48	573.84	-0.64	574.37	573.77	-0.60	350,068	18,386	11,241	14,104	20,991	414,790
30-Nov	573.18	573.67	573.52	-0.16	573.28	573.25	-0.03	574.20	573.31	-0.89	574.80	573.65	-1.15	574.46	573.40	-1.06	574.41	573.48	-0.93	574.14	573.43	-0.70	311,552	16,456	10,594	12,792	23,620	375,014
29-Dec	572.28	572.76	572.56	-0.21	572.30	572.35	0.05	573.41	572.34	-1.07	573.71	572.38	-1.33	573.61	572.44	-1.17	573.60	572.66	-0.94	573.23	572.45	-0.78	355,028	18,508	11,116	13,194	19,664	417,510
Avg | Sum	***573.04***	***572.55***	***573.08***	***0.53***	***572.32***	***573.07***	***0.75***	***573.34***	***573.00***	***-0.35***	***573.63***	***573.02***	***-0.61***	***573.60***	***573.05***	***-0.54***	***573.60***	***573.11***	***-0.49***	***573.17***	***573.06***	***-0.12***	**4,135,820**	**216,873**	**130,982**	**219,982**	**254,664**	**4,958,321**

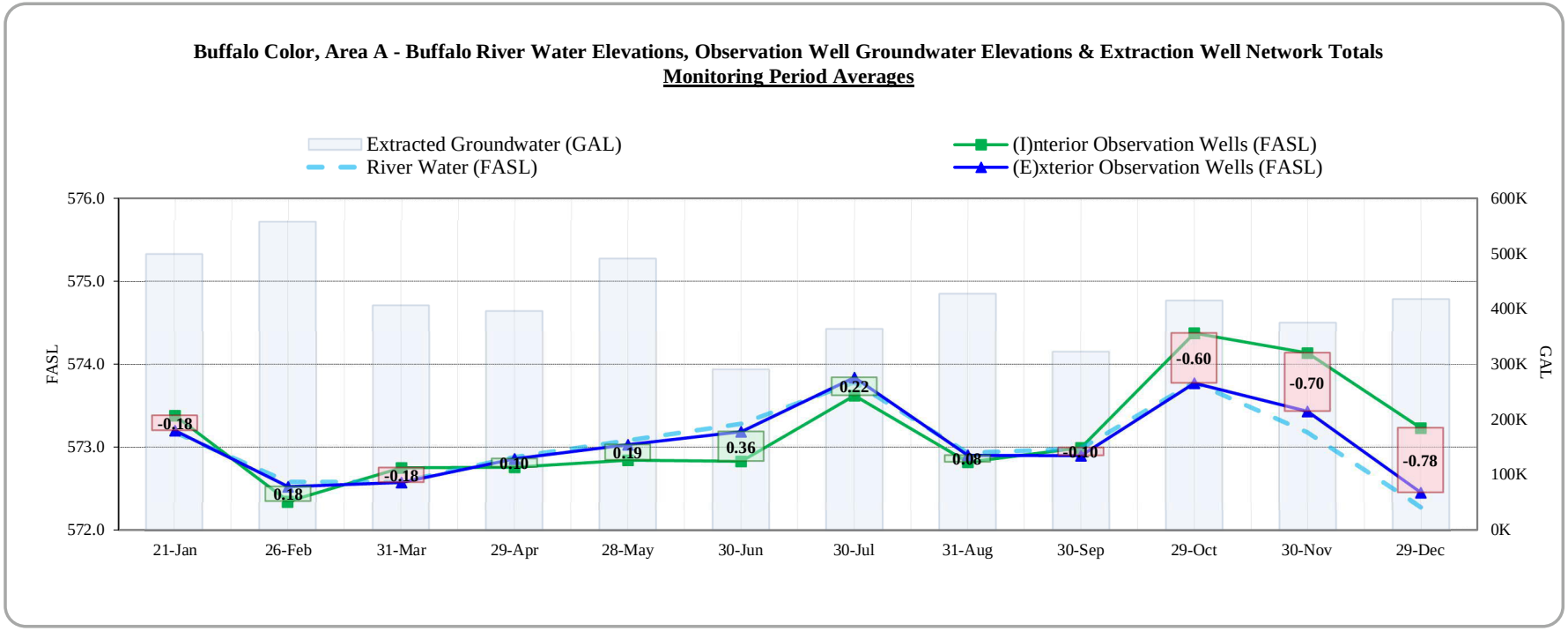

Table 1
Area A Hydrographs - October 2021 - October 2022
South Buffalo Development - Area A

Buffalo Color, Area A - Buffalo River Water Elevations, Observation Well Groundwater Elevations & Extraction Well Network Allocations

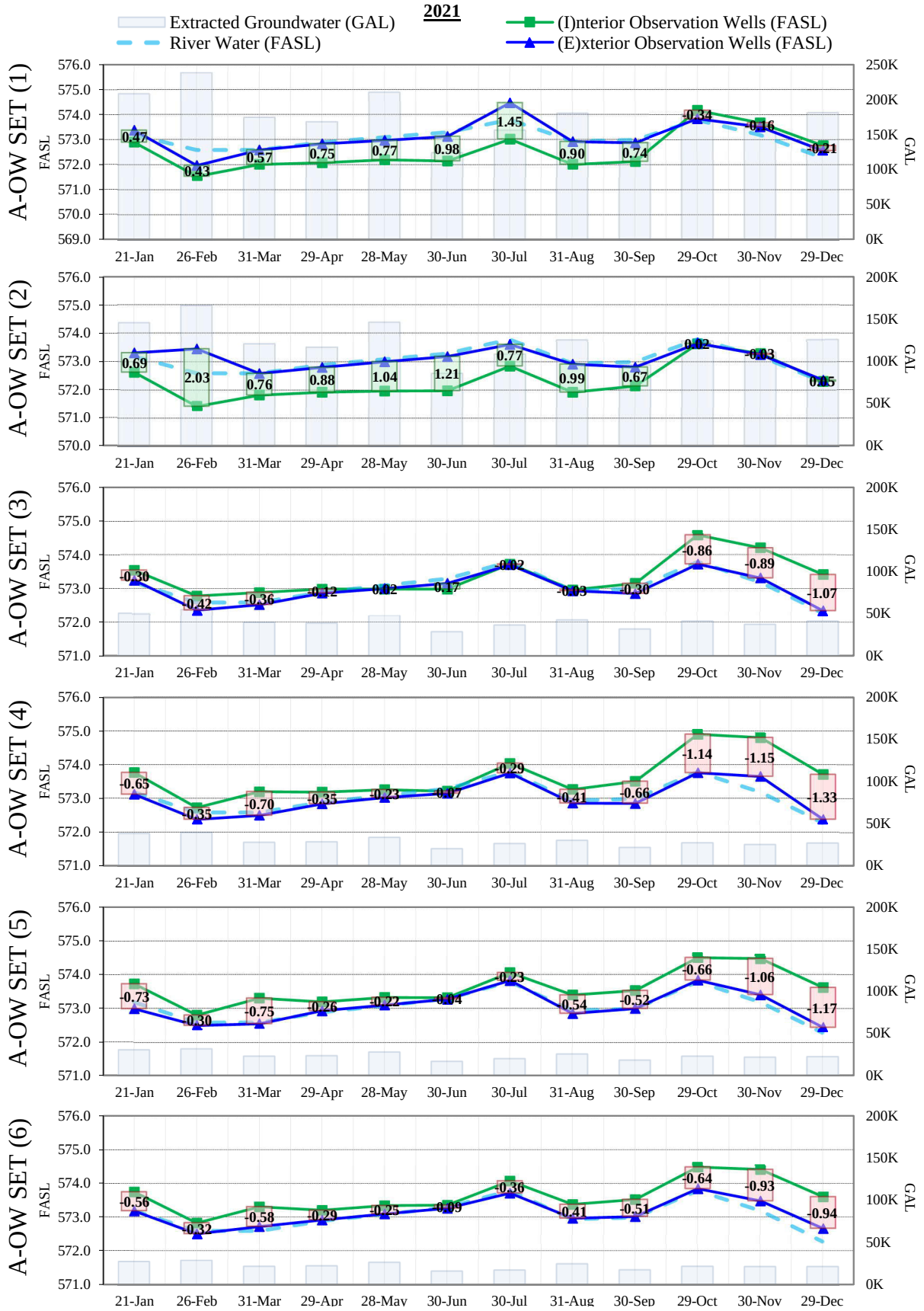

Table 1
Area A Hydrographs - October 2021 - October 2022
South Buffalo Development - Area A

Buffalo Color, Area A - Buffalo River Water Elevations (FASL), Observation Well Groundwater Elevations (FASL), Elevation Differentials (FT) & Extraction Well Network Totals (GAL)

Abbreviations: River Stadia Rod (RSR), Observation Well (OW), Elevation Differential (ED), Extraction Well (EW)

2022	RIVER	A-OW SET (1)			A-OW SET (2)			A-OW SET (3)			A-OW SET (4)			A-OW SET (5)			A-OW SET (6)			AVERAGES			A-EW					
Date	**RSR**	**1I**	**1E**	**1ED**	**2I**	**2E**	**2ED**	**3I**	**3E**	**3ED**	**4I**	**4E**	**4ED**	**5I**	**5E**	**5ED**	**6I**	**6E**	**6ED**	**I**	**E**	**ED**	**1**	**2**	**3A**	**4**	**5**	**TOTAL**
31-Jan	572.18	571.74	572.36	0.61	571.56	572.17	0.61	572.37	572.22	-0.15	572.68	573.18	0.50	572.54	572.13	-0.41	572.57	572.17	-0.40	572.24	572.37	0.13	275,713	14,406	8,283	10,009	18,809	327,220
28-Feb	572.18	573.39	572.52	-0.88	572.42	572.14	-0.28	573.49	572.09	-1.40	574.17	572.06	-2.11	573.96	572.05	-1.91	574.60	571.76	-2.84	573.67	572.10	-1.57	371,835	19,130	10,611	12,707	25,596	439,879
31-Mar	572.58	572.48	572.64	0.15	572.00	572.46	0.46	573.00	572.46	-0.54	573.57	572.48	-1.09	573.43	572.74	-0.69	573.42	572.89	-0.53	572.98	572.61	-0.37	319,456	17,170	10,340	13,903	22,503	383,372
29-Apr	572.48	571.93	572.66	0.72	571.92	572.56	0.64	573.07	572.50	-0.57	573.43	572.49	-0.94	573.38	572.50	-0.88	573.37	572.66	-0.71	572.85	572.56	-0.29	324,560	17,623	9,939	13,704	24,830	390,656
27-May	572.98	572.09	573.01	0.91	572.09	572.97	0.88	573.89	572.86	-1.03	573.48	572.78	-0.70	573.41	572.96	-0.45	573.40	573.01	-0.39	573.06	572.93	-0.13	257,868	14,561	8,472	12,009	19,618	312,528
24-Jun	573.38	572.33	573.22	0.88	572.06	573.15	1.09	573.11	573.25	0.14	573.40	573.31	-0.09	573.44	573.44	0.00	573.43	573.31	-0.12	572.96	573.28	0.32	355,056	19,301	10,814	15,063	20,925	421,159
29-Jul	572.78	571.62	572.98	1.35	571.48	572.81	1.33	572.45	572.96	0.51	572.72	572.83	0.11	572.88	572.60	-0.28	572.88	572.69	-0.19	572.34	572.81	0.47	442,820	22,599	12,817	17,432	17,966	513,634
31-Aug	572.28	570.82	572.14	1.31	570.77	571.91	1.14	571.86	572.11	0.25	572.15	572.09	-0.06	572.43	572.04	-0.39	572.47	572.21	-0.26	571.75	572.08	0.33	361,352	17,418	9,906	14,459	14,365	417,500
30-Sep	571.88	570.64	571.59	0.94	570.51	571.58	1.07	571.70	571.55	-0.15	572.03	571.58	-0.45	572.19	571.78	-0.41	572.17	571.82	-0.35	571.54	571.65	0.11	208,888	10,372	5,783	9,486	6,822	241,351
Avg | Sum	***572.52***	***571.89***	***572.56***	***0.67***	***571.65***	***572.41***	***0.77***	***572.77***	***572.44***	***-0.33***	***573.07***	***572.53***	***-0.53***	***573.08***	***572.47***	***-0.61***	***573.15***	***572.50***	***-0.65***	***572.60***	***572.49***	***-0.11***	**2,917,548**	**152,580**	**86,965**	**118,772**	**171,434**	**3,447,299**

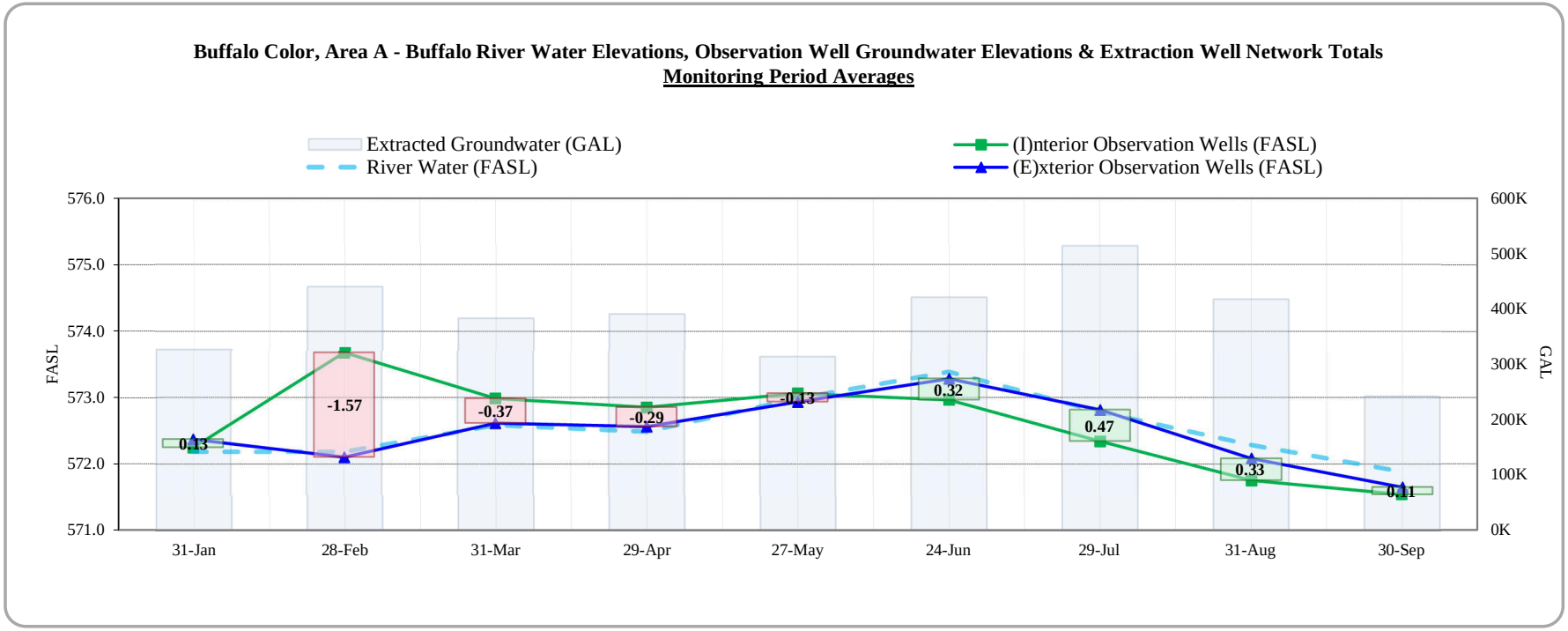

Table 1
Area A Hydrographs - October 2021 - October 2022
South Buffalo Development - Area A

Buffalo Color, Area A - Buffalo River Water Elevations, Observation Well Groundwater Elevations & Extraction Well Network Allocations

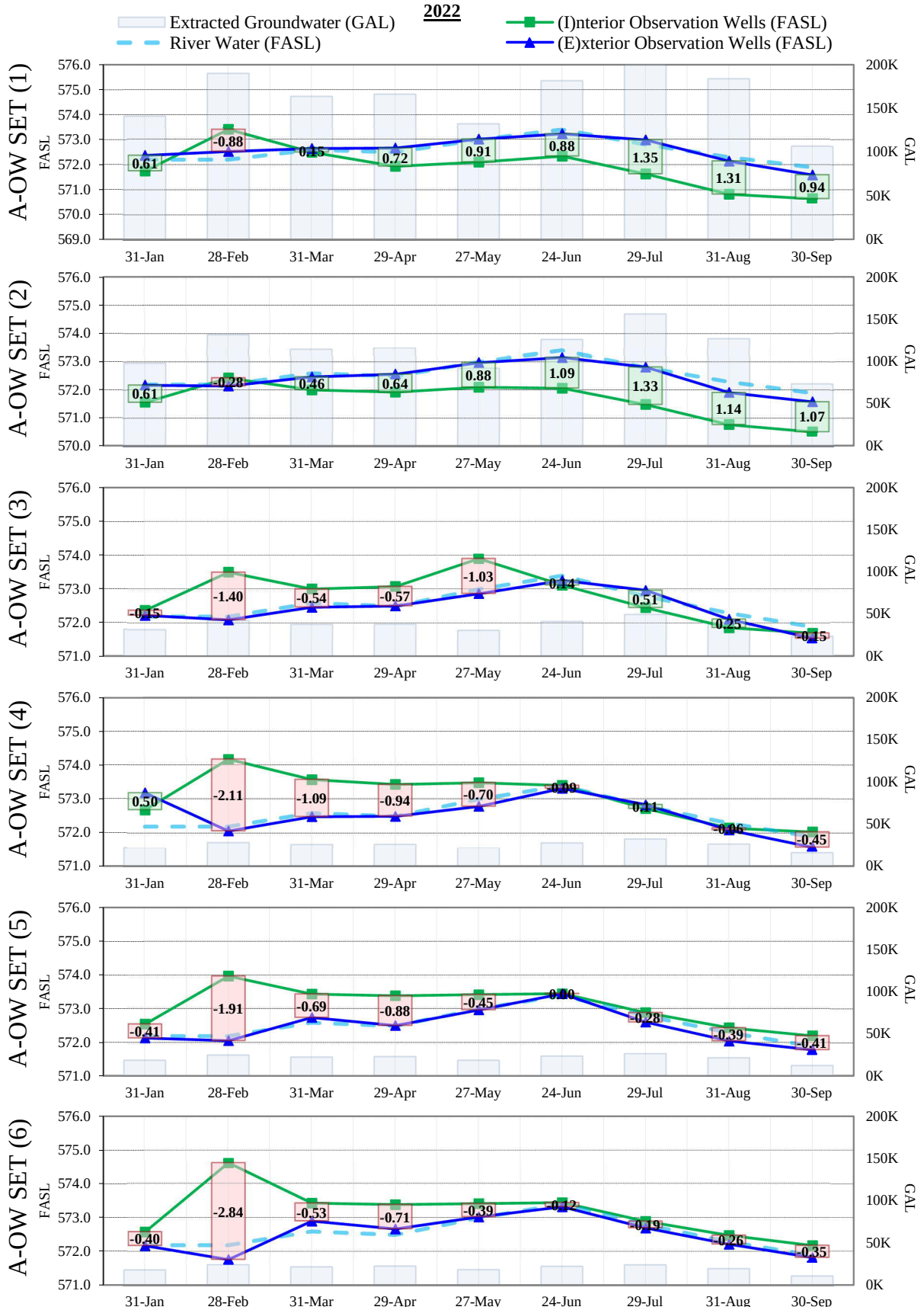

Table 2
Existing and New Extraction Well Construction Summary
South Buffalo Development - Area A

Existing Extraction Wells										
Well ID	Date Installed	Total Depth (ft. bgs)	Screen (ft. bgs)		Top of Casing Elevation (ft. AMSL)	Northing (a)	Easting (a)			
EW-1	Jun-06	32	22	27	582.49	1042883.93	1078036.05			
EW-2	Jun-06	34	24	29	582.64	1042989.17	1078144.74			
EW-3A	Jun-06	38	28	33	583.84	1043099.72	1078269.86			
EW-4	Jun-06	38	28	33	583.28	1043267.43	1078391.48			
EW-5	Jun-06	37	26.5	31.5	585.5	1043406.57	1078514.18			
New Extraction Wells										
Well ID (b)	Date Installed	Total Depth (ft. bgs)	First Water (ft. bgs)	Screen (ft. bgs)		Filter Pack (ft. bgs)		Sump (ft. bgs)		Static DTW (ft. bTOR)
EW-4A	May-20	34.5	10.5	13.5	33.5	8.5	34.5	33.5	34.5	11.4
EW-6	May-20	37.5	11	15.5	35.5	10.5	37.5	35.5	37.5	11.8
EW-7	May-20	34.5	12.5	13.5	33.5	8.5	34.5	33.5	34.5	10.5
EW-8	May-20	34	14	13	33	8	34	33	34	12

a/Coordinates referenced to NY State Plan (West Zone, US Survey Feet)
b/New extraction well survey to be completed during new system initial operation period.
ftbTOR: feet below top of riser

Table 3
Treatability Testing Results
Influent Characterization
South Buffalo Development - Area A

Parameter	Results (ug/L)	Q	BSA Limit (Note 2)	NYS Class GA (Note 2)
Methylene chloride	ND (1.1)		-	5
1,1-Dichloroethane	ND (0.79)		-	5
Chloroform	ND (0.76)		-	7
Carbon tetrachloride	ND (0.49)		-	5
1,2-Dichloropropane	ND (0.93)		-	1
Dibromochloromethane	ND (0.54)		-	50
1,1,2-Trichloroethane	ND (0.68)		-	1
2-Chloroethylvinyl ether	ND (0.69)		-	-
Tetrachloroethene	ND (0.52)		-	5
Chlorobenzene	0.67	J	310	5
Trichlorofluoromethane	ND (0.55)		-	5
1,2-Dichloroethane	ND (0.94)		-	0.6
1,1,1-Trichloroethane	ND (0.57)		-	5
Bromodichloromethane	ND (0.55)		-	50
trans-1,3-Dichloropropene	ND (0.62)		-	0.4
cis-1,3-Dichloropropene	ND (0.67)		-	0.4
Bromoform	ND (0.43)		-	50
1,1,2,2-Tetrachloroethane	ND (0.41)		-	5
Benzene	ND (0.77)		142	1
Toluene	ND (0.63)		-	5
Ethylbenzene	ND (0.56)		-	5
Chloromethane	ND (2.1)		-	-
Bromomethane	ND (2.4)		-	5
Vinyl chloride	ND (0.75)		-	2
Chloroethane	ND (0.74)		-	5
1,1-Dichloroethene	ND (0.62)		-	5
trans-1,2-Dichloroethene	ND (0.66)		-	5
cis-1,2-Dichloroethene	ND (0.34)		-	5
Trichloroethene	ND (0.67)		-	5
1,2-Dichlorobenzene	ND (0.55)		472	3
1,3-Dichlorobenzene	ND (0.55)		-	3
1,4-Dichlorobenzene	ND (0.57)		-	3
p/m-Xylene	1.7	J	-	5
o-xylene	1.4	J	-	5
Xylenes, Total	3.1	J	-	5
Styrene	ND (0.74)		-	5
Acetone	ND (4.7)		-	50
Carbon disulfide	ND (0.57)		-	5
2-Butanone	ND (2.1)		-	-
Vinyl acetate	ND (0.82)		-	-
4-Methyl-2-pentanone	ND (0.38)		-	-
2-Hexanone	ND (1.1)		-	50
Acrolein	ND (3.6)		-	5
Acrylonitrile	ND (0.67)		-	5
Dibromomethane	ND (0.45)		-	5
Unknown Alkane	12.2	J		
Undecane, 2,6-dimethyl-	11.4	NJ		
Unknown	6.18	J		
Unknown Alkane	8.74	J		
Indane	8.32	NJ		
Unknown	6.42	J		
Unknown Cycloalkane	6.68	J		
Unknown				
Unknown				

Parameter	Results (ug/L)	Q	BSA Limit (Note 2)	NYS Class GA (Note 2)
Acenaphthene	55.6		-	20
Benzidine[1]	ND (12.1)		-	5
1,2,4-Trichlorobenzene	ND (1.49)		-	5
Hexachlorobenzene	ND (0.952)		-	0.04
Bis(2-chloroethyl)ether	ND (0.600)		-	1
2-Chloronaphthalene	ND (0.319)		-	10
3,3'-Dichlorobenzidine	ND (0.457)		-	5
2,4-Dinitrotoluene	ND (0.636)		-	5
2,6-Dinitrotoluene	ND (0.631)		-	5
Azobenzene[1]	ND (0.889)		-	5
Fluoranthene	43.3		100	50
4-Chlorophenyl phenyl ether	ND (0.371)		-	-
4-Bromophenyl phenyl ether	ND (0.447)		-	-
Bis(2-chloroisopropyl)ether	ND (0.822)		-	-
Bis(2-chloroethoxy)methane	ND (0.585)		-	5
Hexachlorobutadiene	ND (0.921)		-	0.5
Hexachlorocyclopentadiene[1]	ND (1.36)		-	5
Hexachloroethane	ND (0.973)		-	5
Isophorone	ND (0.546)		-	50
Naphthalene	3.74		314	10
Nitrobenzene	ND (0.788)		-	0.4
NDPA/DPA[1]	ND (0.783)		-	-
n-Nitrosodi-n-propylamine	ND (0.630)		-	-
Bis(2-ethylhexyl)phthalate	ND (1.70)		-	5
Butyl benzyl phthalate	ND (0.670)		-	50
Di-n-butylphthalate	ND (0.631)		-	-
Di-n-octylphthalate	ND (0.633)		-	-
Diethyl phthalate	ND (0.717)		-	50
Dimethyl phthalate	ND (1.40)		-	50
Benzo(a)anthracene	12.9		-	0.002
Benzo(a)pyrene	8.26		-	ND
Benzo(b)fluoranthene	9.59		-	0.002
Benzo(k)fluoranthene	2.7		-	0.002
Chrysene	12		-	0.002
Acenaphthylene	3.82		314	-
Anthracene	31.8		314	50
Benzo(ghi)perylene	4.28		-	-
Fluorene	56.9		314	50
Phenanthrene	81.5		314	50
Dibenzo(a,h)anthracene	1.04	J	-	-
Indeno(1,2,3-cd)pyrene	4.45		-	0.002
Pyrene	41.4		-	50
4-Chloroaniline[1]	ND (0.790)		10	5
Dibenzofuran[1]	52		-	-
2-Methylnaphthalene[1]	2.78		-	-
n-Nitrosodimethylamine[1]	ND (0.407)		-	-
2,4,6-Trichlorophenol	ND (0.607)		-	1
p-Chloro-m-cresol[1]	ND (0.533)		-	-
2-Chlorophenol	0.530	J	-	1
2,4-Dichlorophenol	ND (0.554)		-	1
2,4-Dimethylphenol	ND (0.851)		-	1
2-Nitrophenol	ND (0.604)		-	1
4-Nitrophenol	ND (0.834)		-	1
2,4-Dinitrophenol	ND (1.21)		-	1
4,6-Dinitro-o-cresol	ND (1.20)		-	-
Pentachlorophenol	ND (0.622)		-	1
Phenol	1.79	J	-	1
2-Methylphenol[1]	ND (0.773)		-	1
3-Methylphenol/4-Methylphenol[1]	ND (0.511)		-	1
2,4,5-Trichlorophenol[1]	ND (0.637)		-	1
Benzoic Acid[1]	ND (1.17)		-	-
Benzyl Alcohol[1]	ND (0.490)		-	-
Aniline[1]	1.23	J	ND	5
Unknown Thiophene	22.5	J		
Unknown Naphthalene	51.5	J		
Unknown Alkane	29.5	J		
Unknown Naphthalene	22.3	J		
Unknown Naphthalene	21.4	J		
Unknown Naphthalene	17.2	J		
Unknown	14.8	J		
Unknown Biphenyl	15.2	J		
Unknown Naphthalene	42.4	J		
Unknown PAH	17.4	J		
Unknown	51.7	J		
Unknown Naphthalene	28.1	J		
Unknown PAH	19.4	J		
Unknown Naphthalene	24.1	J		
Unknown PAH	22.2	J		

Parameter	Results (mg/L)	Q	BSA Limit (Note 2)	NYS Class GA (Note 2)
Calcium, Total	82.4		-	-
Calcium, Dissolved	95.6		-	-
Chromium, Total	0.00263		40	0.05
Chromium, Dissolved	0.00095	J	-	-
Copper, Total	0.00457		16	0.2
Copper, Dissolved	0.00084	J	-	-
Iron, Total	2.11		-	0.3
Iron, Dissolved	0.265		-	-
Lead, Total	0.00261		65	0.025
Lead, Dissolved	ND (0.00034)		-	-
Magnesium, Total	17.2		-	35
Magnesium, Dissolved	19		-	-
Manganese, Total	0.1566		-	0.3
Manganese, Dissolved	0.1715		-	-
Mercury, Total	ND (0.00009)		0.0008	0.0007
Mercury, Dissolved	ND (0.00009)		-	-
Nickel, Total	0.00404		14	0.1
Nickel, Dissolved	0.00126	J	-	-
Zinc, Total	0.0813		25	2
Zinc, Dissolved	0.0042	J	-	-

Parameter	Results (mg/L)	BSA Limit (Note 2)	NYS Class GA (Note 2)
Aroclor 1016	ND (0.016)	*0.3*	0.09
Aroclor 1221	ND (0.022)	*0.3*	0.09
Aroclor 1232	ND (0.046)	*0.3*	0.09
Aroclor 1242	ND (0.036)	*0.3*	0.09
Aroclor 1248	ND (0.046)	*0.3*	0.09
Aroclor 1254	ND (0.017)	*0.3*	0.09
Aroclor 1260	ND (0.034)	*0.3*	0.09

Parameter	Results (mg/L)	BSA Limit (Note 2)	NYS Class GA (Note 2)
Solids, Total Suspended	23	250	-
Cyanide, Total	0.178	-	0.2
Cyanide, Amenable	ND (0.005)	6.2	-
Phosphorus, Total	0.282	15.35	-
BOD, 5 day	34	250	-
Oil & Grease, Hem-Grav	31	-	-
Total Phenols	ND (0.13)	20	0.001

NOTES
1 - The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.
2 - Buffalo Sewer Authority Discharge Limit (BSA Permit No. 20-06-BU109). PCB values shown in *italics* are "must report" concentrations. NYS Class GA standard/guidance value are not applicable to the influent sample and are provided for comparative purposes only. "-" = comparative standard/value available.
NJ - Presumptive Evidence of Compound
ND - Non-Detect (Method Detection Limit)
J - Estimated Value between Method Detection Limit and Reporting Limit

Table 4
Treatability Testing and SMP Sampling Comparison
South Buffalo Properties - Area A
Corrective Measures Design Report

Analytes (a)	BSA Discharge Limite (e)	NYS Class GA (e)	Treatability Testing October 2022				Annual SMP Sampling September 2022				New Extraction Wells (b) June 10, 2020								2022 GWTF OM&M Sampling GAC Influent (d)		
			Composited Influent		Treated Effluent		EW-1		EW-2 (c)		EW-4A		EW-6		EW-7				EW-8		May-22	Nov-22	Dec-22
Metals (mg/L)																							
Aluminum	-	-	*NS*		*NS*		<0.060	U	<0.060	U	0.539		1.55		0.954		0.399		1.55				
Antimony	-	0.003	*NS*		*NS*		<0.0068	U	<0.0068	U	< 0.0600	U	< 0.0600	U	< 0.0600	U	< 0.0600	U	< 0.0600	U			
Arsenic	-	0.025	*NS*		*NS*		0.026		0.2		< 0.0100	U	0.043		< 0.0100	U	< 0.0100	U	< 0.0100	U			
Barium	-	1	*NS*		*NS*		0.065		0.079		< 0.100	U	0.137		< 0.100	U	< 0.100	U	< 0.100	U			
Beryllium	-	0.003	*NS*		*NS*		<0.00030	U	<0.00030	U	< 0.00500	U	< 0.00500	U	< 0.00500	U	< 0.00500	U	< 0.00500	U			
Cadmium	-	0.005	*NS*		*NS*		<0.00050	U	<0.00050	U	< 0.00500	U	< 0.00500	U	< 0.00500	U	< 0.00500	U	0.008				
Calcium, Total	-	-	82.4		77.1		155		87.5		48.8		41.6		34.4		28.8		97.1				
Calcium, Dissolved	-	-	95.6		79.3		*NS*		*NS*		*NS*		*NS*		*NS*		*NS*		*NS*				
Chromium, Total	40	0.05	0.00263		0.00217		0.0027	J	0.0054		0.01		< 0.0100	U	< 0.0100	U	< 0.0100	U	0.012				
Chromium, Dissolved	-	-	0.00095	J	0.002		*NS*		*NS*		*NS*		*NS*		*NS*		*NS*		*NS*				
Cobalt	-	-	*NS*		*NS*		<0.00063	U	<0.00063	U	< 0.0500	U	< 0.0500	U	< 0.0500	U	< 0.0500	U	< 0.0500	U			
Copper, Total	16	0.2	0.00457		0.00697		<0.0016	U	0.15		0.047		0.033		0.043		0.029		0.038				
Copper, Dissolved	-	-	0.00084	J	0.00688		*NS*		*NS*		*NS*		*NS*		*NS*		*NS*		*NS*				
Iron, Total	-	0.3	2.11		0.0911		3.9		2		1.53		3.69		2.21		0.83		4.38				
Iron, Dissolved	-	-	0.265		0.0227	J	*NS*		*NS*		*NS*		*NS*		*NS*		*NS*		*NS*				
Lead, Total	65	0.025	0.00261		<0.00034	U	0.0053	J	0.052		< 0.0100	U	0.027		0.026		0.016		< 0.0100	U			
Lead, Dissolved	-	-	<0.00034	U	<0.00034	U	*NS*		*NS*		*NS*		*NS*		*NS*		*NS*		*NS*				
Magnesium, Total	-	35	17.2		21		19.4		16.8		19.1		32		18.2		17.1		15.7				
Magnesium, Dissolved	-	-	19		22.2		*NS*		*NS*		*NS*		*NS*		*NS*		*NS*		*NS*				
Manganese, Total	-	0.3	0.1566		0.01411		0.51		0.45		0.024		0.111		0.037		< 0.0200	U	0.144				
Manganese, Dissolved	-	-	0.1715		0.01385		*NS*		*NS*		*NS*		*NS*		*NS*		*NS*		*NS*				
Mercury, Total	0.0008	0.0007	<0.00009	U	<0.00009	U	<0.000043	U	<0.000043	U	< 0.000200	U	< 0.000200	U	< 0.000200	U	< 0.000200	U	< 0.000200	U			
Mercury, Dissolved	-	-	<0.00009	U	<0.00009	U	*NS*		*NS*		*NS*		*NS*		*NS*		*NS*		*NS*				
Nickel, Total	14	0.1	0.00404		0.00258		<0.0013	U	0.031		< 0.0400	U	< 0.0400	U	< 0.0400	U	< 0.0400	U	< 0.0400	U			
Nickel, Dissolved	-	-	0.00126	J	0.00286		*NS*		*NS*		*NS*		*NS*		*NS*		*NS*		*NS*				
Potassium	-	-	*NS*		*NS*		36.9		89.2		128		211		88		84		19.7				
Selenium	-	0.01	*NS*		*NS*		<0.0087	U	<0.0087	U	< 0.0200	U	< 0.0200	U	< 0.0200	U	< 0.0200	U	< 0.0200	U			
Silver	-	0.05	*NS*		*NS*		<0.0017	U	<0.0017	U	< 0.0100	U	< 0.0100	U	< 0.0100	U	< 0.0100	U	< 0.0100	U			
Sodium	-	20	*NS*		*NS*		119		210		135		552		187		210		100				
Thallium	-	0.0005	*NS*		*NS*		*<0.010*	U	<0.010	U	< 0.0250	U	< 0.0250	U	< 0.0250	U	< 0.0250	U	< 0.0250	U			
Vanadium	-	-	*NS*		*NS*		0.0016	J	0.0036	J	< 0.0250	U	< 0.0250	U	< 0.0250	U	< 0.0250	U	< 0.0250	U			
Zinc, Total	25	2	0.0813		0.01317		0.018		0.19		< 0.0600	U	0.102		0.086		< 0.0600	U	< 0.0600	U			
Zinc, Dissolved	-	-	0.0042	J	0.01663		*NS*		*NS*		*NS*		*NS*		*NS*		*NS*		*NS*				

Table 4
Treatability Testing and SMP Sampling Comparison
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Analytes (a)	BSA Discharge Limite (e)	NYS Class GA (e)	Treatability Testing October 2022				Annual SMP Sampling September 2022				New Extraction Wells (b) June 10, 2020										2022 GWTF OM&M Sampling GAC Influent (d)		
			Composited Influent		Treated Effluent		EW-1		EW-2 (c)		EW-4A		EW-6		EW-7				EW-8		May-22	Nov-22	Dec-22
SVOCs (µg/L)																							
Acenaphthene	-	20	55.6		<0.407	U	2.4	J	4.9	J	< 9.77	U	< 97.4	U	148		135		15.9				
4-Nitroaniline	-	5	*NS*		*NS*		<0.25	U	<1.3	U	< 19.5	U	< 195	U	< 197	U	< 97.7	U	< 19.5	U			
4-Nitrophenol	-	-	<0.834	U	<0.834	U	<1.5	U	<7.6	U	< 19.5	U	< 195	U	< 197	U	< 97.7	U	< 19.5	U			
Benzyl Alcohol[1]	-	-	<0.49	U	<0.490	U	*NS*		*NS*		*NS*		*NS*		*NS*		*NS*		*NS*				
Benzaldehyde	-	-	*NS*		*NS*		<0.27	U	<1.3	U	< 9.77	U	< 97.4	U	< 98.5	U	< 48.8	U	< 9.77	U			
4-Bromophenyl Phenyl Ether	-	-	<0.447	U	<0.447	U	<0.45	U	<2.3	U	< 9.77	U	< 97.4	U	< 98.5	U	< 48.8	U	< 9.77	U			
Azobenzene[1]	-	5	<0.889	U	<0.889	U	*NS*		*NS*		*NS*		*NS*		*NS*		*NS*		*NS*				
Caprolactam	-	-	*NS*		*NS*		<2.2	U	<11	U	< 9.77	U	< 97.4	U	< 98.5	U	< 48.8	U	< 9.77	U			
2,4-Dimethylphenol	-	50	<0.851		<0.851	U	<0.50	U	<2.5	U	< 9.77	U	< 97.4	U	< 98.5	U	< 48.8	U	< 9.77	U			
3-Methylphenol/4-Methylphenol[1]	-	-	<0.511	U	<0.511	U	<0.36	U	<1.8	U	*NS*		*NS*		*NS*		*NS*		*NS*				
4-Chloroaniline[1]	-	5	<0.79	U	<0.790	U	6.6		<3.0	U	< 9.77	U	763		< 98.5	U	< 48.8	U	< 9.77	U			
Bis(2-Chloroisopropyl)Ether	-	5	<0.822	U	<0.822	U	<0.52	U	<2.6	U	< 9.77	U	< 97.4	U	< 98.5	U	< 48.8	U	< 9.77	U			
Phenol	-	1	1.79	J	<0.262	U	<0.39	U	79		< 9.77	U	< 97.4	U	< 98.5	U	< 48.8	U	< 9.77	U			
Bis(2-Chloroethyl)Ether	-	1	<0.6	U	<0.600	U	<0.40	U	<2.0	U	< 9.77	U	< 97.4	U	< 98.5	U	< 48.8	U	< 9.77	U			
Bis(2-Chloroethoxy)Methane	-	5	<0.585	U	<0.585	U	<0.35	U	<1.8	U	< 9.77	U	< 97.4	U	< 98.5	U	< 48.8	U	< 9.77	U			
Bis(2-Ethylhexyl)Phthalate	-	5	<1.7	U	<1.70	U	<2.2	U	<11	U	< 9.77	U	< 97.4	U	< 98.5	U	< 48.8	U	< 9.77	U			
Di-N-Octylphthalate	-	50	<0.633	U	<0.633	U	<0.47	U	<2.4	U	< 9.77	U	< 97.4	U	< 98.5	U	< 48.8	U	< 9.77	U			
Hexachlorobenzene	-	0.04	<0.952	U	<0.952	U	<0.51	U	<2.6	U	< 9.77	U	< 97.4	U	< 98.5	U	< 48.8	U	< 9.77	U			
Anthracene	314	50	31.8		<0.791	U	<0.28	U	<1.4	U	< 9.77	U	< 97.4	U	< 98.5	U	< 48.8	U	< 9.77	U			
1,2,4-Trichlorobenzene	-	5	<1.49	U	<1.49	U	*NS*		*NS*		< 9.77	U	< 97.4	U	< 98.5	U	< 48.8	U	< 9.77	U			
2,4-Dichlorophenol	-	5	<0.554	U	<0.554	U	2.2	J	<2.6	U	< 9.77	U	< 97.4	U	< 98.5	U	< 48.8	U	< 9.77	U			
2,4-Dinitrotoluene	-	5	<0.636	U	<0.636	U	<0.45	U	<2.2	U	< 9.77	U	< 97.4	U	< 98.5	U	< 48.8	U	< 9.77	U			
Pyrene	-	50	41.4		<0.728	U	<0.34	U	<1.7	U	< 9.77	U	< 97.4	U	< 98.5	U	< 48.8	U	< 9.77	U			
Dimethyl Phthalate	-	50	<1.4	U	<1.40	U	<0.36	U	<1.8	U	< 19.5	U	< 195	U	< 197	U	< 97.7	U	< 19.5	U			
Dibenzofuran[1]	-	-	52		<0.373	U	<0.51	U	<2.6	U	< 9.77	U	< 97.4	U	141		134		< 9.77	U			
Atrazine	-	7.5	*NS*		*NS*		<0.46	U	<2.3	U	< 9.77	U	< 97.4	U	< 98.5	U	< 48.8	U	< 9.77	U			
Benzo(Ghi)Perylene	-	-	4.28		<0.672	U	<0.35	U	<1.8	U	< 9.77	U	< 97.4	U	< 98.5	U	< 48.8	U	< 9.77	U			
Indeno(1,2,3-Cd)Pyrene	-	0.002	4.45		<0.633	U	<0.47	U	<2.4	U	< 9.77	U	< 97.4	U	< 98.5	U	< 48.8	U	< 9.77	U			
Benzo(B)Fluoranthene	-	0.002	9.59		<0.741	U	<0.34	U	<1.7	U	< 9.77	U	< 97.4	U	< 98.5	U	< 48.8	U	< 9.77	U			
Fluoranthene	100	50	43.3		<0.736	U	<0.40	U	<2.0	U	< 9.77	U	< 97.4	U	< 98.5	U	< 48.8	U	< 9.77	U			
Benzo(K)Fluoranthene	-	0.002	2.7		<0.739	U	<0.73	U	<3.7	U	< 9.77	U	< 97.4	U	< 98.5	U	< 48.8	U	< 9.77	U			
Acenaphthylene	314	-	3.82		<0.930	U	<0.38	U	<1.9	U	< 9.77	U	< 97.4	U	< 98.5	U	< 48.8	U	< 9.77	U			
Chrysene	-	0.002	12		<0.668	U	<0.33	U	<1.7	U	< 9.77	U	< 97.4	U	< 98.5	U	< 48.8	U	< 9.77	U			
Benzo(A)Pyrene	-	0	8.26		<0.610	U	<0.47	U	<2.4	U	< 9.77	U	< 97.4	U	< 98.5	U	< 48.8	U	< 9.77	U			
2,4-Dinitrophenol	-	10	<1.21	U	<1.21	U	<2.2	U	<11	U	< 19.5	U	< 195	U	< 197	U	< 97.7	U	< 19.5	U			
4,6-Dinitro-O-Cresol	-	-	<1.2	U	<1.20	U	<2.2	U	<11	U	< 19.5	U	< 195	U	< 197	U	< 97.7	U	< 19.5	U			
Dibenzo(A,H)Anthracene	-	-	1.04	J	<0.687	U	<0.42	U	<2.1	U	< 9.77	U	< 97.4	U	< 98.5	U	< 48.8	U	< 9.77	U			
Benzo(A)Anthracene	-	0.002	12.9		<0.665	U	<0.36	U	<1.8	U	< 9.77	U	< 97.4	U	< 98.5	U	< 48.8	U	< 9.77	U			
P-Chloro-M-Cresol[1]	-	-	<0.533	U	<0.533	U	<0.45	U	<2.3	U	< 9.77	U	< 97.4	U	< 98.5	U	< 48.8	U	< 9.77	U			
2,6-Dinitrotoluene	-	5	<0.631	U	<0.631	U	<0.40	U	<2.0	U	< 9.77	U	< 97.4	U	< 98.5	U	< 48.8	U	< 9.77	U			
N-Nitrosodi-N-Propylamine	-	-	<0.63	U	<0.630	U	<0.54	U	<2.7	U	< 9.77	U	< 97.4	U	< 98.5	U	< 48.8	U	< 9.77	U			

Table 4
Treatability Testing and SMP Sampling Comparison
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Analytes (a)	BSA Discharge Limite (e)	NYS Class GA (e)	Treatability Testing October 2022				Annual SMP Sampling September 2022				New Extraction Wells (b) June 10, 2020										2022 GWTF OM&M Sampling GAC Influent (d)		
			Composited Influent		Treated Effluent		EW-1		EW-2 (c)		EW-4A		EW-6		EW-7				EW-8		May-22	Nov-22	Dec-22
SVOCs (µg/L)																							
Aniline (Phenylamine, Aminobenze	0	5	1.23	J	<0.828	U	5.9	J	13	J	*NS*		*NS*		*NS*		*NS*		*NS*				
Benzoic Acid[1]	-	-	<1.17	U	<1.17	U	*NS*		*NS*		*NS*		*NS*		*NS*		*NS*		*NS*				
Hexachloroethane	-	5	<0.973	U	<0.973	U	<0.59	U	<3.0	U	< 9.77	U	< 97.4	U	< 98.5	U	< 48.8	U	< 9.77	U			
4-Chlorophenyl Phenyl Ether	-	-	<0.371	U	<0.371	U	<0.35	U	<1.8	U	< 9.77	U	< 97.4	U	< 98.5	U	< 48.8	U	< 9.77	U			
Hexachlorocyclopentadiene[1]	-	5	<1.36	U	<1.36	U	<0.59	U	<3.0	U	< 9.77	U	< 97.4	U	< 98.5	U	< 48.8	U	< 9.77	U			
Isophorone	-	50	<0.546	U	<0.546	U	<0.43	U	<2.2	U	< 9.77	U	< 97.4	U	< 98.5	U	< 48.8	U	< 9.77	U			
Acenaphthene	-	20	55.6		<0.407	U	2.4	J	4.9	J	< 9.77	U	< 97.4	U	148		135		15.9				
Diethyl Phthalate	-	50	<0.717	U	0.745	J	13	B	4.7	BJ	< 9.77	U	< 97.4	U	< 98.5	U	< 48.8	U	< 9.77	U			
Di-N-Butylphthalate	-	50	<0.631	U	<0.631	U	<0.31	U	<1.6	U	< 9.77	U	< 97.4	U	< 98.5	U	< 48.8	U	< 9.77	U			
Phenanthrene	314	50	81.5		<0.818	U	<0.44	U	<2.2	U	< 9.77	U	< 97.4	U	117		93.2		< 9.77	U			
Butyl Benzyl Phthalate	-	50	<0.67	U	<0.670	U	<1.0	U	<5.0	U	< 9.77	U	< 97.4	U	< 98.5	U	< 48.8	U	< 9.77	U			
Ndpa/Dpa[1]	-	50	<0.783	U	<0.783	U	50		26		< 9.77	U	< 97.4	U	< 98.5	U	< 48.8	U	< 9.77	U			
Fluorene	314	50	56.9		<0.927	U	<0.36	U	<1.8	U	< 9.77	U	< 97.4	U	112		101		< 9.77	U			
Carbazole	-	-	*NS*		*NS*		<0.30	U	<1.5	U	< 9.77	U	< 97.4	U	< 98.5	U	94.6		< 9.77	U			
Hexachlorobutadiene	-	0.5	<0.921	U	<0.921	U	<0.68	U	<3.4	U	< 9.77	U	< 97.4	U	< 98.5	U	< 48.8	U	< 9.77	U			
Pentachlorophenol	-	1	<0.622	U	<0.622	U	<2.2	U	<11	U	< 19.5	U	< 195	U	< 197	U	< 97.7	U	< 19.5	U			
2,4,6-Trichlorophenol	-	-	<0.607	U	<0.607	U	<0.61	U	<3.1	U	< 19.5	U	< 195	U	< 197	U	< 97.7	U	< 19.5	U			
2-Nitroaniline	-	5	*NS*		*NS*		<0.42	U	<2.1	U	< 19.5	U	< 195	U	< 197	U	< 97.7	U	< 19.5	U			
2-Nitrophenol	-	-	<0.604	U	<0.604	U	<0.48	U	<2.4	U	< 9.77	U	< 97.4	U	< 98.5	U	< 48.8	U	< 9.77	U			
Naphthalene	314	10	3.74		<0.896	U	<0.76	U	11	J	< 9.77	U	< 97.4	U	1060		414		< 9.77	U			
2-Methylnaphthalene[1]	-	-	2.78		<0.351	U	<0.60	U	<3.0	U	< 9.77	U	< 97.4	U	< 98.5	U	< 48.8	U	< 9.77	U			
2-Chloronaphthalene	-	10	<0.319	U	<0.319	U	<0.46	U	<2.3	U	< 9.77	U	< 97.4	U	< 98.5	U	< 48.8	U	< 9.77	U			
3,3'-Dichlorobenzidine	-	5	<0.457	U	<0.457	U	<0.40	U	<2.0	U	< 9.77	U	< 97.4	U	< 98.5	U	< 48.8	U	< 9.77	U			
Biphenyl (Diphenyl)	-	5	*NS*		*NS*		<0.65	U	<3.3	U	< 9.77	U	< 97.4	U	< 98.5	U	< 48.8	U	< 9.77	U			
Benzidine[1]	-	5	<12.1	U	<12.1	U	*NS*		*NS*		*NS*		*NS*		*NS*		*NS*		*NS*				
2-Methylphenol[1]	-	-	<0.773	U	<0.773	U	<0.40	U	<2.0	U	< 9.77	U	< 97.4	U	< 98.5	U	< 48.8	U	< 9.77	U			
2-Chlorophenol	-	-	0.53	J	<0.513	U	12		3.1	J	< 9.77	U	< 97.4	U	< 98.5	U	< 48.8	U	< 9.77	U			
2,4,5-Trichlorophenol[1]	-	-	<0.637	U	<0.637	U	<0.48	U	<2.4	U	< 9.77	U	< 97.4	U	< 98.5	U	< 48.8	U	< 9.77	U			
Acetophenone	-	-	*NS*		*NS*		<0.54	U	<2.7	U	< 9.77	U	< 97.4	U	< 98.5	U	< 48.8	U	< 9.77	U			
Nitrobenzene	-	0.4	<0.788	U	<0.788	U	<0.29	U	<1.5	U	< 9.77	U	< 97.4	U	< 98.5	U	< 48.8	U	< 9.77	U			
3-Nitroaniline	-	5	*NS*		*NS*		<0.48	U	<2.4	U	< 19.5	U	< 195	U	< 197	U	< 97.7	U	< 19.5	U			

Table 4
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Analytes (a)	BSA Discharge Limite (e)	NYS Class GA (e)	Treatability Testing October 2022				Annual SMP Sampling September 2022				New Extraction Wells (b) June 10, 2020										2022 GWTF OM&M Sampling GAC Influent (d)					
			Composited Influent		Treated Effluent		EW-1		EW-2 (c)		EW-4A		EW-6		EW-7				EW-8		May-22		Nov-22		Dec-22	
VOCs (µg/L)																										
Ethylbenzene	-	5	<0.56	U	<0.28	U	<150	U	<74	U	< 2.00	U	< 200	U	< 20.0	U	< 20.0	U	< 2.00	U	2.7	J	<37	U	3.2	J
Styrene	-	5	<0.74	U	<0.37	U	<150	U	<73	U	< 5.00	U	< 500	U	< 50.0	U	< 50.0	U	< 5.00	U	*NS*		*NS*		*NS*	
Cis-1,3-Dichloropropene	-	0.4	<0.67	U	<0.34	U	<72	U	<36	U	< 2.00	U	< 200	U	< 20.0	U	< 20.0	U	< 2.00	U	<6.6	U	<26	U	<26	U
Trans-1,3-Dichloropropene	-	0.4	<0.62	U	<0.31	U	<74	U	<37	U	< 2.00	U	< 200	U	< 20.0	U	< 20.0	U	< 2.00	U	<8.8	U	<35	U	<35	U
1,4-Dichlorobenzene	-	3	<0.57	U	<0.29	U	910		<84	U	< 2.00	U	< 200	U	< 20.0	U	< 20.0	U	25.3		520		770		650	
1,2-Dibromoethane (Ethylene Dibr	-	0.0006	*NS*		*NS*		<150	U	<73	U	< 2.00	U	< 200	U	< 20.0	U	< 20.0	U	< 2.00	U	*NS*		*NS*		*NS*	
Acrolein	-	5	<3.6	U	<1.8	U	*NS*		*NS*		*NS*		*NS*		*NS*		*NS*		*NS*		<350	U	<1400	U	<1400	U
1,2-Dichloroethane	-	0.6	<0.94	U	<0.47	U	<42	U	<21	U	< 2.00	U	< 200	U	< 20.0	U	< 20.0	U	< 2.00	U	<2.4	U	<48	U	<48	U
Acrylonitrile	-	5	<0.67	U	<0.33	U	*NS*		*NS*		*NS*		*NS*		*NS*		*NS*		*NS*		<38	U	<150	U	<150	U
Vinyl Acetate	-	-	<0.82	U	<0.41	U	*NS*		*NS*		*NS*		*NS*		*NS*		*NS*		*NS*		*NS*		*NS*		*NS*	
4-Methyl-2-Pentanone	-	-	<0.38	U	<0.19	U	<420	U	<210	U	< 5.00	U	< 500	U	< 50.0	U	< 50.0	U	< 5.00	U	*NS*		*NS*		*NS*	
P/M-Xylene	-	5	1.7	J	<0.3	U	*NS*		*NS*		< 2.00	U	< 200	U	< 20.0	U	< 20.0	U	< 2.00	U	*NS*		*NS*		*NS*	
Methylcyclohexane	-	-	*NS*		*NS*		<32	U	<16	U	< 2.00	U	< 200	U	< 20.0	U	< 20.0	U	< 2.00	U	*NS*		*NS*		*NS*	
Toluene	-	5	<0.63	U	<0.31	U	<100	U	<51	U	< 2.00	U	< 200	U	< 20.0	U	< 20.0	U	2.48		<9.1	U	<36	U	<36	U
Chlorobenzene	310	5	0.67	J	<0.3	U	9600		3400		< 2.00	U	8490		< 20.0	U	< 20.0	U	17		125		2560		1205	
2-Chloroethylvinyl Ether	-	-	<0.69	U	<0.35	U	*NS*		*NS*		*NS*		*NS*		*NS*		*NS*		*NS*		<37	U	<150	U	<150	U
Cyclohexane	-	-	*NS*		*NS*		<36	U	<18	U	< 10.0	U	< 1000	U	< 100	U	< 100	U	< 10.0	U	*NS*		*NS*		*NS*	
1,2,4-Trichlorobenzene	-	5	*NS*		*NS*		<82	U	<41	U	< 5.00	U	< 500	U	< 50.0	U	< 50.0	U	< 5.00	U	*NS*		*NS*		*NS*	
Dibromochloromethane	-	50	<0.54	U	<0.27	U	<64	U	<32	U	< 2.00	U	< 200	U	< 20.0	U	< 20.0	U	< 2.00	U	<8.3	U	<33	U	<33	U
Tetrachloroethene	-	5	<0.52	U	<0.26	U	<72	U	<36	U	< 2.00	U	< 200	U	< 20.0	U	< 20.0	U	< 2.00	U	<6.8	U	<27	U	<27	U
Xylenes, Total	-	5	3.1	J	<0.3	U	<130	U	<66	U	*NS*		*NS*		*NS*		*NS*		*NS*		*NS*		*NS*		*NS*	
Cis-1,2-Dichloroethene	-	5	<0.34	U	<0.17	U	<160	U	<81	U	< 2.00	U	< 200	U	< 20.0	U	< 20.0	U	< 2.00	U	*NS*		*NS*		*NS*	
Trans-1,2-Dichloroethene	-	5	<0.66	U	<0.33	U	<180	U	<90	U	< 2.00	U	< 200	U	< 20.0	U	< 20.0	U	< 2.00	U	*NS*		*NS*		*NS*	
Tert-Butyl Methyl Ether	-	-	*NS*		*NS*		<32	U	<16	U	< 2.00	U	< 200	U	< 20.0	U	< 20.0	U	< 2.00	U	*NS*		*NS*		*NS*	
1,3-Dichlorobenzene	-	3	<0.55	U	<0.27	U	<160	U	<78	U	< 2.00	U	< 200	U	< 20.0	U	< 20.0	U	27		83	J	83	J	69	J
Carbon Tetrachloride	-	5	<0.49	U	<0.24	U	<54	U	<27	U	< 2.00	U	< 200	U	< 20.0	U	< 20.0	U	< 2.00	U	<10	U	<41	U	<41	U
2-Hexanone	-	50	<1.1	U	<0.55	U	<250	U	<120	U	< 5.00	U	< 500	U	< 50.0	U	< 50.0	U	< 5.00	U	*NS*		*NS*		*NS*	
Acetone	-	50	<4.7	U	23		<600	U	<300	U	< 10.0	U	< 1000	U	< 100	U	< 100	U	< 10.0	U	*NS*		*NS*		*NS*	
Chloroform	-	7	<0.76	U	<0.38	U	<68	U	<34	U	< 2.00	U	< 200	U	< 20.0	U	< 20.0	U	< 2.00	U	<11	U	<43	U	<43	U
Benzene	142	1	<0.77	U	<0.38	U	<82	U	920		< 1.00	U	1500		< 10.0	U	< 10.0	U	< 1.00	U	23		36		41	
1,1,1-Trichloroethane	-	5	<0.57	U	<0.29	U	<160	U	<82	U	< 2.00	U	< 200	U	< 20.0	U	< 20.0	U	< 2.00	U	<7.7	U	<31	U	<31	U
Bromomethane	-	5	<2.4	U	<1.2	U	<140	U	<69	U	< 2.00	U	< 200	U	< 20.0	U	< 20.0	U	< 2.00	U	<24	U	<95	U	<95	U

Table 4
Treatability Testing and SMP Sampling Comparison
South Buffalo Properties - Area A
Corrective Measures Design Report

Analytes (a)	BSA Discharge Limite (e)	NYS Class GA (e)	Treatability Testing October 2022				Annual SMP Sampling September 2022				New Extraction Wells (b) June 10, 2020										2022 GWTF OM&M Sampling GAC Influent (d)					
			Composited Influent		Treated Effluent		EW-1		EW-2 (c)		EW-4A		EW-6		EW-7				EW-8		May-22		Nov-22		Dec-22	
VOCs (µg/L)																										
Chloromethane	-	5	<2.1	U	<1	U	<70	U	<35	U	< 2.00	U	< 200	U	< 20.0	U	< 20.0	U	< 2.00	U	<13	U	<51	U	<51	U
Dibromomethane	-	5	<0.45	U	<0.23	U	*NS*		*NS*		*NS*		*NS*		*NS*		*NS*		*NS*		*NS*		*NS*		*NS*	
Chloroethane	-	5	<0.74	U	<0.37	U	<64	U	<32	U	< 2.00	U	< 200	U	< 20.0	U	< 20.0	U	< 2.00	U	<17	U	<70	U	<70	U
Vinyl Chloride	-	2	<0.75	U	<0.38	U	<180	U	<90	U	< 2.00	U	< 200	U	< 20.0	U	< 20.0	U	< 2.00	U	<15	U	<60	U	<60	U
Methylene Chloride	-	5	<1.1	U	<0.56	U	<88	U	<44	U	< 5.00	U	< 500	U	< 50.0	U	< 50.0	U	< 5.00	U	<16	U	<65	U	<65	U
Carbon Disulfide	-	-	<0.57	U	<0.28	U	<38	U	<19	U	< 2.00	U	< 200	U	< 20.0	U	< 20.0	U	< 2.00	U	*NS*		*NS*		*NS*	
Bromoform	-	50	<0.43	U	<0.22	U	<52	U	<26	U	< 5.00	U	< 500	U	< 50.0	U	< 50.0	U	< 5.00	U	<9.4	U	<37	U	<37	U
Bromodichloromethane	-	50	<0.55	U	<0.28	U	<78	U	<39	U	< 2.00	U	< 200	U	< 20.0	U	< 20.0	U	< 2.00	U	<11	U	<43	U	<43	U
1,1-Dichloroethane	-	5	<0.79	U	<0.4	U	<76	U	<38	U	< 2.00	U	< 200	U	< 20.0	U	< 20.0	U	< 2.00	U	<12	U	<47	U	<47	U
1,1-Dichloroethene	-	5	<0.62	U	<0.31	U	<58	U	<29	U	< 2.00	U	< 200	U	< 20.0	U	< 20.0	U	< 2.00	U	<17	U	<68	U	<68	U
Trichlorofluoromethane	-	5	<0.55	U	<0.28	U	<180	U	<88	U	< 2.00	U	< 200	U	< 20.0	U	< 20.0	U	< 2.00	U	<9	U	<36	U	<36	U
Dichlorodifluoromethane	-	5	*NS*		*NS*		<140	U	<68	U	< 2.00	U	< 200	U	< 20.0	U	< 20.0	U	< 2.00	U	*NS*		*NS*		*NS*	
1,1,2-Trichloro-1,2,2-Trifluoroethar	-	5	*NS*		*NS*		<62	U	<31	U	< 2.00	U	< 200	U	< 20.0	U	< 20.0	U	< 2.00	U	*NS*		*NS*		*NS*	
1,2-Dichloropropane	-	1	<0.93	U	<0.46	U	<140	U	<72	U	< 2.00	U	< 200	U	< 20.0	U	< 20.0	U	< 2.00	U	<12	U	<49	U	<49	U
2-Butanone	-	50	<2.1	U	<1	U	<260	U	<130	U	< 10.0	U	< 1000	U	< 100	U	< 100	U	< 10.0	U	*NS*		*NS*		*NS*	
1,1,2-Trichloroethane	-	1	<0.68	U	<0.34	U	<46	U	<23	U	< 2.00	U	< 200	U	< 20.0	U	< 20.0	U	< 2.00	U	<9.6	U	<39	U	<39	U
Trichloroethene	-	5	<0.67	U	<0.33	U	<92	U	<46	U	< 2.00	U	< 200	U	< 20.0	U	< 20.0	U	< 2.00	U	<12	U	<48	U	<48	U
Methyl Acetate	-	-	*NS*		*NS*		<260	U	<130	U	< 2.00	U	< 200	U	< 20.0	U	< 20.0	U	< 2.00	U	*NS*		*NS*		*NS*	
1,1,2,2-Tetrachloroethane	-	5	<0.41	U	<0.2	U	<42	U	<21	U	< 2.00	U	< 200	U	< 20.0	U	< 20.0	U	< 2.00	U	<5.2	U	<21	U	<21	U
O-Xylene	-	5	1.4	J	<0.34	U	*NS*		*NS*		< 2.00	U	< 200	U	< 20.0	U	< 20.0	U	< 2.00	U	*NS*		*NS*		*NS*	
1,2-Dichlorobenzene	472	3	<0.55	U	<0.28	U	<160	U	<79	U	< 2.00	U	< 200	U	< 20.0	U	< 20.0	U	7.21		9.2	J	<36	U	<36	U
1,2-Dibromo-3-Chloropropane	-	0.04	*NS*		*NS*		<78	U	<39	U	< 10.0	U	< 1000	U	< 100	U	< 100	U	< 10.0	U	*NS*		*NS*		*NS*	
Isopropylbenzene (Cumene)	-	5	*NS*		*NS*		<160	U	<79	U	< 2.00	U	< 200	U	< 20.0	U	< 20.0	U	< 2.00	U	*NS*		*NS*		*NS*	

a/ Analyte list may vary. "*NS* " indicates analyte was not included in the analyte list. Treatability testing analyte list in accordance with BSA laboratory method requirements for volatiles (624.1), semi-volatiles (625.1), and metals (6020). Individual extraction well samples are reported from SMP and CM related sampling and those related laboratory method requirements for volatiles (8260), semi-volatiles (8270), and metals (6010).

b/ Extraction well data from sampling after initial well installation in June 2020. Data shown for comparative purposes. Two samples are shown for EW-7. The first sample from the bottom of the screened interval and assumed operational pump intake level. The second sample was collected from interval exhibiting elevated PID readings during well installation. EW-7 contained LNAPL during treatability testing sample collection.

c/ Results of primary sample is shown. Duplicate was collected during annual sampling event.
d/ Influent GAC samples analyzed for VOCs (EPA 624.1) as part of routine system OM&M. Result shown is the average of the two influent samples collected to the GAC tanks [GAC 1 (EW-1, EW-2, EW-5, and Area D) and GAC 2 (EW-3 and EW-4)]. Highest RL is shown if both samples were ND.
(e) Buffalo Sewer Authority Discharge Limit (BSA Permit No. 20-06-BU109) and NYS Class GA standard/guidance value are provided for comparative purposes only.

Grayed and bolded cells indicate detection. "U" = sample not detected above reporting limit shown; "J"= estimated value. Analyte concentration is below the RL but above the MDL; "B"= analyte detected above the RL in the associated method blank

Table 5
Mechanical Filtration Testing Results
South Buffalo Properties - Area A
Corrective Measures Design Report

Analytes (a)	BSA Discharge Limite (Note 1)	NYS Class GA (Note 1)	Treatability Testing October 2022			
			Composited Influent		Post-OWS/Bag Filters/Multimedia Filters (Note 2)	
Metals (mg/L)						
Calcium, Total	-	-	82.4		72.5	
Calcium, Dissolved	-	-	95.6		*NS*	
Chromium, Total	40	0.05	0.00263		0.00083	J
Chromium, Dissolved	-	-	0.00095	J	*NS*	
Copper, Total	16	0.2	0.00457		0.00234	
Copper, Dissolved	-	-	0.00084	J	*NS*	
Iron, Total	-	0.3	2.11		0.37	
Iron, Dissolved	-	-	0.265		*NS*	
Lead, Total	65	0.025	0.00261		0.00055	J
Lead, Dissolved	-	-	<0.00034	U	*NS*	
Magnesium, Total	-	35	17.2		15.9	
Magnesium, Dissolved	-	-	19		*NS*	
Manganese, Total	-	0.3	0.1566		0.1424	
Manganese, Dissolved	-	-	0.1715		*NS*	
Mercury, Total	0.0008	0.0007	<0.00009	U	<0.00009	U
Mercury, Dissolved	-	-	<0.00009	U	*NS*	
Nickel, Total	14	0.1	0.00404		0.00115	J
Nickel, Dissolved	-	-	0.00126	J	*NS*	
Zinc, Total	25	2	0.0813		0.0082	J
Zinc, Dissolved	-	-	0.0042	J	*NS*	

Grayed and bolded cells indicate detection. "U" = sample not detected above reporting limit shown; "J"= estimated value. Analyte concentration is below the RL but above the MDL; "B"= analyte detected above the RL in the associated method blank

(1) Buffalo Sewer Authority Discharge Limit (BSA Permit No. 20-06-BU109) and NYS Class GA standard/guidance value are not applicable to the treatability testing samples and are provided for comparative purposes only.

(2) Sample after sequestrant addition (Redux 345 dosage of 50 mg/L)

Table 6
Treatability Testing Results - Effluent Characterization
Treatability Testing
South Buffalo Development - Area A

Parameter	*Results (ug/L)*	*BSA Limit (Note 2)*	*NYS Class GA (Note 2)*
Methylene chloride	ND (0.56)	-	5
1,1-Dichloroethane	ND (0.40)	-	5
Chloroform	ND (0.38)	-	7
Carbon tetrachloride	ND (0.24)	-	5
1,2-Dichloropropane	ND (0.46)	-	1
Dibromochloromethane	ND (0.27)	-	50
1,1,2-Trichloroethane	ND (0.34)	-	1
2-Chloroethylvinyl ether	ND (0.35)	-	-
Tetrachloroethene	ND (0.26)	-	5
Chlorobenzene	ND (0.30)	310	5
Trichlorofluoromethane	ND (0.28)	-	5
1,2-Dichloroethane	ND (0.47)	-	0.6
1,1,1-Trichloroethane	ND (0.29)	-	5
Bromodichloromethane	ND (0.28)	-	50
trans-1,3-Dichloropropene	ND (0.31)	-	0.4
cis-1,3-Dichloropropene	ND (0.34)	-	0.4
Bromoform	ND (0.22)	-	50
1,1,2,2-Tetrachloroethane	ND (0.20)	-	5
Benzene	ND (0.38)	142	1
Toluene	ND (0.31)	-	5
Ethylbenzene	ND (0.28)	-	5
Chloromethane	ND (1.0)	-	-
Bromomethane	ND (1.2)	-	5
Vinyl chloride	ND (0.38)	-	2
Chloroethane	ND (0.37)	-	5
1,1-Dichloroethene	ND (0.31)	-	5
trans-1,2-Dichloroethene	ND (0.33)	-	5
cis-1,2-Dichloroethene	ND (0.17)	-	5
Trichloroethene	ND (0.33)	-	5
1,2-Dichlorobenzene	ND (0.28)	472	3
1,3-Dichlorobenzene	ND (0.27)	-	3
1,4-Dichlorobenzene	ND (0.29)	-	3
p/m-Xylene	ND (0.30)	-	5
o-xylene	ND (0.34)	-	5
Xylenes, Total	ND (0.30)	-	5
Styrene	ND (0.37)	-	5
Acetone	23	-	50
Carbon disulfide	ND (0.28)	-	5
2-Butanone	ND (1.0)	-	-
Vinyl acetate	ND (0.41)	-	-
4-Methyl-2-pentanone	ND (0.19)	-	-
2-Hexanone	ND (0.55)	-	50
Acrolein	ND (1.8)	-	5
Acrylonitrile	ND (0.33)	-	5
Dibromomethane	ND (0.23)	-	5
Unknown Alkane			
Undecane, 2,6-dimethyl-			
Unknown			
Unknown Alkane			
Indane			
Unknown			
Unknown Cycloalkane			
Unknown	3.23 J		
Unknown	11.8 J		

Parameter	*Results (ug/L)*	*BSA Limit (Note 2)*	*NYS Class GA (Note 2)*
Acenaphthene	ND (0.407)	-	20
Benzidine[1]	ND (12.1)	-	5
1,2,4-Trichlorobenzene	ND (1.49)	-	5
Hexachlorobenzene	ND (0.952)	-	0.04
Bis(2-chloroethyl)ether	ND (0.600)	-	1
2-Chloronaphthalene	ND (0.319)	-	10
3,3'-Dichlorobenzidine	ND (0.457)	-	5
2,4-Dinitrotoluene	ND (0.636)	-	5
2,6-Dinitrotoluene	ND (0.631)	-	5
Azobenzene[1]	ND (0.889)	-	5
Fluoranthene	ND (0.736)	100	50
4-Chlorophenyl phenyl ether	ND (0.371)	-	-
4-Bromophenyl phenyl ether	ND (0.447)	-	-
Bis(2-chloroisopropyl)ether	ND (0.822)	-	-
Bis(2-chloroethoxy)methane	ND (0.585)	-	5
Hexachlorobutadiene	ND (0.921)	-	0.5
Hexachlorocyclopentadiene[1]	ND (1.36)	-	5
Hexachloroethane	ND (0.973)	-	5
Isophorone	ND (0.546)	-	50
Naphthalene	ND (0.896)	314	10
Nitrobenzene	ND (0.788)	-	0.4
NDPA/DPA[1]	ND (0.783)	-	-
n-Nitrosodi-n-propylamine	ND (0.630)	-	-
Bis(2-ethylhexyl)phthalate	ND (1.70)	-	5
Butyl benzyl phthalate	ND (0.670)	-	50
Di-n-butylphthalate	ND (0.631)	-	-
Di-n-octylphthalate	ND (0.633)	-	-
Diethyl phthalate	0.745 J	-	50
Dimethyl phthalate	ND (1.40)	-	50
Benzo(a)anthracene	ND (0.665)	-	0.002
Benzo(a)pyrene	ND (0.610	-	ND
Benzo(b)fluoranthene	ND (0.741)	-	0.002
Benzo(k)fluoranthene	ND (0.739)	-	0.002
Chrysene	ND (0.668)	-	0.002
Acenaphthylene	ND (0.930)	314	-
Anthracene	ND (0.791)	314	50
Benzo(ghi)perylene	ND (0.672)		-
Fluorene	ND (0.927)	314	50
Phenanthrene	ND (0.818)	314	50
Dibenzo(a,h)anthracene	ND (0.687)	-	-
Indeno(1,2,3-cd)pyrene	ND (0.633)	-	0.002
Pyrene	ND (0.728)	-	50
4-Chloroaniline[1]	ND (0.790)	10	5
Dibenzofuran[1]	ND (0.373)	-	-
2-Methylnaphthalene[1]	ND (0.351)	-	-
n-Nitrosodimethylamine[1]	ND (0.407)	-	-
2,4,6-Trichlorophenol	ND (0.607)	-	1
p-Chloro-m-cresol[1]	ND (0.533)	-	-
2-Chlorophenol	ND (0.513)	-	1
2,4-Dichlorophenol	ND (0.554)	-	1
2,4-Dimethylphenol	ND (0.851)	-	1
2-Nitrophenol	ND (0.604)	-	1
4-Nitrophenol	ND (0.834)	-	1
2,4-Dinitrophenol	ND (1.21)	-	1
4,6-Dinitro-o-cresol	ND (1.20)	-	-
Pentachlorophenol	ND (0.622)	-	1
Phenol	ND (0.262)	-	1
2-Methylphenol[1]	ND (0.773)	-	1
3-Methylphenol/4-Methylphenol[1]	ND (0.511)	-	1
2,4,5-Trichlorophenol[1]	ND (0.637)	-	1
Benzoic Acid[1]	ND (1.17)	-	-
Benzyl Alcohol[1]	ND (0.490)	-	-
Aniline[1]	ND (0.828)	0	5
Unknown	4.98 J		
Unknown	6.77 J		
Unknown	16.4 J		
Unknown Organic Acid	6.86 J		
Cyclic Octaatomic Sulfur	312 NJ		
Unknown Organic Acid	12.7 J		
Unknown Amide	7.65 J		
Sulfur	4.91 NJ		

Parameter	*Results (ug/L)*	*BSA Limit (Note 2)*	*NYS Class GA (Note 2)*
Aroclor 1016	ND (0.016)	*0.3*	0.09
Aroclor 1221	ND (0.022)	*0.3*	0.09
Aroclor 1232	ND (0.046)	*0.3*	0.09
Aroclor 1242	ND (0.036)	*0.3*	0.09
Aroclor 1248	ND (0.046)	*0.3*	0.09
Aroclor 1254	ND (0.017)	*0.3*	0.09
Aroclor 1260	ND (0.034)	*0.3*	0.09

Parameter	*Results (mg/L)*	*Q*	*BSA Limit (Note 2)*	*NYS Class GA (Note 2)*
Calcium, Total	77.1		-	-
Calcium, Dissolved	79.3		-	-
Chromium, Total	0.00217		40	0.05
Chromium, Dissolved	0.00200		-	-
Copper, Total	0.00697		16	0.2
Copper, Dissolved	0.00688		-	-
Iron, Total	0.0911		-	0.3
Iron, Dissolved	0.0227	J	-	-
Lead, Total	ND (0.00034)		65	0.025
Lead, Dissolved	ND (0.00034)		-	-
Magnesium, Total	21		-	35
Magnesium, Dissolved	22.2		-	-
Manganese, Total	0.01411		-	0.3
Manganese, Dissolved	0.01385		-	-
Mercury, Total	ND (0.00009)		0.0008	0.0007
Mercury, Dissolved	ND (0.00009)		-	-
Nickel, Total	0.00258		14	0.1
Nickel, Dissolved	0.00286		-	-
Zinc, Total	0.01317		25	2
Zinc, Dissolved	0.01663		-	-

Parameter	*Results (mg/L)*	*Q*	*BSA Limit (Note 2)*	*NYS Class GA (Note 2)*
Solids, Total Suspended	ND (5.0)		250	-
Cyanide, Total	0.003	J	-	0.2
Cyanide, Amenable	ND (0.005)		6.2	-
Phosphorus, Total	0.563		15.35	-
BOD, 5 day	4.3		250	-
Oil & Grease, Hem-Grav	ND (4.0)		-	-
Total Phenols	ND (0.026)		20	0.001

NOTES
1 - The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.
2 - Buffalo Sewer Authority Discharge Limit (BSA Permit No. 20-06-BU109). PCB values shown in *italics* are "must report" concentrations. NYS Class GA standard/guidance value are not applicable to the discharge and are provided for comparative purposes only. No comparative standard/value available if blank.

NJ - Presumptive Evidence of Compound
ND - Non-Detect (Method Detection Limit)
J - Estimated Value between Method Detection Limit and Reporting Limit

Table 6b
BSA Discharge SMR Comparison

BSA Permit Parameter (Note 1)		Treatability Study Effluent Sample (See Note 1)			Converted Analytical Results		BSA Daily Max Discharge Limit (Existing Permit)		Permit Compliance	MAID mg/L	Quantity mg/L	Permit Compliance
Chemical	CAS No. / Method ID	Quantity	Reporting Limit	Unit	Quantity	Unit	Quantity	Unit				
pH	PH	N/A	N/A	SU	N/A	SU	5.0 - 12.0	SU	N/A			
BOD5	BOD	4.3		mg/L	4.3	mg/L	250	mg/L	Yes			
Total Phenol	TOTPHEN	ND	0.026	mg/L	ND	lbs/day	1.67	lbs/day	Yes	20	ND	Yes
Total Chromium	7440-47-3	0.00217		mg/L	0.0026	lbs/day	0.83	lbs/day	Yes	40	0.00217	Yes
Total Copper	7440-50-8	0.00697		mg/L	0.008	lbs/day	0.67	lbs/day	Yes	16	0.00697	Yes
Lead	7439-92-1	ND	0.00034	mg/L	ND	lbs/day	0.541	lbs/day	Yes	65	ND	Yes
Total Mercury	7439-97-6	ND	0.00009	mg/L	ND	lbs/day	0.00033	lbs/day	Yes	0.0008	ND	Yes
Total Nickel	7440-02-0	0.00258		mg/L	0.0031	lbs/day	1.17	lbs/day	Yes	14	0.00258	Yes
Zinc	7440-66-6	0.0132		mg/L	0.016	lbs/day	2.046	lbs/day	Yes	25	0.0132	Yes
Amendable Cyanide	CAN	ND	0.005	mg/L	ND	lbs/day	2.59	lbs/day	Yes	6.2	ND	Yes
Total PCB	Sum Method_E608	ND	0.046	ug/L	ND	lbs/day	0.0001	lbs/day	Yes	0.002	ND	Yes
Aniline or Aniline Derivative*	62-53-3	ND	0.828	ug/L	ND	lbs/day	50	lbs/day	Yes	0.01	ND	Yes
Benzene	71-43-2	ND	0.38	ug/L	ND	lbs/day	0.059	lbs/day	Yes	0.142	ND	Yes
Chlorobenzene	108-90-7	ND	0.3	ug/L	ND	lbs/day	0.129	lbs/day	Yes	0.31	ND	Yes
1,2-Dichlorobenzene	95-50-1	ND	0.28	ug/L	ND	lbs/day	0.197	lbs/day	Yes	0.472	ND	Yes
Fluoranthene	206-44-0	ND	0.736	ug/L	ND	lbs/day	0.0417	lbs/day	Yes	0.1	ND	Yes
Acenaphthylene	208-96-8	ND	0.93	ug/L	ND	lbs/day	0.131	lbs/day	Yes	0.314	ND	Yes
Naphthalene	91-20-3	ND	0.896	ug/L	ND	lbs/day	0.131	lbs/day	Yes	0.314	ND	Yes
Anthracene	120-12-7	ND	0.791	ug/L	ND	lbs/day	0.131	lbs/day	Yes	0.314	ND	Yes
Fluorene	86-73-7	ND	0.927	ug/L	ND	lbs/day	0.131	lbs/day	Yes	0.314	ND	Yes
Phenanthrene	85-01-8	ND	0.818	ug/L	ND	lbs/day	0.131	lbs/day	Yes	0.314	ND	Yes
Max Individual Purgeables*	Max Method_E624	22.5	25	ug/L	0.023	mg/L	*	mg/L	Yes			
Total Suspended Solids	TSS	ND	5.0	mg/L	ND	mg/L	250	mg/L	Yes			
Total Phosphate**	7723-14-0	0.563		mg/L	0.563	mg/L	15.35	mg/L	Yes			
Total Flow (average)	N/A	100	-	gpm	144,000	gpd	50,000	gpd	N/A			

*Permit requires reporting of Aniline or Aniline Derivative and Max Individual Purgeables concentrations in excess of 0.01 mg/L.
**Analyzed by total phosphorus method SM 4500-P E
MAID - Maximum Allowable Instantaneous Discharge

Flow Calculations			
Combined Effluent No. 1 and No. 2 Flow Totals (gallons)			
Initial Reading	NA		
Final Reading	NA		
Total Days in Period	NA		
Total Flow for Period	**N/A**		gallons
Average Flow for Period		**100**	gpm

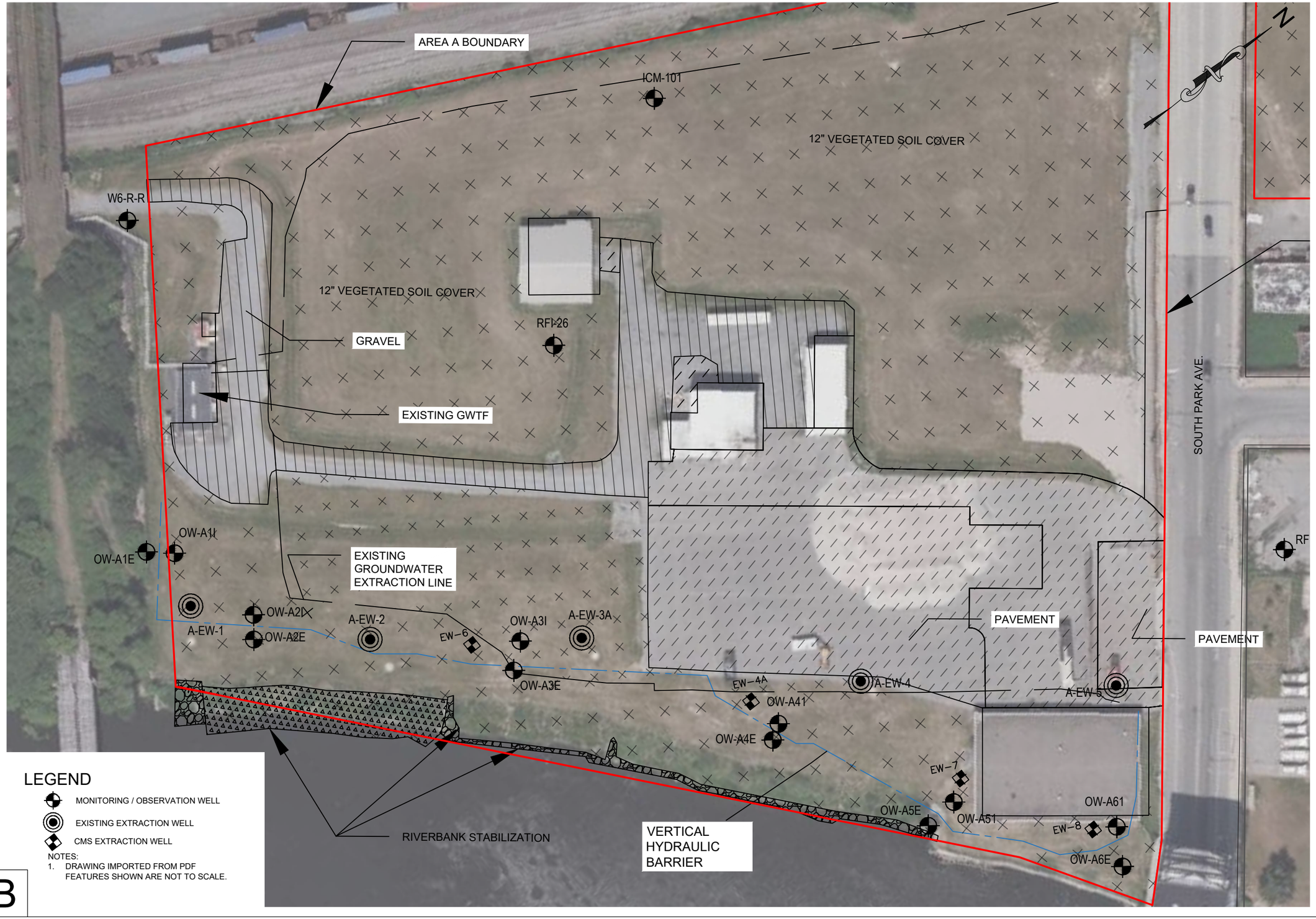
Note 1: Table format and discharge limitation calculations follow existing BSA Permit No. 20-06-BU109. "-" = Not analyzed in treatability test; "N/A" - not applicable to this example SMR.

Table 7
PFAS Effluent Data Summary
Former Buffalo Color Corporation

Analytes	Units	NYSDEC/NYSDOH Standards and Guidance Values (See Note 3)		Area A/D Effluent-20220929		Area A/D Effluent-20220929 (Duplicate)	
		MCLs	Class GA				
Perfluorinated Alkyl Acids (537 Mod)							
1H,1H,2H,2H-Perfluorodecane Sulfonate (8:2)	ng/L	-	-	<0.62	U	<0.62	U
1H,1H,2H,2H-Perfluorooctane Sulfonate (6:2)	ng/L	-	-	<1.0	U	<1.0	U
2-(N-methyl perfluorooctanesulfonamido) acetic acid	ng/L	-	-	<1.5	U	<1.5	U
N-Ethyl-N-((heptadecafluorooctyl)sulphonyl) glycine	ng/L	-	-	<1.3	U	<1.3	U
Perfluorobutanesulfonic acid	ng/L	-	-	4.6		4.6	
Perfluorobutyric acid (PFBA)	ng/L	-	-	5.4		5.5	
Perfluorodecane sulfonic acid	ng/L	-	-	<0.32	U	<0.32	U
Perfluorodecanoic acid (PFDA)	ng/L	-	-	<0.37	U	<0.37	U
Perfluorododecanoic acid (PFDOA)	ng/L	-	-	<0.39	U	<0.39	U
Perfluoroheptane sulfonate (PFHPS)	ng/L	-	-	<0.33	U	<0.33	U
Perfluoroheptanoic acid (PFHPA)	ng/L	-	-	<0.43	U	<0.43	U
Perfluorohexanesulfonic acid	ng/L	-	-	2.2		2.3	
Perfluorohexanoic acid (PFHXA)	ng/L	-	-	1.5	J	1.3	J
Perfluorononanoic acid	ng/L	-	-	<0.39	U	<0.39	U
Perfluorooctane sulfonamide (FOSA)	ng/L	-	-	<0.74	U	<0.74	U
Perfluorooctane sulfonic acid (PFOS)	ng/L	10	2.7	<0.68	U	<0.68	U
Perfluorooctanoic acid (PFOA)	ng/L	10	6.7	<0.61	U	<0.61	U
Perfluoropentanoic acid (PFPEA)	ng/L	-	-	3.3		3.1	
Perfluorotetradecanoic acid (PFTEA)	ng/L	-	-	<0.51	U	<0.51	U
Perfluorotridecanoic acid (PFTRIA)	ng/L	-	-	<0.38	U	<0.38	U
Perfluoroundecanoic acid (PFUNA)	ng/L	-	-	<0.44	U	<0.44	U
SVOCs (8270 SIM)							
1,4-Dioxane	ug/L	1	0.35	0.14	J	0.15	J

Notes:
1 - Compounds Detected Above the Method Detection Limit are presented in Bold Font.
2 - U - Not Detected above Method Detection Limit Shown; J =Esimated Value below the RL but above the MDL; B = analyte detected above the RL in the method blank; ng/L = nanograms per liter (parts per trillion equivalent); ug/L = micrograms per liter (parts per billion equivalent); MCL = Maximum Contaminant Levels; "-" = standard not established
3- There are no discharge limitations in existing BSA permit. Values shown for comparative purposes only as an indication of potential range of potential future effluent discharge limitations.

Figures



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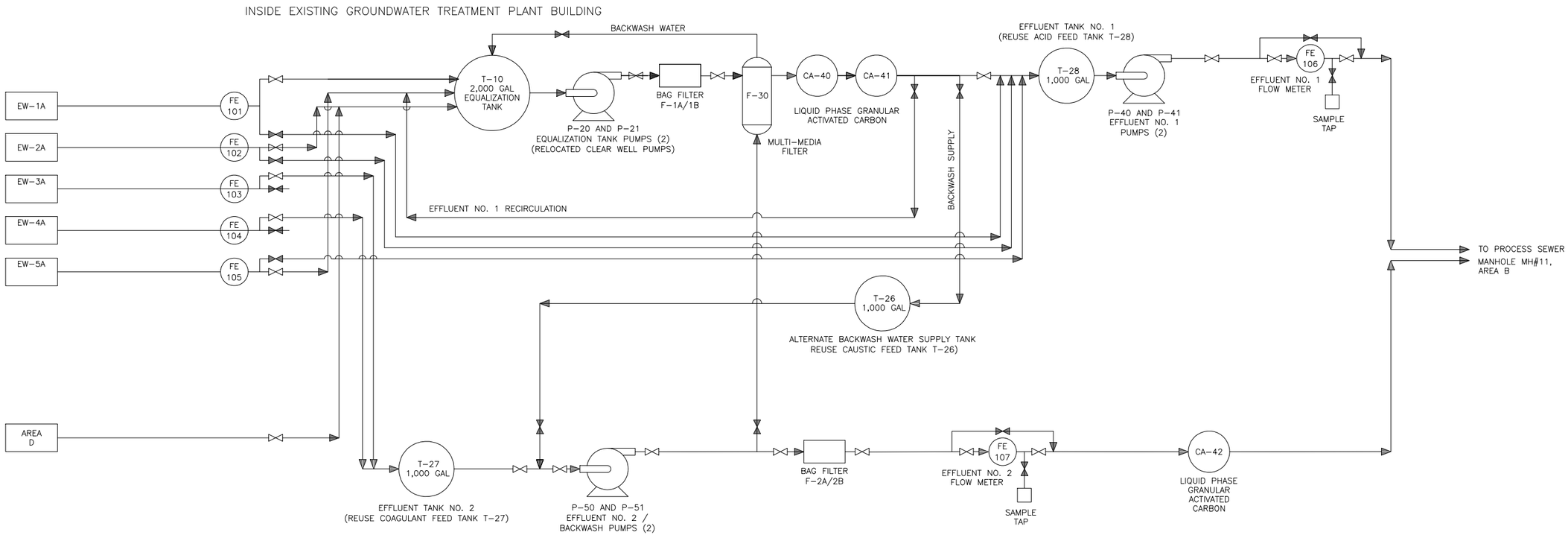
CHECKED
APPROVED

SITE PLAN
FORMER BUFFALO COLOR CORPORATION AREA - A
BUFFALO, NEW YORK 14203

INVENTUM ENGINEERING
441 CARLISLE DRIVE
SUITE C
HERNDON, VIRGINIA 20170
www.InventumEng.com

FIGURE 1



NOTES:

1. GENERAL PROCESS FLOW SHOWN ONLY. NOT ALL PIPING IS SHOWN.

B

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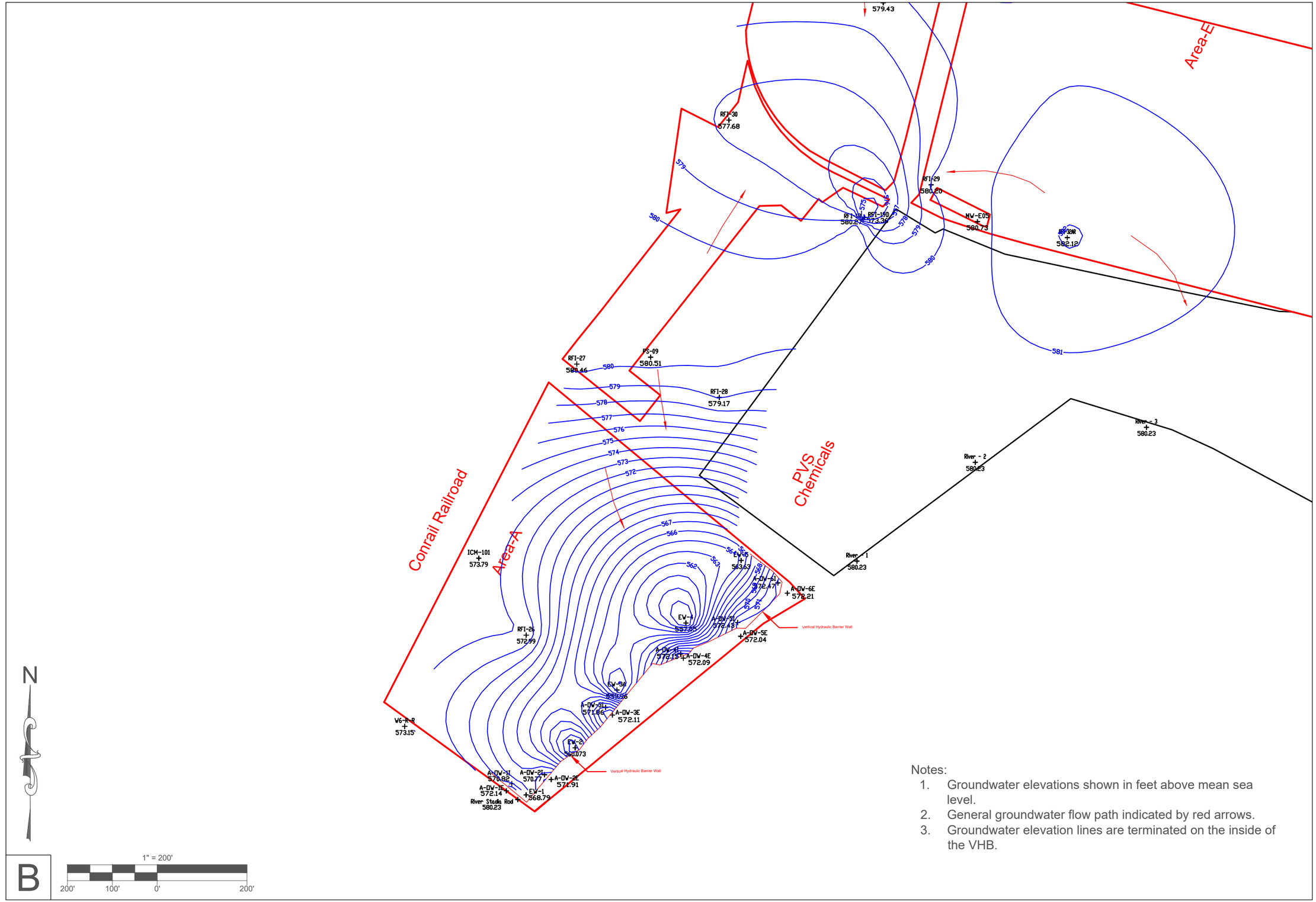
FIGURE 2

EXISTING GWTF LAYOUT
SOUTH BUFFALO DEVELOPMENT, LLC
AREA A

INVENTUM ENGINEERING
441 CARLISLE DRIVE
SUITE C
HERNDON, VIRGINIA 20170
(703) 722-6049
www.InventumEng.com

FIGURE 2

NOT TO SCALE



N

B

1" = 200'

200' 100' 0' 200'

Notes:

1. Groundwater elevations shown in feet above mean sea level.
2. General groundwater flow path indicated by red arrows.
3. Groundwater elevation lines are terminated on the inside of the VHB.

DRAWING BY

CHECKED

APPROVED

THIRD QUARTER 2022
GROUNDWATER ELEVATION
CONTOURS
BUFFALO COLOR AREA-A/B

INVENTUM ENGINEERING
441 CARLISLE DRIVE
SUITE C
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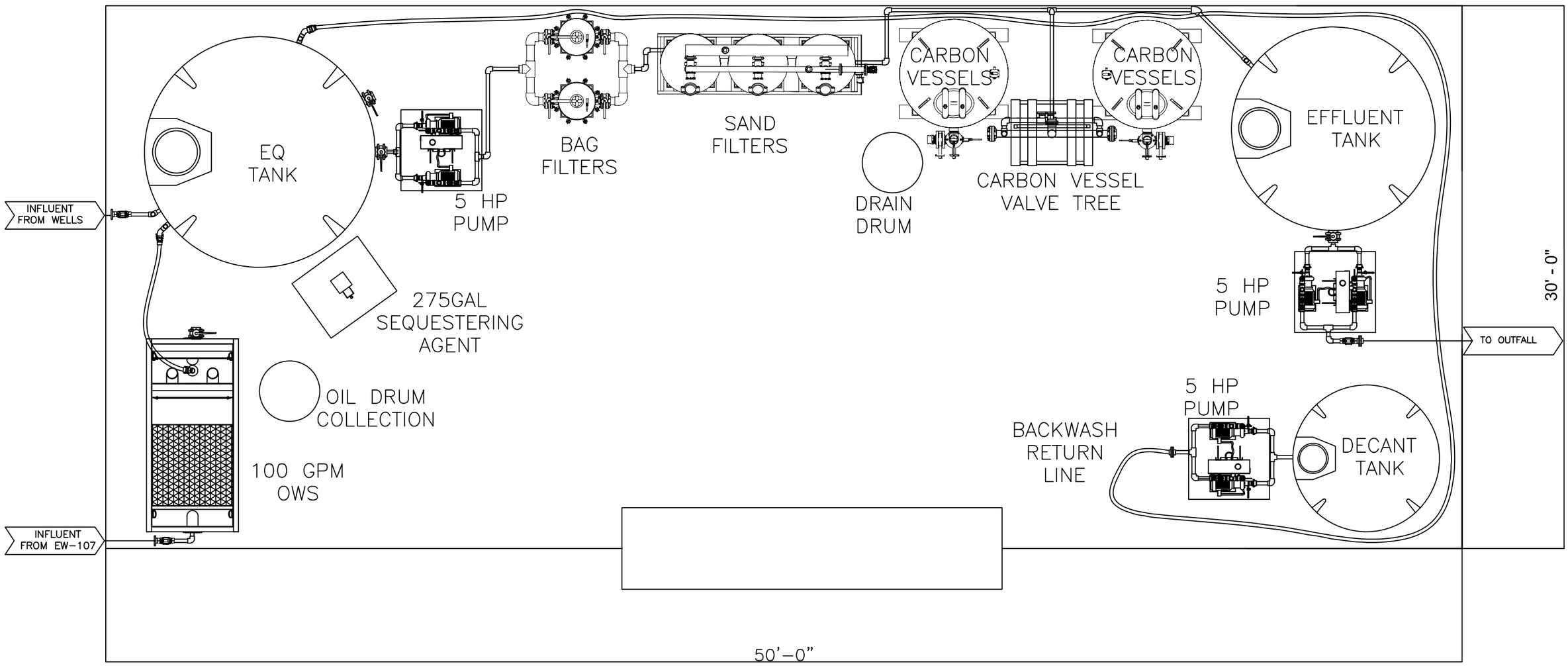
FIGURE 3

DRAWING NUMBER



Notes:
1. Optional Air Stripper between Sand Filters and Carbon Vessels is not shown.
2. Building Dimensions are preliminary. Final dimensions based on equipment selection and OM&M operability.

T:\Centralized Engineering\CAD FILES\BLOCKS\Borders & Templates\GWTT B-Size Border II 2020.dwt - 3/4/2020 - 8:27 AM

REV.	DATE	BY	REMARKS	REV.	DATE	BY	REMARKS
–	11/01/22	KAL	UPDATED.				

CUSTOMER: INVENTUM ENGINEERING

SITE: FORMER BUFFALO COLOR CORP

TITLE: **Figure 4**

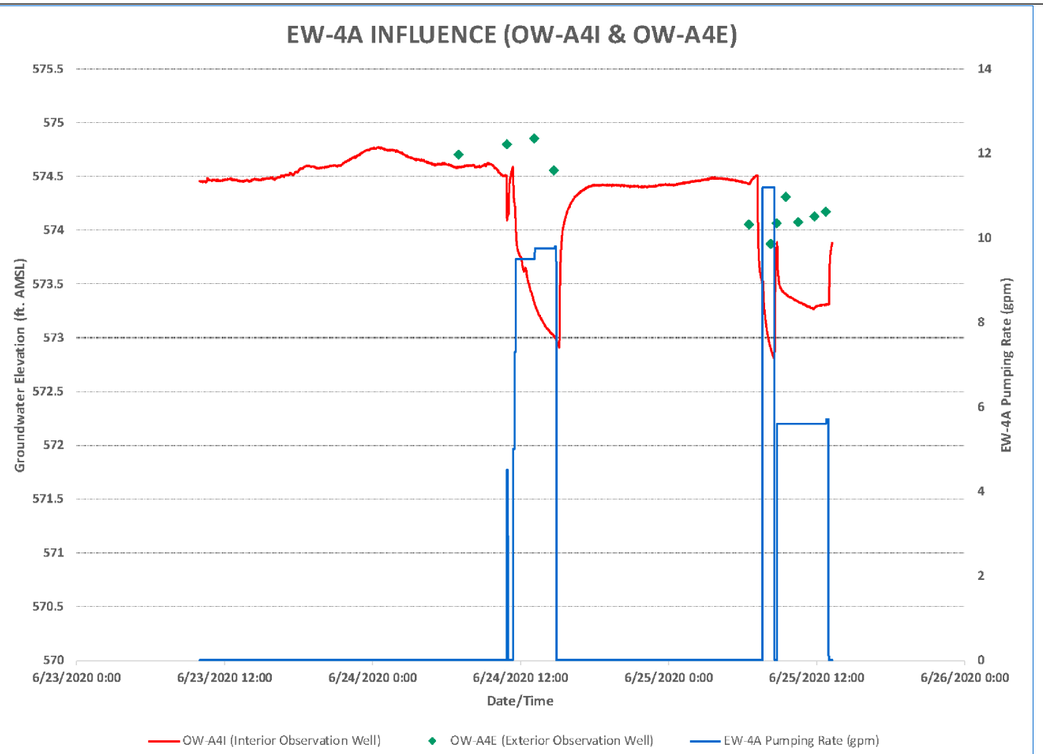
Upgraded GWTF Preliminary Layout

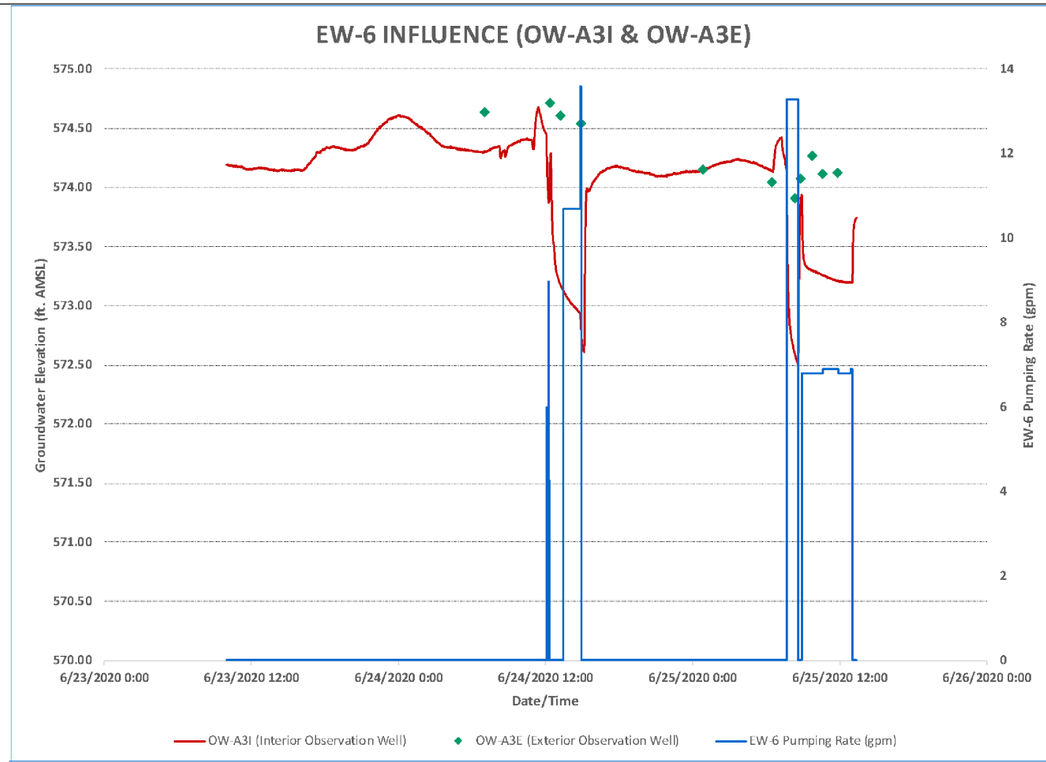
SCALE: NTS

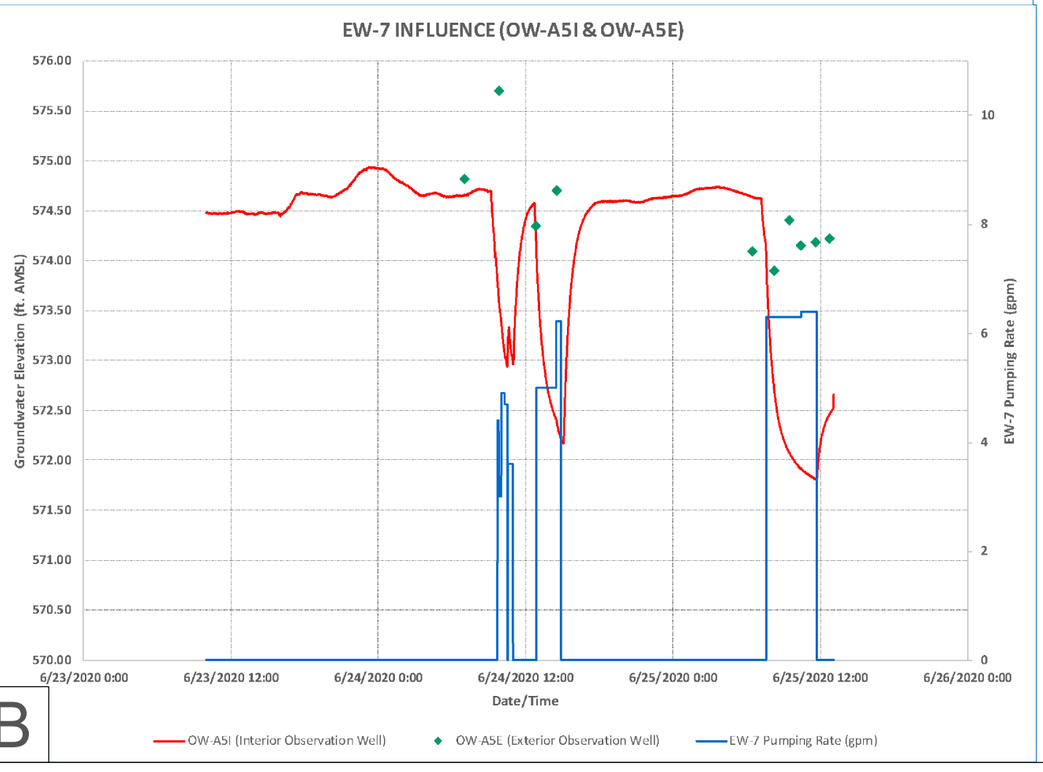
	BY	DATE
DRAWN	KAL	5/24/22
APPROVALS		
MECH.	KAL	5/24/22
I&C		
PROCESS		

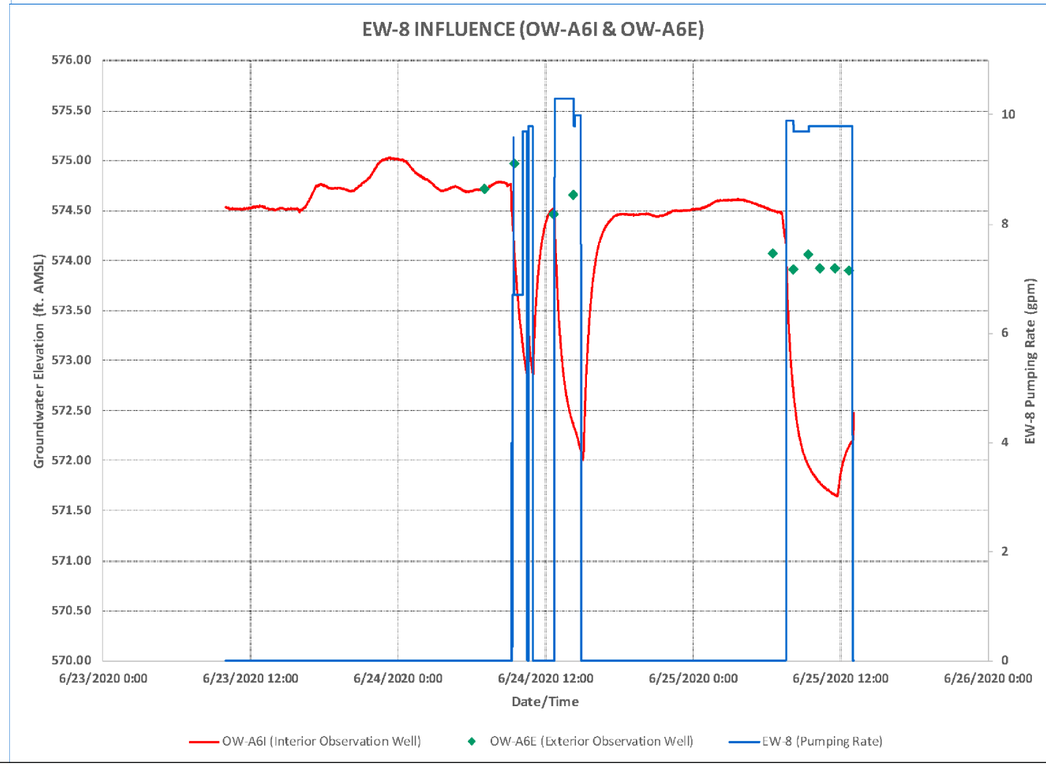
GWTT Ground/Water Treatment & Technology, LLC
627 MOUNT HOPE ROAD WHARTON, NJ 07885
PHONE: 973-983-0901 · FAX: 973-983-0903
www.gwttllc.com

DWG SIZE: B | SHEET: 1 OF 1 | DRAWING NO.: Q0010082-M-140 | –









B

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FIGURE 5
CORRECTIVE MEASURES PUMPING
TEST EVALUATION

SOUTH BUFFALO DEVELOPMENT -
AREA A

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SUITE C
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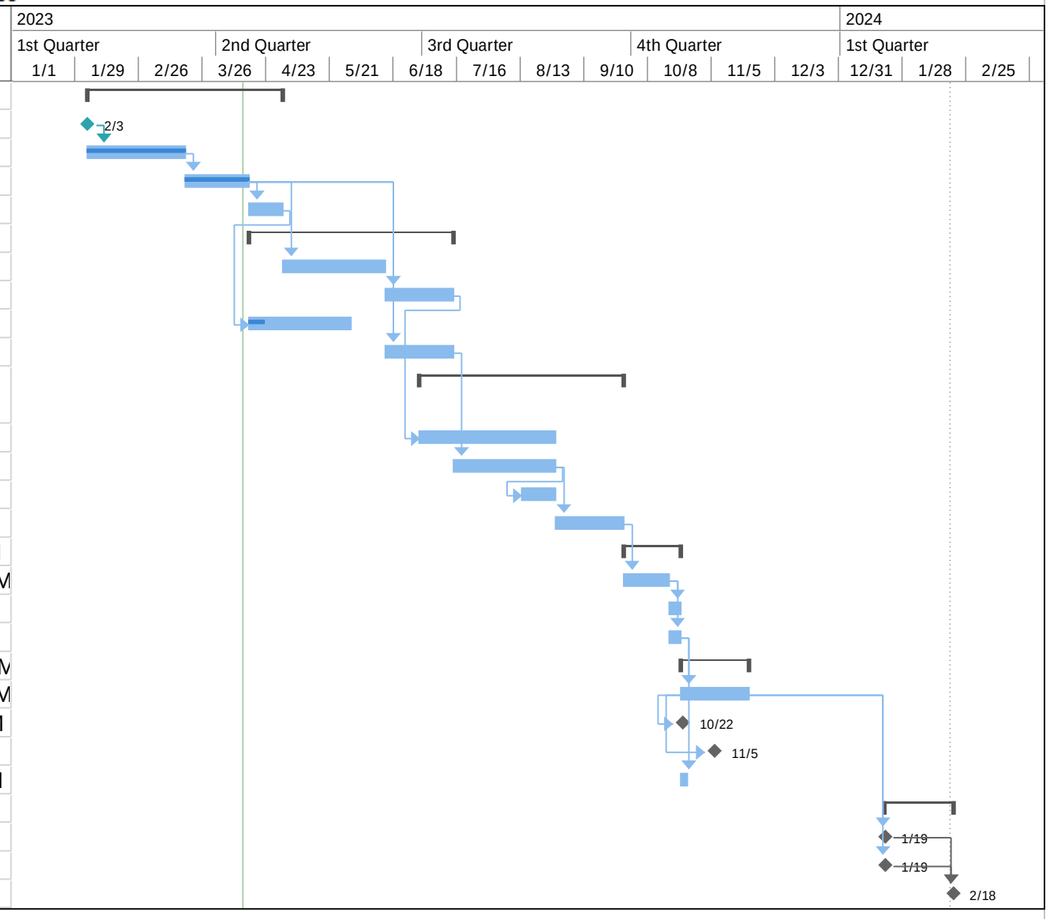
FIGURE 5

Figure 6
Corrective Measures Schedule
Groundwater Treatment Facility Upgrades
Former Color Corporation Site - Area A
NYSDEC Site No. C915230

	Task Name	Duration	Start	Finish
1	Corrective Measures (CM) Groundwater Treatment Design Report	86 days	Fri 2/3/23 12:00 AM	Sat 4/29/23 5:00 PM
2	Groundwater Treatment Design Report Submittal	0 days	Fri 2/3/23 12:00 AM	Fri 2/3/23 12:00 AM
3	NYSDEC Review and Comments	43 days	Fri 2/3/23 8:00 AM	Fri 3/17/23 5:00 PM
4	Revision of Design Report	28 days	Sat 3/18/23 8:00 AM	Fri 4/14/23 5:00 PM
5	NYSDEC Review and Approval	15 days	Sat 4/15/23 8:00 AM	Sat 4/29/23 5:00 PM
6	Final Design/Contracting/Permitting	90 days	Sat 4/15/23 8:00 AM	Thu 7/13/23 5:00 PM
7	Vendor Selection - Equipment Supply/Assembly	45 days	Sun 4/30/23 8:00 AM	Tue 6/13/23 5:00 PM
8	Final Equipment/Mechanical/Electrical/Controls/Logic Design	30 days	Wed 6/14/23 8:00 AM	Thu 7/13/23 5:00 PM
9	Buffalo Sewer Authority Permitting	45 days	Sat 4/15/23 8:00 AM	Mon 5/29/23 5:00 PM
10	City of Buffalo - Construction Permits	30 days	Wed 6/14/23 8:00 AM	Thu 7/13/23 5:00 PM
11	**Phase 1 System Construction [Groundwater Extraction w/limited interruption]**	90 days	Thu 6/29/23 8:00 AM	Tue 9/26/23 5:00 PM
12	Offsite Equipment Assembly	60 days	Thu 6/29/23 8:00 AM	Sun 8/27/23 5:00 PM
13	New Treatment Building Construction	45 days	Fri 7/14/23 8:00 AM	Sun 8/27/23 5:00 PM
14	New Extraction Wellhead and Conveyance System Site Work	15 days	Sun 8/13/23 8:00 AM	Sun 8/27/23 5:00 PM
15	Treatment Equipment/Controls Installation	30 days	Mon 8/28/23 8:00 AM	Tue 9/26/23 5:00 PM
16	Phase 2 System Construction [No Groundwater Extraction]	25 days	Wed 9/27/23 8:00 AM	Sat 10/21/23 5:00 PM
17	Existing Extraction Wellhead and Conveyance System Site Work	20 days	Wed 9/27/23 8:00 AM	Mon 10/16/23 5:00 PM
18	Final Connections to Treatment Building	5 days	Tue 10/17/23 8:00 AM	Sat 10/21/23 5:00 PM
19	Testing and Commissioning	5 days	Tue 10/17/23 8:00 AM	Sat 10/21/23 5:00 PM
20	Initial Operations Period	30 days	Sun 10/22/23 8:00 AM	Mon 11/20/23 5:00 PM
21	Hydraulic Control Monitoring	30 days	Sun 10/22/23 8:00 AM	Mon 11/20/23 5:00 PM
22	System Sampling	0 days	Sun 10/22/23 5:00 PM	Sun 10/22/23 5:00 PM
23	System Sampling	0 days	Sun 11/5/23 5:00 PM	Sun 11/5/23 5:00 PM
24	Surveying	3 days	Sun 10/22/23 8:00 AM	Tue 10/24/23 5:00 PM
25	Reporting	30 days	Fri 1/19/24 5:00 PM	Sun 2/18/24 5:00 PM
26	Corrective Measures Construction Completion Report	0 days	Fri 1/19/24 5:00 PM	Fri 1/19/24 5:00 PM
27	Operations and Maintenance Manual	0 days	Fri 1/19/24 5:00 PM	Fri 1/19/24 5:00 PM
28	Site Management Plan and Final Engineering Report Revisions	0 days	Sun 2/18/24 5:00 PM	Sun 2/18/24 5:00 PM



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

Appendices

Appendix A – Groundwater Sample Purge Records

GROUNDWATER MONITORING WELL PURGE FORM			
Site: Area A South Buffalo Development			
Well ID:	EW-8	Depth to Water (ft BTOC):	16.6
Inventum Sampler:	Peter Z.	Depth to Product (ft BTOC):	-
Date:	8/31/2022	Total Depth (ft BTOC):	36

Purge Details		
Time Start:	915	Comments/Notes:
Time Ended:	1000	
Total Purge Volume:	45 gal	

Volume	pH	Temperature	Turbidity	Conductivity	ORP	DO
1/gal min	6.96	15.28	12.14	1.7	-117	5.12
1/gal min	7.2	14.2	15.66	1.53	-147	3.51
1/gal min	7.18	14.06	7.36	1.48	-147	2.85
1/gal min	7.18	13.79	9.14	1.49	-142	4.89

Sample Details		
Sample Date:	8/31/2022	Analysis: 2-gallon sample collected (unpreserved) for Treatability
Sample Time:	1000	Study testing.
Sampled By:	PZ	

GROUNDWATER MONITORING WELL PURGE FORM			
Site: Area A South Buffalo Development			
Well ID:	EW-7	Depth to Water (ft BTOC):	16.93
Inventum Sampler:	PZ	Depth to Product (ft BTOC):	16.24
Date:	8/31/2022	Total Depth (ft BTOC):	35.46

Purge Details		
Time Start:	10:15	Comments/Notes: NAPL in well. Water parameters were not taken so as not to damage Horiba sensors.
Time Ended:	11:10	
Total Purge Volume:	45 gal	

Volume	pH	Temperature	Turbidity	Conductivity	ORP	DO

Sample Details		
Sample Date:	8/31/2022	Analysis: 2-gallon sample collected (unpreserved) for Treatability Study testing.
Sample Time:	11:10	
Sampled By:	PZ	

GROUNDWATER MONITORING WELL PURGE FORM			
Site: Area A South Buffalo Development			
Well ID:	EW-4A	Depth to Water (ft BTOC):	16.81
Inventum Sampler:	PZ	Depth to Product (ft BTOC):	-
Date:	8/31/2022	Total Depth (ft BTOC):	35.12

Purge Details		
Time Start:	11:15	Comments/Notes:
Time Ended:	12:00	
Total Purge Volume:	40 gal	

Volume	pH	Temperature	Turbidity	Conductivity	ORP	DO
1gal/min	9.49	16.48	36.5	1.31	-170	4.47
1gal/min	9.72	15.29	41.28	1.59	-193	2.85
1gal/min	9.76	15.36	29.11	1.6	-196	1.8
1gal/min	9.75	15.41	26.74	1.71	-201	0.96

Sample Details		
Sample Date:	8/31/2022	Analysis: 2-gallon sample collected (unpreserved) for Treatability
Sample Time:	1200	Study testing.
Sampled By:	PZ	

GROUNDWATER MONITORING WELL PURGE FORM			
Site: Area A South Buffalo Development			
Well ID:	EW-6	Depth to Water (ft BTOC):	15.85
Inventum Sampler:	Peter Z	Depth to Product (ft BTOC):	-
Date:	8/31/2022	Total Depth (ft BTOC):	36.14

Purge Details		
Time Start:	12:15	Comments/Notes:
Time Ended:	13:00	
Total Purge Volume:	45 gal	

Volume	pH	Temperature	Turbidity	Conductivity	ORP	DO
1Gal/min	8.02	16.19	43.12	1.9	-188	0.82
1Gal/min	8.03	15.85	29.16	2.74	-173	2.14
1Gal/min	8.05	15.15	14.11	2.72	-165	2.57
1Gal/min	8.07	14.89	13.56	2.76	-156	3.01

Sample Details		
Sample Date:	8/31/2022	Analysis: 2-gallon sample collected (unpreserved) for Treatability
Sample Time:	1300	Study testing.
Sampled By:	PZ	

Appendix B – Treatability Study Laboratory Data Reports

Composited Influent Sample – Alpha Analytical

ANALYTICAL REPORT

Lab Number:	L2255194
Client:	Groundwater Treatment & Technology 627 Mount Hope Road Wharton, NJ 07885
ATTN:	Rob Orlando
Phone:	(973) 983-0901
Project Name:	SBD
Project Number:	Not Specified
Report Date:	10/17/22

Certifications & Approvals: MA (M-MA086), NH NELAP (2064), CT (PH-0574), IL (200077), ME (MA00086), MD (348), NJ (MA935), NY (11148), NC (25700/666), PA (68-03671), RI (LAO00065), TX (T104704476), VT (VT-0935), VA (460195), USDA (Permit #P330-17-00196).

Eight Walkup Drive, Westborough, MA 01581-1019
508-898-9220 (Fax) 508-898-9193 800-624-9220 - www.alphalab.com

Project Name: SBD
Project Number: Not Specified

Lab Number: L2255194
Report Date: 10/17/22

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L2255194-01	INF	WATER	NY	10/05/22 14:00	10/05/22

Project Name:	SBD	**Lab Number:**	L2255194
Project Number:	Not Specified	**Report Date:**	10/17/22

Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet NELAP requirements for all NELAP accredited parameters unless otherwise noted in the following narrative. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. Tentatively Identified Compounds (TICs), if requested, are reported for compounds identified to be present and are not part of the method/program Target Compound List, even if only a subset of the TCL are being reported. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively.

When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances, the specific failure is not narrated but noted in the associated QC Outlier Summary Report, located directly after the Case Narrative. QC information is also incorporated in the Data Usability Assessment table (Format 11) of our Data Merger tool, where it can be reviewed in conjunction with the sample result, associated regulatory criteria and any associated data usability implications.

Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

HOLD POLICY - For samples submitted on hold, Alpha's policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Alpha Project Manager and made arrangements for Alpha to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Project Management at 800-624-9220 with any questions.

Project Name: SBD **Lab Number:** L2255194
Project Number: Not Specified **Report Date:** 10/17/22

Case Narrative (continued)

Report Submission
October 17, 2022: This final report includes the results of all requested analyses.
October 12, 2022: This is a preliminary report.
October 07, 2022: This is a preliminary report.

All non-detect (ND) or estimated concentrations (J-qualified) have been quantitated to the limit noted in the MDL column.

The analysis of Phenols was subcontracted. A copy of the laboratory report is included as an addendum.
Please note: This data is only available in PDF format and is not available on Data Merger.

Volatile Organics by Method 624
L2255194-01D: The sample has elevated detection limits due to the dilution required by the sample matrix. Sample has particles.
The WG1696885-4 Method Blank, associated with L2255194-01D, has a tentatively identified compound at RT 16.532 and 20.664 minutes that meets the guidance criteria for evaluation and is reporting as a TIC. Since it is present in the Method Blank, it has been determined to be an artifact of the Anti-Foam solution utilized for analysis.

Report Submission
All non-detect (ND) or estimated concentrations (J-qualified) have been quantitated to the limit noted in the MDL column.

Volatile Organics by Method 624
L2255194-01D: The sample has elevated detection limits due to the dilution required by the sample matrix. Sample has particles.

Project Name: SBD **Lab Number:** L2255194
Project Number: Not Specified **Report Date:** 10/17/22

Case Narrative (continued)

The WG1696885-4 Method Blank, associated with L2255194-01D, has a tentatively identified compound (TIC) at RT 16.532 and 20.664 minutes that meets the guidance criteria for evaluation and is reporting as a TIC. Since it is present in the Method Blank it has been determined to be an artifact of the Anti-Foam solution utilized for analysis.

PCBs

In reference to question 4:

WG1695971-1 and WG1695971-2: One or more surrogates failed to meet the DKQP recovery limits. Please refer to the sample results and/or QC section of the report for specific details.

Dissolved Metals

Lab Note: Total v Dissolved results are within RPD criteria.

The WG1696069-2 LCS recovery, associated with L2255194-01, is above the acceptance criteria for silver (124%); however, the associated samples are non-detect to the RL for this target analyte. The results of the original analysis are reported.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature: Tiffani Morrissey - Tiffani Morrissey

Title: Technical Director/Representative Date: 10/17/22

ORGANICS

VOLATILES

Project Name: SBD
Project Number: Not Specified
Lab Number: L2255194
Report Date: 10/17/22

SAMPLE RESULTS

Lab ID: L2255194-01 D
Client ID: INF
Sample Location: NY
Date Collected: 10/05/22 14:00
Date Received: 10/05/22
Field Prep: Refer to COC

Sample Depth:
Matrix: Water
Analytical Method: 128,624.1
Analytical Date: 10/06/22 16:30
Analyst: GT

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
Methylene chloride	ND		ug/l	2.0	1.1	2
1,1-Dichloroethane	ND		ug/l	3.0	0.79	2
Chloroform	ND		ug/l	2.0	0.76	2
Carbon tetrachloride	ND		ug/l	2.0	0.49	2
1,2-Dichloropropane	ND		ug/l	7.0	0.93	2
Dibromochloromethane	ND		ug/l	2.0	0.54	2
1,1,2-Trichloroethane	ND		ug/l	3.0	0.68	2
2-Chloroethylvinyl ether	ND		ug/l	20	0.69	2
Tetrachloroethene	ND		ug/l	2.0	0.52	2
Chlorobenzene	0.67	J	ug/l	7.0	0.61	2
Trichlorofluoromethane	ND		ug/l	10	0.55	2
1,2-Dichloroethane	ND		ug/l	3.0	0.94	2
1,1,1-Trichloroethane	ND		ug/l	4.0	0.57	2
Bromodichloromethane	ND		ug/l	2.0	0.55	2
trans-1,3-Dichloropropene	ND		ug/l	3.0	0.62	2
cis-1,3-Dichloropropene	ND		ug/l	3.0	0.67	2
Bromoform	ND		ug/l	2.0	0.43	2
1,1,2,2-Tetrachloroethane	ND		ug/l	2.0	0.41	2
Benzene	ND		ug/l	2.0	0.77	2
Toluene	ND		ug/l	2.0	0.63	2
Ethylbenzene	ND		ug/l	2.0	0.56	2
Chloromethane	ND		ug/l	10	2.1	2
Bromomethane	ND		ug/l	10	2.4	2
Vinyl chloride	ND		ug/l	2.0	0.75	2
Chloroethane	ND		ug/l	4.0	0.74	2
1,1-Dichloroethene	ND		ug/l	2.0	0.62	2
trans-1,2-Dichloroethene	ND		ug/l	3.0	0.66	2
cis-1,2-Dichloroethene	ND		ug/l	2.0	0.34	2

Project Name: SBD **Lab Number:** L2255194

Project Number: Not Specified **Report Date:** 10/17/22

SAMPLE RESULTS

Lab ID: L2255194-01 D Date Collected: 10/05/22 14:00

Client ID: INF Date Received: 10/05/22

Sample Location: NY Field Prep: Refer to COC

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
Trichloroethene	ND		ug/l	2.0	0.67	2
1,2-Dichlorobenzene	ND		ug/l	10	0.55	2
1,3-Dichlorobenzene	ND		ug/l	10	0.55	2
1,4-Dichlorobenzene	ND		ug/l	10	0.57	2
p/m-Xylene	1.7	J	ug/l	4.0	0.61	2
o-xylene	1.4	J	ug/l	2.0	0.68	2
Xylenes, Total	3.1	J	ug/l	2.0	0.61	2
Styrene	ND		ug/l	2.0	0.74	2
Acetone	ND		ug/l	20	4.7	2
Carbon disulfide	ND		ug/l	10	0.57	2
2-Butanone	ND		ug/l	20	2.1	2
Vinyl acetate	ND		ug/l	20	0.82	2
4-Methyl-2-pentanone	ND		ug/l	20	0.38	2
2-Hexanone	ND		ug/l	20	1.1	2
Acrolein	ND		ug/l	16	3.6	2
Acrylonitrile	ND		ug/l	20	0.67	2
Dibromomethane	ND		ug/l	2.0	0.45	2

Tentatively Identified Compounds						
Unknown Alkane	12.2	J	ug/l			2
Undecane, 2,6-dimethyl-	11.4	NJ	ug/l			2
Indane	8.32	NJ	ug/l			2
Unknown Alkane	8.74	J	ug/l			2
Unknown Cycloalkane	6.68	J	ug/l			2
Unknown	6.42	J	ug/l			2
Unknown	6.18	J	ug/l			2

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Pentafluorobenzene	96		60-140
Fluorobenzene	84		60-140
4-Bromofluorobenzene	95		60-140

Project Name: SBD
Project Number: Not Specified

Lab Number: L2255194
Report Date: 10/17/22

Method Blank Analysis
Batch Quality Control

Analytical Method: 128,624.1
Analytical Date: 10/06/22 10:44
Analyst: GT

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by GC/MS - Westborough Lab for sample(s): 01 Batch: WG1696885-4					
Methylene chloride	ND		ug/l	1.0	0.56
1,1-Dichloroethane	ND		ug/l	1.5	0.40
Chloroform	ND		ug/l	1.0	0.38
Carbon tetrachloride	ND		ug/l	1.0	0.24
1,2-Dichloropropane	ND		ug/l	3.5	0.46
Dibromochloromethane	ND		ug/l	1.0	0.27
1,1,2-Trichloroethane	ND		ug/l	1.5	0.34
2-Chloroethylvinyl ether	ND		ug/l	10	0.35
Tetrachloroethene	ND		ug/l	1.0	0.26
Chlorobenzene	ND		ug/l	3.5	0.30
Trichlorofluoromethane	ND		ug/l	5.0	0.28
1,2-Dichloroethane	ND		ug/l	1.5	0.47
1,1,1-Trichloroethane	ND		ug/l	2.0	0.29
Bromodichloromethane	ND		ug/l	1.0	0.28
trans-1,3-Dichloropropene	ND		ug/l	1.5	0.31
cis-1,3-Dichloropropene	ND		ug/l	1.5	0.34
Bromoform	ND		ug/l	1.0	0.22
1,1,2,2-Tetrachloroethane	ND		ug/l	1.0	0.20
Benzene	ND		ug/l	1.0	0.38
Toluene	ND		ug/l	1.0	0.31
Ethylbenzene	ND		ug/l	1.0	0.28
Chloromethane	ND		ug/l	5.0	1.0
Bromomethane	ND		ug/l	5.0	1.2
Vinyl chloride	ND		ug/l	1.0	0.38
Chloroethane	ND		ug/l	2.0	0.37
1,1-Dichloroethene	ND		ug/l	1.0	0.31
trans-1,2-Dichloroethene	ND		ug/l	1.5	0.33
cis-1,2-Dichloroethene	ND		ug/l	1.0	0.17
Trichloroethene	ND		ug/l	1.0	0.33

Project Name: SBD
Project Number: Not Specified

Lab Number: L2255194
Report Date: 10/17/22

Method Blank Analysis
Batch Quality Control

Analytical Method: 128,624.1
Analytical Date: 10/06/22 10:44
Analyst: GT

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by GC/MS - Westborough Lab for sample(s): 01 Batch: WG1696885-4					
1,2-Dichlorobenzene	ND		ug/l	5.0	0.28
1,3-Dichlorobenzene	ND		ug/l	5.0	0.27
1,4-Dichlorobenzene	ND		ug/l	5.0	0.29
p/m-Xylene	ND		ug/l	2.0	0.30
o-xylene	ND		ug/l	1.0	0.34
Xylenes, Total	ND		ug/l	1.0	0.30
Styrene	ND		ug/l	1.0	0.37
Acetone	ND		ug/l	10	2.4
Carbon disulfide	ND		ug/l	5.0	0.28
2-Butanone	ND		ug/l	10	1.0
Vinyl acetate	ND		ug/l	10	0.41
4-Methyl-2-pentanone	ND		ug/l	10	0.19
2-Hexanone	ND		ug/l	10	0.55
Acrolein	ND		ug/l	8.0	1.8
Acrylonitrile	ND		ug/l	10	0.33
Dibromomethane	ND		ug/l	1.0	0.23

Tentatively Identified Compounds			
Unknown	9.35	J	ug/l
Unknown	80.9	J	ug/l
Unknown	61.6	J	ug/l
Unknown	7.48	J	ug/l

Project Name: SBD
Project Number: Not Specified

Lab Number: L2255194
Report Date: 10/17/22

Method Blank Analysis
Batch Quality Control

Analytical Method: 128,624.1
Analytical Date: 10/06/22 10:44
Analyst: GT

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by GC/MS - Westborough Lab for sample(s): 01 Batch: WG1696885-4					

Surrogate	%Recovery	Qualifier	Acceptance Criteria
Pentafluorobenzene	94		60-140
Fluorobenzene	79		60-140
4-Bromofluorobenzene	95		60-140

Lab Control Sample Analysis
Batch Quality Control

Project Name: SBD
Project Number: Not Specified

Lab Number: L2255194
Report Date: 10/17/22

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 01 Batch: WG1696885-3								
Methylene chloride	105		-		60-140	-		28
1,1-Dichloroethane	105		-		50-150	-		49
Chloroform	110		-		70-135	-		54
Carbon tetrachloride	100		-		70-130	-		41
1,2-Dichloropropane	100		-		35-165	-		55
Dibromochloromethane	80		-		70-135	-		50
1,1,2-Trichloroethane	95		-		70-130	-		45
2-Chloroethylvinyl ether	95		-		1-225	-		71
Tetrachloroethene	90		-		70-130	-		39
Chlorobenzene	80		-		65-135	-		53
Trichlorofluoromethane	125		-		50-150	-		84
1,2-Dichloroethane	110		-		70-130	-		49
1,1,1-Trichloroethane	100		-		70-130	-		36
Bromodichloromethane	105		-		65-135	-		56
trans-1,3-Dichloropropene	85		-		50-150	-		86
cis-1,3-Dichloropropene	90		-		25-175	-		58
Bromoform	70		-		70-130	-		42
1,1,2,2-Tetrachloroethane	90		-		60-140	-		61
Benzene	110		-		65-135	-		61
Toluene	95		-		70-130	-		41
Ethylbenzene	85		-		60-140	-		63
Chloromethane	80		-		1-205	-		60
Bromomethane	120		-		15-185	-		61

Lab Control Sample Analysis
Batch Quality Control

Project Name: SBD
Project Number: Not Specified

Lab Number: L2255194
Report Date: 10/17/22

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 01 Batch: WG1696885-3								
Vinyl chloride	170		-		5-195	-		66
Chloroethane	140		-		40-160	-		78
1,1-Dichloroethene	110		-		50-150	-		32
trans-1,2-Dichloroethene	110		-		70-130	-		45
cis-1,2-Dichloroethene	100		-		60-140	-		30
Trichloroethene	95		-		65-135	-		48
1,2-Dichlorobenzene	70		-		65-135	-		57
1,3-Dichlorobenzene	70		-		70-130	-		43
1,4-Dichlorobenzene	70		-		65-135	-		57
p/m-Xylene	92		-		60-140	-		30
o-xylene	75		-		60-140	-		30
Styrene	80		-		60-140	-		30
Acetone	94		-		40-160	-		30
Carbon disulfide	90		-		60-140	-		30
2-Butanone	102		-		60-140	-		30
Vinyl acetate	82		-		60-140	-		30
4-Methyl-2-pentanone	96		-		60-140	-		30
2-Hexanone	96		-		60-140	-		30
Acrolein	100		-		60-140	-		30
Acrylonitrile	98		-		60-140	-		60
Dibromomethane	85		-		70-130	-		30

Lab Control Sample Analysis
Batch Quality Control

Project Name: SBD
Project Number: Not Specified

Lab Number: L2255194
Report Date: 10/17/22

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 01 Batch: WG1696885-3								

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
Pentafluorobenzene	95				60-140
Fluorobenzene	106				60-140
4-Bromofluorobenzene	97				60-140

SEMIVOLATILES

Project Name: SBD
Project Number: Not Specified

Lab Number: L2255194
Report Date: 10/17/22

SAMPLE RESULTS

Lab ID: L2255194-01
Client ID: INF
Sample Location: NY

Date Collected: 10/05/22 14:00
Date Received: 10/05/22
Field Prep: Refer to COC

Sample Depth:
Matrix: Water
Analytical Method: 129,625.1
Analytical Date: 10/11/22 14:23
Analyst: SZ

Extraction Method: EPA 625.1
Extraction Date: 10/08/22 15:06

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Acenaphthene	55.6		ug/l	2.00	0.407	1
Benzidine[1]	ND		ug/l	20.0	12.1	1
1,2,4-Trichlorobenzene	ND		ug/l	5.00	1.49	1
Hexachlorobenzene	ND		ug/l	2.00	0.952	1
Bis(2-chloroethyl)ether	ND		ug/l	2.00	0.600	1
2-Chloronaphthalene	ND		ug/l	2.00	0.319	1
3,3'-Dichlorobenzidine	ND		ug/l	5.00	0.457	1
2,4-Dinitrotoluene	ND		ug/l	5.00	0.636	1
2,6-Dinitrotoluene	ND		ug/l	5.00	0.631	1
Azobenzene[1]	ND		ug/l	2.00	0.889	1
Fluoranthene	43.3		ug/l	2.00	0.736	1
4-Chlorophenyl phenyl ether	ND		ug/l	2.00	0.371	1
4-Bromophenyl phenyl ether	ND		ug/l	2.00	0.447	1
Bis(2-chloroisopropyl)ether	ND		ug/l	2.00	0.822	1
Bis(2-chloroethoxy)methane	ND		ug/l	5.00	0.585	1
Hexachlorobutadiene	ND		ug/l	2.00	0.921	1
Hexachlorocyclopentadiene[1]	ND		ug/l	10.0	1.36	1
Hexachloroethane	ND		ug/l	2.00	0.973	1
Isophorone	ND		ug/l	5.00	0.546	1
Naphthalene	3.74		ug/l	2.00	0.896	1
Nitrobenzene	ND		ug/l	2.00	0.788	1
NDPA/DPA[1]	ND		ug/l	2.00	0.783	1
n-Nitrosodi-n-propylamine	ND		ug/l	5.00	0.630	1
Bis(2-ethylhexyl)phthalate	ND		ug/l	2.20	1.70	1
Butyl benzyl phthalate	ND		ug/l	5.00	0.670	1
Di-n-butylphthalate	ND		ug/l	5.00	0.631	1
Di-n-octylphthalate	ND		ug/l	5.00	0.633	1
Diethyl phthalate	ND		ug/l	5.00	0.717	1

Project Name: SBD **Lab Number:** L2255194

Project Number: Not Specified **Report Date:** 10/17/22

SAMPLE RESULTS

Lab ID: L2255194-01 Date Collected: 10/05/22 14:00

Client ID: INF Date Received: 10/05/22

Sample Location: NY Field Prep: Refer to COC

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Dimethyl phthalate	ND		ug/l	5.00	1.40	1
Benzo(a)anthracene	12.9		ug/l	2.00	0.665	1
Benzo(a)pyrene	8.26		ug/l	2.00	0.610	1
Benzo(b)fluoranthene	9.59		ug/l	2.00	0.741	1
Benzo(k)fluoranthene	2.70		ug/l	2.00	0.739	1
Chrysene	12.0		ug/l	2.00	0.668	1
Acenaphthylene	3.82		ug/l	2.00	0.930	1
Anthracene	31.8		ug/l	2.00	0.791	1
Benzo(ghi)perylene	4.28		ug/l	2.00	0.672	1
Fluorene	56.9		ug/l	2.00	0.927	1
Phenanthrene	81.5		ug/l	2.00	0.818	1
Dibenzo(a,h)anthracene	1.04	J	ug/l	2.00	0.687	1
Indeno(1,2,3-cd)pyrene	4.45		ug/l	2.00	0.633	1
Pyrene	41.4		ug/l	2.00	0.728	1
4-Chloroaniline[1]	ND		ug/l	5.00	0.790	1
Dibenzofuran[1]	52.0		ug/l	2.00	0.373	1
2-Methylnaphthalene[1]	2.78		ug/l	2.00	0.351	1
n-Nitrosodimethylamine[1]	ND		ug/l	2.00	0.407	1
2,4,6-Trichlorophenol	ND		ug/l	5.00	0.607	1
p-Chloro-m-cresol[1]	ND		ug/l	2.00	0.533	1
2-Chlorophenol	0.530	J	ug/l	2.00	0.513	1
2,4-Dichlorophenol	ND		ug/l	5.00	0.554	1
2,4-Dimethylphenol	ND		ug/l	5.00	0.851	1
2-Nitrophenol	ND		ug/l	5.00	0.604	1
4-Nitrophenol	ND		ug/l	10.0	0.834	1
2,4-Dinitrophenol	ND		ug/l	20.0	1.21	1
4,6-Dinitro-o-cresol	ND		ug/l	10.0	1.20	1
Pentachlorophenol	ND		ug/l	5.00	0.622	1
Phenol	1.79	J	ug/l	5.00	0.262	1
2-Methylphenol[1]	ND		ug/l	5.00	0.773	1
3-Methylphenol/4-Methylphenol[1]	ND		ug/l	5.00	0.511	1
2,4,5-Trichlorophenol[1]	ND		ug/l	5.00	0.637	1
Benzoic Acid[1]	ND		ug/l	50.0	1.17	1
Benzyl Alcohol[1]	ND		ug/l	2.00	0.490	1

Project Name: SBD **Lab Number:** L2255194

Project Number: Not Specified **Report Date:** 10/17/22

SAMPLE RESULTS

Lab ID: L2255194-01 Date Collected: 10/05/22 14:00

Client ID: INF Date Received: 10/05/22

Sample Location: NY Field Prep: Refer to COC

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Tentatively Identified Compounds						
Unknown Thiophene	22.5	J	ug/l			1
Unknown Naphthalene	51.5	J	ug/l			1
Unknown Alkane	29.5	J	ug/l			1
Unknown Naphthalene	22.3	J	ug/l			1
Unknown Naphthalene	21.4	J	ug/l			1
Unknown Naphthalene	17.2	J	ug/l			1
Unknown	14.8	J	ug/l			1
Unknown Biphenyl	15.2	J	ug/l			1
Unknown Naphthalene	42.4	J	ug/l			1
Unknown PAH	17.4	J	ug/l			1
Unknown	51.7	J	ug/l			1
Unknown Naphthalene	28.1	J	ug/l			1
Unknown Naphthalene	24.1	J	ug/l			1
Unknown PAH	19.4	J	ug/l			1
Unknown PAH	22.2	J	ug/l			1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Fluorophenol	36		25-87
Phenol-d6	24		16-65
Nitrobenzene-d5	64		42-122
2-Fluorobiphenyl	68		46-121
2,4,6-Tribromophenol	75		45-128
4-Terphenyl-d14	81		47-138

Project Name: SBD
Project Number: Not Specified

Lab Number: L2255194
Report Date: 10/17/22

Method Blank Analysis
Batch Quality Control

Analytical Method: 129,625.1
Analytical Date: 10/11/22 12:41
Analyst: SZ

Extraction Method: EPA 625.1
Extraction Date: 10/07/22 16:24

Parameter	Result	Qualifier	Units	RL	MDL
Semivolatile Organics by GC/MS - Westborough Lab for sample(s): 01 Batch: WG1696891-1					
Acenaphthene	ND		ug/l	2.00	0.407
Benzidine[1]	ND		ug/l	20.0	12.1
1,2,4-Trichlorobenzene	ND		ug/l	5.00	1.49
Hexachlorobenzene	ND		ug/l	2.00	0.952
Bis(2-chloroethyl)ether	ND		ug/l	2.00	0.600
2-Chloronaphthalene	ND		ug/l	2.00	0.319
3,3'-Dichlorobenzidine	ND		ug/l	5.00	0.457
2,4-Dinitrotoluene	ND		ug/l	5.00	0.636
2,6-Dinitrotoluene	ND		ug/l	5.00	0.631
Azobenzene[1]	ND		ug/l	2.00	0.889
Fluoranthene	ND		ug/l	2.00	0.736
4-Chlorophenyl phenyl ether	ND		ug/l	2.00	0.371
4-Bromophenyl phenyl ether	ND		ug/l	2.00	0.447
Bis(2-chloroisopropyl)ether	ND		ug/l	2.00	0.822
Bis(2-chloroethoxy)methane	ND		ug/l	5.00	0.585
Hexachlorobutadiene	ND		ug/l	2.00	0.921
Hexachlorocyclopentadiene[1]	ND		ug/l	10.0	1.36
Hexachloroethane	ND		ug/l	2.00	0.973
Isophorone	ND		ug/l	5.00	0.546
Naphthalene	ND		ug/l	2.00	0.896
Nitrobenzene	ND		ug/l	2.00	0.788
NDPA/DPA[1]	ND		ug/l	2.00	0.783
n-Nitrosodi-n-propylamine	ND		ug/l	5.00	0.630
Bis(2-ethylhexyl)phthalate	ND		ug/l	2.20	1.70
Butyl benzyl phthalate	ND		ug/l	5.00	0.670
Di-n-butylphthalate	ND		ug/l	5.00	0.631
Di-n-octylphthalate	ND		ug/l	5.00	0.633
Diethyl phthalate	ND		ug/l	5.00	0.717
Dimethyl phthalate	ND		ug/l	5.00	1.40

Project Name: SBD
Project Number: Not Specified

Lab Number: L2255194
Report Date: 10/17/22

Method Blank Analysis
Batch Quality Control

Analytical Method: 129,625.1
Analytical Date: 10/11/22 12:41
Analyst: SZ

Extraction Method: EPA 625.1
Extraction Date: 10/07/22 16:24

Parameter	Result	Qualifier	Units	RL	MDL
Semivolatile Organics by GC/MS - Westborough Lab for sample(s): 01 Batch: WG1696891-1					
Benzo(a)anthracene	ND		ug/l	2.00	0.665
Benzo(a)pyrene	ND		ug/l	2.00	0.610
Benzo(b)fluoranthene	ND		ug/l	2.00	0.741
Benzo(k)fluoranthene	ND		ug/l	2.00	0.739
Chrysene	ND		ug/l	2.00	0.668
Acenaphthylene	ND		ug/l	2.00	0.930
Anthracene	ND		ug/l	2.00	0.791
Benzo(ghi)perylene	ND		ug/l	2.00	0.672
Fluorene	ND		ug/l	2.00	0.927
Phenanthrene	ND		ug/l	2.00	0.818
Dibenzo(a,h)anthracene	ND		ug/l	2.00	0.687
Indeno(1,2,3-cd)pyrene	ND		ug/l	2.00	0.633
Pyrene	ND		ug/l	2.00	0.728
4-Chloroaniline[1]	ND		ug/l	5.00	0.790
Dibenzofuran[1]	ND		ug/l	2.00	0.373
2-Methylnaphthalene[1]	ND		ug/l	2.00	0.351
n-Nitrosodimethylamine[1]	ND		ug/l	2.00	0.407
2,4,6-Trichlorophenol	ND		ug/l	5.00	0.607
p-Chloro-m-cresol[1]	ND		ug/l	2.00	0.533
2-Chlorophenol	ND		ug/l	2.00	0.513
2,4-Dichlorophenol	ND		ug/l	5.00	0.554
2,4-Dimethylphenol	ND		ug/l	5.00	0.851
2-Nitrophenol	ND		ug/l	5.00	0.604
4-Nitrophenol	ND		ug/l	10.0	0.834
2,4-Dinitrophenol	ND		ug/l	20.0	1.21
4,6-Dinitro-o-cresol	ND		ug/l	10.0	1.20
Pentachlorophenol	ND		ug/l	5.00	0.622
Phenol	ND		ug/l	5.00	0.262
2-Methylphenol[1]	ND		ug/l	5.00	0.773

Project Name: SBD
Project Number: Not Specified

Lab Number: L2255194
Report Date: 10/17/22

Method Blank Analysis
Batch Quality Control

Analytical Method: 129,625.1
Analytical Date: 10/11/22 12:41
Analyst: SZ

Extraction Method: EPA 625.1
Extraction Date: 10/07/22 16:24

Parameter	Result	Qualifier	Units	RL	MDL
Semivolatile Organics by GC/MS - Westborough Lab for sample(s): 01 Batch: WG1696891-1					
3-Methylphenol/4-Methylphenol[1]	ND		ug/l	5.00	0.511
2,4,5-Trichlorophenol[1]	ND		ug/l	5.00	0.637
Benzoic Acid[1]	ND		ug/l	50.0	1.17
Benzyl Alcohol[1]	ND		ug/l	2.00	0.490
Tentatively Identified Compounds					
No Tentatively Identified Compounds	ND		ug/l		

Surrogate	%Recovery	Qualifier	Acceptance Criteria
2-Fluorophenol	47		25-87
Phenol-d6	33		16-65
Nitrobenzene-d5	68		42-122
2-Fluorobiphenyl	68		46-121
2,4,6-Tribromophenol	62		45-128
4-Terphenyl-d14	72		47-138

Lab Control Sample Analysis
Batch Quality Control

Project Name: SBD
Project Number: Not Specified

Lab Number: L2255194
Report Date: 10/17/22

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Semivolatile Organics by GC/MS - Westborough Lab Associated sample(s): 01 Batch: WG1696891-2								
Acenaphthene	74		-		60-132	-		48
Benzidine[1]	2		-		0-70	-		30
1,2,4-Trichlorobenzene	74		-		57-130	-		50
Hexachlorobenzene	78		-		8-142	-		55
Bis(2-chloroethyl)ether	76		-		43-126	-		108
2-Chloronaphthalene	75		-		65-120	-		24
3,3'-Dichlorobenzidine	32		-		8-213	-		108
2,4-Dinitrotoluene	76		-		48-127	-		42
2,6-Dinitrotoluene	79		-		68-137	-		48
Azobenzene[1]	86		-		44-115	-		23
Fluoranthene	76		-		43-121	-		66
4-Chlorophenyl phenyl ether	75		-		38-145	-		61
4-Bromophenyl phenyl ether	78		-		65-120	-		43
Bis(2-chloroisopropyl)ether	75		-		63-139	-		76
Bis(2-chloroethoxy)methane	80		-		49-165	-		54
Hexachlorobutadiene	69		-		38-120	-		62
Hexachlorocyclopentadiene[1]	48		-		7-118	-		35
Hexachloroethane	70		-		55-120	-		52
Isophorone	80		-		47-180	-		93
Naphthalene	73		-		36-120	-		65
Nitrobenzene	100		-		54-158	-		62
NDPA/DPA[1]	76		-		45-112	-		36
n-Nitrosodi-n-propylamine	80		-		14-198	-		87

Lab Control Sample Analysis
Batch Quality Control

Project Name: SBD
Project Number: Not Specified

Lab Number: L2255194
Report Date: 10/17/22

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Semivolatile Organics by GC/MS - Westborough Lab Associated sample(s): 01 Batch: WG1696891-2								
Bis(2-ethylhexyl)phthalate	84		-		29-137	-		82
Butyl benzyl phthalate	80		-		1-140	-		60
Di-n-butylphthalate	83		-		8-120	-		47
Di-n-octylphthalate	83		-		19-132	-		69
Diethyl phthalate	77		-		1-120	-		100
Dimethyl phthalate	79		-		1-120	-		183
Benzo(a)anthracene	77		-		42-133	-		53
Benzo(a)pyrene	85		-		32-148	-		72
Benzo(b)fluoranthene	77		-		42-140	-		71
Benzo(k)fluoranthene	79		-		25-146	-		63
Chrysene	76		-		44-140	-		87
Acenaphthylene	81		-		54-126	-		74
Anthracene	77		-		43-120	-		66
Benzo(ghi)perylene	78		-		1-195	-		97
Fluorene	75		-		70-120	-		38
Phenanthrene	76		-		65-120	-		39
Dibenzo(a,h)anthracene	79		-		1-200	-		126
Indeno(1,2,3-cd)pyrene	79		-		1-151	-		99
Pyrene	77		-		70-120	-		49
4-Chloroaniline[1]	48		-		10-100	-		53
Dibenzofuran[1]	74		-		23-126	-		22
2-Methylnaphthalene[1]	104		-		40-109	-		18
n-Nitrosodimethylamine[1]	47		-		15-68	-		17

Lab Control Sample Analysis
Batch Quality Control

Project Name: SBD
Project Number: Not Specified

Lab Number: L2255194
Report Date: 10/17/22

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Semivolatile Organics by GC/MS - Westborough Lab Associated sample(s): 01 Batch: WG1696891-2								
2,4,6-Trichlorophenol	80		-		52-129	-		58
p-Chloro-m-cresol[1]	82		-		68-130	-		73
2-Chlorophenol	78		-		36-120	-		61
2,4-Dichlorophenol	81		-		53-122	-		50
2,4-Dimethylphenol	70		-		42-120	-		58
2-Nitrophenol	79		-		45-167	-		55
4-Nitrophenol	38		-		13-129	-		131
2,4-Dinitrophenol	71		-		1-173	-		132
4,6-Dinitro-o-cresol	75		-		56-130	-		203
Pentachlorophenol	62		-		38-152	-		86
Phenol	36		-		17-120	-		64
2-Methylphenol[1]	68		-		38-102	-		23
3-Methylphenol/4-Methylphenol[1]	63		-		35-103	-		26
2,4,5-Trichlorophenol[1]	80		-		47-126	-		28
Benzoic Acid[1]	28		-		2-55	-		27
Benzyl Alcohol[1]	68		-		31-103	-		23

Lab Control Sample Analysis
Batch Quality Control

Project Name: SBD
Project Number: Not Specified

Lab Number: L2255194
Report Date: 10/17/22

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Semivolatile Organics by GC/MS - Westborough Lab Associated sample(s): 01 Batch: WG1696891-2								

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
2-Fluorophenol	54				25-87
Phenol-d6	38				16-65
Nitrobenzene-d5	81				42-122
2-Fluorobiphenyl	80				46-121
2,4,6-Tribromophenol	79				45-128
4-Terphenyl-d14	80				47-138

PCBS

Project Name: SBD
Project Number: Not Specified

Lab Number: L2255194
Report Date: 10/17/22

SAMPLE RESULTS

Lab ID: L2255194-01
Client ID: INF
Sample Location: NY

Date Collected: 10/05/22 14:00
Date Received: 10/05/22
Field Prep: Refer to COC

Sample Depth:
Matrix: Water
Analytical Method: 127,608.3
Analytical Date: 10/08/22 14:58
Analyst: JM

Extraction Method: EPA 608.3
Extraction Date: 10/06/22 06:22
Cleanup Method: EPA 3665A
Cleanup Date: 10/06/22
Cleanup Method: EPA 3660B
Cleanup Date: 10/06/22

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
Polychlorinated Biphenyls by GC - Westborough Lab							
Aroclor 1016	ND		ug/l	0.250	0.016	1	A
Aroclor 1221	ND		ug/l	0.250	0.022	1	A
Aroclor 1232	ND		ug/l	0.250	0.046	1	A
Aroclor 1242	ND		ug/l	0.250	0.036	1	A
Aroclor 1248	ND		ug/l	0.250	0.046	1	A
Aroclor 1254	ND		ug/l	0.250	0.017	1	A
Aroclor 1260	ND		ug/l	0.200	0.034	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	76		37-123	B
Decachlorobiphenyl	74		38-114	B
2,4,5,6-Tetrachloro-m-xylene	74		37-123	A
Decachlorobiphenyl	67		38-114	A

Project Name: SBD
Project Number: Not Specified

Lab Number: L2255194
Report Date: 10/17/22

Method Blank Analysis
Batch Quality Control

Analytical Method: 127,608.3
Analytical Date: 10/06/22 08:46
Analyst: SDC

Extraction Method: EPA 608.3
Extraction Date: 10/05/22 20:02
Cleanup Method: EPA 3665A
Cleanup Date: 10/06/22
Cleanup Method: EPA 3660B
Cleanup Date: 10/06/22

Parameter	Result	Qualifier	Units	RL	MDL	Column
Polychlorinated Biphenyls by GC - Westborough Lab for sample(s): 01 Batch: WG1695971-1						
Aroclor 1016	ND		ug/l	0.250	0.016	A
Aroclor 1221	ND		ug/l	0.250	0.022	A
Aroclor 1232	ND		ug/l	0.250	0.046	A
Aroclor 1242	ND		ug/l	0.250	0.036	A
Aroclor 1248	ND		ug/l	0.250	0.046	A
Aroclor 1254	ND		ug/l	0.250	0.017	A
Aroclor 1260	ND		ug/l	0.200	0.034	A

Surrogate	%Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	90		37-123	B
Decachlorobiphenyl	**123**	Q	38-114	B
2,4,5,6-Tetrachloro-m-xylene	88		37-123	A
Decachlorobiphenyl	**129**	Q	38-114	A

Lab Control Sample Analysis

Batch Quality Control

Project Name: SBD

Project Number: Not Specified

Lab Number: L2255194

Report Date: 10/17/22

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits	Column
Polychlorinated Biphenyls by GC - Westborough Lab Associated sample(s): 01 Batch: WG1695971-2									
Aroclor 1016	99		-		50-140	-		36	A
Aroclor 1260	100		-		8-140	-		38	A

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	84				37-123	B
Decachlorobiphenyl	112				38-114	B
2,4,5,6-Tetrachloro-m-xylene	82				37-123	A
Decachlorobiphenyl	**116**	Q			38-114	A

METALS

Project Name: SBD
Project Number: Not Specified
Lab Number: L2255194
Report Date: 10/17/22

SAMPLE RESULTS

Lab ID: L2255194-01
Client ID: INF
Sample Location: NY
Sample Depth:
Matrix: Water

Date Collected: 10/05/22 14:00
Date Received: 10/05/22
Field Prep: Refer to COC

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Calcium, Total	82.4		mg/l	0.100	0.0394	1	10/06/22 11:42	10/07/22 11:17	EPA 3005A	1,6020B	SV
Chromium, Total	0.00263		mg/l	0.00100	0.00017	1	10/06/22 11:42	10/07/22 11:17	EPA 3005A	1,6020B	SV
Copper, Total	0.00457		mg/l	0.00100	0.00038	1	10/06/22 11:42	10/07/22 11:17	EPA 3005A	1,6020B	SV
Iron, Total	2.11		mg/l	0.0500	0.0191	1	10/06/22 11:42	10/07/22 11:17	EPA 3005A	1,6020B	SV
Lead, Total	0.00261		mg/l	0.00100	0.00034	1	10/06/22 11:42	10/07/22 11:17	EPA 3005A	1,6020B	SV
Magnesium, Total	17.2		mg/l	0.0700	0.0242	1	10/06/22 11:42	10/07/22 11:17	EPA 3005A	1,6020B	SV
Manganese, Total	0.1566		mg/l	0.00100	0.00044	1	10/06/22 11:42	10/07/22 11:17	EPA 3005A	1,6020B	SV
Mercury, Total	ND		mg/l	0.00020	0.00009	1	10/06/22 12:34	10/06/22 17:40	EPA 7470A	1,7470A	ZK
Nickel, Total	0.00404		mg/l	0.00200	0.00055	1	10/06/22 11:42	10/07/22 11:17	EPA 3005A	1,6020B	SV
Zinc, Total	0.08130		mg/l	0.01000	0.00341	1	10/06/22 11:42	10/07/22 11:17	EPA 3005A	1,6020B	SV
Dissolved Metals - Mansfield Lab											
Calcium, Dissolved	95.6		mg/l	0.100	0.0394	1	10/06/22 10:59	10/07/22 11:27	EPA 3005A	1,6020B	SV
Chromium, Dissolved	0.00095	J	mg/l	0.00100	0.00017	1	10/06/22 10:59	10/07/22 11:27	EPA 3005A	1,6020B	SV
Copper, Dissolved	0.00084	J	mg/l	0.00100	0.00038	1	10/06/22 10:59	10/07/22 11:27	EPA 3005A	1,6020B	SV
Iron, Dissolved	0.265		mg/l	0.0500	0.0191	1	10/06/22 10:59	10/07/22 11:27	EPA 3005A	1,6020B	SV
Lead, Dissolved	ND		mg/l	0.00100	0.00034	1	10/06/22 10:59	10/07/22 11:27	EPA 3005A	1,6020B	SV
Magnesium, Dissolved	19.0		mg/l	0.0700	0.0242	1	10/06/22 10:59	10/07/22 11:27	EPA 3005A	1,6020B	SV
Manganese, Dissolved	0.1715		mg/l	0.00100	0.00044	1	10/06/22 10:59	10/07/22 11:27	EPA 3005A	1,6020B	SV
Mercury, Dissolved	ND		mg/l	0.00020	0.00009	1	10/06/22 11:53	10/06/22 15:48	EPA 7470A	1,7470A	ZK
Nickel, Dissolved	0.00126	J	mg/l	0.00200	0.00055	1	10/06/22 10:59	10/07/22 11:27	EPA 3005A	1,6020B	SV
Zinc, Dissolved	0.00420	J	mg/l	0.01000	0.00341	1	10/06/22 10:59	10/07/22 11:27	EPA 3005A	1,6020B	SV

Project Name: SBD **Lab Number:** L2255194

Project Number: Not Specified **Report Date:** 10/17/22

Method Blank Analysis
Batch Quality Control

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Dissolved Metals - Mansfield Lab for sample(s): 01 Batch: WG1696069-1										
Calcium, Dissolved	ND		mg/l	0.100	0.0394	1	10/06/22 10:59	10/07/22 11:59	1,6020B	SV
Chromium, Dissolved	ND		mg/l	0.00100	0.00017	1	10/06/22 10:59	10/07/22 11:59	1,6020B	SV
Copper, Dissolved	ND		mg/l	0.00100	0.00038	1	10/06/22 10:59	10/07/22 11:59	1,6020B	SV
Iron, Dissolved	ND		mg/l	0.0500	0.0191	1	10/06/22 10:59	10/07/22 11:59	1,6020B	SV
Lead, Dissolved	ND		mg/l	0.00100	0.00034	1	10/06/22 10:59	10/07/22 11:59	1,6020B	SV
Magnesium, Dissolved	ND		mg/l	0.0700	0.0242	1	10/06/22 10:59	10/07/22 11:59	1,6020B	SV
Manganese, Dissolved	ND		mg/l	0.00100	0.00044	1	10/06/22 10:59	10/07/22 11:59	1,6020B	SV
Nickel, Dissolved	ND		mg/l	0.00200	0.00055	1	10/06/22 10:59	10/07/22 11:59	1,6020B	SV
Zinc, Dissolved	ND		mg/l	0.01000	0.00341	1	10/06/22 10:59	10/07/22 11:59	1,6020B	SV

Prep Information

Digestion Method: EPA 3005A

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Dissolved Metals - Mansfield Lab for sample(s): 01 Batch: WG1696071-1										
Mercury, Dissolved	ND		mg/l	0.00020	0.00009	1	10/06/22 11:53	10/06/22 15:08	1,7470A	ZK

Prep Information

Digestion Method: EPA 7470A

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Mansfield Lab for sample(s): 01 Batch: WG1696117-1										
Calcium, Total	ND		mg/l	0.100	0.0394	1	10/06/22 11:42	10/07/22 10:42	1,6020B	SV
Chromium, Total	ND		mg/l	0.00100	0.00017	1	10/06/22 11:42	10/07/22 10:42	1,6020B	SV
Copper, Total	ND		mg/l	0.00100	0.00038	1	10/06/22 11:42	10/07/22 10:42	1,6020B	SV
Iron, Total	ND		mg/l	0.0500	0.0191	1	10/06/22 11:42	10/07/22 10:42	1,6020B	SV
Lead, Total	ND		mg/l	0.00100	0.00034	1	10/06/22 11:42	10/07/22 10:42	1,6020B	SV
Magnesium, Total	ND		mg/l	0.0700	0.0242	1	10/06/22 11:42	10/07/22 10:42	1,6020B	SV
Manganese, Total	ND		mg/l	0.00100	0.00044	1	10/06/22 11:42	10/07/22 10:42	1,6020B	SV

Project Name: SBD
Project Number: Not Specified

Lab Number: L2255194
Report Date: 10/17/22

Method Blank Analysis
Batch Quality Control

Nickel, Total	ND	mg/l	0.00200	0.00055	1	10/06/22 11:42	10/07/22 10:42	1,6020B	SV
Zinc, Total	ND	mg/l	0.01000	0.00341	1	10/06/22 11:42	10/07/22 10:42	1,6020B	SV

Prep Information

Digestion Method: EPA 3005A

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Mansfield Lab for sample(s): 01 Batch: WG1696122-1										
Mercury, Total	ND		mg/l	0.00020	0.00009	1	10/06/22 12:34	10/06/22 16:33	1,7470A	ZK

Prep Information

Digestion Method: EPA 7470A

Lab Control Sample Analysis

Batch Quality Control

Project Name: SBD

Project Number: Not Specified

Lab Number: L2255194

Report Date: 10/17/22

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Dissolved Metals - Mansfield Lab Associated sample(s): 01 Batch: WG1696069-2								
Calcium, Dissolved	93		-		80-120	-		
Chromium, Dissolved	109		-		80-120	-		
Copper, Dissolved	107		-		80-120	-		
Iron, Dissolved	115		-		80-120	-		
Lead, Dissolved	102		-		80-120	-		
Magnesium, Dissolved	113		-		80-120	-		
Manganese, Dissolved	113		-		80-120	-		
Nickel, Dissolved	108		-		80-120	-		
Zinc, Dissolved	106		-		80-120	-		
Dissolved Metals - Mansfield Lab Associated sample(s): 01 Batch: WG1696071-2								
Mercury, Dissolved	96		-		80-120	-		

Lab Control Sample Analysis

Batch Quality Control

Project Name: SBD

Project Number: Not Specified

Lab Number: L2255194

Report Date: 10/17/22

Parameter	LCS %Recovery	LCSD %Recovery	%Recovery Limits	RPD	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01 Batch: WG1696117-2					
Calcium, Total	94	-	80-120	-	
Chromium, Total	106	-	80-120	-	
Copper, Total	105	-	80-120	-	
Iron, Total	109	-	80-120	-	
Lead, Total	100	-	80-120	-	
Magnesium, Total	115	-	80-120	-	
Manganese, Total	108	-	80-120	-	
Nickel, Total	104	-	80-120	-	
Zinc, Total	101	-	80-120	-	
Total Metals - Mansfield Lab Associated sample(s): 01 Batch: WG1696122-2					
Mercury, Total	103	-	80-120	-	

Matrix Spike Analysis
Batch Quality Control

Project Name: SBD
Project Number: Not Specified

Lab Number: L2255194
Report Date: 10/17/22

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Dissolved Metals - Mansfield Lab Associated sample(s): 01 QC Batch ID: WG1696069-3 QC Sample: L2254365-01 Client ID: MS Sample												
Calcium, Dissolved	241.	10	258	**170**	Q	-	-		75-125	-		20
Chromium, Dissolved	0.00033J	0.2	0.2235	112		-	-		75-125	-		20
Copper, Dissolved	ND	0.25	0.2754	110		-	-		75-125	-		20
Iron, Dissolved	12.5	1	14.2	**170**	Q	-	-		75-125	-		20
Lead, Dissolved	ND	0.53	0.5467	103		-	-		75-125	-		20
Magnesium, Dissolved	45.1	10	59.0	**139**	Q	-	-		75-125	-		20
Manganese, Dissolved	1.702	0.5	2.355	**131**	Q	-	-		75-125	-		20
Nickel, Dissolved	0.00254	0.5	0.5474	109		-	-		75-125	-		20
Zinc, Dissolved	ND	0.5	0.5204	104		-	-		75-125	-		20
Dissolved Metals - Mansfield Lab Associated sample(s): 01 QC Batch ID: WG1696071-3 QC Sample: L2254894-01 Client ID: MS Sample												
Mercury, Dissolved	ND	0.005	0.00471	94		-	-		75-125	-		20
Total Metals - Mansfield Lab Associated sample(s): 01 QC Batch ID: WG1696117-3 WG1696117-4 QC Sample: L2254888-04 Client ID: MS Sample												
Calcium, Total	137.	10	143	**60**	Q	144	**70**	Q	75-125	1		20
Chromium, Total	0.00050J	0.2	0.2036	102		0.2060	103		75-125	1		20
Copper, Total	0.00354	0.25	0.2546	100		0.2491	98		75-125	2		20
Iron, Total	0.114	1	1.26	115		1.24	113		75-125	2		20
Lead, Total	ND	0.53	0.5129	97		0.5150	97		75-125	0		20
Magnesium, Total	11.5	10	22.3	108		22.4	109		75-125	0		20
Manganese, Total	0.01525	0.5	0.5450	106		0.5474	106		75-125	0		20
Nickel, Total	0.00070J	0.5	0.4979	100		0.5114	102		75-125	3		20
Zinc, Total	ND	0.5	0.4674	93		0.4724	94		75-125	1		20

Matrix Spike Analysis
Batch Quality Control

Project Name: SBD
Project Number: Not Specified

Lab Number: L2255194
Report Date: 10/17/22

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	MSD Found	MSD %Recovery	Recovery Limits	RPD	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01	QC Batch ID: WG1696122-3				WG1696122-4		QC Sample: L2254888-04	Client ID:	MS Sample
Mercury, Total	ND	0.005	0.00494	99	0.00495	99	75-125	0	20

Lab Duplicate Analysis

Batch Quality Control

Project Name: SBD
Project Number: Not Specified

Lab Number: L2255194
Report Date: 10/17/22

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Dissolved Metals - Mansfield Lab Associated sample(s): 01 QC Batch ID: WG1696069-4 QC Sample: L2254365-01 Client ID: DUP Sample						
Calcium, Dissolved	241.	240	mg/l	0		20
Chromium, Dissolved	0.00033J	0.00030J	mg/l	NC		20
Copper, Dissolved	ND	ND	mg/l	NC		20
Iron, Dissolved	12.5	12.5	mg/l	0		20
Lead, Dissolved	ND	ND	mg/l	NC		20
Magnesium, Dissolved	45.1	45.3	mg/l	0		20
Manganese, Dissolved	1.702	1.708	mg/l	0		20
Nickel, Dissolved	0.00254	0.00266	mg/l	5		20
Zinc, Dissolved	ND	ND	mg/l	NC		20
Dissolved Metals - Mansfield Lab Associated sample(s): 01 QC Batch ID: WG1696071-4 QC Sample: L2254894-01 Client ID: DUP Sample						
Mercury, Dissolved	ND	ND	mg/l	NC		20

Project Name: SBD
Project Number: Not Specified

Lab Serial Dilution Analysis
Batch Quality Control

Lab Number: L2255194
Report Date: 10/17/22

Parameter	Native Sample	Serial Dilution	Units	% D	Qual	RPD Limits
Dissolved Metals - Mansfield Lab Associated sample(s): 01 QC Batch ID: WG1696069-6 QC Sample: L2254365-01 Client ID: DUP Sample						
Calcium, Dissolved	241.	230.	mg/l	5		20
Iron, Dissolved	12.5	12.2	mg/l	2		20
Magnesium, Dissolved	45.1	44.2	mg/l	2		20
Manganese, Dissolved	1.702	1.661	mg/l	2		20
Total Metals - Mansfield Lab Associated sample(s): 01 QC Batch ID: WG1696117-6 QC Sample: L2254888-04 Client ID: DUP Sample						
Calcium, Total	137.	136.	mg/l	1		20
Magnesium, Total	11.5	11.2	mg/l	3		20

INORGANICS
&
MISCELLANEOUS

Project Name: SBD
Project Number: Not Specified

Lab Number: L2255194
Report Date: 10/17/22

SAMPLE RESULTS

Lab ID: L2255194-01
Client ID: INF
Sample Location: NY

Date Collected: 10/05/22 14:00
Date Received: 10/05/22
Field Prep: Refer to COC

Sample Depth:
Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total Suspended	23.		mg/l	10	NA	2	-	10/10/22 21:20	121,2540D	MDG
Cyanide, Total	0.178		mg/l	0.005	0.001	1	10/14/22 11:15	10/14/22 14:11	1,9010C/9012B	CRS
Cyanide, Amenable	ND		mg/l	0.010	0.005	2	10/07/22 13:10	10/10/22 08:40	121,4500CN-G	CRS
Phosphorus, Total	0.282		mg/l	0.020	0.008	2	10/11/22 12:00	10/11/22 15:43	121,4500P-E	AAA
BOD, 5 day	34.		mg/l	5.0	NA	2.5	10/06/22 23:55	10/11/22 18:35	121,5210B	JT
Oil & Grease, Hem-Grav	31.		mg/l	4.0	4.0	1	10/10/22 11:00	10/10/22 17:51	140,1664B	JM

Project Name: SBD
Project Number: Not Specified

Lab Number: L2255194
Report Date: 10/17/22

Method Blank Analysis
Batch Quality Control

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab for sample(s): 01 Batch: WG1696537-1										
BOD, 5 day	ND		mg/l	2.0	NA	1	10/06/22 23:55	10/11/22 18:35	121,5210B	JT
General Chemistry - Westborough Lab for sample(s): 01 Batch: WG1696714-1										
Cyanide, Amenable	ND		mg/l	0.010	0.005	2	10/07/22 13:10	10/10/22 08:40	121,4500CN-G	CR
General Chemistry - Westborough Lab for sample(s): 01 Batch: WG1697572-1										
Oil & Grease, Hem-Grav	ND		mg/l	4.0	4.0	1	10/10/22 11:00	10/10/22 17:51	140,1664B	JM
General Chemistry - Westborough Lab for sample(s): 01 Batch: WG1697720-1										
Solids, Total Suspended	ND		mg/l	5.0	NA	1	-	10/10/22 21:20	121,2540D	MD
General Chemistry - Westborough Lab for sample(s): 01 Batch: WG1697878-1										
Phosphorus, Total	ND		mg/l	0.010	0.004	1	10/11/22 12:00	10/11/22 15:15	121,4500P-E	AA
General Chemistry - Westborough Lab for sample(s): 01 Batch: WG1698531-1										
Cyanide, Total	ND		mg/l	0.005	0.001	1	10/14/22 11:15	10/14/22 13:58	1,9010C/9012B	CR

Lab Control Sample Analysis

Batch Quality Control

Project Name: SBD
Project Number: Not Specified

Lab Number: L2255194
Report Date: 10/17/22

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01 Batch: WG1696537-2								
BOD, 5 day	100		-		85-115	-		20
General Chemistry - Westborough Lab Associated sample(s): 01 Batch: WG1696714-2								
Cyanide, Amenable	97		-		85-115	-		
General Chemistry - Westborough Lab Associated sample(s): 01 Batch: WG1697572-2								
Oil & Grease, Hem-Grav	84		-		78-114	-		18
General Chemistry - Westborough Lab Associated sample(s): 01 Batch: WG1697720-2								
Solids, Total Suspended	99		-		80-120	-		
General Chemistry - Westborough Lab Associated sample(s): 01 Batch: WG1697878-2								
Phosphorus, Total	107		-		80-120	-		
General Chemistry - Westborough Lab Associated sample(s): 01 Batch: WG1698531-2 WG1698531-3								
Cyanide, Total	94		97		85-115	3		20

Matrix Spike Analysis
Batch Quality Control

Project Name: SBD
Project Number: Not Specified

Lab Number: L2255194
Report Date: 10/17/22

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1696537-4 QC Sample: L2255195-01 Client ID: MS Sample												
BOD, 5 day	ND	100	92	92		-	-		50-145	-		35
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1697572-4 QC Sample: L2251297-01 Client ID: MS Sample												
Oil & Grease, Hem-Grav	ND	39.6	ND	**0**	Q	-	-		78-114	-		18
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1697878-4 QC Sample: L2253541-05 Client ID: MS Sample												
Phosphorus, Total	0.503	0.5	0.975	94		-	-		75-125	-		20
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1698531-4 WG1698531-5 QC Sample: L2255194-01 Client ID: INF												
Cyanide, Total	0.178	0.2	0.402	112		0.415	118		80-120	3		20

Lab Duplicate Analysis

Batch Quality Control

Project Name: SBD

Project Number: Not Specified

Lab Number: L2255194

Report Date: 10/17/22

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1696537-3 QC Sample: L2255195-01 Client ID: DUP Sample						
BOD, 5 day	ND	ND	mg/l	NC		35
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1696714-3 QC Sample: L2255116-01 Client ID: DUP Sample						
Cyanide, Amenable	ND	ND	mg/l	NC		20
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1697572-3 QC Sample: L2255023-02 Client ID: DUP Sample						
Oil & Grease, Hem-Grav	ND	ND	mg/l	NC		18
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1697720-3 QC Sample: L2255194-01 Client ID: INF						
Solids, Total Suspended	23.	24	mg/l	4		32
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG1697878-3 QC Sample: L2253541-05 Client ID: DUP Sample						
Phosphorus, Total	0.503	0.499	mg/l	1		20

Project Name: SBD
Project Number: Not Specified

Lab Number: L2255194
Report Date: 10/17/22

Sample Receipt and Container Information

Were project specific reporting limits specified? YES

Cooler Information

Cooler	Custody Seal
A	Absent

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2255194-01A	Vial Na2S2O3 preserved	A	NA		2.5	Y	Absent		624.1(3)
L2255194-01B	Vial Na2S2O3 preserved	A	NA		2.5	Y	Absent		624.1(3)
L2255194-01C	Vial Na2S2O3 preserved	A	NA		2.5	Y	Absent		624.1(3)
L2255194-01D	Plastic 250ml H2SO4 preserved	A	<2	<2	2.5	Y	Absent		TPHOS-4500(28)
L2255194-01E	Plastic 250ml NaOH preserved	A	>12	>12	2.5	Y	Absent		ACN-4500(14)
L2255194-01F	Plastic 250ml HNO3 preserved	A	<2	<2	2.5	Y	Absent		CU-6020S(180),MN-6020S(180),ZN-6020S(180),MG-6020S(180),FE-6020S(180),CA-6020S(180),CR-6020S(180),PB-6020S(180),NI-6020S(180),HG-S(28)
L2255194-01G	Plastic 250ml HNO3 preserved	A	<2	<2	2.5	Y	Absent		FE-6020T(180),CA-6020T(180),NI-6020T(180),CR-6020T(180),CU-6020T(180),ZN-6020T(180),PB-6020T(180),MN-6020T(180),MG-6020T(180),HG-T(28)
L2255194-01H	Plastic 500ml unpreserved	A	8	8	2.5	Y	Absent		BOD-5210(2)
L2255194-01I	Plastic 950ml unpreserved	A	8	8	2.5	Y	Absent		TSS-2540(7)
L2255194-01J	Amber 1000ml H2SO4 preserved	A	<2	<2	2.5	Y	Absent		SUB-TPHENOL(28)
L2255194-01K	Amber 1000ml Na2S2O3	A	8	8	2.5	Y	Absent		PCB-608.3(365)
L2255194-01L	Amber 1000ml Na2S2O3	A	8	8	2.5	Y	Absent		PCB-608.3(365)
L2255194-01M	Amber 1000ml Na2S2O3	A	8	8	2.5	Y	Absent		625.1(7)
L2255194-01N	Amber 1000ml Na2S2O3	A	8	8	2.5	Y	Absent		625.1(7)
L2255194-01O	Amber 1000ml HCl preserved	A	NA		2.5	Y	Absent		OG-1664(28)
L2255194-01P	Amber 1000ml HCl preserved	A	NA		2.5	Y	Absent		OG-1664(28)
L2255194-01Q	Plastic 250ml NaOH preserved	A	NA		2.5	Y	Absent		TCN-9010(14)

*Values in parentheses indicate holding time in days

Project Name:	SBD	**Lab Number:**	L2255194
Project Number:	Not Specified	**Report Date:**	10/17/22

GLOSSARY

Acronyms

DL	- Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the limit of quantitation (LOQ). The DL includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
EDL	- Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).
EMPC	- Estimated Maximum Possible Concentration: The concentration that results from the signal present at the retention time of an analyte when the ions meet all of the identification criteria except the ion abundance ratio criteria. An EMPC is a worst-case estimate of the concentration.
EPA	- Environmental Protection Agency.
LCS	- Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LCSD	- Laboratory Control Sample Duplicate: Refer to LCS.
LFB	- Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LOD	- Limit of Detection: This value represents the level to which a target analyte can reliably be detected for a specific analyte in a specific matrix by a specific method. The LOD includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
LOQ	- Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.) Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
MDL	- Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
MS	- Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available. For Method 332.0, the spike recovery is calculated using the native concentration, including estimated values.
MSD	- Matrix Spike Sample Duplicate: Refer to MS.
NA	- Not Applicable.
NC	- Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.
NDPA/DPA	- N-Nitrosodiphenylamine/Diphenylamine.
NI	- Not Ignitable.
NP	- Non-Plastic: Term is utilized for the analysis of Atterberg Limits in soil.
NR	- No Results: Term is utilized when 'No Target Compounds Requested' is reported for the analysis of Volatile or Semivolatile Organic TIC only requests.
RL	- Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
RPD	- Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.
SRM	- Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.
STLP	- Semi-dynamic Tank Leaching Procedure per EPA Method 1315.
TEF	- Toxic Equivalency Factors: The values assigned to each dioxin and furan to evaluate their toxicity relative to 2,3,7,8-TCDD.
TEQ	- Toxic Equivalent: The measure of a sample's toxicity derived by multiplying each dioxin and furan by its corresponding TEF and then summing the resulting values.
TIC	- Tentatively Identified Compound: A compound that has been identified to be present and is not part of the target compound list (TCL) for the method and/or program. All TICs are qualitatively identified and reported as estimated concentrations.

Report Format: DU Report with 'J' Qualifiers

Project Name:	SBD	**Lab Number:**	L2255194
Project Number:	Not Specified	**Report Date:**	10/17/22

Footnotes

1 - The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

Terms

Analytical Method: Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

Chlordane: The target compound Chlordane (CAS No. 57-74-9) is reported for GC ECD analyses. Per EPA,this compound "refers to a mixture of chlordane isomers, other chlorinated hydrocarbons and numerous other components." (Reference: USEPA Toxicological Review of Chlordane, In Support of Summary Information on the Integrated Risk Information System (IRIS), December 1997.)

Difference: With respect to Total Oxidizable Precursor (TOP) Assay analysis, the difference is defined as the Post-Treatment value minus the Pre-Treatment value.

Final pH: As it pertains to Sample Receipt & Container Information section of the report, Final pH reflects pH of container determined after adjustment at the laboratory, if applicable. If no adjustment required, value reflects Initial pH.

Frozen Date/Time: With respect to Volatile Organics in soil, Frozen Date/Time reflects the date/time at which associated Reagent Water-preserved vials were initially frozen. Note: If frozen date/time is beyond 48 hours from sample collection, value will be reflected in 'bold'.

Gasoline Range Organics (GRO): Gasoline Range Organics (GRO) results include all chromatographic peaks eluting from Methyl tert butyl ether through Naphthalene, with the exception of GRO analysis in support of State of Ohio programs, which includes all chromatographic peaks eluting from Hexane through Dodecane.

Initial pH: As it pertains to Sample Receipt & Container Information section of the report, Initial pH reflects pH of container determined upon receipt, if applicable.

PAH Total: With respect to Alkylated PAH analyses, the 'PAHs, Total' result is defined as the summation of results for all or a subset of the following compounds: Naphthalene, C1-C4 Naphthalenes, 2-Methylnaphthalene, 1-Methylnaphthalene, Biphenyl, Acenaphthylene, Acenaphthene, Fluorene, C1-C3 Fluorenes, Phenanthrene, C1-C4 Phenanthrenes/Anthracenes, Anthracene, Fluoranthene, Pyrene, C1-C4 Fluoranthenes/Pyrenes, Benz(a)anthracene, Chrysene, C1-C4 Chrysenes, Benzo(b)fluoranthene, Benzo(j)+(k)fluoranthene, Benzo(e)pyrene, Benzo(a)pyrene, Perylene, Indeno(1,2,3-cd)pyrene, Dibenz(ah)+(ac)anthracene, Benzo(g,h,i)perylene. If a 'Total' result is requested, the results of its individual components will also be reported.

PFAS Total: With respect to PFAS analyses, the 'PFAS, Total (5)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA and PFOS. In addition, the 'PFAS, Total (6)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA, PFDA and PFOS. For MassDEP DW compliance analysis only, the 'PFAS, Total (6)' result is defined as the summation of results at or above the RL. Note: If a 'Total' result is requested, the results of its individual components will also be reported.

Total: With respect to Organic analyses, a 'Total' result is defined as the summation of results for individual isomers or Aroclors. If a 'Total' result is requested, the results of its individual components will also be reported. This is applicable to 'Total' results for methods 8260, 8081 and 8082.

Data Qualifiers

A - Spectra identified as "Aldol Condensates" are byproducts of the extraction/concentration procedures when acetone is introduced in the process.

B - The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).

C - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.

D - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.

E - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.

F - The ratio of quantifier ion response to qualifier ion response falls outside of the laboratory criteria. Results are considered to be an estimated maximum concentration.

G - The concentration may be biased high due to matrix interferences (i.e, co-elution) with non-target compound(s). The result should be considered estimated.

H - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.

I - The lower value for the two columns has been reported due to obvious interference.

J - Estimated value. The Target analyte concentration is below the quantitation limit (RL), but above the Method Detection Limit (MDL) or Estimated Detection Limit (EDL) for SPME-related analyses. This represents an estimated concentration for Tentatively

Report Format: DU Report with 'J' Qualifiers

Project Name:	SBD	**Lab Number:**	L2255194
Project Number:	Not Specified	**Report Date:**	10/17/22

Data Qualifiers

Identified Compounds (TICs).

M - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.

ND - Not detected at the method detection limit (MDL) for the sample, or estimated detection limit (EDL) for SPME-related analyses.

NJ - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.

P - The RPD between the results for the two columns exceeds the method-specified criteria.

Q - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)

R - Analytical results are from sample re-analysis.

RE - Analytical results are from sample re-extraction.

S - Analytical results are from modified screening analysis.

V - The surrogate associated with this target analyte has a recovery outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)

Z - The batch matrix spike and/or duplicate associated with this target analyte has a recovery/RPD outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)

Project Name:	SBD	**Lab Number:**	L2255194
Project Number:	Not Specified	**Report Date:**	10/17/22

REFERENCES

1 Test Methods for Evaluating Solid Waste: Physical/Chemical Methods. EPA SW-846. Third Edition. Updates I - VI, 2018.

121 Standard Methods for the Examination of Water and Wastewater. APHA-AWWA-WEF. Standard Methods Online.

127 Method 608.3: Organochlorine Pesticides and PCBs by GC/HSD, EPA 821-R-16-009, December 2016.

128 Method 624.1: Purgeables by GC/MS, EPA 821-R-16-008, December 2016.

129 Method 625.1: Base/Neutrals and Acids by GC/MS, EPA 821-R-16-007, December 2016.

140 Method 1664,Revision B: N-Hexane Extractable Material (HEM; Oil & Grease) and Silica Gel Treated N-Hexane Extractable Material (SGT-HEM; Non-polar Material) by Extraction and Gravimetry, EPA-821-R-10-001, February 2010.

LIMITATION OF LIABILITIES

Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.

Certification Information

The following analytes are not included in our Primary NELAP Scope of Accreditation:

Westborough Facility
EPA 624/624.1: m/p-xylene, o-xylene, Naphthalene
EPA 625/625.1: alpha-Terpineol
EPA 8260C/8260D: NPW: 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene, Azobenzene; SCM: Iodomethane (methyl iodide), 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene.
EPA 8270D/8270E: NPW: Dimethylnaphthalene,1,4-Diphenylhydrazine, alpha-Terpineol; SCM: Dimethylnaphthalene,1,4-Diphenylhydrazine.
SM4500: NPW: Amenable Cyanide; SCM: Total Phosphorus, TKN, NO2, NO3.

Mansfield Facility
SM 2540D: TSS
EPA 8082A: NPW: PCB: 1, 5, 31, 87,101, 110, 141, 151, 153, 180, 183, 187.
EPA TO-15: Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene, 3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 1-Methylnaphthalene.
Biological Tissue Matrix: EPA 3050B

The following analytes are included in our Massachusetts DEP Scope of Accreditation

Westborough Facility:

Drinking Water
EPA 300.0: Chloride, Nitrate-N, Fluoride, Sulfate; **EPA 353.2**: Nitrate-N, Nitrite-N; **SM4500NO3-F**: Nitrate-N, Nitrite-N; **SM4500F-C, SM4500CN-CE, EPA 180.1, SM2130B, SM4500Cl-D, SM2320B, SM2540C, SM4500H-B, SM4500NO2-B**
EPA 332: Perchlorate; **EPA 524.2:** THMs and VOCs; **EPA 504.1:** EDB, DBCP.
Microbiology: **SM9215B; SM9223-P/A, SM9223B-Colilert-QT,SM9222D**.

Non-Potable Water
SM4500H,B, EPA 120.1, SM2510B, SM2540C, SM2320B, SM4500CL-E, SM4500F-BC, SM4500NH3-BH: Ammonia-N and Kjeldahl-N, **EPA 350.1**: Ammonia-N, **LACHAT 10-107-06-1-B**: Ammonia-N, **EPA 351.1, SM4500NO3-F, EPA 353.2**: Nitrate-N, **SM4500P-E, SM4500P-B, E, SM4500SO4-E, SM5220D, EPA 410.4, SM5210B, SM5310C, SM4500CL-D, EPA 1664, EPA 420.1, SM4500-CN-CE, SM2540D, EPA 300: Chloride, Sulfate, Nitrate.**
EPA 624.1: Volatile Halocarbons & Aromatics,
EPA 608.3: Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II, Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs
EPA 625.1: SVOC (Acid/Base/Neutral Extractables), **EPA 600/4-81-045**: PCB-Oil.
Microbiology: **SM9223B-Colilert-QT; Enterolert-QT, SM9221E, EPA 1600, EPA 1603, SM9222D.**

Mansfield Facility:

Drinking Water
EPA 200.7: Al, Ba, Cd, Cr, Cu, Fe, Mn, Ni, Na, Ag, Ca, Zn. **EPA 200.8:** Al, Sb, As, Ba, Be, Cd, Cr, Cu, Pb, Mn, Ni, Se, Ag, TL, Zn. **EPA 245.1** Hg.
EPA 522, EPA 537.1.

Non-Potable Water
EPA 200.7: Al, Sb, As, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Sr, TL, Ti, V, Zn.
EPA 200.8: Al, Sb, As, Be, Cd, Cr, Cu, Fe, Pb, Mn, Ni, K, Se, Ag, Na, TL, Zn.
EPA 245.1 Hg.
SM2340B

For a complete listing of analytes and methods, please contact your Alpha Project Manager.

NEW YORK CHAIN OF CUSTODY

ALPHA ANALYTICAL

Westborough, MA 01581
8 Walkup Dr.
TEL: 508-898-9220
FAX: 508-898-9193

Mansfield, MA 02048
320 Forbes Blvd
TEL: 508-822-9300
FAX: 508-822-3288

Service Centers
Mahwah, NJ 07430: 35 Whitney Rd, Suite 5
Albany, NY 12205: 14 Walker Way
Tonawanda, NY 14150: 275 Cooper Ave, Suite 105

Page 1 of 2

Date Rec'd in Lab: 10/5/22

ALPHA Job #: L2255194

Client Information

Client: GWTT
Address: 627 Mount Hope Road
Wharton, NJ 07885
Phone: 973-800-3531
Fax: 973-983-0903
Email: rorlando@gwttllc.com

Project Information

Project Name: SBD
Project Location: NY
Project #
(Use Project name as Project #) ☐
Project Manager: Rob Orlando
ALPHAQuote #:

Turn-Around Time

Standard ☐ Due Date:
Rush (only if pre approved) ☑ # of Days: 5 Day

Deliverables

☐ ASP-A ☐ ASP-B
☐ EQuIS (1 File) ☐ EQuIS (4 File)
☐ Other

Regulatory Requirement

☐ NY TOGS ☐ NY Part 375
☐ AWQ Standards ☐ NY CP-51
☐ NY Restricted Use ☐ Other
☐ NY Unrestricted Use
☐ NYC Sewer Discharge

Billing Information

☑ Same as Client Info
PO #

Disposal Site Information

Please identify below location of applicable disposal facilities.

Disposal Facility:
☐ NJ ☐ NY
☐ Other:

These samples have been previously analyzed by Alpha ☐

Other project specific requirements/comments:

Total and Dissolved Metals - 2 DAY RUSH TAT
624.1 and 625.1 - VOCs and SVOCs PLUS TICs

Please specify Metals or TAL. Ca, Cr, Cu, Fe, Pb, Hg, Mg, Mn, Ni, Zn

ANALYSIS

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection Date	Collection Time	Sample Matrix	Sampler's Initials	8260-1664	SUB-TPHENOL	PCB-608.3	625.1	TOTAL Hg/METALS	DISS Hg/METALS	TPHOS-4500	BOD-5210	Total Bottles
55194-01	INF	10/5/2022	14:00	WW	RMO	X	X	X	X	X	X	X	X	11

Sample Filtration
☑ Done
☐ Lab to do
Preservation
☐ Lab to do
(Please Specify below)

Sample Specific Comments

Preservative Code:
A = None
B = HCl
C = HNO_3
D = H_2SO_4
E = NaOH
F = MeOH
G = $NaHSO_4$
H = $Na_2S_2O_3$
K/E = Zn Ac/NaOH
O = Other

Container Code
P = Plastic
A = Amber Glass
V = Vial
G = Glass
B = Bacteria Cup
C = Cube
O = Other
E = Encore
D = BOD Bottle

Westboro: Certification No: MA935
Mansfield: Certification No: MA015

Container Type	A	A	A	A	P	P	P	P
Preservative	B	D	H	H	C	C	D	A

Relinquished By:	Date/Time	Received By:	Date/Time
GWTT	10/5/22 16:22	Paul Mazzella	10/5/22 16:22
Paul Mazzella	10/5/22 16:22		
Paul Mazzella	10/5/22		10/5/22 1635

Please print clearly, legibly and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. BY EXECUTING THIS COC, THE CLIENT HAS READ AND AGREES TO BE BOUND BY ALPHA'S TERMS & CONDITIONS.

NEW YORK CHAIN OF CUSTODY

Westborough, MA 01581
8 Walkup Dr.
TEL: 508-898-9220
FAX: 508-898-9193

Mansfield, MA 02048
320 Forbes Blvd
TEL: 508-822-9300
FAX: 508-822-3288

Service Centers
Mahwah, NJ 07430: 35 Whitney Rd, Suite 5
Albany, NY 12205: 14 Walker Way
Tonawanda, NY 14150: 275 Cooper Ave, Suite 105

Page 2 of 2

Date Rec'd in Lab: 10/5/22

ALPHA Job #: L2255194

Client Information

Client: GWTT
Address: 627 Mount Hope Road
Wharton, NJ 07885
Phone: 973-800-3531
Fax: 973-983-0903
Email: rorlando@gwttllc.com

Project Information

Project Name: SBD
Project Location: NY
Project #
(Use Project name as Project #) ☐
Project Manager: Rob Orlando
ALPHAQuote #:

Turn-Around Time

Standard ☐ Due Date:
Rush (only if pre approved) ☑ # of Days: 5 Day

Deliverables

☐ ASP-A ☐ ASP-B
☐ EQuIS (1 File) ☐ EQuIS (4 File)
☐ Other

Regulatory Requirement

☐ NY TOGS ☐ NY Part 375
☐ AWQ Standards ☐ NY CP-51
☐ NY Restricted Use ☐ Other
☐ NY Unrestricted Use
☐ NYC Sewer Discharge

Billing Information

☑ Same as Client Info
PO #

Disposal Site Information

Please identify below location of applicable disposal facilities.
Disposal Facility:
☐ NJ ☐ NY
☐ Other:

These samples have been previously analyzed by Alpha ☐

Other project specific requirements/comments:

Total and Dissolved Metals - 2 DAY RUSH TAT
624.1 and 625.1 - VOCs and SVOCs PLUS TICs

Please specify Metals or TAL.

ANALYSIS

ACJ | TSS-2540 | 624.1

Sample Filtration
☑ Done
☐ Lab to do
Preservation
☐ Lab to do
(Please Specify below)

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection Date	Collection Time	Sample Matrix	Sampler's Initials	ACJ	TSS-2540	624.1						Sample Specific Comments	Total Bottles
55194-01	INF	10/5/2022	14:00	WW	RMO	X	X	X	X	X	X	X	X		5

Container Type: P P V
Preservative: E A H

Preservative Code:
A = None
B = HCl
C = HNO_3
D = H_2SO_4
E = NaOH
F = MeOH
G = $NaHSO_4$
H = $Na_2S_2O_3$
K/E = Zn Ac/NaOH
O = Other

Container Code
P = Plastic
A = Amber Glass
V = Vial
G = Glass
B = Bacteria Cup
C = Cube
O = Other
E = Encore
D = BOD Bottle

Westboro: Certification No: MA935
Mansfield: Certification No: MA015

Relinquished By:	Date/Time	Received By:	Date/Time
GWTT	10/5/22	Paul Mazzella	10/5/22 16:22
Paul Mazzella	10/5/22 16:37		
	10/5/22		10/5/22 1650

Please print clearly, legibly and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. BY EXECUTING THIS COC, THE CLIENT HAS READ AND AGREES TO BE BOUND BY ALPHA'S TERMS & CONDITIONS.

eurofins | Environment Testing America

ANALYTICAL REPORT

Job Number: 460-267117-1

Job Description: L2255194

For:
Alpha Analytical Inc
8 Walkup Drive
Westboro, MA 01581

Attention: Ralph Kocsis

Approved for release.
Warleny M Infante
Project Management Assistant I
10/17/2022 11:53 AM

Designee for
Kristyn L Tempe, Manager of Project Management
777 New Durham Road, Edison, NJ, 08817
(732)549-3900
Kristyn.Tempe@et.eurofinsus.com
10/17/2022

cc: Ashaley Kane
Ben Rao
Sub Reports
Ms. Nadine Yakes

Eurofins Edison
777 New Durham Road, Edison, NJ 08817
Tel (732) 549-3900 Fax (732) 549-3679 www.EurofinsUS.com

Table of Contents

Table of Contents

CASE NARRATIVE

Client: Alpha Analytical Inc

Project: L2255194

Report Number: 460-267117-1

This case narrative is in the form of an exception report, where only the anomalies related to this report, method specific performance and/or QA/QC issues are discussed. If there are no issues to report, this narrative will include a statement that documents that there are no relevant data issues.

It should be noted that samples with elevated Reporting Limits (RLs) as a result of a dilution may not be able to satisfy customer reporting limits in some cases. Such increases in the RLs are unavoidable but acceptable consequence of sample dilution that enables quantification of target analytes or interferences which exceed the calibration range of the instrument.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

RECEIPT

The sample was received on 10/8/2022 10:15 AM. Unless otherwise noted below, the sample arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 2.1º C.

Note: All samples which require thermal preservation are considered acceptable if the arrival temperature is within 2C of the required temperature or method specified range. For samples with a specified temperature of 4C, samples with a temperature ranging from just above freezing temperature of water to 6C shall be acceptable. Samples that are hand delivered immediately following collection may not meet these criteria, however they will be deemed acceptable according to NELAC standards, if there is evidence that the chilling process has begun, such as arrival on ice, etc.

TOTAL RECOVERABLE PHENOLS

Sample INF (460-267117-1) was analyzed for total recoverable phenols in accordance with EPA Method 420.1. The samples were prepared and analyzed on 10/14/2022.

Phenols, Total failed the recovery criteria low for the MS/MSD of sample 460-266891-1 in batch 460-872027.

Refer to the QC report for details.

No other difficulties were encountered during the phenol analysis.

All other quality control parameters were within the acceptance limits.

Sample Summary

Client: Alpha Analytical Inc
Project/Site: L2255194

Job ID: 460-267117-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
460-267117-1	INF	Water	10/05/22 14:00	10/08/22 10:15

Detection Summary

Client: Alpha Analytical Inc
Project/Site: L2255194

Job ID: 460-267117-1

Client Sample ID: INF

Lab Sample ID: 460-267117-1

No Detections.

This Detection Summary does not include radiochemical test results.

Method Summary

Client: Alpha Analytical Inc
Project/Site: L2255194

Job ID: 460-267117-1

Method	Method Description	Protocol	Laboratory
420.1	Phenolics, Total Recoverable	MCAWW	EET EDI
Distill/Phenol	Distillation, Phenolics	None	EET EDI

Protocol References:

MCAWW = "Methods For Chemical Analysis Of Water And Wastes", EPA-600/4-79-020, March 1983 And Subsequent Revisions.

None = None

Laboratory References:

EET EDI = Eurofins Edison, 777 New Durham Road, Edison, NJ 08817, TEL (732)549-3900

Client Sample Results

Client: Alpha Analytical Inc
Project/Site: L2255194

Job ID: 460-267117-1

Client Sample ID: INF

Date Collected: 10/05/22 14:00
Date Received: 10/08/22 10:15

Lab Sample ID: 460-267117-1

Matrix: Water

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Phenols, Total (MCAWW 420.1)	0.13	U	0.25	0.13	mg/L		10/14/22 11:19	10/14/22 16:24	1

QC Sample Results

Client: Alpha Analytical Inc
Project/Site: L2255194

Job ID: 460-267117-1

Method: 420.1 - Phenolics, Total Recoverable

Lab Sample ID: MB 460-871962/2-A
Matrix: Water
Analysis Batch: 872027

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 871962

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Phenols, Total	0.026	U	0.050	0.026	mg/L		10/14/22 11:19	10/14/22 16:24	1

Lab Sample ID: LCS 460-871962/3-A
Matrix: Water
Analysis Batch: 872027

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 871962

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
Phenols, Total			0.400	0.395		mg/L		99	86 - 118		

Lab Sample ID: MRL 460-871962/1-A
Matrix: Water
Analysis Batch: 872027

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 871962

Analyte			Spike Added	MRL Result	MRL Qualifier	Unit	D	%Rec	%Rec Limits		
Phenols, Total			0.0500	0.0512		mg/L		102	50 - 150		

Lab Sample ID: 460-266891-A-1-B MS
Matrix: Water
Analysis Batch: 872027

Client Sample ID: Matrix Spike
Prep Type: Total/NA
Prep Batch: 871962

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits		
Phenols, Total	0.21	F1	0.400	0.461	F1	mg/L		62	86 - 118		

Lab Sample ID: 460-266891-A-1-C MSD
Matrix: Water
Analysis Batch: 872027

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA
Prep Batch: 871962

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Phenols, Total	0.21	F1	0.400	0.481	F1	mg/L		67	86 - 118	4	33

Definitions/Glossary

Client: Alpha Analytical Inc
Project/Site: L2255194

Job ID: 460-267117-1

Qualifiers

General Chemistry

Qualifier	Qualifier Description
F1	MS and/or MSD recovery exceeds control limits.
U	Indicates the analyte was analyzed for but not detected.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

QC Association Summary

Client: Alpha Analytical Inc
Project/Site: L2255194

Job ID: 460-267117-1

General Chemistry

Prep Batch: 871962

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
460-267117-1	INF	Total/NA	Water	Distill/Phenol	
MB 460-871962/2-A	Method Blank	Total/NA	Water	Distill/Phenol	
LCS 460-871962/3-A	Lab Control Sample	Total/NA	Water	Distill/Phenol	
MRL 460-871962/1-A	Lab Control Sample	Total/NA	Water	Distill/Phenol	
460-266891-A-1-B MS	Matrix Spike	Total/NA	Water	Distill/Phenol	
460-266891-A-1-C MSD	Matrix Spike Duplicate	Total/NA	Water	Distill/Phenol	

Analysis Batch: 872027

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
460-267117-1	INF	Total/NA	Water	420.1	871962
MB 460-871962/2-A	Method Blank	Total/NA	Water	420.1	871962
LCS 460-871962/3-A	Lab Control Sample	Total/NA	Water	420.1	871962
MRL 460-871962/1-A	Lab Control Sample	Total/NA	Water	420.1	871962
460-266891-A-1-B MS	Matrix Spike	Total/NA	Water	420.1	871962
460-266891-A-1-C MSD	Matrix Spike Duplicate	Total/NA	Water	420.1	871962

Lab Chronicle

Client: Alpha Analytical Inc
Project/Site: L2255194

Job ID: 460-267117-1

Client Sample ID: INF

Date Collected: 10/05/22 14:00
Date Received: 10/08/22 10:15

Lab Sample ID: 460-267117-1

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	Distill/Phenol			871962	IAA	EET EDI	10/14/22 11:19
Total/NA	Analysis	420.1		1	872027	AXP	EET EDI	10/14/22 16:24

Laboratory References:

EET EDI = Eurofins Edison, 777 New Durham Road, Edison, NJ 08817, TEL (732)549-3900

Accreditation/Certification Summary

Client: Alpha Analytical Inc
Project/Site: L2255194

Job ID: 460-267117-1

Laboratory: Eurofins Edison

The accreditations/certifications listed below are applicable to this report.

Authority	Program	Identification Number	Expiration Date
New Jersey	NELAP	12028	06-30-23

GENERAL CHEMISTRY

COVER PAGE
GENERAL CHEMISTRY

Lab Name: Eurofins Edison Job Number: 460-267117-1

SDG No.:

Project: L2255194

Client Sample ID	Lab Sample ID
INF	460-267117-1

Comments:

1B-IN
INORGANIC ANALYSIS DATA SHEET
GENERAL CHEMISTRY

Client Sample ID: INF
Lab Sample ID: 460-267117-1
Lab Name: Eurofins Edison
Job No.: 460-267117-1
SDG ID.:
Matrix: Water
Date Sampled: 10/05/2022 14:00
Reporting Basis: WET
Date Received: 10/08/2022 10:15

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
64743-03-9	Phenols, Total	0.13	0.25	0.13	mg/L	U		1	420.1

2-IN
CALIBRATION QUALITY CONTROL
GENERAL CHEMISTRY

Lab Name: Eurofins Edison Job No.: 460-267117-1

SDG No.:

Analyst: AXP Batch Start Date: 10/14/2022

Reporting Units: mg/L Analytical Batch No.: 872027

Sample Number	QC Type	Time	Analyte	Result	Spike Amount	(%) Recovery	Limits	Qual	Reagent
7	ICV	15:30	Phenols, Total	0.991	1.00	99	90-110		WTphenSS1_00045
8	ICB	15:30	Phenols, Total	0.026				U	
25	CCV	16:04	Phenols, Total	0.947	1.00	95	90-110		WTphenSS1_00045
26	CCB	16:04	Phenols, Total	0.026				U	
29	CCV	16:16	Phenols, Total	0.932	1.00	93	90-110		WTphenSS1_00045
30	CCB	16:16	Phenols, Total	0.026				U	
41	CCV	16:28	Phenols, Total	0.955	1.00	95	90-110		WTphenSS1_00045
42	CCB	16:28	Phenols, Total	0.026				U	

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM II-IN

3-IN
METHOD BLANK
GENERAL CHEMISTRY

Lab Name: Eurofins Edison Job No.: 460-267117-1

SDG No.:

Method	Lab Sample ID	Analyte	Result	Qual	Units	RL	Dil
Batch ID: 872027	Date: 10/14/2022 16:24	Prep Batch: 871962	Date: 10/14/2022 11:19				
420.1	MB 460-871962/2-A	Phenols, Total	0.026	U	mg/L	0.050	1

FORM III-IN

5-IN
MATRIX SPIKE SAMPLE RECOVERY
GENERAL CHEMISTRY

Lab Name: Eurofins Edison Job No.: 460-267117-1

SDG No.:

Matrix: Water

Method	Lab Sample ID	Analyte	Result	C	Unit	Spike Amount	Pct. Rec.	Limits	RPD	RPD Limit	Q
Batch ID: 872027 Date: 10/14/2022 16:15			Prep Batch: 871962		Date: 10/14/2022 11:19						
420.1	460-266891-A-1-B	Phenols, Total	0.21		mg/L						F1
420.1	460-266891-A-1-B MS	Phenols, Total	0.461		mg/L	0.400	62	86-118			F1

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM V-IN

5-IN
MATRIX SPIKE DUPLICATE SAMPLE RECOVERY
GENERAL CHEMISTRY

Lab Name: Eurofins Edison Job No.: 460-267117-1

SDG No.:

Matrix: Water

Method	Lab Sample ID	Analyte	Result	C	Unit	Spike Amount	Pct. Rec.	Limits	RPD	RPD Limit	Q
Batch ID: 872027	Date: 10/14/2022 16:15		Prep Batch: 871962		Date: 10/14/2022 11:19						
420.1	460-266891-A-1-C MSD	Phenols, Total	0.481		mg/L	0.400	67	86-118	4	33	F1

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM V-IN

7A-IN
LAB CONTROL SAMPLE
GENERAL CHEMISTRY

Lab Name: Eurofins Edison Job No.: 460-267117-1

SDG No.:

Matrix: Water

Method	Lab Sample ID	Analyte	Result	C	Unit	Spike Amount	Pct. Rec.	Limits	RPD	RPD Limit	Q
Batch ID: 872027	Date: 10/14/2022 16:24		Prep Batch: 871962			Date: 10/14/2022 11:19					
						LCS Source: WTphenIM1_00701					
420.1	LCS 460-871962/3-A	Phenols, Total	0.395		mg/L	0.400	99	86-118			

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM VIIA-IN

7A-IN
METHOD REPORTING LIMIT CHECK
GENERAL CHEMISTRY

Lab Name: Eurofins Edison Job No.: 460-267117-1

SDG No.:

Matrix: Water

Method	Lab Sample ID	Analyte	Result	C	Unit	Spike Amount	Pct. Rec.	Limits	RPD	RPD Limit	Q
Batch ID: 872027	Date: 10/14/2022 16:24		Prep Batch: 871962			Date: 10/14/2022 11:19					
						LCS Source: WTphenIM1_00701					
420.1	MRL 460-871962/1-A	Phenols, Total	0.0512		mg/L	0.0500	102	50-150			

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM VIIA-IN

Calibration results Aquakem 7.2.AQ2 Page: 1

Laboratory
Analyzer User

10/14/2022 15:31

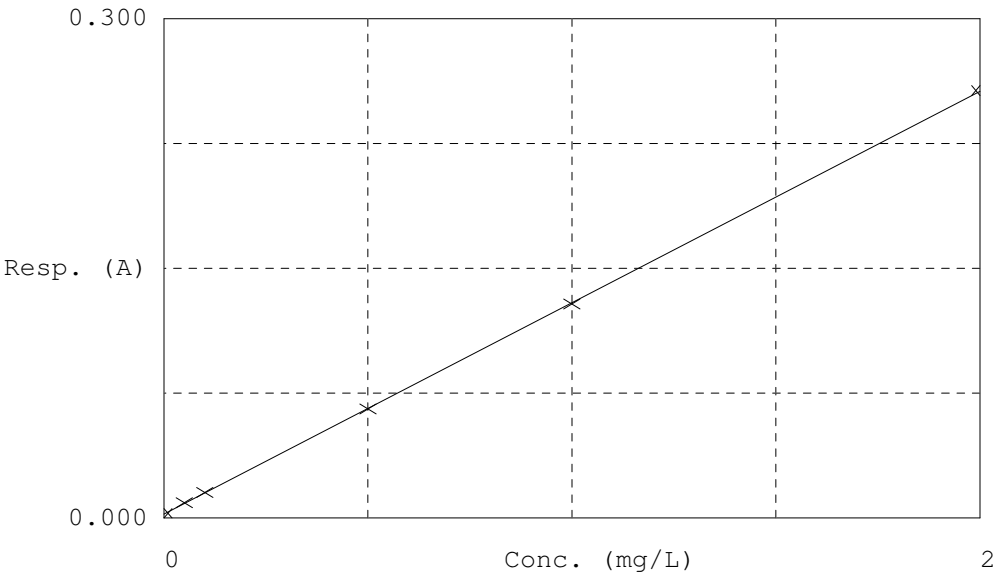
Test PHENOLS

Accepted 10/14/2022 15:31

Factor 7.877
Bias 0.002

Coeff. of det. 0.999973

Errors



	Calibrator	Response	Calc. con.	Conc.	Errors
1	Ph-0.0	0.003	0.00107	0.00000	
2	Ph-0.05	0.009	0.05302	0.05000	
3	Ph-0.10	0.015	0.10191	0.10000	
4	Ph-0.50	0.066	0.49650	0.50000	
5	Ph-1.0	0.129	0.99362	1.00000	
6	Ph-2.0	0.257	2.00389	2.00000	
7	ICB-PHEN(contro	0.004	0.01232	0.00000	
8	ICV-PHEN(contro	0.128	0.99102	1.00000	

9-IN
DETECTION LIMITS
GENERAL CHEMISTRY

Lab Name: Eurofins Edison Job Number: 460-267117-1

SDG Number:

Matrix: Water Instrument ID: Konelab1

Method: 420.1 MDL Date: 02/17/2021 11:22

Prep Method: Distill/Phenol

Analyte	Wavelength/ Mass	RL (mg/L)	MDL (mg/L)
Phenols, Total		0.05	0.026

FORM IX - IN

9-IN
CALIBRATION BLANK DETECTION LIMITS
GENERAL CHEMISTRY

Lab Name: Eurofins Edison Job Number: 460-267117-1

SDG Number:

Matrix: Water Instrument ID: Konelab1

Method: 420.1 XMDL Date: 02/17/2021 11:23

Analyte	Wavelength/ Mass	XRL (mg/L)	XMDL (mg/L)
Phenols, Total		0.05	0.026

FORM IX - IN

12-IN
PREPARATION LOG
GENERAL CHEMISTRY

Lab Name: Eurofins Edison Job No.: 460-267117-1

SDG No.:

Prep Method: Distill/Phenol

Lab Sample ID	Preparation Date	Prep Batch	Initial Weight	Initial Volume (mL)	Final Volume (mL)
MRL 460-871962/1-A	10/14/2022 11:19	871962		50	50
MB 460-871962/2-A	10/14/2022 11:19	871962		50	50
LCS 460-871962/3-A	10/14/2022 11:19	871962		50	50
460-266891-A-1-B MS	10/14/2022 11:19	871962		50	50
460-266891-A-1-C MSD	10/14/2022 11:19	871962		50	50
460-267117-1	10/14/2022 11:19	871962		10	50

FORM XII-IN

13-IN
ANALYSIS RUN LOG
GENERAL CHEMISTRY

Lab Name: Eurofins Edison   Job No.: 460-267117-1

SDG No.:

Instrument ID: Konelab1   Method: 420.1

Start Date: 10/14/2022 15:30   End Date: 10/14/2022 16:41

Lab Sample ID	D/F	Type	Time	Analytes: PhenT																			
ZZZZZZ			15:30																				
ZZZZZZ			15:30																				
ZZZZZZ			15:30																				
ZZZZZZ			15:30																				
ZZZZZZ			15:30																				
ZZZZZZ			15:30																				
ICV 460-872027/7	1		15:30	X																			
ICB 460-872027/8	1		15:30	X																			
CCV 460-872027/9			15:57																				
CCB 460-872027/10			15:57																				
ZZZZZZ			15:57																				
ZZZZZZ			15:57																				
ZZZZZZ			15:57																				
ZZZZZZ			15:57																				
ZZZZZZ			15:57																				
ZZZZZZ			15:57																				
ZZZZZZ			15:57																				
ZZZZZZ			15:57																				
ZZZZZZ			15:57																				
ZZZZZZ			15:57																				
CCV 460-872027/21			16:00																				
CCB 460-872027/22			16:00																				
ZZZZZZ			16:00																				
ZZZZZZ			16:00																				
CCV 460-872027/25	1		16:04	X																			
CCB 460-872027/26	1		16:04	X																			
460-266891-A-1-B MS	2	T	16:15	X																			
460-266891-A-1-C MSD	2	T	16:15	X																			
CCV 460-872027/29	1		16:16	X																			
CCB 460-872027/30	1		16:16	X																			
MRL 460-871962/1-A	1	T	16:24	X																			
MB 460-871962/2-A	1	T	16:24	X																			
LCS 460-871962/3-A	1	T	16:24	X																			
ZZZZZZ			16:24																				
ZZZZZZ			16:24																				
460-267117-1	1	T	16:24	X																			
ZZZZZZ			16:24																				
ZZZZZZ			16:24																				
ZZZZZZ			16:26																				
ZZZZZZ			16:26																				
CCV 460-872027/41	1		16:28	X																			
CCB 460-872027/42	1		16:28	X																			

13-IN
ANALYSIS RUN LOG
GENERAL CHEMISTRY

Lab Name: Eurofins Edison Job No.: 460-267117-1

SDG No.:

Instrument ID: Konelab1 Method: 420.1

Start Date: 10/14/2022 15:30 End Date: 10/14/2022 16:41

Lab Sample ID	D / F	Type	Time	Analytes																			
				PhenT																			
ZZZZZZ			16:40																				
CCV 460-872027/44			16:41																				
CCB 460-872027/45			16:41																				

Prep Types
T = Total/NA

GENERAL CHEMISTRY BATCH WORKSHEET

Lab Name: Eurofins Edison Job No.: 460-267117-1

SDG No.:

Batch Number: 871962 Batch Start Date: 10/14/22 09:00 Batch Analyst: Afremova, Izabella

Batch Method: Distill/Phenol Batch End Date: 10/14/22 12:00

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	FinalAmount	ChlorineCheck	Initial pH	Final pH	WTphenIM1 00701
MRL 460-871962/1		Distill/Phenol, 420.1		50 mL	50 mL	N	5.97 SU	2.86 SU	0.025 mL
MB 460-871962/2		Distill/Phenol, 420.1		50 mL	50 mL	N	5.89 SU	2.88 SU	
LCS 460-871962/3		Distill/Phenol, 420.1		50 mL	50 mL	N	6.01 SU	2.82 SU	0.2 mL
460-266891-A-1 MS		Distill/Phenol, 420.1	T	50 mL	50 mL	N	1.21 SU	2.89 SU	0.2 mL
460-266891-A-1 MSD		Distill/Phenol, 420.1	T	50 mL	50 mL	N	1.19 SU	2.79 SU	0.2 mL
460-267117-A-1	INF	Distill/Phenol, 420.1	T	10 mL	50 mL	N	1.24 SU	2.78 SU	

Batch Notes	
pH Meter ID	e
Acid used for pH adjustment	(1:9) H3PO4 # C - 0815-22 exp 4/4/23
Pipette/Syringe/Dispenser ID	P -36
Copper II Sulfate Pentahydrate ID	C 0598-22 exp 1/25/23
Start Time	10:30 am
End Time	11:45 am

Basis	Basis Description
T	Total/NA

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

GENERAL CHEMISTRY BATCH WORKSHEET

Lab Name: Eurofins Edison Job No.: 460-267117-1

SDG No.:

Batch Number: 872027 Batch Start Date: 10/14/22 15:30 Batch Analyst: Patel, Amitkumar X

Batch Method: 420.1 Batch End Date:

Lab Sample ID	Client Sample ID	Method Chain	Basis	FinalAmount	WTphenSS1 00045				
ICV 460-872027/7		420.1		100 mL	0.1 mL				
ICB 460-872027/8		420.1		100 mL					
CCV 460-872027/25		420.1		100 mL	0.1 mL				
CCB 460-872027/26		420.1		100 mL					
460-266891-A-1-B MS		420.1	T	5 mL					
460-266891-A-1-C MSD		420.1	T	5 mL					
CCV 460-872027/29		420.1		100 mL	0.1 mL				
CCB 460-872027/30		420.1		100 mL					
MRL 460-871962/1-A		420.1		5 mL					
MB 460-871962/2-A		420.1		5 mL					
LCS 460-871962/3-A		420.1		5 mL					
460-267117-A-1-A	INF	420.1	T	5 mL					
CCV 460-872027/41		420.1		100 mL	0.1 mL				
CCB 460-872027/42		420.1		100 mL					

Batch Notes	
Pipette/Syringe/Dispenser ID	P-21, P-22
Buffer Reagent ID	C-0403-22 exp 11/24/22
Color Reagent 1 ID	4AAP - C-0846-22 exp 1014/22
Color Reagent 2 ID	K3Fe(CN)6 - C-0839-22 exp 10/19/22

Basis	Basis Description
T	Total/NA

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

Shipping and Receiving Documents

267117

Subcontract Chain of Custody

Eurofins Test America Edison
777 New Durham Road
Edison, NJ 08817

Alpha Job Number
L2255194

Client Information

Client: Alpha Analytical Labs
Address: Eight Walkup Drive
Westborough, MA 01581-1019

Phone: 201.812.9072
Email: cromero@alphalab.com

Project Information

Project Location: NY
Project Manager: Cynthia Romero

Turnaround & Deliverables Information

Due Date: 10/12/22 (RUSH)
Deliverables:

Regulatory Requirements/Report Limits

State/Federal Program:
Regulatory Criteria:

Project Specific Requirements and/or Report Requirements

Reference following Alpha Job Number on final report/deliverables: L2255194

Report to include Method Blank, LCS/LCSD:

Additional Comments: Send all results/reports to subreports@alphalab.com

Lab ID	Client ID	Collection Date/Time	Sample Matrix	Analysis	Batch QC
	INF	10-05-22 14:00	WATER	Total Phenols	

460-267117 Chain of Custody

2.1/2.1 IR#9

	Relinquished By:	Date/Time:	Received By:	Date/Time:
		10/6/22		
	9 10/6			
Form No: AL_subcoc	Paul Magella 10/7/22 2340		Paul Magella	10/7/22 2045
	10/5/22 18:15		Angela Casalla 10/6/22 18:15	

267117

Eurofins TestAmerica Edison
Receipt Temperature and pH Log

Page ____ of ____

Job Number: _____

Number of Coolers: 1 IR Gun # 9

Cooler Temperatures

	RAW	CORRECTED		RAW	CORRECTED		RAW	CORRECTED
Cooler #1:	2.1 °C	2.1 °C	Cooler #4:	°C	°C	Cooler #7:	°C	°C
Cooler #2:	°C	°C	Cooler #5:	°C	°C	Cooler #8:	°C	°C
Cooler #3:	°C	°C	Cooler #6:	°C	°C	Cooler #9:	°C	°C

TALS Sample Number	Ammonia (pH<2)	COD (pH<2)	Nitrate Nitrite (pH<2)	Metals* (pH<2)	Hardness (pH<2)	Pest (pH 5-9)	EPH or QAM (pH<2)	Phenols (pH<2)	Sulfide (pH>9)	TKN (pH<2)	TOC (pH<2)	Total Cyanide (pH>12)	Total Phos (pH<2)	Other	Other
1								≤2							

If pH adjustments are required record the information below:

Sample No(s). adjusted: _____

Preservative Name/Conc.: _____ Volume of Preservative used (ml): _____

Lot # of Preservative(s): _____ Expiration Date: _____

The appropriate Project Manager and Department Manager should be notified about the samples which were pH adjusted.

Samples for Metal analysis which are out of compliance must be acidified at least 24 hours prior to analysis.

EDS-WI-038, Rev 4.1
10/22/2019

Initials: _____ Date: 10/20/22

Login Sample Receipt Checklist

Client: Alpha Analytical Inc

Job Number: 460-267117-1

Login Number: 267117
List Number: 1
Creator: Rivera, Kenneth

List Source: Eurofins Edison

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Post-OWS/Post-Filter/Effluent – Alpha Analytical

ANALYTICAL REPORT

Lab Number:	L2256923
Client:	Groundwater Treatment & Technology 627 Mount Hope Road Wharton, NJ 07885
ATTN:	Rob Orlando
Phone:	(973) 983-0901
Project Name:	SBD
Project Number:	Not Specified
Report Date:	10/21/22

Certifications & Approvals: MA (M-MA086), NH NELAP (2064), CT (PH-0574), IL (200077), ME (MA00086), MD (348), NJ (MA935), NY (11148), NC (25700/666), PA (68-03671), RI (LAO00065), TX (T104704476), VT (VT-0935), VA (460195), USDA (Permit #P330-17-00196).

Eight Walkup Drive, Westborough, MA 01581-1019
508-898-9220 (Fax) 508-898-9193 800-624-9220 - www.alphalab.com

Project Name: SBD
Project Number: Not Specified

Lab Number: L2256923
Report Date: 10/21/22

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L2256923-01	POST OWS	WATER	NY	10/12/22 14:00	10/12/22
L2256923-02	POST FILTER	WATER	NY	10/12/22 16:00	10/12/22
L2256923-03	EFF	WATER	NY	10/12/22 18:00	10/12/22

Project Name:	SBD	**Lab Number:**	L2256923
Project Number:	Not Specified	**Report Date:**	10/21/22

Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet NELAP requirements for all NELAP accredited parameters unless otherwise noted in the following narrative. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. Tentatively Identified Compounds (TICs), if requested, are reported for compounds identified to be present and are not part of the method/program Target Compound List, even if only a subset of the TCL are being reported. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively.

When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances, the specific failure is not narrated but noted in the associated QC Outlier Summary Report, located directly after the Case Narrative. QC information is also incorporated in the Data Usability Assessment table (Format 11) of our Data Merger tool, where it can be reviewed in conjunction with the sample result, associated regulatory criteria and any associated data usability implications.

Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

HOLD POLICY - For samples submitted on hold, Alpha's policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Alpha Project Manager and made arrangements for Alpha to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Project Management at 800-624-9220 with any questions.

Project Name: SBD **Lab Number:** L2256923
Project Number: Not Specified **Report Date:** 10/21/22

Case Narrative (continued)

Report Submission

All non-detect (ND) or estimated concentrations (J-qualified) have been quantitated to the limit noted in the MDL column.

The analysis of Total Phenolics was subcontracted. A copy of the laboratory report is included as an addendum. Please note: This data is only available in PDF format and is not available on Data Merger.

Volatile Organics by Method 624

The WG1700091-3 LCS recoveries, associated with L2256923-03, are above the acceptance criteria for trichlorofluoromethane (160%), vinyl chloride (220%), and chloroethane (185%); however, the associated sample is non-detect to the RL for these target analytes. The results of the original analysis are reported.

Semivolatile Organics by Method 625

L2256923-03: The surrogate recovery is above the acceptance criteria for nitrobenzene-d5 (129%). Since the sample was non-detect for all target analytes, re-analysis was not required.

Total Metals

The WG1699093-3 MS recovery for calcium (193%), performed on L2256923-02, does not apply because the sample concentration is greater than four times the spike amount added.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature: Cristin Walker

Title: Technical Director/Representative Date: 10/21/22

ORGANICS

VOLATILES

Project Name: SBD
Project Number: Not Specified

Lab Number: L2256923
Report Date: 10/21/22

SAMPLE RESULTS

Lab ID: L2256923-03
Client ID: EFF
Sample Location: NY

Date Collected: 10/12/22 18:00
Date Received: 10/12/22
Field Prep: Refer to COC

Sample Depth:
Matrix: Water
Analytical Method: 128,624.1
Analytical Date: 10/14/22 12:59
Analyst: LAC

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
Methylene chloride	ND		ug/l	1.0	0.56	1
1,1-Dichloroethane	ND		ug/l	1.5	0.40	1
Chloroform	ND		ug/l	1.0	0.38	1
Carbon tetrachloride	ND		ug/l	1.0	0.24	1
1,2-Dichloropropane	ND		ug/l	3.5	0.46	1
Dibromochloromethane	ND		ug/l	1.0	0.27	1
1,1,2-Trichloroethane	ND		ug/l	1.5	0.34	1
2-Chloroethylvinyl ether	ND		ug/l	10	0.35	1
Tetrachloroethene	ND		ug/l	1.0	0.26	1
Chlorobenzene	ND		ug/l	3.5	0.30	1
Trichlorofluoromethane	ND		ug/l	5.0	0.28	1
1,2-Dichloroethane	ND		ug/l	1.5	0.47	1
1,1,1-Trichloroethane	ND		ug/l	2.0	0.29	1
Bromodichloromethane	ND		ug/l	1.0	0.28	1
trans-1,3-Dichloropropene	ND		ug/l	1.5	0.31	1
cis-1,3-Dichloropropene	ND		ug/l	1.5	0.34	1
Bromoform	ND		ug/l	1.0	0.22	1
1,1,2,2-Tetrachloroethane	ND		ug/l	1.0	0.20	1
Benzene	ND		ug/l	1.0	0.38	1
Toluene	ND		ug/l	1.0	0.31	1
Ethylbenzene	ND		ug/l	1.0	0.28	1
Chloromethane	ND		ug/l	5.0	1.0	1
Bromomethane	ND		ug/l	5.0	1.2	1
Vinyl chloride	ND		ug/l	1.0	0.38	1
Chloroethane	ND		ug/l	2.0	0.37	1
1,1-Dichloroethene	ND		ug/l	1.0	0.31	1
trans-1,2-Dichloroethene	ND		ug/l	1.5	0.33	1
cis-1,2-Dichloroethene	ND		ug/l	1.0	0.17	1

Project Name: SBD
Project Number: Not Specified
Lab Number: L2256923
Report Date: 10/21/22

SAMPLE RESULTS

Lab ID: L2256923-03
Client ID: EFF
Sample Location: NY
Date Collected: 10/12/22 18:00
Date Received: 10/12/22
Field Prep: Refer to COC

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
Trichloroethene	ND		ug/l	1.0	0.33	1
1,2-Dichlorobenzene	ND		ug/l	5.0	0.28	1
1,3-Dichlorobenzene	ND		ug/l	5.0	0.27	1
1,4-Dichlorobenzene	ND		ug/l	5.0	0.29	1
p/m-Xylene	ND		ug/l	2.0	0.30	1
o-xylene	ND		ug/l	1.0	0.34	1
Xylenes, Total	ND		ug/l	1.0	0.30	1
Styrene	ND		ug/l	1.0	0.37	1
Acetone	23		ug/l	10	2.4	1
Carbon disulfide	ND		ug/l	5.0	0.28	1
2-Butanone	ND		ug/l	10	1.0	1
Vinyl acetate	ND		ug/l	10	0.41	1
4-Methyl-2-pentanone	ND		ug/l	10	0.19	1
2-Hexanone	ND		ug/l	10	0.55	1
Acrolein	ND		ug/l	8.0	1.8	1
Acrylonitrile	ND		ug/l	10	0.33	1
Dibromomethane	ND		ug/l	1.0	0.23	1
Tentatively Identified Compounds						
Unknown	3.23	J	ug/l			1
Unknown	11.8	J	ug/l			1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Pentafluorobenzene	97		60-140
Fluorobenzene	91		60-140
4-Bromofluorobenzene	91		60-140

Project Name: SBD
Project Number: Not Specified

Lab Number: L2256923
Report Date: 10/21/22

Method Blank Analysis
Batch Quality Control

Analytical Method: 128,624.1
Analytical Date: 10/14/22 11:49
Analyst: LAC

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by GC/MS - Westborough Lab for sample(s): 03 Batch: WG1700091-4					
Methylene chloride	ND		ug/l	1.0	0.56
1,1-Dichloroethane	ND		ug/l	1.5	0.40
Chloroform	ND		ug/l	1.0	0.38
Carbon tetrachloride	ND		ug/l	1.0	0.24
1,2-Dichloropropane	ND		ug/l	3.5	0.46
Dibromochloromethane	ND		ug/l	1.0	0.27
1,1,2-Trichloroethane	ND		ug/l	1.5	0.34
2-Chloroethylvinyl ether	ND		ug/l	10	0.35
Tetrachloroethene	ND		ug/l	1.0	0.26
Chlorobenzene	ND		ug/l	3.5	0.30
Trichlorofluoromethane	ND		ug/l	5.0	0.28
1,2-Dichloroethane	ND		ug/l	1.5	0.47
1,1,1-Trichloroethane	ND		ug/l	2.0	0.29
Bromodichloromethane	ND		ug/l	1.0	0.28
trans-1,3-Dichloropropene	ND		ug/l	1.5	0.31
cis-1,3-Dichloropropene	ND		ug/l	1.5	0.34
Bromoform	ND		ug/l	1.0	0.22
1,1,2,2-Tetrachloroethane	ND		ug/l	1.0	0.20
Benzene	ND		ug/l	1.0	0.38
Toluene	ND		ug/l	1.0	0.31
Ethylbenzene	ND		ug/l	1.0	0.28
Chloromethane	ND		ug/l	5.0	1.0
Bromomethane	ND		ug/l	5.0	1.2
Vinyl chloride	ND		ug/l	1.0	0.38
Chloroethane	ND		ug/l	2.0	0.37
1,1-Dichloroethene	ND		ug/l	1.0	0.31
trans-1,2-Dichloroethene	ND		ug/l	1.5	0.33
cis-1,2-Dichloroethene	ND		ug/l	1.0	0.17
Trichloroethene	ND		ug/l	1.0	0.33

Project Name: SBD
Project Number: Not Specified

Lab Number: L2256923
Report Date: 10/21/22

Method Blank Analysis
Batch Quality Control

Analytical Method: 128,624.1
Analytical Date: 10/14/22 11:49
Analyst: LAC

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by GC/MS - Westborough Lab for sample(s): 03 Batch: WG1700091-4					
1,2-Dichlorobenzene	ND		ug/l	5.0	0.28
1,3-Dichlorobenzene	ND		ug/l	5.0	0.27
1,4-Dichlorobenzene	ND		ug/l	5.0	0.29
p/m-Xylene	ND		ug/l	2.0	0.30
o-xylene	ND		ug/l	1.0	0.34
Xylenes, Total	ND		ug/l	1.0	0.30
Styrene	ND		ug/l	1.0	0.37
Acetone	ND		ug/l	10	2.4
Carbon disulfide	0.38	J	ug/l	5.0	0.28
2-Butanone	ND		ug/l	10	1.0
Vinyl acetate	ND		ug/l	10	0.41
4-Methyl-2-pentanone	ND		ug/l	10	0.19
2-Hexanone	ND		ug/l	10	0.55
Acrolein	ND		ug/l	8.0	1.8
Acrylonitrile	ND		ug/l	10	0.33
Dibromomethane	ND		ug/l	1.0	0.23

Tentatively Identified Compounds			
Unknown	295	J	ug/l
Unknown	17.6	J	ug/l
Unknown	15.2	J	ug/l
Unknown	206	J	ug/l

Project Name: SBD
Project Number: Not Specified

Lab Number: L2256923
Report Date: 10/21/22

Method Blank Analysis
Batch Quality Control

Analytical Method: 128,624.1
Analytical Date: 10/14/22 11:49
Analyst: LAC

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by GC/MS - Westborough Lab for sample(s): 03 Batch: WG1700091-4					

Surrogate	%Recovery	Qualifier	Acceptance Criteria
Pentafluorobenzene	98		60-140
Fluorobenzene	85		60-140
4-Bromofluorobenzene	86		60-140

Lab Control Sample Analysis
Batch Quality Control

Project Name: SBD
Project Number: Not Specified

Lab Number: L2256923
Report Date: 10/21/22

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 03 Batch: WG1700091-3								
Methylene chloride	120		-		60-140	-		28
1,1-Dichloroethane	125		-		50-150	-		49
Chloroform	115		-		70-135	-		54
Carbon tetrachloride	100		-		70-130	-		41
1,2-Dichloropropane	90		-		35-165	-		55
Dibromochloromethane	80		-		70-135	-		50
1,1,2-Trichloroethane	95		-		70-130	-		45
2-Chloroethylvinyl ether	90		-		1-225	-		71
Tetrachloroethene	95		-		70-130	-		39
Chlorobenzene	80		-		65-135	-		53
Trichlorofluoromethane	**160**	Q	-		50-150	-		84
1,2-Dichloroethane	125		-		70-130	-		49
1,1,1-Trichloroethane	105		-		70-130	-		36
Bromodichloromethane	90		-		65-135	-		56
trans-1,3-Dichloropropene	80		-		50-150	-		86
cis-1,3-Dichloropropene	90		-		25-175	-		58
Bromoform	75		-		70-130	-		42
1,1,2,2-Tetrachloroethane	100		-		60-140	-		61
Benzene	120		-		65-135	-		61
Toluene	95		-		70-130	-		41
Ethylbenzene	85		-		60-140	-		63
Chloromethane	95		-		1-205	-		60
Bromomethane	36		-		15-185	-		61

Lab Control Sample Analysis
Batch Quality Control

Project Name: SBD
Project Number: Not Specified

Lab Number: L2256923
Report Date: 10/21/22

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 03 Batch: WG1700091-3								
Vinyl chloride	**220**	Q	-		5-195	-		66
Chloroethane	**185**	Q	-		40-160	-		78
1,1-Dichloroethene	135		-		50-150	-		32
trans-1,2-Dichloroethene	120		-		70-130	-		45
cis-1,2-Dichloroethene	105		-		60-140	-		30
Trichloroethene	80		-		65-135	-		48
1,2-Dichlorobenzene	80		-		65-135	-		57
1,3-Dichlorobenzene	75		-		70-130	-		43
1,4-Dichlorobenzene	75		-		65-135	-		57
p/m-Xylene	85		-		60-140	-		30
o-xylene	75		-		60-140	-		30
Styrene	80		-		60-140	-		30
Acetone	126		-		40-160	-		30
Carbon disulfide	110		-		60-140	-		30
2-Butanone	126		-		60-140	-		30
Vinyl acetate	112		-		60-140	-		30
4-Methyl-2-pentanone	102		-		60-140	-		30
2-Hexanone	102		-		60-140	-		30
Acrolein	88		-		60-140	-		30
Acrylonitrile	125		-		60-140	-		60
Dibromomethane	85		-		70-130	-		30

Lab Control Sample Analysis

Batch Quality Control

Project Name: SBD
Project Number: Not Specified

Lab Number: L2256923
Report Date: 10/21/22

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 03 Batch: WG1700091-3								

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
Pentafluorobenzene	97				60-140
Fluorobenzene	87				60-140
4-Bromofluorobenzene	86				60-140

SEMIVOLATILES

Project Name: SBD
Project Number: Not Specified

Lab Number: L2256923
Report Date: 10/21/22

SAMPLE RESULTS

Lab ID: L2256923-03
Client ID: EFF
Sample Location: NY

Date Collected: 10/12/22 18:00
Date Received: 10/12/22
Field Prep: Refer to COC

Sample Depth:
Matrix: Water
Analytical Method: 129,625.1
Analytical Date: 10/18/22 06:17
Analyst: SZ

Extraction Method: EPA 625.1
Extraction Date: 10/17/22 07:17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Acenaphthene	ND		ug/l	2.00	0.407	1
Benzidine[1]	ND		ug/l	20.0	12.1	1
1,2,4-Trichlorobenzene	ND		ug/l	5.00	1.49	1
Hexachlorobenzene	ND		ug/l	2.00	0.952	1
Bis(2-chloroethyl)ether	ND		ug/l	2.00	0.600	1
2-Chloronaphthalene	ND		ug/l	2.00	0.319	1
3,3'-Dichlorobenzidine	ND		ug/l	5.00	0.457	1
2,4-Dinitrotoluene	ND		ug/l	5.00	0.636	1
2,6-Dinitrotoluene	ND		ug/l	5.00	0.631	1
Azobenzene[1]	ND		ug/l	2.00	0.889	1
Fluoranthene	ND		ug/l	2.00	0.736	1
4-Chlorophenyl phenyl ether	ND		ug/l	2.00	0.371	1
4-Bromophenyl phenyl ether	ND		ug/l	2.00	0.447	1
Bis(2-chloroisopropyl)ether	ND		ug/l	2.00	0.822	1
Bis(2-chloroethoxy)methane	ND		ug/l	5.00	0.585	1
Hexachlorobutadiene	ND		ug/l	2.00	0.921	1
Hexachlorocyclopentadiene[1]	ND		ug/l	10.0	1.36	1
Hexachloroethane	ND		ug/l	2.00	0.973	1
Isophorone	ND		ug/l	5.00	0.546	1
Naphthalene	ND		ug/l	2.00	0.896	1
Nitrobenzene	ND		ug/l	2.00	0.788	1
NDPA/DPA[1]	ND		ug/l	2.00	0.783	1
n-Nitrosodi-n-propylamine	ND		ug/l	5.00	0.630	1
Bis(2-ethylhexyl)phthalate	ND		ug/l	2.20	1.70	1
Butyl benzyl phthalate	ND		ug/l	5.00	0.670	1
Di-n-butylphthalate	ND		ug/l	5.00	0.631	1
Di-n-octylphthalate	ND		ug/l	5.00	0.633	1
Diethyl phthalate	0.745	J	ug/l	5.00	0.717	1

Project Name: SBD **Lab Number:** L2256923

Project Number: Not Specified **Report Date:** 10/21/22

SAMPLE RESULTS

Lab ID: L2256923-03 Date Collected: 10/12/22 18:00

Client ID: EFF Date Received: 10/12/22

Sample Location: NY Field Prep: Refer to COC

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Dimethyl phthalate	ND		ug/l	5.00	1.40	1
Benzo(a)anthracene	ND		ug/l	2.00	0.665	1
Benzo(a)pyrene	ND		ug/l	2.00	0.610	1
Benzo(b)fluoranthene	ND		ug/l	2.00	0.741	1
Benzo(k)fluoranthene	ND		ug/l	2.00	0.739	1
Chrysene	ND		ug/l	2.00	0.668	1
Acenaphthylene	ND		ug/l	2.00	0.930	1
Anthracene	ND		ug/l	2.00	0.791	1
Benzo(ghi)perylene	ND		ug/l	2.00	0.672	1
Fluorene	ND		ug/l	2.00	0.927	1
Phenanthrene	ND		ug/l	2.00	0.818	1
Dibenzo(a,h)anthracene	ND		ug/l	2.00	0.687	1
Indeno(1,2,3-cd)pyrene	ND		ug/l	2.00	0.633	1
Pyrene	ND		ug/l	2.00	0.728	1
4-Chloroaniline[1]	ND		ug/l	5.00	0.790	1
Dibenzofuran[1]	ND		ug/l	2.00	0.373	1
2-Methylnaphthalene[1]	ND		ug/l	2.00	0.351	1
n-Nitrosodimethylamine[1]	ND		ug/l	2.00	0.407	1
2,4,6-Trichlorophenol	ND		ug/l	5.00	0.607	1
p-Chloro-m-cresol[1]	ND		ug/l	2.00	0.533	1
2-Chlorophenol	ND		ug/l	2.00	0.513	1
2,4-Dichlorophenol	ND		ug/l	5.00	0.554	1
2,4-Dimethylphenol	ND		ug/l	5.00	0.851	1
2-Nitrophenol	ND		ug/l	5.00	0.604	1
4-Nitrophenol	ND		ug/l	10.0	0.834	1
2,4-Dinitrophenol	ND		ug/l	20.0	1.21	1
4,6-Dinitro-o-cresol	ND		ug/l	10.0	1.20	1
Pentachlorophenol	ND		ug/l	5.00	0.622	1
Phenol	ND		ug/l	5.00	0.262	1
2-Methylphenol[1]	ND		ug/l	5.00	0.773	1
3-Methylphenol/4-Methylphenol[1]	ND		ug/l	5.00	0.511	1
2,4,5-Trichlorophenol[1]	ND		ug/l	5.00	0.637	1
Benzoic Acid[1]	ND		ug/l	50.0	1.17	1
Benzyl Alcohol[1]	ND		ug/l	2.00	0.490	1

Project Name: SBD
Project Number: Not Specified
Lab Number: L2256923
Report Date: 10/21/22

SAMPLE RESULTS

Lab ID: L2256923-03
Client ID: EFF
Sample Location: NY
Date Collected: 10/12/22 18:00
Date Received: 10/12/22
Field Prep: Refer to COC

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Tentatively Identified Compounds						
Unknown	4.98	J	ug/l			1
Unknown	6.77	J	ug/l			1
Unknown	16.4	J	ug/l			1
Unknown Organic Acid	6.86	J	ug/l			1
Cyclic Octaatomic Sulfur	312	NJ	ug/l			1
Unknown Organic Acid	12.7	J	ug/l			1
Unknown Amide	7.65	J	ug/l			1
Sulfur	4.91	NJ	ug/l			1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Fluorophenol	81		25-87
Phenol-d6	60		16-65
Nitrobenzene-d5	**129**	Q	42-122
2-Fluorobiphenyl	90		46-121
2,4,6-Tribromophenol	103		45-128
4-Terphenyl-d14	99		47-138

Project Name: SBD
Project Number: Not Specified

Lab Number: L2256923
Report Date: 10/21/22

Method Blank Analysis
Batch Quality Control

Analytical Method: 129,625.1
Analytical Date: 10/17/22 12:08
Analyst: SZ

Extraction Method: EPA 625.1
Extraction Date: 10/16/22 19:25

Parameter	Result	Qualifier	Units	RL	MDL
Semivolatile Organics by GC/MS - Westborough Lab for sample(s): 03 Batch: WG1700202-1					
Acenaphthene	ND		ug/l	2.00	0.407
Benzidine[1]	ND		ug/l	20.0	12.1
1,2,4-Trichlorobenzene	ND		ug/l	5.00	1.49
Hexachlorobenzene	ND		ug/l	2.00	0.952
Bis(2-chloroethyl)ether	ND		ug/l	2.00	0.600
2-Chloronaphthalene	ND		ug/l	2.00	0.319
3,3'-Dichlorobenzidine	ND		ug/l	5.00	0.457
2,4-Dinitrotoluene	ND		ug/l	5.00	0.636
2,6-Dinitrotoluene	ND		ug/l	5.00	0.631
Azobenzene[1]	ND		ug/l	2.00	0.889
Fluoranthene	ND		ug/l	2.00	0.736
4-Chlorophenyl phenyl ether	ND		ug/l	2.00	0.371
4-Bromophenyl phenyl ether	ND		ug/l	2.00	0.447
Bis(2-chloroisopropyl)ether	ND		ug/l	2.00	0.822
Bis(2-chloroethoxy)methane	ND		ug/l	5.00	0.585
Hexachlorobutadiene	ND		ug/l	2.00	0.921
Hexachlorocyclopentadiene[1]	ND		ug/l	10.0	1.36
Hexachloroethane	ND		ug/l	2.00	0.973
Isophorone	ND		ug/l	5.00	0.546
Naphthalene	ND		ug/l	2.00	0.896
Nitrobenzene	ND		ug/l	2.00	0.788
NDPA/DPA[1]	ND		ug/l	2.00	0.783
n-Nitrosodi-n-propylamine	ND		ug/l	5.00	0.630
Bis(2-ethylhexyl)phthalate	ND		ug/l	2.20	1.70
Butyl benzyl phthalate	ND		ug/l	5.00	0.670
Di-n-butylphthalate	ND		ug/l	5.00	0.631
Di-n-octylphthalate	ND		ug/l	5.00	0.633
Diethyl phthalate	ND		ug/l	5.00	0.717
Dimethyl phthalate	ND		ug/l	5.00	1.40

Project Name: SBD
Project Number: Not Specified

Lab Number: L2256923
Report Date: 10/21/22

Method Blank Analysis
Batch Quality Control

Analytical Method: 129,625.1
Analytical Date: 10/17/22 12:08
Analyst: SZ

Extraction Method: EPA 625.1
Extraction Date: 10/16/22 19:25

Parameter	Result	Qualifier	Units	RL	MDL
Semivolatile Organics by GC/MS - Westborough Lab for sample(s): 03 Batch: WG1700202-1					
Benzo(a)anthracene	ND		ug/l	2.00	0.665
Benzo(a)pyrene	ND		ug/l	2.00	0.610
Benzo(b)fluoranthene	ND		ug/l	2.00	0.741
Benzo(k)fluoranthene	ND		ug/l	2.00	0.739
Chrysene	ND		ug/l	2.00	0.668
Acenaphthylene	ND		ug/l	2.00	0.930
Anthracene	ND		ug/l	2.00	0.791
Benzo(ghi)perylene	ND		ug/l	2.00	0.672
Fluorene	ND		ug/l	2.00	0.927
Phenanthrene	ND		ug/l	2.00	0.818
Dibenzo(a,h)anthracene	ND		ug/l	2.00	0.687
Indeno(1,2,3-cd)pyrene	ND		ug/l	2.00	0.633
Pyrene	ND		ug/l	2.00	0.728
4-Chloroaniline[1]	ND		ug/l	5.00	0.790
Dibenzofuran[1]	ND		ug/l	2.00	0.373
2-Methylnaphthalene[1]	ND		ug/l	2.00	0.351
n-Nitrosodimethylamine[1]	ND		ug/l	2.00	0.407
2,4,6-Trichlorophenol	ND		ug/l	5.00	0.607
p-Chloro-m-cresol[1]	ND		ug/l	2.00	0.533
2-Chlorophenol	ND		ug/l	2.00	0.513
2,4-Dichlorophenol	ND		ug/l	5.00	0.554
2,4-Dimethylphenol	ND		ug/l	5.00	0.851
2-Nitrophenol	ND		ug/l	5.00	0.604
4-Nitrophenol	ND		ug/l	10.0	0.834
2,4-Dinitrophenol	ND		ug/l	20.0	1.21
4,6-Dinitro-o-cresol	ND		ug/l	10.0	1.20
Pentachlorophenol	ND		ug/l	5.00	0.622
Phenol	ND		ug/l	5.00	0.262
2-Methylphenol[1]	ND		ug/l	5.00	0.773

Project Name: SBD
Project Number: Not Specified

Lab Number: L2256923
Report Date: 10/21/22

Method Blank Analysis
Batch Quality Control

Analytical Method: 129,625.1
Analytical Date: 10/17/22 12:08
Analyst: SZ

Extraction Method: EPA 625.1
Extraction Date: 10/16/22 19:25

Parameter	Result	Qualifier	Units	RL	MDL
Semivolatile Organics by GC/MS - Westborough Lab for sample(s): 03 Batch: WG1700202-1					
3-Methylphenol/4-Methylphenol[1]	ND		ug/l	5.00	0.511
2,4,5-Trichlorophenol[1]	ND		ug/l	5.00	0.637
Benzoic Acid[1]	ND		ug/l	50.0	1.17
Benzyl Alcohol[1]	ND		ug/l	2.00	0.490
Tentatively Identified Compounds					
No Tentatively Identified Compounds	ND		ug/l		

Surrogate	%Recovery	Qualifier	Acceptance Criteria
2-Fluorophenol	52		25-87
Phenol-d6	34		16-65
Nitrobenzene-d5	71		42-122
2-Fluorobiphenyl	78		46-121
2,4,6-Tribromophenol	67		45-128
4-Terphenyl-d14	88		47-138

Lab Control Sample Analysis
Batch Quality Control

Project Name: SBD
Project Number: Not Specified

Lab Number: L2256923
Report Date: 10/21/22

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Semivolatile Organics by GC/MS - Westborough Lab Associated sample(s): 03 Batch: WG1700202-2								
Acenaphthene	71		-		60-132	-		48
Benzidine[1]	35		-		0-70	-		30
1,2,4-Trichlorobenzene	68		-		57-130	-		50
Hexachlorobenzene	74		-		8-142	-		55
Bis(2-chloroethyl)ether	76		-		43-126	-		108
2-Chloronaphthalene	76		-		65-120	-		24
3,3'-Dichlorobenzidine	37		-		8-213	-		108
2,4-Dinitrotoluene	74		-		48-127	-		42
2,6-Dinitrotoluene	81		-		68-137	-		48
Azobenzene[1]	72		-		44-115	-		23
Fluoranthene	76		-		43-121	-		66
4-Chlorophenyl phenyl ether	75		-		38-145	-		61
4-Bromophenyl phenyl ether	73		-		65-120	-		43
Bis(2-chloroisopropyl)ether	70		-		63-139	-		76
Bis(2-chloroethoxy)methane	84		-		49-165	-		54
Hexachlorobutadiene	58		-		38-120	-		62
Hexachlorocyclopentadiene[1]	60		-		7-118	-		35
Hexachloroethane	58		-		55-120	-		52
Isophorone	80		-		47-180	-		93
Naphthalene	70		-		36-120	-		65
Nitrobenzene	75		-		54-158	-		62
NDPA/DPA[1]	77		-		45-112	-		36
n-Nitrosodi-n-propylamine	80		-		14-198	-		87

Lab Control Sample Analysis
Batch Quality Control

Project Name: SBD
Project Number: Not Specified

Lab Number: L2256923
Report Date: 10/21/22

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Semivolatile Organics by GC/MS - Westborough Lab Associated sample(s): 03 Batch: WG1700202-2								
Bis(2-ethylhexyl)phthalate	80		-		29-137	-		82
Butyl benzyl phthalate	76		-		1-140	-		60
Di-n-butylphthalate	77		-		8-120	-		47
Di-n-octylphthalate	80		-		19-132	-		69
Diethyl phthalate	77		-		1-120	-		100
Dimethyl phthalate	84		-		1-120	-		183
Benzo(a)anthracene	75		-		42-133	-		53
Benzo(a)pyrene	78		-		32-148	-		72
Benzo(b)fluoranthene	71		-		42-140	-		71
Benzo(k)fluoranthene	77		-		25-146	-		63
Chrysene	75		-		44-140	-		87
Acenaphthylene	85		-		54-126	-		74
Anthracene	77		-		43-120	-		66
Benzo(ghi)perylene	75		-		1-195	-		97
Fluorene	76		-		70-120	-		38
Phenanthrene	74		-		65-120	-		39
Dibenzo(a,h)anthracene	78		-		1-200	-		126
Indeno(1,2,3-cd)pyrene	84		-		1-151	-		99
Pyrene	75		-		70-120	-		49
4-Chloroaniline[1]	61		-		10-100	-		53
Dibenzofuran[1]	74		-		23-126	-		22
2-Methylnaphthalene[1]	72		-		40-109	-		18
n-Nitrosodimethylamine[1]	45		-		15-68	-		17

Lab Control Sample Analysis
Batch Quality Control

Project Name: SBD
Project Number: Not Specified

Lab Number: L2256923
Report Date: 10/21/22

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Semivolatile Organics by GC/MS - Westborough Lab Associated sample(s): 03 Batch: WG1700202-2								
2,4,6-Trichlorophenol	82		-		52-129	-		58
p-Chloro-m-cresol[1]	80		-		68-130	-		73
2-Chlorophenol	78		-		36-120	-		61
2,4-Dichlorophenol	84		-		53-122	-		50
2,4-Dimethylphenol	87		-		42-120	-		58
2-Nitrophenol	74		-		45-167	-		55
4-Nitrophenol	40		-		13-129	-		131
2,4-Dinitrophenol	45		-		1-173	-		132
4,6-Dinitro-o-cresol	68		-		56-130	-		203
Pentachlorophenol	61		-		38-152	-		86
Phenol	38		-		17-120	-		64
2-Methylphenol[1]	73		-		38-102	-		23
3-Methylphenol/4-Methylphenol[1]	70		-		35-103	-		26
2,4,5-Trichlorophenol[1]	81		-		47-126	-		28
Benzoic Acid[1]	32		-		2-55	-		27
Benzyl Alcohol[1]	65		-		31-103	-		23

Lab Control Sample Analysis
Batch Quality Control

Project Name: SBD
Project Number: Not Specified

Lab Number: L2256923
Report Date: 10/21/22

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Semivolatile Organics by GC/MS - Westborough Lab Associated sample(s): 03 Batch: WG1700202-2								

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
2-Fluorophenol	58				25-87
Phenol-d6	39				16-65
Nitrobenzene-d5	77				42-122
2-Fluorobiphenyl	85				46-121
2,4,6-Tribromophenol	77				45-128
4-Terphenyl-d14	84				47-138

PCBS

Project Name: SBD
Project Number: Not Specified

Lab Number: L2256923
Report Date: 10/21/22

SAMPLE RESULTS

Lab ID: L2256923-03
Client ID: EFF
Sample Location: NY

Date Collected: 10/12/22 18:00
Date Received: 10/12/22
Field Prep: Refer to COC

Sample Depth:
Matrix: Water
Analytical Method: 127,608.3
Analytical Date: 10/19/22 10:22
Analyst: JM

Extraction Method: EPA 608.3
Extraction Date: 10/19/22 05:24
Cleanup Method: EPA 3665A
Cleanup Date: 10/19/22
Cleanup Method: EPA 3660B
Cleanup Date: 10/19/22

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
Polychlorinated Biphenyls by GC - Westborough Lab							
Aroclor 1016	ND		ug/l	0.250	0.016	1	A
Aroclor 1221	ND		ug/l	0.250	0.022	1	A
Aroclor 1232	ND		ug/l	0.250	0.046	1	A
Aroclor 1242	ND		ug/l	0.250	0.036	1	A
Aroclor 1248	ND		ug/l	0.250	0.046	1	A
Aroclor 1254	ND		ug/l	0.250	0.017	1	A
Aroclor 1260	ND		ug/l	0.200	0.034	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	79		37-123	B
Decachlorobiphenyl	86		38-114	B
2,4,5,6-Tetrachloro-m-xylene	76		37-123	A
Decachlorobiphenyl	79		38-114	A

Project Name: SBD
Project Number: Not Specified

Lab Number: L2256923
Report Date: 10/21/22

Method Blank Analysis
Batch Quality Control

Analytical Method: 127,608.3
Analytical Date: 10/19/22 10:04
Analyst: JM

Extraction Method: EPA 608.3
Extraction Date: 10/19/22 05:24
Cleanup Method: EPA 3665A
Cleanup Date: 10/19/22
Cleanup Method: EPA 3660B
Cleanup Date: 10/19/22

Parameter	Result	Qualifier	Units	RL	MDL	Column
Polychlorinated Biphenyls by GC - Westborough Lab for sample(s): 03 Batch: WG1701241-1						
Aroclor 1016	ND		ug/l	0.250	0.016	A
Aroclor 1221	ND		ug/l	0.250	0.022	A
Aroclor 1232	ND		ug/l	0.250	0.046	A
Aroclor 1242	ND		ug/l	0.250	0.036	A
Aroclor 1248	ND		ug/l	0.250	0.046	A
Aroclor 1254	ND		ug/l	0.250	0.017	A
Aroclor 1260	ND		ug/l	0.200	0.034	A

Surrogate	%Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	83		37-123	B
Decachlorobiphenyl	100		38-114	B
2,4,5,6-Tetrachloro-m-xylene	78		37-123	A
Decachlorobiphenyl	87		38-114	A

Lab Control Sample Analysis

Batch Quality Control

Project Name: SBD

Project Number: Not Specified

Lab Number: L2256923

Report Date: 10/21/22

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits	Column
Polychlorinated Biphenyls by GC - Westborough Lab Associated sample(s): 03 Batch: WG1701241-2									
Aroclor 1016	92		-		50-140	-		36	A
Aroclor 1260	77		-		8-140	-		38	A

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	81				37-123	B
Decachlorobiphenyl	89				38-114	B
2,4,5,6-Tetrachloro-m-xylene	78				37-123	A
Decachlorobiphenyl	80				38-114	A

METALS

Project Name: SBD
Project Number: Not Specified
Lab Number: L2256923
Report Date: 10/21/22

SAMPLE RESULTS

Lab ID: L2256923-02
Client ID: POST FILTER
Sample Location: NY
Sample Depth:
Matrix: Water

Date Collected: 10/12/22 16:00
Date Received: 10/12/22
Field Prep: None

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Calcium, Total	72.5		mg/l	0.100	0.0394	1	10/13/22 22:14	10/18/22 13:06	EPA 3005A	1,6020B	SV
Chromium, Total	0.00083	J	mg/l	0.00100	0.00017	1	10/13/22 22:14	10/18/22 13:06	EPA 3005A	1,6020B	SV
Copper, Total	0.00234		mg/l	0.00100	0.00038	1	10/13/22 22:14	10/18/22 13:06	EPA 3005A	1,6020B	SV
Iron, Total	0.370		mg/l	0.0500	0.0191	1	10/13/22 22:14	10/18/22 13:06	EPA 3005A	1,6020B	SV
Lead, Total	0.00055	J	mg/l	0.00100	0.00034	1	10/13/22 22:14	10/18/22 13:06	EPA 3005A	1,6020B	SV
Magnesium, Total	15.9		mg/l	0.0700	0.0242	1	10/13/22 22:14	10/18/22 13:06	EPA 3005A	1,6020B	SV
Manganese, Total	0.1424		mg/l	0.00100	0.00044	1	10/13/22 22:14	10/18/22 13:06	EPA 3005A	1,6020B	SV
Mercury, Total	ND		mg/l	0.00020	0.00009	1	10/13/22 22:47	10/14/22 13:03	EPA 7470A	1,7470A	ZK
Nickel, Total	0.00115	J	mg/l	0.00200	0.00055	1	10/13/22 22:14	10/18/22 13:06	EPA 3005A	1,6020B	SV
Zinc, Total	0.00820	J	mg/l	0.01000	0.00341	1	10/13/22 22:14	10/18/22 13:06	EPA 3005A	1,6020B	SV

Project Name: SBD
Project Number: Not Specified
Lab Number: L2256923
Report Date: 10/21/22

SAMPLE RESULTS

Lab ID: L2256923-03
Client ID: EFF
Sample Location: NY
Sample Depth:
Matrix: Water

Date Collected: 10/12/22 18:00
Date Received: 10/12/22
Field Prep: Refer to COC

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Calcium, Total	77.1		mg/l	0.100	0.0394	1	10/13/22 22:14	10/18/22 15:34	EPA 3005A	1,6020B	SV
Chromium, Total	0.00217		mg/l	0.00100	0.00017	1	10/13/22 22:14	10/18/22 15:34	EPA 3005A	1,6020B	SV
Copper, Total	0.00697		mg/l	0.00100	0.00038	1	10/13/22 22:14	10/18/22 15:34	EPA 3005A	1,6020B	SV
Iron, Total	0.0911		mg/l	0.0500	0.0191	1	10/13/22 22:14	10/18/22 15:34	EPA 3005A	1,6020B	SV
Lead, Total	ND		mg/l	0.00100	0.00034	1	10/13/22 22:14	10/18/22 15:34	EPA 3005A	1,6020B	SV
Magnesium, Total	21.0		mg/l	0.0700	0.0242	1	10/13/22 22:14	10/18/22 15:34	EPA 3005A	1,6020B	SV
Manganese, Total	0.01411		mg/l	0.00100	0.00044	1	10/13/22 22:14	10/18/22 15:34	EPA 3005A	1,6020B	SV
Mercury, Total	ND		mg/l	0.00020	0.00009	1	10/13/22 22:47	10/14/22 12:21	EPA 7470A	1,7470A	ZK
Nickel, Total	0.00258		mg/l	0.00200	0.00055	1	10/13/22 22:14	10/18/22 15:34	EPA 3005A	1,6020B	SV
Zinc, Total	0.01317		mg/l	0.01000	0.00341	1	10/13/22 22:14	10/18/22 15:34	EPA 3005A	1,6020B	SV
Dissolved Metals - Mansfield Lab											
Calcium, Dissolved	79.3		mg/l	0.100	0.0394	1	10/15/22 00:26	10/18/22 21:34	EPA 3005A	1,6020B	SV
Chromium, Dissolved	0.00200		mg/l	0.00100	0.00017	1	10/15/22 00:26	10/18/22 21:34	EPA 3005A	1,6020B	SV
Copper, Dissolved	0.00688		mg/l	0.00100	0.00038	1	10/15/22 00:26	10/18/22 21:34	EPA 3005A	1,6020B	SV
Iron, Dissolved	0.0227	J	mg/l	0.0500	0.0191	1	10/15/22 00:26	10/18/22 21:34	EPA 3005A	1,6020B	SV
Lead, Dissolved	ND		mg/l	0.00100	0.00034	1	10/15/22 00:26	10/18/22 21:34	EPA 3005A	1,6020B	SV
Magnesium, Dissolved	22.2		mg/l	0.0700	0.0242	1	10/15/22 00:26	10/18/22 21:34	EPA 3005A	1,6020B	SV
Manganese, Dissolved	0.01385		mg/l	0.00100	0.00044	1	10/15/22 00:26	10/18/22 21:34	EPA 3005A	1,6020B	SV
Mercury, Dissolved	ND		mg/l	0.00020	0.00009	1	10/15/22 00:53	10/15/22 13:16	EPA 7470A	1,7470A	DJR
Nickel, Dissolved	0.00286		mg/l	0.00200	0.00055	1	10/15/22 00:26	10/18/22 21:34	EPA 3005A	1,6020B	SV
Zinc, Dissolved	0.01663		mg/l	0.01000	0.00341	1	10/15/22 00:26	10/18/22 21:34	EPA 3005A	1,6020B	SV

Project Name: SBD **Lab Number:** L2256923

Project Number: Not Specified **Report Date:** 10/21/22

Method Blank Analysis
Batch Quality Control

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Mansfield Lab for sample(s): 02-03 Batch: WG1699093-1										
Calcium, Total	ND		mg/l	0.100	0.0394	1	10/13/22 22:14	10/18/22 12:35	1,6020B	SV
Chromium, Total	ND		mg/l	0.00100	0.00017	1	10/13/22 22:14	10/18/22 12:35	1,6020B	SV
Copper, Total	ND		mg/l	0.00100	0.00038	1	10/13/22 22:14	10/18/22 12:35	1,6020B	SV
Iron, Total	ND		mg/l	0.0500	0.0191	1	10/13/22 22:14	10/18/22 12:35	1,6020B	SV
Lead, Total	ND		mg/l	0.00100	0.00034	1	10/13/22 22:14	10/18/22 12:35	1,6020B	SV
Magnesium, Total	ND		mg/l	0.0700	0.0242	1	10/13/22 22:14	10/18/22 12:35	1,6020B	SV
Manganese, Total	ND		mg/l	0.00100	0.00044	1	10/13/22 22:14	10/18/22 12:35	1,6020B	SV
Nickel, Total	ND		mg/l	0.00200	0.00055	1	10/13/22 22:14	10/18/22 12:35	1,6020B	SV
Zinc, Total	ND		mg/l	0.01000	0.00341	1	10/13/22 22:14	10/18/22 12:35	1,6020B	SV

Prep Information

Digestion Method: EPA 3005A

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Mansfield Lab for sample(s): 02-03 Batch: WG1699096-1										
Mercury, Total	ND		mg/l	0.00020	0.00009	1	10/13/22 22:47	10/14/22 12:15	1,7470A	ZK

Prep Information

Digestion Method: EPA 7470A

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Dissolved Metals - Mansfield Lab for sample(s): 03 Batch: WG1699607-1										
Calcium, Dissolved	ND		mg/l	0.100	0.0394	1	10/15/22 00:26	10/18/22 21:29	1,6020B	SV
Chromium, Dissolved	ND		mg/l	0.00100	0.00017	1	10/15/22 00:26	10/18/22 21:29	1,6020B	SV
Copper, Dissolved	ND		mg/l	0.00100	0.00038	1	10/15/22 00:26	10/18/22 21:29	1,6020B	SV
Iron, Dissolved	ND		mg/l	0.0500	0.0191	1	10/15/22 00:26	10/18/22 21:29	1,6020B	SV
Lead, Dissolved	ND		mg/l	0.00100	0.00034	1	10/15/22 00:26	10/18/22 21:29	1,6020B	SV
Magnesium, Dissolved	ND		mg/l	0.0700	0.0242	1	10/15/22 00:26	10/18/22 21:29	1,6020B	SV
Manganese, Dissolved	ND		mg/l	0.00100	0.00044	1	10/15/22 00:26	10/18/22 21:29	1,6020B	SV

Project Name: SBD
Project Number: Not Specified

Lab Number: L2256923
Report Date: 10/21/22

Method Blank Analysis
Batch Quality Control

Nickel, Dissolved	ND	mg/l	0.00200	0.00055	1	10/15/22 00:26	10/18/22 21:29	1,6020B	SV
Zinc, Dissolved	ND	mg/l	0.01000	0.00341	1	10/15/22 00:26	10/18/22 21:29	1,6020B	SV

Prep Information

Digestion Method: EPA 3005A

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Dissolved Metals - Mansfield Lab for sample(s): 03 Batch: WG1699616-1										
Mercury, Dissolved	ND		mg/l	0.00020	0.00009	1	10/15/22 00:53	10/15/22 13:09	1,7470A	DJR

Prep Information

Digestion Method: EPA 7470A

Lab Control Sample Analysis

Batch Quality Control

Project Name: SBD

Project Number: Not Specified

Lab Number: L2256923

Report Date: 10/21/22

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 02-03 Batch: WG1699093-2								
Calcium, Total	94		-		80-120	-		
Chromium, Total	93		-		80-120	-		
Copper, Total	92		-		80-120	-		
Iron, Total	100		-		80-120	-		
Lead, Total	110		-		80-120	-		
Magnesium, Total	98		-		80-120	-		
Manganese, Total	97		-		80-120	-		
Nickel, Total	92		-		80-120	-		
Zinc, Total	90		-		80-120	-		
Total Metals - Mansfield Lab Associated sample(s): 02-03 Batch: WG1699096-2								
Mercury, Total	82		-		80-120	-		

Lab Control Sample Analysis

Batch Quality Control

Project Name: SBD

Project Number: Not Specified

Lab Number: L2256923

Report Date: 10/21/22

Parameter	LCS %Recovery	LCSD %Recovery	%Recovery Limits	RPD	RPD Limits
Dissolved Metals - Mansfield Lab Associated sample(s): 03 Batch: WG1699607-2					
Calcium, Dissolved	112	-	80-120	-	
Chromium, Dissolved	96	-	80-120	-	
Copper, Dissolved	98	-	80-120	-	
Iron, Dissolved	101	-	80-120	-	
Lead, Dissolved	117	-	80-120	-	
Magnesium, Dissolved	106	-	80-120	-	
Manganese, Dissolved	101	-	80-120	-	
Nickel, Dissolved	99	-	80-120	-	
Zinc, Dissolved	95	-	80-120	-	
Dissolved Metals - Mansfield Lab Associated sample(s): 03 Batch: WG1699616-2					
Mercury, Dissolved	100	-	80-120	-	

Matrix Spike Analysis
Batch Quality Control

Project Name: SBD
Project Number: Not Specified

Lab Number: L2256923
Report Date: 10/21/22

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 02-03 QC Batch ID: WG1699093-3 QC Sample: L2256923-02 Client ID: POST FILTER												
Calcium, Total	72.5	10	91.8	**193**	Q	-	-		75-125	-		20
Chromium, Total	0.00083J	0.2	0.1912	96		-	-		75-125	-		20
Copper, Total	0.00234	0.25	0.2312	92		-	-		75-125	-		20
Iron, Total	0.370	1	1.42	105		-	-		75-125	-		20
Lead, Total	0.00055J	0.53	0.5212	98		-	-		75-125	-		20
Magnesium, Total	15.9	10	27.8	119		-	-		75-125	-		20
Manganese, Total	0.1424	0.5	0.6660	105		-	-		75-125	-		20
Nickel, Total	0.00115J	0.5	0.4632	93		-	-		75-125	-		20
Zinc, Total	0.00820J	0.5	0.4748	95		-	-		75-125	-		20
Total Metals - Mansfield Lab Associated sample(s): 02-03 QC Batch ID: WG1699096-3 QC Sample: L2256923-03 Client ID: EFF												
Mercury, Total	ND	0.005	0.00418	84		-	-		75-125	-		20
Dissolved Metals - Mansfield Lab Associated sample(s): 03 QC Batch ID: WG1699607-3 WG1699607-4 QC Sample: L2256931-01 Client ID: MS Sample												
Calcium, Dissolved	274	10	338	**640**	Q	344	**700**	Q	75-125	2		20
Chromium, Dissolved	0.00357	0.2	0.1987	98		0.1990	98		75-125	0		20
Copper, Dissolved	ND	0.25	0.2390	96		0.00470J	**2**	Q	75-125	**192**	Q	20
Iron, Dissolved	0.0377J	1	1.08	108		1.08	108		75-125	0		20
Lead, Dissolved	ND	0.53	0.5766	109		0.4907	92		75-125	16		20
Magnesium, Dissolved	32.5	10	46.0	**135**	Q	47.0	**145**	Q	75-125	2		20
Manganese, Dissolved	0.01765	0.5	0.5076	98		0.5127	99		75-125	1		20
Nickel, Dissolved	0.0006J	0.5	0.5024	100		0.4859	97		75-125	3		20
Zinc, Dissolved	ND	0.5	0.4628	92		0.4570	91		75-125	1		20

Matrix Spike Analysis
Batch Quality Control

Project Name: SBD
Project Number: Not Specified

Lab Number: L2256923
Report Date: 10/21/22

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	MSD Found	MSD %Recovery	Recovery Limits	RPD	RPD Limits
Dissolved Metals - Mansfield Lab Associated sample(s): 03 QC Batch ID: WG1699616-3 QC Sample: L2256923-03 Client ID: EFF									
Mercury, Dissolved	ND	0.005	0.00452	90	-	-	75-125	-	20

Lab Duplicate Analysis
Batch Quality Control

Project Name: SBD
Project Number: Not Specified

Lab Number: L2256923
Report Date: 10/21/22

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 02-03 QC Batch ID: WG1699093-4 QC Sample: L2256923-02 Client ID: POST FILTER						
Calcium, Total	72.5	69.2	mg/l	5		20
Chromium, Total	0.00083J	0.00092J	mg/l	NC		20
Copper, Total	0.00234	0.00227	mg/l	3		20
Iron, Total	0.370	0.374	mg/l	1		20
Lead, Total	0.00055J	0.00055J	mg/l	NC		20
Magnesium, Total	15.9	15.1	mg/l	5		20
Manganese, Total	0.1424	0.1401	mg/l	2		20
Nickel, Total	0.00115J	0.00115J	mg/l	NC		20
Zinc, Total	0.00820J	0.00814J	mg/l	NC		20
Total Metals - Mansfield Lab Associated sample(s): 02-03 QC Batch ID: WG1699096-4 QC Sample: L2256923-03 Client ID: EFF						
Mercury, Total	ND	ND	mg/l	NC		20
Dissolved Metals - Mansfield Lab Associated sample(s): 03 QC Batch ID: WG1699616-4 QC Sample: L2256923-03 Client ID: EFF						
Mercury, Dissolved	ND	0.00015J	mg/l	NC		20

INORGANICS
&
MISCELLANEOUS

Project Name: SBD
Project Number: Not Specified

Lab Number: L2256923
Report Date: 10/21/22

SAMPLE RESULTS

Lab ID: L2256923-01
Client ID: POST OWS
Sample Location: NY

Date Collected: 10/12/22 14:00
Date Received: 10/12/22
Field Prep: None

Sample Depth:
Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Oil & Grease, Hem-Grav	7.7		mg/l	4.0	4.0	1	10/18/22 09:30	10/18/22 14:14	140,1664B	JM

Project Name: SBD
Project Number: Not Specified

Lab Number: L2256923
Report Date: 10/21/22

SAMPLE RESULTS

Lab ID: L2256923-02
Client ID: POST FILTER
Sample Location: NY

Date Collected: 10/12/22 16:00
Date Received: 10/12/22
Field Prep: None

Sample Depth:
Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total Suspended	ND		mg/l	5.0	NA	1	-	10/14/22 23:14	121,2540D	SMH

Project Name: SBD
Project Number: Not Specified

Lab Number: L2256923
Report Date: 10/21/22

SAMPLE RESULTS

Lab ID: L2256923-03
Client ID: EFF
Sample Location: NY

Date Collected: 10/12/22 18:00
Date Received: 10/12/22
Field Prep: Refer to COC

Sample Depth:
Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total Suspended	ND		mg/l	5.0	NA	1	-	10/19/22 11:30	121,2540D	MCU
Cyanide, Total	0.003	J	mg/l	0.005	0.001	1	10/18/22 11:15	10/18/22 14:17	1,9010C/9012B	CRS
Cyanide, Amenable	ND		mg/l	0.010	0.005	2	10/17/22 14:55	10/18/22 09:10	121,4500CN-G	JER
Phosphorus, Total	0.563		mg/l	0.010	0.004	1	10/18/22 09:00	10/18/22 12:34	121,4500P-E	AAA
BOD, 5 day	4.3		mg/l	2.0	NA	1	10/14/22 10:20	10/19/22 08:15	121,5210B	MT
Oil & Grease, Hem-Grav	ND		mg/l	4.0	4.0	1	10/18/22 09:30	10/18/22 14:14	140,1664B	JM

Project Name: SBD
Project Number: Not Specified

Lab Number: L2256923
Report Date: 10/21/22

Method Blank Analysis
Batch Quality Control

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab for sample(s): 03 Batch: WG1699479-1										
BOD, 5 day	ND		mg/l	2.0	NA	1	10/14/22 10:20	10/19/22 08:15	121,5210B	MT
General Chemistry - Westborough Lab for sample(s): 03 Batch: WG1700367-1										
Cyanide, Amenable	ND		mg/l	0.010	0.005	2	10/17/22 14:55	10/18/22 09:10	121,4500CN-G	JER
General Chemistry - Westborough Lab for sample(s): 02 Batch: WG1700691-1										
Solids, Total Suspended	ND		mg/l	5.0	NA	1	-	10/14/22 23:14	121,2540D	SMH
General Chemistry - Westborough Lab for sample(s): 03 Batch: WG1700872-1										
Phosphorus, Total	ND		mg/l	0.010	0.004	1	10/18/22 09:00	10/18/22 12:07	121,4500P-E	AAA
General Chemistry - Westborough Lab for sample(s): 03 Batch: WG1700890-1										
Cyanide, Total	ND		mg/l	0.005	0.001	1	10/18/22 11:15	10/18/22 13:58	1,9010C/9012B	CRS
General Chemistry - Westborough Lab for sample(s): 01,03 Batch: WG1700902-1										
Oil & Grease, Hem-Grav	ND		mg/l	4.0	4.0	1	10/18/22 09:30	10/18/22 14:14	140,1664B	JM
General Chemistry - Westborough Lab for sample(s): 03 Batch: WG1700929-1										
Solids, Total Suspended	ND		mg/l	5.0	NA	1	-	10/19/22 11:30	121,2540D	MCU

Lab Control Sample Analysis

Batch Quality Control

Project Name: SBD
Project Number: Not Specified

Lab Number: L2256923
Report Date: 10/21/22

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 03 Batch: WG1699479-2								
BOD, 5 day	103		-		85-115	-		20
General Chemistry - Westborough Lab Associated sample(s): 03 Batch: WG1700367-2								
Cyanide, Amenable	97		-		85-115	-		
General Chemistry - Westborough Lab Associated sample(s): 02 Batch: WG1700691-2								
Solids, Total Suspended	98		-		80-120	-		
General Chemistry - Westborough Lab Associated sample(s): 03 Batch: WG1700872-2								
Phosphorus, Total	103		-		80-120	-		
General Chemistry - Westborough Lab Associated sample(s): 03 Batch: WG1700890-2 WG1700890-3								
Cyanide, Total	103		106		85-115	3		20
General Chemistry - Westborough Lab Associated sample(s): 01,03 Batch: WG1700902-2								
Oil & Grease, Hem-Grav	88		-		78-114	-		18
General Chemistry - Westborough Lab Associated sample(s): 03 Batch: WG1700929-2								
Solids, Total Suspended	103		-		80-120	-		

Matrix Spike Analysis
Batch Quality Control

Project Name: SBD
Project Number: Not Specified

Lab Number: L2256923
Report Date: 10/21/22

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 03 QC Batch ID: WG1699479-4 QC Sample: L2257070-03 Client ID: MS Sample												
BOD, 5 day	ND	100	94	94		-	-		50-145	-		35
General Chemistry - Westborough Lab Associated sample(s): 03 QC Batch ID: WG1700872-4 QC Sample: L2254980-04 Client ID: MS Sample												
Phosphorus, Total	0.365	0.5	0.820	91		-	-		75-125	-		20
General Chemistry - Westborough Lab Associated sample(s): 03 QC Batch ID: WG1700890-4 WG1700890-5 QC Sample: L2256532-07 Client ID: MS Sample												
Cyanide, Total	ND	0.2	0.220	110		0.224	112		80-120	2		20
General Chemistry - Westborough Lab Associated sample(s): 01,03 QC Batch ID: WG1700902-4 QC Sample: L2253572-01 Client ID: MS Sample												
Oil & Grease, Hem-Grav	ND	38.8	34	86		-	-		78-114	-		18

Lab Duplicate Analysis
Batch Quality Control

Project Name: SBD
Project Number: Not Specified

Lab Number: L2256923
Report Date: 10/21/22

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 03 QC Batch ID: WG1699479-3 QC Sample: L2257070-03 Client ID: DUP Sample						
BOD, 5 day	ND	ND	mg/l	NC		35
General Chemistry - Westborough Lab Associated sample(s): 03 QC Batch ID: WG1700367-3 QC Sample: L2256923-03 Client ID: EFF						
Cyanide, Amenable	ND	ND	mg/l	NC		20
General Chemistry - Westborough Lab Associated sample(s): 02 QC Batch ID: WG1700691-3 QC Sample: L2256468-01 Client ID: DUP Sample						
Solids, Total Suspended	130	130	mg/l	0		32
General Chemistry - Westborough Lab Associated sample(s): 03 QC Batch ID: WG1700872-3 QC Sample: L2254980-04 Client ID: DUP Sample						
Phosphorus, Total	0.365	0.335	mg/l	9		20
General Chemistry - Westborough Lab Associated sample(s): 01,03 QC Batch ID: WG1700902-3 QC Sample: L2256923-03 Client ID: EFF						
Oil & Grease, Hem-Grav	ND	ND	mg/l	NC		18
General Chemistry - Westborough Lab Associated sample(s): 03 QC Batch ID: WG1700929-3 QC Sample: L2257226-02 Client ID: DUP Sample						
Solids, Total Suspended	2100	2100	mg/l	0		32

Project Name: SBD
Project Number: Not Specified

Lab Number: L2256923
Report Date: 10/21/22

Sample Receipt and Container Information

Were project specific reporting limits specified? YES

Cooler Information

Cooler	Custody Seal
A	Absent

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2256923-01A	Amber 1000ml HCl preserved	A	NA		4.6	Y	Absent		OG-1664(28)
L2256923-01B	Amber 1000ml HCl preserved	A	NA		4.6	Y	Absent		OG-1664(28)
L2256923-02A	Plastic 250ml HNO3 preserved	A	<2	<2	4.6	Y	Absent		FE-6020T(180),CR-6020T(180),NI-6020T(180),CA-6020T(180),ZN-6020T(180),CU-6020T(180),PB-6020T(180),MN-6020T(180),MG-6020T(180),HG-T(28)
L2256923-02B	Plastic 950ml unpreserved	A	7	7	4.6	Y	Absent		TSS-2540(7)
L2256923-03A	Vial Na2S2O3 preserved	A	NA		4.6	Y	Absent		624.1(3)
L2256923-03B	Vial Na2S2O3 preserved	A	NA		4.6	Y	Absent		624.1(3)
L2256923-03C	Vial Na2S2O3 preserved	A	NA		4.6	Y	Absent		624.1(3)
L2256923-03E	Plastic 250ml NaOH preserved	A	>12	>12	4.6	Y	Absent		ACN-4500(14)
L2256923-03F	Plastic 250ml H2SO4 preserved	A	<2	<2	4.6	Y	Absent		TPHOS-4500(28)
L2256923-03G	Plastic 500ml unpreserved	A	7	7	4.6	Y	Absent		BOD-5210(2)
L2256923-03H	Amber 1000ml H2SO4 preserved	A	<2	<2	4.6	Y	Absent		SUB-TPHENOL(28)
L2256923-03I	Amber 1000ml Na2S2O3	A	7	7	4.6	Y	Absent		625.1(7)
L2256923-03J	Amber 1000ml Na2S2O3	A	7	7	4.6	Y	Absent		625.1(7)
L2256923-03K	Amber 1000ml Na2S2O3	A	7	7	4.6	Y	Absent		PCB-608.3(365)
L2256923-03L	Amber 1000ml Na2S2O3	A	7	7	4.6	Y	Absent		PCB-608.3(365)
L2256923-03M	Amber 1000ml HCl preserved	A	NA		4.6	Y	Absent		OG-1664(28)
L2256923-03N	Amber 1000ml HCl preserved	A	NA		4.6	Y	Absent		OG-1664(28)
L2256923-03O	Plastic 950ml unpreserved	A	7	7	4.6	Y	Absent		TSS-2540(7)
L2256923-03P	Plastic 250ml HNO3 preserved	A	<2	<2	4.6	Y	Absent		CU-6020S(180),MN-6020S(180),MG-6020S(180),ZN-6020S(180),CA-6020S(180),CR-6020S(180),FE-6020S(180),PB-6020S(180),NI-6020S(180),HG-S(28)

*Values in parentheses indicate holding time in days

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Project Number: Not Specified

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Container Information

Container ID	*Container Type*	*Cooler*	*Initial pH*	*Final pH*	*Temp deg C*	*Pres*	*Seal*	*Frozen Date/Time*	*Analysis(*)*
L2256923-03Q	Plastic 250ml HNO3 preserved	A	<2	<2	4.6	Y	Absent		FE-6020T(180),CA-6020T(180),NI-6020T(180),CR-6020T(180),CU-6020T(180),ZN-6020T(180),PB-6020T(180),MN-6020T(180),MG-6020T(180),HG-T(28)

*Values in parentheses indicate holding time in days

Project Name:	SBD	**Lab Number:**	L2256923
Project Number:	Not Specified	**Report Date:**	10/21/22

GLOSSARY

Acronyms

DL	- Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the limit of quantitation (LOQ). The DL includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
EDL	- Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).
EMPC	- Estimated Maximum Possible Concentration: The concentration that results from the signal present at the retention time of an analyte when the ions meet all of the identification criteria except the ion abundance ratio criteria. An EMPC is a worst-case estimate of the concentration.
EPA	- Environmental Protection Agency.
LCS	- Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LCSD	- Laboratory Control Sample Duplicate: Refer to LCS.
LFB	- Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LOD	- Limit of Detection: This value represents the level to which a target analyte can reliably be detected for a specific analyte in a specific matrix by a specific method. The LOD includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
LOQ	- Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.) Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
MDL	- Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
MS	- Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available. For Method 332.0, the spike recovery is calculated using the native concentration, including estimated values.
MSD	- Matrix Spike Sample Duplicate: Refer to MS.
NA	- Not Applicable.
NC	- Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.
NDPA/DPA	- N-Nitrosodiphenylamine/Diphenylamine.
NI	- Not Ignitable.
NP	- Non-Plastic: Term is utilized for the analysis of Atterberg Limits in soil.
NR	- No Results: Term is utilized when 'No Target Compounds Requested' is reported for the analysis of Volatile or Semivolatile Organic TIC only requests.
RL	- Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
RPD	- Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.
SRM	- Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.
STLP	- Semi-dynamic Tank Leaching Procedure per EPA Method 1315.
TEF	- Toxic Equivalency Factors: The values assigned to each dioxin and furan to evaluate their toxicity relative to 2,3,7,8-TCDD.
TEQ	- Toxic Equivalent: The measure of a sample's toxicity derived by multiplying each dioxin and furan by its corresponding TEF and then summing the resulting values.
TIC	- Tentatively Identified Compound: A compound that has been identified to be present and is not part of the target compound list (TCL) for the method and/or program. All TICs are qualitatively identified and reported as estimated concentrations.

Report Format: DU Report with 'J' Qualifiers

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Footnotes

1 - The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

Terms

Analytical Method: Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

Chlordane: The target compound Chlordane (CAS No. 57-74-9) is reported for GC ECD analyses. Per EPA,this compound "refers to a mixture of chlordane isomers, other chlorinated hydrocarbons and numerous other components." (Reference: USEPA Toxicological Review of Chlordane, In Support of Summary Information on the Integrated Risk Information System (IRIS), December 1997.)

Difference: With respect to Total Oxidizable Precursor (TOP) Assay analysis, the difference is defined as the Post-Treatment value minus the Pre-Treatment value.

Final pH: As it pertains to Sample Receipt & Container Information section of the report, Final pH reflects pH of container determined after adjustment at the laboratory, if applicable. If no adjustment required, value reflects Initial pH.

Frozen Date/Time: With respect to Volatile Organics in soil, Frozen Date/Time reflects the date/time at which associated Reagent Water-preserved vials were initially frozen. Note: If frozen date/time is beyond 48 hours from sample collection, value will be reflected in 'bold'.

Gasoline Range Organics (GRO): Gasoline Range Organics (GRO) results include all chromatographic peaks eluting from Methyl tert butyl ether through Naphthalene, with the exception of GRO analysis in support of State of Ohio programs, which includes all chromatographic peaks eluting from Hexane through Dodecane.

Initial pH: As it pertains to Sample Receipt & Container Information section of the report, Initial pH reflects pH of container determined upon receipt, if applicable.

PAH Total: With respect to Alkylated PAH analyses, the 'PAHs, Total' result is defined as the summation of results for all or a subset of the following compounds: Naphthalene, C1-C4 Naphthalenes, 2-Methylnaphthalene, 1-Methylnaphthalene, Biphenyl, Acenaphthylene, Acenaphthene, Fluorene, C1-C3 Fluorenes, Phenanthrene, C1-C4 Phenanthrenes/Anthracenes, Anthracene, Fluoranthene, Pyrene, C1-C4 Fluoranthenes/Pyrenes, Benz(a)anthracene, Chrysene, C1-C4 Chrysenes, Benzo(b)fluoranthene, Benzo(j)+(k)fluoranthene, Benzo(e)pyrene, Benzo(a)pyrene, Perylene, Indeno(1,2,3-cd)pyrene, Dibenz(ah)+(ac)anthracene, Benzo(g,h,i)perylene. If a 'Total' result is requested, the results of its individual components will also be reported.

PFAS Total: With respect to PFAS analyses, the 'PFAS, Total (5)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA and PFOS. In addition, the 'PFAS, Total (6)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA, PFDA and PFOS. For MassDEP DW compliance analysis only, the 'PFAS, Total (6)' result is defined as the summation of results at or above the RL. Note: If a 'Total' result is requested, the results of its individual components will also be reported.

Total: With respect to Organic analyses, a 'Total' result is defined as the summation of results for individual isomers or Aroclors. If a 'Total' result is requested, the results of its individual components will also be reported. This is applicable to 'Total' results for methods 8260, 8081 and 8082.

Data Qualifiers

A - Spectra identified as "Aldol Condensates" are byproducts of the extraction/concentration procedures when acetone is introduced in the process.

B - The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).

C - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.

D - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.

E - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.

F - The ratio of quantifier ion response to qualifier ion response falls outside of the laboratory criteria. Results are considered to be an estimated maximum concentration.

G - The concentration may be biased high due to matrix interferences (i.e, co-elution) with non-target compound(s). The result should be considered estimated.

H - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.

I - The lower value for the two columns has been reported due to obvious interference.

J - Estimated value. The Target analyte concentration is below the quantitation limit (RL), but above the Method Detection Limit (MDL) or Estimated Detection Limit (EDL) for SPME-related analyses. This represents an estimated concentration for Tentatively

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Data Qualifiers

Identified Compounds (TICs).

M - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.

ND - Not detected at the method detection limit (MDL) for the sample, or estimated detection limit (EDL) for SPME-related analyses.

NJ - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.

P - The RPD between the results for the two columns exceeds the method-specified criteria.

Q - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)

R - Analytical results are from sample re-analysis.

RE - Analytical results are from sample re-extraction.

S - Analytical results are from modified screening analysis.

V - The surrogate associated with this target analyte has a recovery outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)

Z - The batch matrix spike and/or duplicate associated with this target analyte has a recovery/RPD outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)

Project Name:	SBD	**Lab Number:**	L2256923
Project Number:	Not Specified	**Report Date:**	10/21/22

REFERENCES

1 Test Methods for Evaluating Solid Waste: Physical/Chemical Methods. EPA SW-846. Third Edition. Updates I - VI, 2018.

121 Standard Methods for the Examination of Water and Wastewater. APHA-AWWA-WEF. Standard Methods Online.

127 Method 608.3: Organochlorine Pesticides and PCBs by GC/HSD, EPA 821-R-16-009, December 2016.

128 Method 624.1: Purgeables by GC/MS, EPA 821-R-16-008, December 2016.

129 Method 625.1: Base/Neutrals and Acids by GC/MS, EPA 821-R-16-007, December 2016.

140 Method 1664,Revision B: N-Hexane Extractable Material (HEM; Oil & Grease) and Silica Gel Treated N-Hexane Extractable Material (SGT-HEM; Non-polar Material) by Extraction and Gravimetry, EPA-821-R-10-001, February 2010.

LIMITATION OF LIABILITIES

Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.

Certification Information

The following analytes are not included in our Primary NELAP Scope of Accreditation:

Westborough Facility
EPA 624/624.1: m/p-xylene, o-xylene, Naphthalene
EPA 625/625.1: alpha-Terpineol
EPA 8260C/8260D: NPW: 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene, Azobenzene; SCM: Iodomethane (methyl iodide), 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene.
EPA 8270D/8270E: NPW: Dimethylnaphthalene,1,4-Diphenylhydrazine, alpha-Terpineol; SCM: Dimethylnaphthalene,1,4-Diphenylhydrazine.
SM4500: NPW: Amenable Cyanide; SCM: Total Phosphorus, TKN, NO2, NO3.

Mansfield Facility
SM 2540D: TSS
EPA 8082A: NPW: PCB: 1, 5, 31, 87,101, 110, 141, 151, 153, 180, 183, 187.
EPA TO-15: Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene, 3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 1-Methylnaphthalene.
Biological Tissue Matrix: EPA 3050B

The following analytes are included in our Massachusetts DEP Scope of Accreditation

Westborough Facility:

Drinking Water
EPA 300.0: Chloride, Nitrate-N, Fluoride, Sulfate; **EPA 353.2**: Nitrate-N, Nitrite-N; **SM4500NO3-F**: Nitrate-N, Nitrite-N; **SM4500F-C, SM4500CN-CE, EPA 180.1, SM2130B, SM4500Cl-D, SM2320B, SM2540C, SM4500H-B, SM4500NO2-B**
EPA 332: Perchlorate; **EPA 524.2:** THMs and VOCs; **EPA 504.1:** EDB, DBCP.
Microbiology: **SM9215B; SM9223-P/A, SM9223B-Colilert-QT,SM9222D**.

Non-Potable Water
SM4500H,B, EPA 120.1, SM2510B, SM2540C, SM2320B, SM4500CL-E, SM4500F-BC, SM4500NH3-BH: Ammonia-N and Kjeldahl-N, **EPA 350.1**: Ammonia-N, **LACHAT 10-107-06-1-B**: Ammonia-N, **EPA 351.1, SM4500NO3-F, EPA 353.2**: Nitrate-N, **SM4500P-E, SM4500P-B, E, SM4500SO4-E, SM5220D, EPA 410.4, SM5210B, SM5310C, SM4500CL-D, EPA 1664, EPA 420.1, SM4500-CN-CE, SM2540D, EPA 300: Chloride, Sulfate, Nitrate.**
EPA 624.1: Volatile Halocarbons & Aromatics,
EPA 608.3: Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II, Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs
EPA 625.1: SVOC (Acid/Base/Neutral Extractables), **EPA 600/4-81-045**: PCB-Oil.
Microbiology: **SM9223B-Colilert-QT; Enterolert-QT, SM9221E, EPA 1600, EPA 1603, SM9222D.**

Mansfield Facility:

Drinking Water
EPA 200.7: Al, Ba, Cd, Cr, Cu, Fe, Mn, Ni, Na, Ag, Ca, Zn. **EPA 200.8:** Al, Sb, As, Ba, Be, Cd, Cr, Cu, Pb, Mn, Ni, Se, Ag, TL, Zn. **EPA 245.1** Hg.
EPA 522, EPA 537.1.

Non-Potable Water
EPA 200.7: Al, Sb, As, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Sr, TL, Ti, V, Zn.
EPA 200.8: Al, Sb, As, Be, Cd, Cr, Cu, Fe, Pb, Mn, Ni, K, Se, Ag, Na, TL, Zn.
EPA 245.1 Hg.
SM2340B

For a complete listing of analytes and methods, please contact your Alpha Project Manager.

NEW YORK CHAIN OF CUSTODY

ALPHA ANALYTICAL

Westborough, MA 01581
8 Walkup Dr.
TEL: 508-898-9220
FAX: 508-898-9193

Mansfield, MA 02048
320 Forbes Blvd
TEL: 508-822-9300
FAX: 508-822-3288

Service Centers
Mahwah, NJ 07430: 35 Whitney Rd, Suite 5
Albany, NY 12205: 14 Walker Way
Tonawanda, NY 14150: 275 Cooper Ave, Suite 105

Page 1 of 2

Date Rec'd in Lab 10/12/22

ALPHA Job # L2256923

Client Information
Client: GWTT
Address: 627 Mount Hope Road
Wharton, NJ 07885
Phone: 973-800-3531
Fax: 973-983-0903
Email: rorlando@gwttllc.com

Project Information
Project Name: SBD
Project Location: NY
Project #
(Use Project name as Project #) ☐
Project Manager: Rob Orlando
ALPHAQuote #:

Turn-Around Time
☐ Standard — Due Date:
☑ Rush (only if pre approved) — # of Days: 5 Day

Deliverables
☐ ASP-A ☐ ASP-B
☐ EQuIS (1 File) ☐ EQuIS (4 File)
☐ Other

Regulatory Requirement
☐ NY TOGS ☐ NY Part 375
☐ AWQ Standards ☐ NY CP-51
☐ NY Restricted Use ☐ Other
☐ NY Unrestricted Use
☐ NYC Sewer Discharge

Billing Information
☑ Same as Client Info
PO #

Disposal Site Information
Please identify below location of applicable disposal facilities.
Disposal Facility:
☐ NJ ☐ NY
Other:

☐ These samples have been previously analyzed by Alpha

Other project specific requirements/comments:
624.1 and 625.1 - VOCs and SVOCs PLUS TICs

Please specify Metals or TAL. Ca, Cr, Cu, Fe, Pb, Hg, Mg, Mn, Ni, Zn

ANALYSIS

Sample Filtration
☑ Done
☐ Lab to do
Preservation
☐ Lab to do
(Please Specify below)

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection Date	Collection Time	Sample Matrix	Sampler's Initials	624-1664	SUB-TAHEND	PCB-608.3	625.1	TOTAL METALS/Hg	DISS METALS/Hg	TAKS-4500	BOD-5210	Sample Specific Comments	Total Bottles
56923 01	POST OW3	10/12/22	1400	WW	RMO	X									2
02	POST FILTER	10/12/22	1600	WW	RMO					X					1
03	EFF	10/12/22	1800	WW	RMO	X	X	X	X	X	X	X	X		11

Preservative Code:
A = None
B = HCl
C = HNO_3
D = H_2SO_4
E = NaOH
F = MeOH
G = $NaHSO_4$
H = $Na_2S_2O_3$
K/E = Zn Ac/NaOH
O = Other

Container Code
P = Plastic
A = Amber Glass
V = Vial
G = Glass
B = Bacteria Cup
C = Cube
O = Other
E = Encore
D = BOD Bottle

Westboro: Certification No: MA935
Mansfield: Certification No: MA015

Container Type	A	A	A	A	P	P	P	P
Preservative	B	D	H	H	C	C	D	A

Relinquished By:	Date/Time	Received By:	Date/Time
GWTT	10/12/22 18:30		10/12 18:30
	10/12/22 1830		10/12/22 2115
	10/12/22 2315		10/12/22 2315

Please print clearly, legibly and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. BY EXECUTING THIS COC, THE CLIENT HAS READ AND AGREES TO BE BOUND BY ALPHA'S TERMS & CONDITIONS.

NEW YORK CHAIN OF CUSTODY

ALPHA ANALYTICAL

Westborough, MA 01581
8 Walkup Dr.
TEL: 508-898-9220
FAX: 508-898-9193

Mansfield, MA 02048
320 Forbes Blvd
TEL: 508-822-9300
FAX: 508-822-3288

Service Centers
Mahwah, NJ 07430: 35 Whitney Rd, Suite 5
Albany, NY 12205: 14 Walker Way
Tonawanda, NY 14150: 275 Cooper Ave, Suite 105

Page 2 of 2

Date Rec'd in Lab: 10/12/22

ALPHA Job #: L2256923

Client Information

Client: GWTT
Address: 627 Mount Hope Road
Wharton, NJ 07885
Phone: 973-800-3531
Fax: 973-983-0903
Email: rorlando@gwttllc.com

Project Information

Project Name: SBD
Project Location: NY
Project #
(Use Project name as Project #) ☐
Project Manager: Rob Orlando
ALPHAQuote #:

Turn-Around Time

☐ Standard — Due Date:
☑ Rush (only if pre approved) — # of Days: 5 Day

Deliverables

☐ ASP-A ☐ ASP-B
☐ EQuIS (1 File) ☐ EQuIS (4 File)
☐ Other

Billing Information

☑ Same as Client Info
PO #

Regulatory Requirement

☐ NY TOGS ☐ NY Part 375
☐ AWQ Standards ☐ NY CP-51
☐ NY Restricted Use ☐ Other
☐ NY Unrestricted Use
☐ NYC Sewer Discharge

Disposal Site Information

Please identify below location of applicable disposal facilities.

Disposal Facility:
NJ ☐ NY
Other:

☐ These samples have been previously analyzed by Alpha

Other project specific requirements/comments:

624.1 and 625.1 - VOCs and SVOCs PLUS TICs

Please specify Metals or TAL.

ANALYSIS

ACN | 625-2540 | 624.1

Sample Filtration
☑ Done
☐ Lab to do
Preservation
☐ Lab to do
(Please Specify below)

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection Date	Collection Time	Sample Matrix	Sampler's Initials	ACN	625-2540	624.1	Total Bottles	Sample Specific Comments
56923-01	Post GWS	10/12/22	1450	WW	RMO				6	
-02	Post Filter	10/12/22	1600	WW	RMO		X		4	
-03	EFF	10/12/22	1800	WW	RMO	X	X	X	5	

Preservative Code:
A = None
B = HCl
C = HNO_3
D = H_2SO_4
E = NaOH
F = MeOH
G = $NaHSO_4$
H = $Na_2S_2O_3$
K/E = Zn Ac/NaOH
O = Other

Container Code
P = Plastic
A = Amber Glass
V = Vial
G = Glass
B = Bacteria Cup
C = Cube
O = Other
E = Encore
D = BOD Bottle

Westboro: Certification No: MA935
Mansfield: Certification No: MA015

Container Type	P	P	V						
Preservative	E	A	H						

Relinquished By:	Date/Time	Received By:	Date/Time
GWTT	10/12/22 1820		10/12/22 1918
	10/12/22 1918		10/12/22 2315
	10/13/22 2315		10/12/22 2315

Please print clearly, legibly and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. BY EXECUTING THIS COC, THE CLIENT HAS READ AND AGREES TO BE BOUND BY ALPHA'S TERMS & CONDITIONS.

eurofins | Environment Testing America

ANALYTICAL REPORT

Job Number: 460-267629-1

Job Description: L2256923

For:
Alpha Analytical Inc
8 Walkup Drive
Westboro, MA 01581

Attention: Ralph Kocsis

Approved for release.
Kristyn L Tempe
Manager of Project Management
10/21/2022 2:50 PM

Kristyn L Tempe, Manager of Project Management
777 New Durham Road, Edison, NJ, 08817
(732)549-3900
Kristyn.Tempe@et.eurofinsus.com
10/21/2022
Revision: 1

cc: Reports Dept.

Table of Contents

Table of Contents

CASE NARRATIVE

Client: Alpha Analytical Inc

Project: L2256923

Report Number: 460-267629-1
Revision

This case narrative is in the form of an exception report, where only the anomalies related to this report, method specific performance and/or QA/QC issues are discussed. If there are no issues to report, this narrative will include a statement that documents that there are no relevant data issues.

It should be noted that samples with elevated Reporting Limits (RLs) as a result of a dilution may not be able to satisfy customer reporting limits in some cases. Such increases in the RLs are unavoidable but acceptable consequence of sample dilution that enables quantification of target analytes or interferences which exceed the calibration range of the instrument.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

RECEIPT
The sample was received on 10/14/2022 8:07 AM. Unless otherwise noted below, the sample arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 1.1º C.

The Chain-of-Custody (COC) was incomplete as received and/or improperly completed. No TAT or container total recorded on the COC.

Note: All samples which require thermal preservation are considered acceptable if the arrival temperature is within 2C of the required temperature or method specified range. For samples with a specified temperature of 4C, samples with a temperature ranging from just above freezing temperature of water to 6C shall be acceptable. Samples that are hand delivered immediately following collection may not meet these criteria, however they will be deemed acceptable according to NELAC standards, if there is evidence that the chilling process has begun, such as arrival on ice, etc.

TOTAL RECOVERABLE PHENOLS
Sample EFF (460-267629-1) was analyzed for total recoverable phenols in accordance with EPA Method 420.1. The samples were prepared and analyzed on 10/20/2022.

No difficulties were encountered during the phenol analysis.

All quality control parameters were within the acceptance limits.

Sample Summary

Client: Alpha Analytical Inc
Project/Site: L2256923

Job ID: 460-267629-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
460-267629-1	EFF	Water	10/12/22 18:00	10/14/22 08:07

Detection Summary

Client: Alpha Analytical Inc
Project/Site: L2256923

Job ID: 460-267629-1

Client Sample ID: EFF

Lab Sample ID: 460-267629-1

No Detections.

This Detection Summary does not include radiochemical test results.

Method Summary

Client: Alpha Analytical Inc
Project/Site: L2256923

Job ID: 460-267629-1

Method	Method Description	Protocol	Laboratory
420.1	Phenolics, Total Recoverable	MCAWW	EET EDI
Distill/Phenol	Distillation, Phenolics	None	EET EDI

Protocol References:

MCAWW = "Methods For Chemical Analysis Of Water And Wastes", EPA-600/4-79-020, March 1983 And Subsequent Revisions.

None = None

Laboratory References:

EET EDI = Eurofins Edison, 777 New Durham Road, Edison, NJ 08817, TEL (732)549-3900

Client Sample Results

Client: Alpha Analytical Inc
Project/Site: L2256923

Job ID: 460-267629-1

Client Sample ID: EFF

Date Collected: 10/12/22 18:00
Date Received: 10/14/22 08:07

Lab Sample ID: 460-267629-1

Matrix: Water

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Phenols, Total (MCAWW 420.1)	0.026	U	0.050	0.026	mg/L		10/20/22 07:03	10/20/22 11:00	1

QC Sample Results

Client: Alpha Analytical Inc
Project/Site: L2256923

Job ID: 460-267629-1

Method: 420.1 - Phenolics, Total Recoverable

Lab Sample ID: MB 460-873014/2-A
Matrix: Water
Analysis Batch: 873089

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 873014

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Phenols, Total	0.026	U	0.050	0.026	mg/L		10/20/22 07:03	10/20/22 11:00	1

Lab Sample ID: LCS 460-873014/3-A
Matrix: Water
Analysis Batch: 873089

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 873014

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
Phenols, Total			0.400	0.415		mg/L		104	86 - 118		

Lab Sample ID: MRL 460-873014/1-A
Matrix: Water
Analysis Batch: 873089

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 873014

Analyte			Spike Added	MRL Result	MRL Qualifier	Unit	D	%Rec	%Rec Limits		
Phenols, Total			0.0500	0.0556		mg/L		111	50 - 150		

Lab Sample ID: 460-267629-1 MS
Matrix: Water
Analysis Batch: 873089

Client Sample ID: EFF
Prep Type: Total/NA
Prep Batch: 873014

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits		
Phenols, Total	0.026	U	0.400	0.389		mg/L		97	86 - 118		

Lab Sample ID: 460-267629-1 MSD
Matrix: Water
Analysis Batch: 873089

Client Sample ID: EFF
Prep Type: Total/NA
Prep Batch: 873014

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Phenols, Total	0.026	U	0.400	0.385		mg/L		96	86 - 118	1	33

Definitions/Glossary

Client: Alpha Analytical Inc
Project/Site: L2256923

Job ID: 460-267629-1

Qualifiers

General Chemistry

Qualifier	Qualifier Description
U	Indicates the analyte was analyzed for but not detected.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

QC Association Summary

Client: Alpha Analytical Inc
Project/Site: L2256923

Job ID: 460-267629-1

General Chemistry

Prep Batch: 873014

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
460-267629-1	EFF	Total/NA	Water	Distill/Phenol	
MB 460-873014/2-A	Method Blank	Total/NA	Water	Distill/Phenol	
LCS 460-873014/3-A	Lab Control Sample	Total/NA	Water	Distill/Phenol	
MRL 460-873014/1-A	Lab Control Sample	Total/NA	Water	Distill/Phenol	
460-267629-1 MS	EFF	Total/NA	Water	Distill/Phenol	
460-267629-1 MSD	EFF	Total/NA	Water	Distill/Phenol	

Analysis Batch: 873089

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
460-267629-1	EFF	Total/NA	Water	420.1	873014
MB 460-873014/2-A	Method Blank	Total/NA	Water	420.1	873014
LCS 460-873014/3-A	Lab Control Sample	Total/NA	Water	420.1	873014
MRL 460-873014/1-A	Lab Control Sample	Total/NA	Water	420.1	873014
460-267629-1 MS	EFF	Total/NA	Water	420.1	873014
460-267629-1 MSD	EFF	Total/NA	Water	420.1	873014

Lab Chronicle

Client: Alpha Analytical Inc
Project/Site: L2256923

Job ID: 460-267629-1

Client Sample ID: EFF
Date Collected: 10/12/22 18:00
Date Received: 10/14/22 08:07

Lab Sample ID: 460-267629-1
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	Distill/Phenol			873014	IAA	EET EDI	10/20/22 07:03
Total/NA	Analysis	420.1		1	873089	AXP	EET EDI	10/20/22 11:00

Laboratory References:
EET EDI = Eurofins Edison, 777 New Durham Road, Edison, NJ 08817, TEL (732)549-3900

Accreditation/Certification Summary

Client: Alpha Analytical Inc
Project/Site: L2256923

Job ID: 460-267629-1

Laboratory: Eurofins Edison

The accreditations/certifications listed below are applicable to this report.

Authority	Program	Identification Number	Expiration Date
New Jersey	NELAP	12028	06-30-23

GENERAL CHEMISTRY

COVER PAGE
GENERAL CHEMISTRY

Lab Name: Eurofins Edison Job Number: 460-267629-1

SDG No.:

Project: L2256923

Client Sample ID	Lab Sample ID
EFF	460-267629-1

Comments:

1B-IN
INORGANIC ANALYSIS DATA SHEET
GENERAL CHEMISTRY

Client Sample ID: EFF
Lab Sample ID: 460-267629-1
Lab Name: Eurofins Edison
Job No.: 460-267629-1
SDG ID.:
Matrix: Water
Date Sampled: 10/12/2022 18:00
Reporting Basis: WET
Date Received: 10/14/2022 08:07

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
64743-03-9	Phenols, Total	0.026	0.050	0.026	mg/L	U		1	420.1

2-IN
CALIBRATION QUALITY CONTROL
GENERAL CHEMISTRY

Lab Name: Eurofins Edison Job No.: 460-267629-1

SDG No.:

Analyst: AXP Batch Start Date: 10/20/2022

Reporting Units: mg/L Analytical Batch No.: 873089

Sample Number	QC Type	Time	Analyte	Result	Spike Amount	(%) Recovery	Limits	Qual	Reagent
7	ICV	09:58	Phenols, Total	0.962	1.00	96	90-110		WTphenSS1_00045
8	ICB	09:58	Phenols, Total	0.026				U	
23	CCV	11:00	Phenols, Total	0.940	1.00	94	90-110		WTphenSS1_00045
24	CCB	11:00	Phenols, Total	0.026				U	
35	CCV	11:03	Phenols, Total	0.947	1.00	95	90-110		WTphenSS1_00045
36	CCB	11:03	Phenols, Total	0.026				U	

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM II-IN

3-IN
METHOD BLANK
GENERAL CHEMISTRY

Lab Name: Eurofins Edison Job No.: 460-267629-1

SDG No.:

Method	Lab Sample ID	Analyte	Result	Qual	Units	RL	Dil
Batch ID: 873089	Date: 10/20/2022 11:00	Prep Batch: 873014	Date: 10/20/2022 07:03				
420.1	MB 460-873014/2-A	Phenols, Total	0.026	U	mg/L	0.050	1

FORM III-IN

5-IN
MATRIX SPIKE SAMPLE RECOVERY
GENERAL CHEMISTRY

Lab Name: Eurofins Edison Job No.: 460-267629-1

SDG No.:

Matrix: Water

Method	Lab Sample ID	Analyte	Result	C	Unit	Spike Amount	Pct. Rec.	Limits	RPD	RPD Limit	Q
Batch ID: 873089	Date: 10/20/2022 11:00		Prep Batch: 873014		Date: 10/20/2022 07:03						
420.1	460-267629-1	Phenols, Total	0.026	U	mg/L						
420.1	460-267629-1 MS	Phenols, Total	0.389		mg/L	0.400	97	86-118			

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM V-IN

5-IN
MATRIX SPIKE DUPLICATE SAMPLE RECOVERY
GENERAL CHEMISTRY

Lab Name: Eurofins Edison Job No.: 460-267629-1

SDG No.:

Matrix: Water

Method	Lab Sample ID	Analyte	Result	C	Unit	Spike Amount	Pct. Rec.	Limits	RPD	RPD Limit	Q
Batch ID: 873089	Date: 10/20/2022 11:00		Prep Batch: 873014		Date: 10/20/2022 07:03						
420.1	460-267629-1 MSD	Phenols, Total	0.385		mg/L	0.400	96	86-118	1	33	

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM V-IN

7A-IN
LAB CONTROL SAMPLE
GENERAL CHEMISTRY

Lab Name: Eurofins Edison Job No.: 460-267629-1

SDG No.:

Matrix: Water

Method	Lab Sample ID	Analyte	Result	C	Unit	Spike Amount	Pct. Rec.	Limits	RPD	RPD Limit	Q
Batch ID: 873089	Date: 10/20/2022 11:00		Prep Batch: 873014			Date: 10/20/2022 07:03					
						LCS Source: WTphenIM1_00703					
420.1	LCS 460-873014/3-A	Phenols, Total	0.415		mg/L	0.400	104	86-118			

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM VIIA-IN

7A-IN
METHOD REPORTING LIMIT CHECK
GENERAL CHEMISTRY

Lab Name: Eurofins Edison Job No.: 460-267629-1

SDG No.:

Matrix: Water

Method	Lab Sample ID	Analyte	Result	C	Unit	Spike Amount	Pct. Rec.	Limits	RPD	RPD Limit	Q
Batch ID: 873089	Date: 10/20/2022 11:00		Prep Batch: 873014		Date: 10/20/2022 07:03						
					LCS Source: WTphenIM1_00703						
420.1	MRL 460-873014/1-A	Phenols, Total	0.0556		mg/L	0.0500	111	50-150			

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM VIIA-IN

Calibration results Aquakem 7.2.AQ2 Page: 1

Laboratory
Analyzer User

10/20/2022 10:08

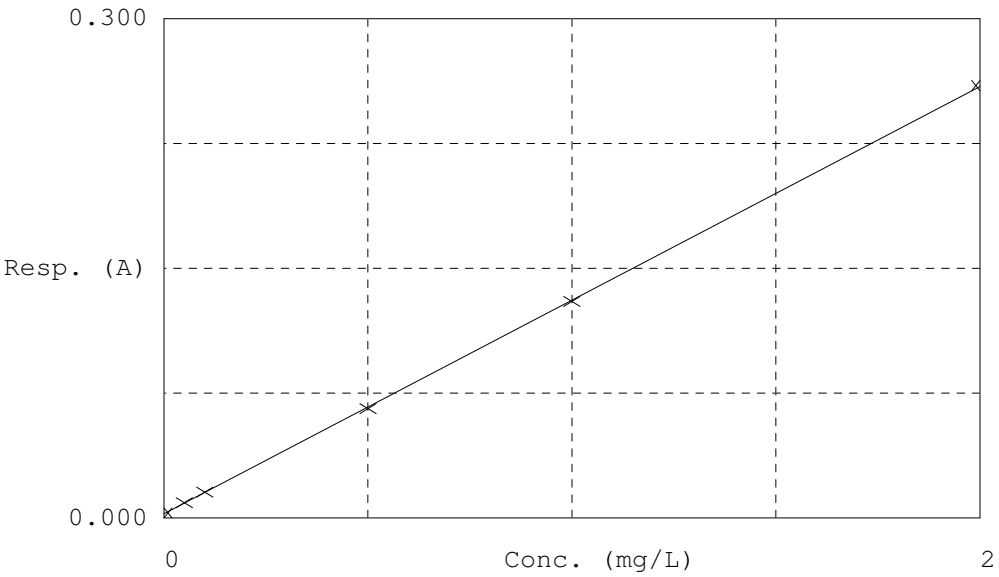
Test PHENOLS

Accepted 10/20/2022 10:08

Factor 7.789
Bias 0.003

Coeff. of det. 0.999955

Errors



	Calibrator	Response	Calc. con.	Conc.	Errors
1	Ph-0.0	0.003	0.00444	0.00000	
2	Ph-0.05	0.009	0.05198	0.05000	
3	Ph-0.10	0.016	0.10213	0.10000	
4	Ph-0.50	0.066	0.49282	0.50000	
5	Ph-1.0	0.130	0.99399	1.00000	
6	Ph-2.0	0.260	2.00465	2.00000	
7	ICB-PHEN(contro	0.004	0.00961	0.00000	
8	ICV-PHEN(contro	0.126	0.96157	1.00000	

9-IN
DETECTION LIMITS
GENERAL CHEMISTRY

Lab Name: Eurofins Edison Job Number: 460-267629-1

SDG Number:

Matrix: Water Instrument ID: Konelab1

Method: 420.1 MDL Date: 02/17/2021 11:22

Prep Method: Distill/Phenol

Analyte	Wavelength/ Mass	RL (mg/L)	MDL (mg/L)
Phenols, Total		0.05	0.026

FORM IX - IN

9-IN
CALIBRATION BLANK DETECTION LIMITS
GENERAL CHEMISTRY

Lab Name: Eurofins Edison Job Number: 460-267629-1

SDG Number:

Matrix: Water Instrument ID: Konelab1

Method: 420.1 XMDL Date: 02/17/2021 11:23

Analyte	Wavelength/ Mass	XRL (mg/L)	XMDL (mg/L)
Phenols, Total		0.05	0.026

FORM IX - IN

12-IN
PREPARATION LOG
GENERAL CHEMISTRY

Lab Name: Eurofins Edison Job No.: 460-267629-1

SDG No.:

Prep Method: Distill/Phenol

Lab Sample ID	Preparation Date	Prep Batch	Initial Weight	Initial Volume (mL)	Final Volume (mL)
MRL 460-873014/1-A	10/20/2022 07:03	873014		50	50
MB 460-873014/2-A	10/20/2022 07:03	873014		50	50
LCS 460-873014/3-A	10/20/2022 07:03	873014		50	50
460-267629-1	10/20/2022 07:03	873014		50	50
460-267629-1 MS	10/20/2022 07:03	873014		50	50
460-267629-1 MSD	10/20/2022 07:03	873014		50	50

FORM XII-IN

13-IN
ANALYSIS RUN LOG
GENERAL CHEMISTRY

Lab Name: Eurofins Edison Job No.: 460-267629-1

SDG No.:

Instrument ID: Konelab1 Method: 420.1

Start Date: 10/20/2022 09:58 End Date: 10/20/2022 11:03

Lab Sample ID	D/F	Type	Time	Analytes: PhenT
ZZZZZZ			09:58	
ZZZZZZ			09:58	
ZZZZZZ			09:58	
ZZZZZZ			09:58	
ZZZZZZ			09:58	
ZZZZZZ			09:58	
ICV 460-873089/7	1		09:58	X
ICB 460-873089/8	1		09:58	X
CCV 460-873089/9			10:35	
CCB 460-873089/10			10:35	
ZZZZZZ			10:35	
ZZZZZZ			10:35	
ZZZZZZ			10:35	
ZZZZZZ			10:35	
ZZZZZZ			10:35	
ZZZZZZ			10:35	
ZZZZZZ			10:35	
ZZZZZZ			10:35	
ZZZZZZ			10:35	
ZZZZZZ			10:35	
CCV 460-873089/21			10:38	
CCB 460-873089/22			10:38	
CCV 460-873089/23	1		11:00	X
CCB 460-873089/24	1		11:00	X
MRL 460-873014/1-A	1	T	11:00	X
MB 460-873014/2-A	1	T	11:00	X
LCS 460-873014/3-A	1	T	11:00	X
460-267629-1	1	T	11:00	X
460-267629-1 MS	1	T	11:00	X
460-267629-1 MSD	1	T	11:00	X
ZZZZZZ			11:00	
ZZZZZZ			11:00	
ZZZZZZ			11:00	
ZZZZZZ			11:00	
CCV 460-873089/35	1		11:03	X
CCB 460-873089/36	1		11:03	X

Prep Types

T = Total/NA

GENERAL CHEMISTRY BATCH WORKSHEET

Lab Name: Eurofins Edison Job No.: 460-267629-1

SDG No.:

Batch Number: 873014 Batch Start Date: 10/20/22 06:30 Batch Analyst: Afremova, Izabella

Batch Method: Distill/Phenol Batch End Date: 10/20/22 08:30

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	FinalAmount	ChlorineCheck	Initial pH	Final pH	WTphenIM1 00703
MRL 460-873014/1		Distill/Phenol, 420.1		50 mL	50 mL	N	5.97 SU	2.86 SU	0.025 mL
MB 460-873014/2		Distill/Phenol, 420.1		50 mL	50 mL	N	6.01 SU	2.84 SU	
LCS 460-873014/3		Distill/Phenol, 420.1		50 mL	50 mL	N	5.99 SU	2.82 SU	0.2 mL
460-267629-A-1	EFF	Distill/Phenol, 420.1	T	50 mL	50 mL	N	1.17 SU	2.84 SU	
460-267629-A-1 MS	EFF	Distill/Phenol, 420.1	T	50 mL	50 mL	N	1.18 SU	2.79 SU	0.2 mL
460-267629-A-1 MSD	EFF	Distill/Phenol, 420.1	T	50 mL	50 mL	N	1.18 SU	2.86 SU	0.2 mL

Batch Notes	
pH Meter ID	e
Acid used for pH adjustment	(1:9) H3PO4 # C - 0815-22 exp 4/4/23
Pipette/Syringe/Dispenser ID	P -36
Copper II Sulfate Pentahydrate ID	C 0598-22 exp 1/25/23
Start Time	7:00 am
End Time	8:30 am

Basis	Basis Description
T	Total/NA

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

GENERAL CHEMISTRY BATCH WORKSHEET

Lab Name: Eurofins Edison Job No.: 460-267629-1

SDG No.:

Batch Number: 873089 Batch Start Date: 10/20/22 09:58 Batch Analyst: Patel, Amitkumar X

Batch Method: 420.1 Batch End Date:

Lab Sample ID	Client Sample ID	Method Chain	Basis	FinalAmount	WTphenSS1 00045				
ICV 460-873089/7		420.1		100 mL	0.1 mL				
ICB 460-873089/8		420.1		100 mL					
CCV 460-873089/23		420.1		100 mL	0.1 mL				
CCB 460-873089/24		420.1		100 mL					
MRL 460-873014/1-A		420.1		5 mL					
MB 460-873014/2-A		420.1		5 mL					
LCS 460-873014/3-A		420.1		5 mL					
460-267629-A-1-A	EFF	420.1	T	5 mL					
460-267629-A-1-B MS	EFF	420.1	T	5 mL					
460-267629-A-1-C MSD	EFF	420.1	T	5 mL					
CCV 460-873089/35		420.1		100 mL	0.1 mL				
CCB 460-873089/36		420.1		100 mL					

Batch Notes	
Pipette/Syringe/Dispenser ID	P-21, P-22
Buffer Reagent ID	C-0403-22 exp 11/24/22
Color Reagent 1 ID	4AAP - C-0865-22 exp 10/20/22
Color Reagent 2 ID	K3Fe(CN)6 - C-08666-22 exp 10/27/22

Basis	Basis Description
T	Total/NA

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

Shipping and Receiving Documents

Subcontract Chain of Custody

Eurofins Test America Edison
777 New Durham Road
Edison, NJ 08817

Alpha Job Number
L2256923

Client Information

Client: Alpha Analytical Labs
Address: Eight Walkup Drive
Westborough, MA 01581-1019

Phone: 201.428.2601
Email: ngalamb@alphalab.com

Project Information

Project Location: NY
Project Manager: Nicole Galamb

Turnaround & Deliverables Information

Due Date:
Deliverables:

Regulatory Requirements/Report Limits

State/Federal Program:
Regulatory Criteria:

Project Specific Requirements and/or Report Requirements

Reference following Alpha Job Number on final report/deliverables: L2256923

Report to include Method Blank, LCS/LCSD:

Additional Comments: Send all results/reports to subreports@alphalab.com

267629

Lab ID	Client ID	Collection Date/Time	Sample Matrix	Analysis	Batch QC
	EFF	10-12-22 18:00	WATER	Total Phenols	

460-267629 Chain of Custody

	Relinquished By:	Date/Time:	Received By:	Date/Time:
		10/13/22		10/13/22 2145
	AAL	10/13/22	AAL	10/14/22 0630
Form No: AL_subcoc	AAL	10-14-22 0807	Angela Lavalla	10/14/22 807

0C
1.1/1.1 IR#9

Page 1 of 1

Eurofins TestAmerica Edison
Receipt Temperature and pH Log

Job Number: 267629

Number of Coolers: 1 IR Gun # 9

Cooler Temperatures

	RAW	CORRECTED		RAW	CORRECTED		RAW	CORRECTED
Cooler #1:	1.1 °C	1.1 °C	Cooler #4:	°C	°C	Cooler #7:	°C	°C
Cooler #2:	°C	°C	Cooler #5:	°C	°C	Cooler #8:	°C	°C
Cooler #3:	°C	°C	Cooler #6:	°C	°C	Cooler #9:	°C	°C

TALS Sample Number	Ammonia (pH<2)	COD (pH<2)	Nitrate Nitrite (pH<2)	Metals* (pH<2)	Hardness (pH<2)	Pest (pH 5-9)	EPH or QAM (pH<2)	Phenols (pH<2)	Sulfide (pH>9)	TKN (pH<2)	TOC (pH<2)	Total Cyanide (pH>12)	Total Phos (pH<2)	Other	Other
1								LL							

If pH adjustments are required record the information below:

Sample No(s). adjusted: NA

Preservative Name/Conc.: NA Volume of Preservative used (ml): NA

Lot # of Preservative(s): NA Expiration Date: NA

The appropriate Project Manager and Department Manager should be notified about the samples which were pH adjusted.

** Samples for Metal analysis which are out of compliance must be acidified at least 24 hours prior to analysis.*

Initials: AC Date: 10/14/22

Login Sample Receipt Checklist

Client: Alpha Analytical Inc

Job Number: 460-267629-1

Login Number: 267629
List Number: 1
Creator: Lysy, Susan

List Source: Eurofins Edison

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	False	Refer to Job Narrative for details.
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	N/A	
Samples do not require splitting or compositing.	N/A	
Residual Chlorine Checked.	N/A	

GAC Influent – Nov. and Dec. 20222 - Eurofins

eurofins | Environment Testing

ANALYTICAL REPORT

PREPARED FOR

Attn: Kirsten Colligan
Ontario Specialty Contracting, Inc.
140 Lee St.
Buffalo, New York 14210

Generated 11/30/2022 5:52:32 PM

JOB DESCRIPTION

37745-Buffalo Color- Quarterly GAC
Buffalo Color - Quarterly GAC

JOB NUMBER

480-204132-1

Eurofins Buffalo
10 Hazelwood Drive
Amherst NY 14228-2298

See page two for job notes and contact information.

Job Notes

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to the NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory. This report is confidential and is intended for the sole use of Eurofins Environment Testing Northeast, LLC Buffalo and its client. All questions regarding this report should be directed to the Eurofins Environment Testing Northeast, LLC Buffalo Project Manager or designee who has signed this report.

The test results in this report relate only to the samples as received by the laboratory and will meet all requirements of the methodology, with any exceptions noted. This report shall not be reproduced except in full, without the express written approval of the laboratory. All questions should be directed to the Eurofins Environment Testing Northeast, LLC Project Manager.

Authorization

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11/30/2022 5:52:32 PM

Authorized for release by
Rebecca Jones, Project Management Assistant I
Rebecca.Jones@et.eurofinsus.com
Designee for
John Schove, Project Manager II
John.Schove@et.eurofinsus.com
(716)504-9838

Table of Contents

Definitions/Glossary

Client: Ontario Specialty Contracting, Inc.
Job ID: 480-204132-1
Project/Site: 37745-Buffalo Color- Quarterly GAC

Qualifiers

GC/MS VOA

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Job ID: 480-204132-1

Laboratory: Eurofins Buffalo

Narrative

Job Narrative
480-204132-1

Comments
No additional comments.

Receipt
The samples were received on 11/23/2022 11:20 AM. Unless otherwise noted below, the samples arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 3.1º C.

GC/MS VOA
Method 624.1: The following samples were diluted to bring the concentration of target analytes within the calibration range: BCC DC1 GAC Influent 1122 (480-204132-1), BCC DC1 GAC Effluent 1122 (480-204132-3) and BCC DC2 GAC Influent 1122 (480-204132-4). Elevated reporting limits (RLs) are provided.

Method 624.1: The preservative used in the sample containers provided is not compatible with the Method 624 analytes requested. The following samples were received preserved with hydrochloric acid: BCC DC1 GAC Influent 1122 (480-204132-1), BCC DC1 GAC Effluent 1122 (480-204132-3), BCC DC2 GAC Influent 1122 (480-204132-4) and BCC DC2 GAC Effluent 1122 (480-204132-5). The requested target analyte list contains 2-Chloroethyl vinyl ether, Acrylonitrile and/or Acrolein, which are acid-labile compounds that degrade in an acidic medium.

Method 624.1: The following samples were diluted to bring the concentration of target analytes within the calibration range: BCC DC1 GAC Middle 1122 (480-204132-2), BCC DC1 GAC Effluent 1122 (480-204132-3) and BCC DC2 GAC Effluent 1122 (480-204132-5). Elevated reporting limits (RLs) are provided.

Method 624.1: The preservative used in the sample containers provided is not compatible with the Method 624 analytes requested. The following sample was received preserved with hydrochloric acid: BCC DC1 GAC Middle 1122 (480-204132-2). The requested target analyte list contains 2-Chloroethyl vinyl ether, Acrylonitrile and/or Acrolein, which are acid-labile compounds that degrade in an acidic medium.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Detection Summary

Client: Ontario Specialty Contracting, Inc.
Job ID: 480-204132-1
Project/Site: 37745-Buffalo Color- Quarterly GAC

Client Sample ID: BCC DC1 GAC Influent 1122 — Lab Sample ID: 480-204132-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,3-Dichlorobenzene	83	J	400	43	ug/L	80		624.1	Total/NA
1,4-Dichlorobenzene	770		400	41	ug/L	80		624.1	Total/NA
Benzene	51	J	400	48	ug/L	80		624.1	Total/NA
Chlorobenzene	5000		400	38	ug/L	80		624.1	Total/NA

Client Sample ID: BCC DC1 GAC Middle 1122 — Lab Sample ID: 480-204132-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chlorobenzene	1600		250	24	ug/L	50		624.1	Total/NA

Client Sample ID: BCC DC1 GAC Effluent 1122 — Lab Sample ID: 480-204132-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,3-Dichlorobenzene	7.2	J	50	5.4	ug/L	10		624.1	Total/NA
1,4-Dichlorobenzene	55		50	5.1	ug/L	10		624.1	Total/NA
Benzene	45	J	50	6.0	ug/L	10		624.1	Total/NA
Chlorobenzene - DL	1600		100	9.5	ug/L	20		624.1	Total/NA

Client Sample ID: BCC DC2 GAC Influent 1122 — Lab Sample ID: 480-204132-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Benzene	21		20	2.4	ug/L	4		624.1	Total/NA
Chlorobenzene	120		20	1.9	ug/L	4		624.1	Total/NA

Client Sample ID: BCC DC2 GAC Effluent 1122 — Lab Sample ID: 480-204132-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Benzene	19		5.0	0.60	ug/L	1		624.1	Total/NA
Chloroform	0.92	J	5.0	0.54	ug/L	1		624.1	Total/NA
Chlorobenzene - DL	110		10	0.95	ug/L	2		624.1	Total/NA

This Detection Summary does not include radiochemical test results.

Client: Ontario Specialty Contracting, Inc.
Job ID: 480-204132-1
Project/Site: 37745-Buffalo Color- Quarterly GAC

Client Sample ID: BCC DC1 GAC Influent 1122
Lab Sample ID: 480-204132-1
Date Collected: 11/23/22 09:00
Matrix: Water
Date Received: 11/23/22 11:20

Method: 40CFR136A 624.1 - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		400	31	ug/L			11/23/22 17:55	80
1,1,2,2-Tetrachloroethane	ND		400	21	ug/L			11/23/22 17:55	80
1,1,2-Trichloroethane	ND		400	39	ug/L			11/23/22 17:55	80
1,1-Dichloroethane	ND		400	47	ug/L			11/23/22 17:55	80
1,1-Dichloroethene	ND		400	68	ug/L			11/23/22 17:55	80
1,2-Dichlorobenzene	ND		400	36	ug/L			11/23/22 17:55	80
1,2-Dichloroethane	ND		400	48	ug/L			11/23/22 17:55	80
1,2-Dichloroethene, Total	ND		800	260	ug/L			11/23/22 17:55	80
1,2-Dichloropropane	ND		400	49	ug/L			11/23/22 17:55	80
1,3-Dichlorobenzene	**83**	**J**	400	43	ug/L			11/23/22 17:55	80
1,4-Dichlorobenzene	**770**		400	41	ug/L			11/23/22 17:55	80
2-Chloroethyl vinyl ether	ND		2000	150	ug/L			11/23/22 17:55	80
Acrolein	ND		8000	1400	ug/L			11/23/22 17:55	80
Acrylonitrile	ND		8000	150	ug/L			11/23/22 17:55	80
Benzene	**51**	**J**	400	48	ug/L			11/23/22 17:55	80
Bromodichloromethane	ND		400	43	ug/L			11/23/22 17:55	80
Bromoform	ND		400	37	ug/L			11/23/22 17:55	80
Bromomethane	ND		400	95	ug/L			11/23/22 17:55	80
Carbon tetrachloride	ND		400	41	ug/L			11/23/22 17:55	80
Chlorobenzene	**5000**		400	38	ug/L			11/23/22 17:55	80
Chloroethane	ND		400	70	ug/L			11/23/22 17:55	80
Chloroform	ND		400	43	ug/L			11/23/22 17:55	80
Chloromethane	ND		400	51	ug/L			11/23/22 17:55	80
cis-1,3-Dichloropropene	ND		400	26	ug/L			11/23/22 17:55	80
Dibromochloromethane	ND		400	33	ug/L			11/23/22 17:55	80
Ethylbenzene	ND		400	37	ug/L			11/23/22 17:55	80
Methylene Chloride	ND		400	65	ug/L			11/23/22 17:55	80
Tetrachloroethene	ND		400	27	ug/L			11/23/22 17:55	80
Toluene	ND		400	36	ug/L			11/23/22 17:55	80
trans-1,3-Dichloropropene	ND		400	35	ug/L			11/23/22 17:55	80
Trichloroethene	ND		400	48	ug/L			11/23/22 17:55	80
Trichlorofluoromethane	ND		400	36	ug/L			11/23/22 17:55	80
Vinyl chloride	ND		400	60	ug/L			11/23/22 17:55	80

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*99*		*68 - 130*		*11/23/22 17:55*	*80*
4-Bromofluorobenzene (Surr)	*98*		*76 - 123*		*11/23/22 17:55*	*80*
Dibromofluoromethane (Surr)	*105*		*75 - 123*		*11/23/22 17:55*	*80*
Toluene-d8 (Surr)	*95*		*77 - 120*		*11/23/22 17:55*	*80*

Client: Ontario Specialty Contracting, Inc.
Job ID: 480-204132-1
Project/Site: 37745-Buffalo Color- Quarterly GAC

Client Sample ID: BCC DC1 GAC Middle 1122
Lab Sample ID: 480-204132-2
Date Collected: 11/23/22 09:15
Matrix: Water
Date Received: 11/23/22 11:20

Method: 40CFR136A 624.1 - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		250	19	ug/L			11/28/22 14:51	50
1,1,2,2-Tetrachloroethane	ND		250	13	ug/L			11/28/22 14:51	50
1,1,2-Trichloroethane	ND		250	24	ug/L			11/28/22 14:51	50
1,1-Dichloroethane	ND		250	29	ug/L			11/28/22 14:51	50
1,1-Dichloroethene	ND		250	43	ug/L			11/28/22 14:51	50
1,2-Dichlorobenzene	ND		250	22	ug/L			11/28/22 14:51	50
1,2-Dichloroethane	ND		250	30	ug/L			11/28/22 14:51	50
1,2-Dichloroethene, Total	ND		500	160	ug/L			11/28/22 14:51	50
1,2-Dichloropropane	ND		250	31	ug/L			11/28/22 14:51	50
1,3-Dichlorobenzene	ND		250	27	ug/L			11/28/22 14:51	50
1,4-Dichlorobenzene	ND		250	25	ug/L			11/28/22 14:51	50
2-Chloroethyl vinyl ether	ND		1300	93	ug/L			11/28/22 14:51	50
Acrolein	ND		5000	870	ug/L			11/28/22 14:51	50
Acrylonitrile	ND		5000	95	ug/L			11/28/22 14:51	50
Benzene	ND		250	30	ug/L			11/28/22 14:51	50
Bromodichloromethane	ND		250	27	ug/L			11/28/22 14:51	50
Bromoform	ND		250	23	ug/L			11/28/22 14:51	50
Bromomethane	ND		250	60	ug/L			11/28/22 14:51	50
Carbon tetrachloride	ND		250	26	ug/L			11/28/22 14:51	50
Chlorobenzene	**1600**		250	24	ug/L			11/28/22 14:51	50
Chloroethane	ND		250	44	ug/L			11/28/22 14:51	50
Chloroform	ND		250	27	ug/L			11/28/22 14:51	50
Chloromethane	ND		250	32	ug/L			11/28/22 14:51	50
cis-1,3-Dichloropropene	ND		250	17	ug/L			11/28/22 14:51	50
Dibromochloromethane	ND		250	21	ug/L			11/28/22 14:51	50
Ethylbenzene	ND		250	23	ug/L			11/28/22 14:51	50
Methylene Chloride	ND		250	41	ug/L			11/28/22 14:51	50
Tetrachloroethene	ND		250	17	ug/L			11/28/22 14:51	50
Toluene	ND		250	23	ug/L			11/28/22 14:51	50
trans-1,3-Dichloropropene	ND		250	22	ug/L			11/28/22 14:51	50
Trichloroethene	ND		250	30	ug/L			11/28/22 14:51	50
Trichlorofluoromethane	ND		250	22	ug/L			11/28/22 14:51	50
Vinyl chloride	ND		250	37	ug/L			11/28/22 14:51	50

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*102*		*68 - 130*		*11/28/22 14:51*	*50*
4-Bromofluorobenzene (Surr)	*100*		*76 - 123*		*11/28/22 14:51*	*50*
Dibromofluoromethane (Surr)	*103*		*75 - 123*		*11/28/22 14:51*	*50*
Toluene-d8 (Surr)	*96*		*77 - 120*		*11/28/22 14:51*	*50*

Client: Ontario Specialty Contracting, Inc.
Job ID: 480-204132-1
Project/Site: 37745-Buffalo Color- Quarterly GAC

Client Sample ID: BCC DC1 GAC Effluent 1122
Lab Sample ID: 480-204132-3
Date Collected: 11/23/22 09:30
Matrix: Water
Date Received: 11/23/22 11:20

Method: 40CFR136A 624.1 - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		50	3.9	ug/L			11/23/22 18:43	10
1,1,2,2-Tetrachloroethane	ND		50	2.6	ug/L			11/23/22 18:43	10
1,1,2-Trichloroethane	ND		50	4.8	ug/L			11/23/22 18:43	10
1,1-Dichloroethane	ND		50	5.9	ug/L			11/23/22 18:43	10
1,1-Dichloroethene	ND		50	8.5	ug/L			11/23/22 18:43	10
1,2-Dichlorobenzene	ND		50	4.4	ug/L			11/23/22 18:43	10
1,2-Dichloroethane	ND		50	6.0	ug/L			11/23/22 18:43	10
1,2-Dichloroethene, Total	ND		100	32	ug/L			11/23/22 18:43	10
1,2-Dichloropropane	ND		50	6.1	ug/L			11/23/22 18:43	10
1,3-Dichlorobenzene	**7.2**	**J**	50	5.4	ug/L			11/23/22 18:43	10
1,4-Dichlorobenzene	**55**		50	5.1	ug/L			11/23/22 18:43	10
2-Chloroethyl vinyl ether	ND		250	19	ug/L			11/23/22 18:43	10
Acrolein	ND		1000	170	ug/L			11/23/22 18:43	10
Acrylonitrile	ND		1000	19	ug/L			11/23/22 18:43	10
Benzene	**45**	**J**	50	6.0	ug/L			11/23/22 18:43	10
Bromodichloromethane	ND		50	5.4	ug/L			11/23/22 18:43	10
Bromoform	ND		50	4.7	ug/L			11/23/22 18:43	10
Bromomethane	ND		50	12	ug/L			11/23/22 18:43	10
Carbon tetrachloride	ND		50	5.1	ug/L			11/23/22 18:43	10
Chloroethane	ND		50	8.7	ug/L			11/23/22 18:43	10
Chloroform	ND		50	5.4	ug/L			11/23/22 18:43	10
Chloromethane	ND		50	6.4	ug/L			11/23/22 18:43	10
cis-1,3-Dichloropropene	ND		50	3.3	ug/L			11/23/22 18:43	10
Dibromochloromethane	ND		50	4.1	ug/L			11/23/22 18:43	10
Ethylbenzene	ND		50	4.6	ug/L			11/23/22 18:43	10
Methylene Chloride	ND		50	8.1	ug/L			11/23/22 18:43	10
Tetrachloroethene	ND		50	3.4	ug/L			11/23/22 18:43	10
Toluene	ND		50	4.5	ug/L			11/23/22 18:43	10
trans-1,3-Dichloropropene	ND		50	4.4	ug/L			11/23/22 18:43	10
Trichloroethene	ND		50	6.0	ug/L			11/23/22 18:43	10
Trichlorofluoromethane	ND		50	4.5	ug/L			11/23/22 18:43	10
Vinyl chloride	ND		50	7.5	ug/L			11/23/22 18:43	10

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*101*		*68 - 130*		*11/23/22 18:43*	*10*
4-Bromofluorobenzene (Surr)	*98*		*76 - 123*		*11/23/22 18:43*	*10*
Dibromofluoromethane (Surr)	*103*		*75 - 123*		*11/23/22 18:43*	*10*
Toluene-d8 (Surr)	*95*		*77 - 120*		*11/23/22 18:43*	*10*

Method: 40CFR136A 624.1 - Volatile Organic Compounds (GC/MS) - DL

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chlorobenzene	**1600**		100	9.5	ug/L			11/28/22 15:15	20

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*100*		*68 - 130*		*11/28/22 15:15*	*20*
4-Bromofluorobenzene (Surr)	*97*		*76 - 123*		*11/28/22 15:15*	*20*
Dibromofluoromethane (Surr)	*104*		*75 - 123*		*11/28/22 15:15*	*20*
Toluene-d8 (Surr)	*96*		*77 - 120*		*11/28/22 15:15*	*20*

Client: Ontario Specialty Contracting, Inc.
Job ID: 480-204132-1
Project/Site: 37745-Buffalo Color- Quarterly GAC

Client Sample ID: BCC DC2 GAC Influent 1122
Lab Sample ID: 480-204132-4
Date Collected: 11/23/22 09:45
Matrix: Water
Date Received: 11/23/22 11:20

Method: 40CFR136A 624.1 - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		20	1.5	ug/L			11/23/22 19:08	4
1,1,2,2-Tetrachloroethane	ND		20	1.0	ug/L			11/23/22 19:08	4
1,1,2-Trichloroethane	ND		20	1.9	ug/L			11/23/22 19:08	4
1,1-Dichloroethane	ND		20	2.4	ug/L			11/23/22 19:08	4
1,1-Dichloroethene	ND		20	3.4	ug/L			11/23/22 19:08	4
1,2-Dichlorobenzene	ND		20	1.8	ug/L			11/23/22 19:08	4
1,2-Dichloroethane	ND		20	2.4	ug/L			11/23/22 19:08	4
1,2-Dichloroethene, Total	ND		40	13	ug/L			11/23/22 19:08	4
1,2-Dichloropropane	ND		20	2.4	ug/L			11/23/22 19:08	4
1,3-Dichlorobenzene	ND		20	2.2	ug/L			11/23/22 19:08	4
1,4-Dichlorobenzene	ND		20	2.0	ug/L			11/23/22 19:08	4
2-Chloroethyl vinyl ether	ND		100	7.4	ug/L			11/23/22 19:08	4
Acrolein	ND		400	70	ug/L			11/23/22 19:08	4
Acrylonitrile	ND		400	7.6	ug/L			11/23/22 19:08	4
Benzene	**21**		20	2.4	ug/L			11/23/22 19:08	4
Bromodichloromethane	ND		20	2.1	ug/L			11/23/22 19:08	4
Bromoform	ND		20	1.9	ug/L			11/23/22 19:08	4
Bromomethane	ND		20	4.8	ug/L			11/23/22 19:08	4
Carbon tetrachloride	ND		20	2.0	ug/L			11/23/22 19:08	4
Chlorobenzene	**120**		20	1.9	ug/L			11/23/22 19:08	4
Chloroethane	ND		20	3.5	ug/L			11/23/22 19:08	4
Chloroform	ND		20	2.2	ug/L			11/23/22 19:08	4
Chloromethane	ND		20	2.5	ug/L			11/23/22 19:08	4
cis-1,3-Dichloropropene	ND		20	1.3	ug/L			11/23/22 19:08	4
Dibromochloromethane	ND		20	1.7	ug/L			11/23/22 19:08	4
Ethylbenzene	ND		20	1.9	ug/L			11/23/22 19:08	4
Methylene Chloride	ND		20	3.3	ug/L			11/23/22 19:08	4
Tetrachloroethene	ND		20	1.4	ug/L			11/23/22 19:08	4
Toluene	ND		20	1.8	ug/L			11/23/22 19:08	4
trans-1,3-Dichloropropene	ND		20	1.8	ug/L			11/23/22 19:08	4
Trichloroethene	ND		20	2.4	ug/L			11/23/22 19:08	4
Trichlorofluoromethane	ND		20	1.8	ug/L			11/23/22 19:08	4
Vinyl chloride	ND		20	3.0	ug/L			11/23/22 19:08	4

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*100*		*68 - 130*		*11/23/22 19:08*	*4*
4-Bromofluorobenzene (Surr)	*100*		*76 - 123*		*11/23/22 19:08*	*4*
Dibromofluoromethane (Surr)	*103*		*75 - 123*		*11/23/22 19:08*	*4*
Toluene-d8 (Surr)	*96*		*77 - 120*		*11/23/22 19:08*	*4*

Client: Ontario Specialty Contracting, Inc.
Job ID: 480-204132-1
Project/Site: 37745-Buffalo Color- Quarterly GAC

Client Sample ID: BCC DC2 GAC Effluent 1122
Lab Sample ID: 480-204132-5
Date Collected: 11/23/22 10:00
Matrix: Water
Date Received: 11/23/22 11:20

Method: 40CFR136A 624.1 - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		5.0	0.39	ug/L			11/23/22 19:32	1
1,1,2,2-Tetrachloroethane	ND		5.0	0.26	ug/L			11/23/22 19:32	1
1,1,2-Trichloroethane	ND		5.0	0.48	ug/L			11/23/22 19:32	1
1,1-Dichloroethane	ND		5.0	0.59	ug/L			11/23/22 19:32	1
1,1-Dichloroethene	ND		5.0	0.85	ug/L			11/23/22 19:32	1
1,2-Dichlorobenzene	ND		5.0	0.44	ug/L			11/23/22 19:32	1
1,2-Dichloroethane	ND		5.0	0.60	ug/L			11/23/22 19:32	1
1,2-Dichloroethene, Total	ND		10	3.2	ug/L			11/23/22 19:32	1
1,2-Dichloropropane	ND		5.0	0.61	ug/L			11/23/22 19:32	1
1,3-Dichlorobenzene	ND		5.0	0.54	ug/L			11/23/22 19:32	1
1,4-Dichlorobenzene	ND		5.0	0.51	ug/L			11/23/22 19:32	1
2-Chloroethyl vinyl ether	ND		25	1.9	ug/L			11/23/22 19:32	1
Acrolein	ND		100	17	ug/L			11/23/22 19:32	1
Acrylonitrile	ND		100	1.9	ug/L			11/23/22 19:32	1
Benzene	**19**		5.0	0.60	ug/L			11/23/22 19:32	1
Bromodichloromethane	ND		5.0	0.54	ug/L			11/23/22 19:32	1
Bromoform	ND		5.0	0.47	ug/L			11/23/22 19:32	1
Bromomethane	ND		5.0	1.2	ug/L			11/23/22 19:32	1
Carbon tetrachloride	ND		5.0	0.51	ug/L			11/23/22 19:32	1
Chloroethane	ND		5.0	0.87	ug/L			11/23/22 19:32	1
Chloroform	**0.92**	**J**	5.0	0.54	ug/L			11/23/22 19:32	1
Chloromethane	ND		5.0	0.64	ug/L			11/23/22 19:32	1
cis-1,3-Dichloropropene	ND		5.0	0.33	ug/L			11/23/22 19:32	1
Dibromochloromethane	ND		5.0	0.41	ug/L			11/23/22 19:32	1
Ethylbenzene	ND		5.0	0.46	ug/L			11/23/22 19:32	1
Methylene Chloride	ND		5.0	0.81	ug/L			11/23/22 19:32	1
Tetrachloroethene	ND		5.0	0.34	ug/L			11/23/22 19:32	1
Toluene	ND		5.0	0.45	ug/L			11/23/22 19:32	1
trans-1,3-Dichloropropene	ND		5.0	0.44	ug/L			11/23/22 19:32	1
Trichloroethene	ND		5.0	0.60	ug/L			11/23/22 19:32	1
Trichlorofluoromethane	ND		5.0	0.45	ug/L			11/23/22 19:32	1
Vinyl chloride	ND		5.0	0.75	ug/L			11/23/22 19:32	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*97*		*68 - 130*		*11/23/22 19:32*	*1*
4-Bromofluorobenzene (Surr)	*101*		*76 - 123*		*11/23/22 19:32*	*1*
Dibromofluoromethane (Surr)	*104*		*75 - 123*		*11/23/22 19:32*	*1*
Toluene-d8 (Surr)	*98*		*77 - 120*		*11/23/22 19:32*	*1*

Method: 40CFR136A 624.1 - Volatile Organic Compounds (GC/MS) - DL

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chlorobenzene	**110**		10	0.95	ug/L			11/28/22 15:38	2

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*98*		*68 - 130*		*11/28/22 15:38*	*2*
4-Bromofluorobenzene (Surr)	*99*		*76 - 123*		*11/28/22 15:38*	*2*
Dibromofluoromethane (Surr)	*102*		*75 - 123*		*11/28/22 15:38*	*2*
Toluene-d8 (Surr)	*95*		*77 - 120*		*11/28/22 15:38*	*2*

Surrogate Summary

Client: Ontario Specialty Contracting, Inc.
Project/Site: 37745-Buffalo Color- Quarterly GAC

Job ID: 480-204132-1

Method: 624.1 - Volatile Organic Compounds (GC/MS)

Matrix: Water

Prep Type: Total/NA

		Percent Surrogate Recovery (Acceptance Limits)			
		DCA	BFB	DBFM	TOL
Lab Sample ID	Client Sample ID	(68-130)	(76-123)	(75-123)	(77-120)
480-204132-1	BCC DC1 GAC Influent 1122	99	98	105	95
480-204132-2	BCC DC1 GAC Middle 1122	102	100	103	96
480-204132-3	BCC DC1 GAC Effluent 1122	101	98	103	95
480-204132-3 - DL	BCC DC1 GAC Effluent 1122	100	97	104	96
480-204132-4	BCC DC2 GAC Influent 1122	100	100	103	96
480-204132-5	BCC DC2 GAC Effluent 1122	97	101	104	98
480-204132-5 - DL	BCC DC2 GAC Effluent 1122	98	99	102	95
LCS 480-651139/6	Lab Control Sample	102	97	102	96
LCS 480-651343/6	Lab Control Sample	97	96	101	97
MB 480-651139/8	Method Blank	99	100	100	95
MB 480-651343/8	Method Blank	99	99	102	95

Surrogate Legend

DCA = 1,2-Dichloroethane-d4 (Surr)
BFB = 4-Bromofluorobenzene (Surr)
DBFM = Dibromofluoromethane (Surr)
TOL = Toluene-d8 (Surr)

Method: 624.1 - Volatile Organic Compounds (GC/MS)

Lab Sample ID: MB 480-651139/8
Matrix: Water
Analysis Batch: 651139

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		5.0	0.39	ug/L			11/23/22 12:52	1
1,1,2,2-Tetrachloroethane	ND		5.0	0.26	ug/L			11/23/22 12:52	1
1,1,2-Trichloroethane	ND		5.0	0.48	ug/L			11/23/22 12:52	1
1,1-Dichloroethane	ND		5.0	0.59	ug/L			11/23/22 12:52	1
1,1-Dichloroethene	ND		5.0	0.85	ug/L			11/23/22 12:52	1
1,2-Dichlorobenzene	ND		5.0	0.44	ug/L			11/23/22 12:52	1
1,2-Dichloroethane	ND		5.0	0.60	ug/L			11/23/22 12:52	1
1,2-Dichloroethene, Total	ND		10	3.2	ug/L			11/23/22 12:52	1
1,2-Dichloropropane	ND		5.0	0.61	ug/L			11/23/22 12:52	1
1,3-Dichlorobenzene	ND		5.0	0.54	ug/L			11/23/22 12:52	1
1,4-Dichlorobenzene	ND		5.0	0.51	ug/L			11/23/22 12:52	1
2-Chloroethyl vinyl ether	ND		25	1.9	ug/L			11/23/22 12:52	1
Acrolein	ND		100	17	ug/L			11/23/22 12:52	1
Acrylonitrile	ND		100	1.9	ug/L			11/23/22 12:52	1
Benzene	ND		5.0	0.60	ug/L			11/23/22 12:52	1
Bromodichloromethane	ND		5.0	0.54	ug/L			11/23/22 12:52	1
Bromoform	ND		5.0	0.47	ug/L			11/23/22 12:52	1
Bromomethane	ND		5.0	1.2	ug/L			11/23/22 12:52	1
Carbon tetrachloride	ND		5.0	0.51	ug/L			11/23/22 12:52	1
Chlorobenzene	ND		5.0	0.48	ug/L			11/23/22 12:52	1
Chloroethane	ND		5.0	0.87	ug/L			11/23/22 12:52	1
Chloroform	ND		5.0	0.54	ug/L			11/23/22 12:52	1
Chloromethane	ND		5.0	0.64	ug/L			11/23/22 12:52	1
cis-1,3-Dichloropropene	ND		5.0	0.33	ug/L			11/23/22 12:52	1
Dibromochloromethane	ND		5.0	0.41	ug/L			11/23/22 12:52	1
Ethylbenzene	ND		5.0	0.46	ug/L			11/23/22 12:52	1
Methylene Chloride	ND		5.0	0.81	ug/L			11/23/22 12:52	1
Tetrachloroethene	ND		5.0	0.34	ug/L			11/23/22 12:52	1
Toluene	ND		5.0	0.45	ug/L			11/23/22 12:52	1
trans-1,3-Dichloropropene	ND		5.0	0.44	ug/L			11/23/22 12:52	1
Trichloroethene	ND		5.0	0.60	ug/L			11/23/22 12:52	1
Trichlorofluoromethane	ND		5.0	0.45	ug/L			11/23/22 12:52	1
Vinyl chloride	ND		5.0	0.75	ug/L			11/23/22 12:52	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*99*		*68 - 130*		*11/23/22 12:52*	*1*
4-Bromofluorobenzene (Surr)	*100*		*76 - 123*		*11/23/22 12:52*	*1*
Dibromofluoromethane (Surr)	*100*		*75 - 123*		*11/23/22 12:52*	*1*
Toluene-d8 (Surr)	*95*		*77 - 120*		*11/23/22 12:52*	*1*

Lab Sample ID: LCS 480-651139/6
Matrix: Water
Analysis Batch: 651139

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
1,1,1-Trichloroethane	20.0	19.0		ug/L		95	52 - 162
1,1,2,2-Tetrachloroethane	20.0	16.6		ug/L		83	46 - 157
1,1,2-Trichloroethane	20.0	17.8		ug/L		89	52 - 150

Method: 624.1 - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCS 480-651139/6
Matrix: Water
Analysis Batch: 651139

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
1,1-Dichloroethane	20.0	17.6		ug/L		88	59 - 155
1,1-Dichloroethene	20.0	17.8		ug/L		89	1 - 234
1,2-Dichlorobenzene	20.0	17.5		ug/L		87	18 - 190
1,2-Dichloroethane	20.0	17.8		ug/L		89	49 - 155
1,2-Dichloropropane	20.0	18.4		ug/L		92	1 - 210
1,3-Dichlorobenzene	20.0	17.2		ug/L		86	59 - 156
1,4-Dichlorobenzene	20.0	17.1		ug/L		86	18 - 190
2-Chloroethyl vinyl ether	20.0	18.3	J	ug/L		91	1 - 305
Benzene	20.0	18.2		ug/L		91	37 - 151
Bromodichloromethane	20.0	18.6		ug/L		93	35 - 155
Bromoform	20.0	19.1		ug/L		96	45 - 169
Bromomethane	20.0	22.3		ug/L		111	1 - 242
Carbon tetrachloride	20.0	18.4		ug/L		92	70 - 140
Chlorobenzene	20.0	17.5		ug/L		87	37 - 160
Chloroethane	20.0	22.5		ug/L		113	14 - 230
Chloroform	20.0	17.8		ug/L		89	51 - 138
Chloromethane	20.0	25.0		ug/L		125	1 - 273
cis-1,3-Dichloropropene	20.0	18.2		ug/L		91	1 - 227
Dibromochloromethane	20.0	18.1		ug/L		91	53 - 149
Ethylbenzene	20.0	17.3		ug/L		86	37 - 162
Methylene Chloride	20.0	18.1		ug/L		91	1 - 221
Tetrachloroethene	20.0	17.9		ug/L		89	64 - 148
Toluene	20.0	17.2		ug/L		86	47 - 150
trans-1,3-Dichloropropene	20.0	16.5		ug/L		83	17 - 183
Trichloroethene	20.0	18.6		ug/L		93	71 - 157
Trichlorofluoromethane	20.0	22.2		ug/L		111	17 - 181
Vinyl chloride	20.0	21.2		ug/L		106	1 - 251

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*102*		*68 - 130*
4-Bromofluorobenzene (Surr)	*97*		*76 - 123*
Dibromofluoromethane (Surr)	*102*		*75 - 123*
Toluene-d8 (Surr)	*96*		*77 - 120*

Lab Sample ID: MB 480-651343/8
Matrix: Water
Analysis Batch: 651343

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		5.0	0.39	ug/L			11/28/22 14:13	1
1,1,2,2-Tetrachloroethane	ND		5.0	0.26	ug/L			11/28/22 14:13	1
1,1,2-Trichloroethane	ND		5.0	0.48	ug/L			11/28/22 14:13	1
1,1-Dichloroethane	ND		5.0	0.59	ug/L			11/28/22 14:13	1
1,1-Dichloroethene	ND		5.0	0.85	ug/L			11/28/22 14:13	1
1,2-Dichlorobenzene	ND		5.0	0.44	ug/L			11/28/22 14:13	1
1,2-Dichloroethane	ND		5.0	0.60	ug/L			11/28/22 14:13	1
1,2-Dichloroethene, Total	ND		10	3.2	ug/L			11/28/22 14:13	1
1,2-Dichloropropane	ND		5.0	0.61	ug/L			11/28/22 14:13	1

Method: 624.1 - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: MB 480-651343/8
Matrix: Water
Analysis Batch: 651343

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,3-Dichlorobenzene	ND		5.0	0.54	ug/L			11/28/22 14:13	1
1,4-Dichlorobenzene	ND		5.0	0.51	ug/L			11/28/22 14:13	1
2-Chloroethyl vinyl ether	ND		25	1.9	ug/L			11/28/22 14:13	1
Acrolein	ND		100	17	ug/L			11/28/22 14:13	1
Acrylonitrile	ND		100	1.9	ug/L			11/28/22 14:13	1
Benzene	ND		5.0	0.60	ug/L			11/28/22 14:13	1
Bromodichloromethane	ND		5.0	0.54	ug/L			11/28/22 14:13	1
Bromoform	ND		5.0	0.47	ug/L			11/28/22 14:13	1
Bromomethane	ND		5.0	1.2	ug/L			11/28/22 14:13	1
Carbon tetrachloride	ND		5.0	0.51	ug/L			11/28/22 14:13	1
Chlorobenzene	ND		5.0	0.48	ug/L			11/28/22 14:13	1
Chloroethane	ND		5.0	0.87	ug/L			11/28/22 14:13	1
Chloroform	ND		5.0	0.54	ug/L			11/28/22 14:13	1
Chloromethane	ND		5.0	0.64	ug/L			11/28/22 14:13	1
cis-1,3-Dichloropropene	ND		5.0	0.33	ug/L			11/28/22 14:13	1
Dibromochloromethane	ND		5.0	0.41	ug/L			11/28/22 14:13	1
Ethylbenzene	ND		5.0	0.46	ug/L			11/28/22 14:13	1
Methylene Chloride	ND		5.0	0.81	ug/L			11/28/22 14:13	1
Tetrachloroethene	ND		5.0	0.34	ug/L			11/28/22 14:13	1
Toluene	ND		5.0	0.45	ug/L			11/28/22 14:13	1
trans-1,3-Dichloropropene	ND		5.0	0.44	ug/L			11/28/22 14:13	1
Trichloroethene	ND		5.0	0.60	ug/L			11/28/22 14:13	1
Trichlorofluoromethane	ND		5.0	0.45	ug/L			11/28/22 14:13	1
Vinyl chloride	ND		5.0	0.75	ug/L			11/28/22 14:13	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*99*		*68 - 130*		*11/28/22 14:13*	*1*
4-Bromofluorobenzene (Surr)	*99*		*76 - 123*		*11/28/22 14:13*	*1*
Dibromofluoromethane (Surr)	*102*		*75 - 123*		*11/28/22 14:13*	*1*
Toluene-d8 (Surr)	*95*		*77 - 120*		*11/28/22 14:13*	*1*

Lab Sample ID: LCS 480-651343/6
Matrix: Water
Analysis Batch: 651343

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
1,1,1-Trichloroethane	20.0	18.5		ug/L		93	52 - 162
1,1,2,2-Tetrachloroethane	20.0	16.6		ug/L		83	46 - 157
1,1,2-Trichloroethane	20.0	17.2		ug/L		86	52 - 150
1,1-Dichloroethane	20.0	17.4		ug/L		87	59 - 155
1,1-Dichloroethene	20.0	17.8		ug/L		89	1 - 234
1,2-Dichlorobenzene	20.0	16.3		ug/L		81	18 - 190
1,2-Dichloroethane	20.0	17.7		ug/L		89	49 - 155
1,2-Dichloropropane	20.0	17.8		ug/L		89	1 - 210
1,3-Dichlorobenzene	20.0	16.9		ug/L		84	59 - 156
1,4-Dichlorobenzene	20.0	16.5		ug/L		82	18 - 190
2-Chloroethyl vinyl ether	20.0	18.4	J	ug/L		92	1 - 305
Benzene	20.0	17.5		ug/L		87	37 - 151

Method: 624.1 - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCS 480-651343/6
Matrix: Water
Analysis Batch: 651343

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Bromodichloromethane	20.0	18.1		ug/L		90	35 - 155
Bromoform	20.0	18.3		ug/L		92	45 - 169
Bromomethane	20.0	21.2		ug/L		106	1 - 242
Carbon tetrachloride	20.0	18.1		ug/L		90	70 - 140
Chlorobenzene	20.0	17.0		ug/L		85	37 - 160
Chloroethane	20.0	22.1		ug/L		111	14 - 230
Chloroform	20.0	17.6		ug/L		88	51 - 138
Chloromethane	20.0	23.7		ug/L		118	1 - 273
cis-1,3-Dichloropropene	20.0	17.9		ug/L		90	1 - 227
Dibromochloromethane	20.0	17.7		ug/L		88	53 - 149
Ethylbenzene	20.0	16.8		ug/L		84	37 - 162
Methylene Chloride	20.0	17.6		ug/L		88	1 - 221
Tetrachloroethene	20.0	17.4		ug/L		87	64 - 148
Toluene	20.0	16.8		ug/L		84	47 - 150
trans-1,3-Dichloropropene	20.0	16.4		ug/L		82	17 - 183
Trichloroethene	20.0	17.8		ug/L		89	71 - 157
Trichlorofluoromethane	20.0	23.0		ug/L		115	17 - 181
Vinyl chloride	20.0	21.0		ug/L		105	1 - 251

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*97*		*68 - 130*
4-Bromofluorobenzene (Surr)	*96*		*76 - 123*
Dibromofluoromethane (Surr)	*101*		*75 - 123*
Toluene-d8 (Surr)	*97*		*77 - 120*

QC Association Summary

Client: Ontario Specialty Contracting, Inc.
Job ID: 480-204132-1
Project/Site: 37745-Buffalo Color- Quarterly GAC

GC/MS VOA

Analysis Batch: 651139

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-204132-1	BCC DC1 GAC Influent 1122	Total/NA	Water	624.1	
480-204132-3	BCC DC1 GAC Effluent 1122	Total/NA	Water	624.1	
480-204132-4	BCC DC2 GAC Influent 1122	Total/NA	Water	624.1	
480-204132-5	BCC DC2 GAC Effluent 1122	Total/NA	Water	624.1	
MB 480-651139/8	Method Blank	Total/NA	Water	624.1	
LCS 480-651139/6	Lab Control Sample	Total/NA	Water	624.1	

Analysis Batch: 651343

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-204132-2	BCC DC1 GAC Middle 1122	Total/NA	Water	624.1	
480-204132-3 - DL	BCC DC1 GAC Effluent 1122	Total/NA	Water	624.1	
480-204132-5 - DL	BCC DC2 GAC Effluent 1122	Total/NA	Water	624.1	
MB 480-651343/8	Method Blank	Total/NA	Water	624.1	
LCS 480-651343/6	Lab Control Sample	Total/NA	Water	624.1	

Lab Chronicle

Client: Ontario Specialty Contracting, Inc.
Project/Site: 37745-Buffalo Color- Quarterly GAC

Job ID: 480-204132-1

Client Sample ID: BCC DC1 GAC Influent 1122

Lab Sample ID: 480-204132-1

Date Collected: 11/23/22 09:00
Matrix: Water
Date Received: 11/23/22 11:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	624.1		80	651139	ATG	EET BUF	11/23/22 17:55

Client Sample ID: BCC DC1 GAC Middle 1122

Lab Sample ID: 480-204132-2

Date Collected: 11/23/22 09:15
Matrix: Water
Date Received: 11/23/22 11:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	624.1		50	651343	ATG	EET BUF	11/28/22 14:51

Client Sample ID: BCC DC1 GAC Effluent 1122

Lab Sample ID: 480-204132-3

Date Collected: 11/23/22 09:30
Matrix: Water
Date Received: 11/23/22 11:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	624.1		10	651139	ATG	EET BUF	11/23/22 18:43
Total/NA	Analysis	624.1	DL	20	651343	ATG	EET BUF	11/28/22 15:15

Client Sample ID: BCC DC2 GAC Influent 1122

Lab Sample ID: 480-204132-4

Date Collected: 11/23/22 09:45
Matrix: Water
Date Received: 11/23/22 11:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	624.1		4	651139	ATG	EET BUF	11/23/22 19:08

Client Sample ID: BCC DC2 GAC Effluent 1122

Lab Sample ID: 480-204132-5

Date Collected: 11/23/22 10:00
Matrix: Water
Date Received: 11/23/22 11:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	624.1		1	651139	ATG	EET BUF	11/23/22 19:32
Total/NA	Analysis	624.1	DL	2	651343	ATG	EET BUF	11/28/22 15:38

Laboratory References:

EET BUF = Eurofins Buffalo, 10 Hazelwood Drive, Amherst, NY 14228-2298, TEL (716)691-2600

Accreditation/Certification Summary

Client: Ontario Specialty Contracting, Inc. Job ID: 480-204132-1
Project/Site: 37745-Buffalo Color- Quarterly GAC

Laboratory: Eurofins Buffalo

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	Identification Number	Expiration Date
New York	NELAP	10026	03-31-23

The following analytes are included in this report, but the laboratory is not certified by the governing authority. This list may include analytes for which the agency does not offer certification.

Analysis Method	Prep Method	Matrix	Analyte
624.1		Water	1,2-Dichloroethene, Total

Method Summary

Client: Ontario Specialty Contracting, Inc.
Job ID: 480-204132-1
Project/Site: 37745-Buffalo Color- Quarterly GAC

Method	Method Description	Protocol	Laboratory
624.1	Volatile Organic Compounds (GC/MS)	40CFR136A	EET BUF

Protocol References:

40CFR136A = "Methods for Organic Chemical Analysis of Municipal Industrial Wastewater ", 40CFR, Part 136, Appendix A, October 26, 1984 and subsequent revisions.

Laboratory References:

EET BUF = Eurofins Buffalo, 10 Hazelwood Drive, Amherst, NY 14228-2298, TEL (716)691-2600

Sample Summary

Client: Ontario Specialty Contracting, Inc.
Job ID: 480-204132-1
Project/Site: 37745-Buffalo Color- Quarterly GAC

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
480-204132-1	BCC DC1 GAC Influent 1122	Water	11/23/22 09:00	11/23/22 11:20
480-204132-2	BCC DC1 GAC Middle 1122	Water	11/23/22 09:15	11/23/22 11:20
480-204132-3	BCC DC1 GAC Effluent 1122	Water	11/23/22 09:30	11/23/22 11:20
480-204132-4	BCC DC2 GAC Influent 1122	Water	11/23/22 09:45	11/23/22 11:20
480-204132-5	BCC DC2 GAC Effluent 1122	Water	11/23/22 10:00	11/23/22 11:20

Eurofins Buffalo
10 Hazelwood Drive
Amherst, NY 14228-2298
Phone: 716-691-2600 Fax: 716-691-7991

Chain of Custody Record

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Client Information	Sampler: Taylor Kunzelman	Lab PM: Schove, John R	Carrier Tracking No(s): OSC	COC No: 480-177043-6056.1
Client Contact: Kirsten Colligan	Phone: 716-480-3282	E-Mail: John.Schove@et.eurofinsus.com	State of Origin: NY	Page: Page 1 of 1
Company: Ontario Specialty Contracting, Inc.	PWSID:			Job #: 16011
Address: 140 Lee St.	Due Date Requested: 11-23-22			
City: Buffalo	TAT Requested (days): Standard			
State, Zip: NY, 14210	Compliance Project: Δ Yes Δ No			
Phone: 716-856-3333	PO #: ~~65216~~ 65029			
Email: kcolligan@oscinc.com	WO #: 16011			
Project Name: OSC- Former Buffalo Color Sites/ Event Desc: Buffalo Color - Qu	Project #: 48003159			
Site: New York	SSOW#:			

Analysis Requested

Preservation Codes:
A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3

480-204132 Chain of Custody

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	624_5ml - Priority Pollutant List - VOA - 62	Total Number	Special Instructions/Note:
			Preservation Code:				N		
BCC DC1 GAC Influent 1122	11-23-22	09:00		Water			3		
BCC DC1 GAC Middle 1122		09:15		Water			3		
BCC DC1 GAC Effluent 1122		09:30		Water			3		
BCC DC2 GAC Influent 1122		09:45		Water			3		
BCC DC2 GAC Effluent 1122		10:00		Water			3		

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:
Relinquished by: Taylor Kunzelman	Date/Time: 11-23-22	Company: OSC	Received by:
Relinquished by:	Date/Time:	Company	Received by:
Relinquished by:	Date/Time:	Company	Received by: Date/Time: 11-23-22 1120 Company: TTS

Custody Seals Intact: Δ Yes Δ No | Custody Seal No.:

Cooler Temperature(s) °C and Other Remarks: #1 3.1

Ver: 06/08/2021

11/30/2022

Login Sample Receipt Checklist

Client: Ontario Specialty Contracting, Inc.

Job Number: 480-204132-1

Login Number: 204132

List Source: Eurofins Buffalo

List Number: 1

Creator: Wallace, Cameron

Question	Answer	Comment
Radioactivity either was not measured or, if measured, is at or below background	True	
The cooler's custody seal, if present, is intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the sample IDs on the containers and the COC.	True	
Samples are received within Holding Time (Excluding tests with immediate HTs)..	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
VOA sample vials do not have headspace or bubble is <6mm (1/4") in diameter.	True	
If necessary, staff have been informed of any short hold time or quick TAT needs	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Sampling Company provided.	True	OSC
Samples received within 48 hours of sampling.	True	
Samples requiring field filtration have been filtered in the field.	True	
Chlorine Residual checked.	N/A	

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ANALYTICAL REPORT

PREPARED FOR

Attn: Kirsten Colligan
Ontario Specialty Contracting, Inc.
140 Lee St.
Buffalo, New York 14210

Generated 12/8/2022 10:12:30 AM

JOB DESCRIPTION

Quarterly GAC

JOB NUMBER

480-204383-1

Eurofins Buffalo
10 Hazelwood Drive
Amherst NY 14228-2298

See page two for job notes and contact information.

Job Notes

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to the NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory. This report is confidential and is intended for the sole use of Eurofins Environment Testing Northeast, LLC Buffalo and its client. All questions regarding this report should be directed to the Eurofins Environment Testing Northeast, LLC Buffalo Project Manager or designee who has signed this report.

The test results in this report relate only to the samples as received by the laboratory and will meet all requirements of the methodology, with any exceptions noted. This report shall not be reproduced except in full, without the express written approval of the laboratory. All questions should be directed to the Eurofins Environment Testing Northeast, LLC Project Manager.

Authorization

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12/8/2022 10:12:30 AM

Authorized for release by
Rebecca Jones, Project Management Assistant I
Rebecca.Jones@et.eurofinsus.com
Designee for
John Schove, Project Manager II
John.Schove@et.eurofinsus.com
(716)504-9838

Table of Contents

Definitions/Glossary

Client: Ontario Specialty Contracting, Inc.
Project/Site: Quarterly GAC

Job ID: 480-204383-1

Qualifiers

GC/MS VOA

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Case Narrative

Client: Ontario Specialty Contracting, Inc.
Project/Site: Quarterly GAC

Job ID: 480-204383-1

Job ID: 480-204383-1

Laboratory: Eurofins Buffalo

Narrative

Job Narrative
480-204383-1

Comments
No additional comments.

Receipt
The samples were received on 12/2/2022 2:45 PM. Unless otherwise noted below, the samples arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 5.0º C.

GC/MS VOA
Method 624.1: The following samples were diluted to bring the concentration of target analytes within the calibration range: BCC DC1 GAC Influent 1222 (480-204383-1) and BCC DC2 GAC Influent 1222 (480-204383-4). Elevated reporting limits (RLs) are provided.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Detection Summary

Client: Ontario Specialty Contracting, Inc.
Project/Site: Quarterly GAC

Job ID: 480-204383-1

Client Sample ID: BCC DC1 GAC Influent 1222 — Lab Sample ID: 480-204383-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,3-Dichlorobenzene	69	J	400	43	ug/L	80		624.1	Total/NA
1,4-Dichlorobenzene	650		400	41	ug/L	80		624.1	Total/NA
Chlorobenzene	2300		400	38	ug/L	80		624.1	Total/NA

Client Sample ID: BCC DC1 GAC Middle 1222 — Lab Sample ID: 480-204383-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,2-Dichlorobenzene	0.86	J	5.0	0.44	ug/L	1		624.1	Total/NA
1,3-Dichlorobenzene	7.1		5.0	0.54	ug/L	1		624.1	Total/NA
1,4-Dichlorobenzene	33		5.0	0.51	ug/L	1		624.1	Total/NA
Benzene	11		5.0	0.60	ug/L	1		624.1	Total/NA
Chlorobenzene	21		5.0	0.48	ug/L	1		624.1	Total/NA
Chloroform	1.0	J	5.0	0.54	ug/L	1		624.1	Total/NA

Client Sample ID: BCC DC1 GAC Effluent 1222 — Lab Sample ID: 480-204383-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloroform	1.0	J	5.0	0.54	ug/L	1		624.1	Total/NA

Client Sample ID: BCC DC2 GAC Influent 1222 — Lab Sample ID: 480-204383-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Benzene	41		20	2.4	ug/L	4		624.1	Total/NA
Chlorobenzene	110		20	1.9	ug/L	4		624.1	Total/NA
Ethylbenzene	3.2	J	20	1.9	ug/L	4		624.1	Total/NA

Client Sample ID: BCC DC2 GAC Effluent 1222 — Lab Sample ID: 480-204383-5

No Detections.

This Detection Summary does not include radiochemical test results.

Eurofins Buffalo

Client: Ontario Specialty Contracting, Inc.
Project/Site: Quarterly GAC

Job ID: 480-204383-1

Client Sample ID: BCC DC1 GAC Influent 1222
Date Collected: 12/02/22 10:00
Date Received: 12/02/22 14:45

Lab Sample ID: 480-204383-1
Matrix: Water

Method: 40CFR136A 624.1 - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		400	31	ug/L			12/05/22 15:49	80
1,1,2,2-Tetrachloroethane	ND		400	21	ug/L			12/05/22 15:49	80
1,1,2-Trichloroethane	ND		400	39	ug/L			12/05/22 15:49	80
1,1-Dichloroethane	ND		400	47	ug/L			12/05/22 15:49	80
1,1-Dichloroethene	ND		400	68	ug/L			12/05/22 15:49	80
1,2-Dichlorobenzene	ND		400	36	ug/L			12/05/22 15:49	80
1,2-Dichloroethane	ND		400	48	ug/L			12/05/22 15:49	80
1,2-Dichloroethene, Total	ND		800	260	ug/L			12/05/22 15:49	80
1,2-Dichloropropane	ND		400	49	ug/L			12/05/22 15:49	80
1,3-Dichlorobenzene	**69**	**J**	400	43	ug/L			12/05/22 15:49	80
1,4-Dichlorobenzene	**650**		400	41	ug/L			12/05/22 15:49	80
2-Chloroethyl vinyl ether	ND		2000	150	ug/L			12/05/22 15:49	80
Acrolein	ND		8000	1400	ug/L			12/05/22 15:49	80
Acrylonitrile	ND		8000	150	ug/L			12/05/22 15:49	80
Benzene	ND		400	48	ug/L			12/05/22 15:49	80
Bromodichloromethane	ND		400	43	ug/L			12/05/22 15:49	80
Bromoform	ND		400	37	ug/L			12/05/22 15:49	80
Bromomethane	ND		400	95	ug/L			12/05/22 15:49	80
Carbon tetrachloride	ND		400	41	ug/L			12/05/22 15:49	80
Chlorobenzene	**2300**		400	38	ug/L			12/05/22 15:49	80
Chloroethane	ND		400	70	ug/L			12/05/22 15:49	80
Chloroform	ND		400	43	ug/L			12/05/22 15:49	80
Chloromethane	ND		400	51	ug/L			12/05/22 15:49	80
cis-1,3-Dichloropropene	ND		400	26	ug/L			12/05/22 15:49	80
Dibromochloromethane	ND		400	33	ug/L			12/05/22 15:49	80
Ethylbenzene	ND		400	37	ug/L			12/05/22 15:49	80
Methylene Chloride	ND		400	65	ug/L			12/05/22 15:49	80
Tetrachloroethene	ND		400	27	ug/L			12/05/22 15:49	80
Toluene	ND		400	36	ug/L			12/05/22 15:49	80
trans-1,3-Dichloropropene	ND		400	35	ug/L			12/05/22 15:49	80
Trichloroethene	ND		400	48	ug/L			12/05/22 15:49	80
Trichlorofluoromethane	ND		400	36	ug/L			12/05/22 15:49	80
Vinyl chloride	ND		400	60	ug/L			12/05/22 15:49	80

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*97*		*68 - 130*		*12/05/22 15:49*	*80*
4-Bromofluorobenzene (Surr)	*95*		*76 - 123*		*12/05/22 15:49*	*80*
Dibromofluoromethane (Surr)	*101*		*75 - 123*		*12/05/22 15:49*	*80*
Toluene-d8 (Surr)	*96*		*77 - 120*		*12/05/22 15:49*	*80*

Client: Ontario Specialty Contracting, Inc.
Project/Site: Quarterly GAC

Job ID: 480-204383-1

Client Sample ID: BCC DC1 GAC Middle 1222

Date Collected: 12/02/22 10:15
Date Received: 12/02/22 14:45

Lab Sample ID: 480-204383-2

Matrix: Water

Method: 40CFR136A 624.1 - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		5.0	0.39	ug/L			12/06/22 18:01	1
1,1,2,2-Tetrachloroethane	ND		5.0	0.26	ug/L			12/06/22 18:01	1
1,1,2-Trichloroethane	ND		5.0	0.48	ug/L			12/06/22 18:01	1
1,1-Dichloroethane	ND		5.0	0.59	ug/L			12/06/22 18:01	1
1,1-Dichloroethene	ND		5.0	0.85	ug/L			12/06/22 18:01	1
1,2-Dichlorobenzene	**0.86**	**J**	5.0	0.44	ug/L			12/06/22 18:01	1
1,2-Dichloroethane	ND		5.0	0.60	ug/L			12/06/22 18:01	1
1,2-Dichloroethene, Total	ND		10	3.2	ug/L			12/06/22 18:01	1
1,2-Dichloropropane	ND		5.0	0.61	ug/L			12/06/22 18:01	1
1,3-Dichlorobenzene	**7.1**		5.0	0.54	ug/L			12/06/22 18:01	1
1,4-Dichlorobenzene	**33**		5.0	0.51	ug/L			12/06/22 18:01	1
2-Chloroethyl vinyl ether	ND		25	1.9	ug/L			12/06/22 18:01	1
Acrolein	ND		100	17	ug/L			12/06/22 18:01	1
Acrylonitrile	ND		100	1.9	ug/L			12/06/22 18:01	1
Benzene	**11**		5.0	0.60	ug/L			12/06/22 18:01	1
Bromodichloromethane	ND		5.0	0.54	ug/L			12/06/22 18:01	1
Bromoform	ND		5.0	0.47	ug/L			12/06/22 18:01	1
Bromomethane	ND		5.0	1.2	ug/L			12/06/22 18:01	1
Carbon tetrachloride	ND		5.0	0.51	ug/L			12/06/22 18:01	1
Chlorobenzene	**21**		5.0	0.48	ug/L			12/06/22 18:01	1
Chloroethane	ND		5.0	0.87	ug/L			12/06/22 18:01	1
Chloroform	**1.0**	**J**	5.0	0.54	ug/L			12/06/22 18:01	1
Chloromethane	ND		5.0	0.64	ug/L			12/06/22 18:01	1
cis-1,3-Dichloropropene	ND		5.0	0.33	ug/L			12/06/22 18:01	1
Dibromochloromethane	ND		5.0	0.41	ug/L			12/06/22 18:01	1
Ethylbenzene	ND		5.0	0.46	ug/L			12/06/22 18:01	1
Methylene Chloride	ND		5.0	0.81	ug/L			12/06/22 18:01	1
Tetrachloroethene	ND		5.0	0.34	ug/L			12/06/22 18:01	1
Toluene	ND		5.0	0.45	ug/L			12/06/22 18:01	1
trans-1,3-Dichloropropene	ND		5.0	0.44	ug/L			12/06/22 18:01	1
Trichloroethene	ND		5.0	0.60	ug/L			12/06/22 18:01	1
Trichlorofluoromethane	ND		5.0	0.45	ug/L			12/06/22 18:01	1
Vinyl chloride	ND		5.0	0.75	ug/L			12/06/22 18:01	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*102*		*68 - 130*		*12/06/22 18:01*	*1*
4-Bromofluorobenzene (Surr)	*103*		*76 - 123*		*12/06/22 18:01*	*1*
Dibromofluoromethane (Surr)	*101*		*75 - 123*		*12/06/22 18:01*	*1*
Toluene-d8 (Surr)	*95*		*77 - 120*		*12/06/22 18:01*	*1*

Client: Ontario Specialty Contracting, Inc.
Project/Site: Quarterly GAC

Job ID: 480-204383-1

Client Sample ID: BCC DC1 GAC Effluent 1222

Lab Sample ID: 480-204383-3

Date Collected: 12/02/22 10:30
Date Received: 12/02/22 14:45

Matrix: Water

Method: 40CFR136A 624.1 - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		5.0	0.39	ug/L			12/06/22 14:24	1
1,1,2,2-Tetrachloroethane	ND		5.0	0.26	ug/L			12/06/22 14:24	1
1,1,2-Trichloroethane	ND		5.0	0.48	ug/L			12/06/22 14:24	1
1,1-Dichloroethane	ND		5.0	0.59	ug/L			12/06/22 14:24	1
1,1-Dichloroethene	ND		5.0	0.85	ug/L			12/06/22 14:24	1
1,2-Dichlorobenzene	ND		5.0	0.44	ug/L			12/06/22 14:24	1
1,2-Dichloroethane	ND		5.0	0.60	ug/L			12/06/22 14:24	1
1,2-Dichloroethene, Total	ND		10	3.2	ug/L			12/06/22 14:24	1
1,2-Dichloropropane	ND		5.0	0.61	ug/L			12/06/22 14:24	1
1,3-Dichlorobenzene	ND		5.0	0.54	ug/L			12/06/22 14:24	1
1,4-Dichlorobenzene	ND		5.0	0.51	ug/L			12/06/22 14:24	1
2-Chloroethyl vinyl ether	ND		25	1.9	ug/L			12/06/22 14:24	1
Acrolein	ND		100	17	ug/L			12/06/22 14:24	1
Acrylonitrile	ND		100	1.9	ug/L			12/06/22 14:24	1
Benzene	ND		5.0	0.60	ug/L			12/06/22 14:24	1
Bromodichloromethane	ND		5.0	0.54	ug/L			12/06/22 14:24	1
Bromoform	ND		5.0	0.47	ug/L			12/06/22 14:24	1
Bromomethane	ND		5.0	1.2	ug/L			12/06/22 14:24	1
Carbon tetrachloride	ND		5.0	0.51	ug/L			12/06/22 14:24	1
Chlorobenzene	ND		5.0	0.48	ug/L			12/06/22 14:24	1
Chloroethane	ND		5.0	0.87	ug/L			12/06/22 14:24	1
Chloroform	**1.0**	**J**	5.0	0.54	ug/L			12/06/22 14:24	1
Chloromethane	ND		5.0	0.64	ug/L			12/06/22 14:24	1
cis-1,3-Dichloropropene	ND		5.0	0.33	ug/L			12/06/22 14:24	1
Dibromochloromethane	ND		5.0	0.41	ug/L			12/06/22 14:24	1
Ethylbenzene	ND		5.0	0.46	ug/L			12/06/22 14:24	1
Methylene Chloride	ND		5.0	0.81	ug/L			12/06/22 14:24	1
Tetrachloroethene	ND		5.0	0.34	ug/L			12/06/22 14:24	1
Toluene	ND		5.0	0.45	ug/L			12/06/22 14:24	1
trans-1,3-Dichloropropene	ND		5.0	0.44	ug/L			12/06/22 14:24	1
Trichloroethene	ND		5.0	0.60	ug/L			12/06/22 14:24	1
Trichlorofluoromethane	ND		5.0	0.45	ug/L			12/06/22 14:24	1
Vinyl chloride	ND		5.0	0.75	ug/L			12/06/22 14:24	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*99*		*68 - 130*		*12/06/22 14:24*	*1*
4-Bromofluorobenzene (Surr)	*99*		*76 - 123*		*12/06/22 14:24*	*1*
Dibromofluoromethane (Surr)	*101*		*75 - 123*		*12/06/22 14:24*	*1*
Toluene-d8 (Surr)	*95*		*77 - 120*		*12/06/22 14:24*	*1*

Client: Ontario Specialty Contracting, Inc.
Project/Site: Quarterly GAC

Job ID: 480-204383-1

Client Sample ID: BCC DC2 GAC Influent 1222

Lab Sample ID: 480-204383-4

Date Collected: 12/02/22 10:45
Matrix: Water
Date Received: 12/02/22 14:45

Method: 40CFR136A 624.1 - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		20	1.5	ug/L			12/05/22 17:01	4
1,1,2,2-Tetrachloroethane	ND		20	1.0	ug/L			12/05/22 17:01	4
1,1,2-Trichloroethane	ND		20	1.9	ug/L			12/05/22 17:01	4
1,1-Dichloroethane	ND		20	2.4	ug/L			12/05/22 17:01	4
1,1-Dichloroethene	ND		20	3.4	ug/L			12/05/22 17:01	4
1,2-Dichlorobenzene	ND		20	1.8	ug/L			12/05/22 17:01	4
1,2-Dichloroethane	ND		20	2.4	ug/L			12/05/22 17:01	4
1,2-Dichloroethene, Total	ND		40	13	ug/L			12/05/22 17:01	4
1,2-Dichloropropane	ND		20	2.4	ug/L			12/05/22 17:01	4
1,3-Dichlorobenzene	ND		20	2.2	ug/L			12/05/22 17:01	4
1,4-Dichlorobenzene	ND		20	2.0	ug/L			12/05/22 17:01	4
2-Chloroethyl vinyl ether	ND		100	7.4	ug/L			12/05/22 17:01	4
Acrolein	ND		400	70	ug/L			12/05/22 17:01	4
Acrylonitrile	ND		400	7.6	ug/L			12/05/22 17:01	4
Benzene	**41**		20	2.4	ug/L			12/05/22 17:01	4
Bromodichloromethane	ND		20	2.1	ug/L			12/05/22 17:01	4
Bromoform	ND		20	1.9	ug/L			12/05/22 17:01	4
Bromomethane	ND		20	4.8	ug/L			12/05/22 17:01	4
Carbon tetrachloride	ND		20	2.0	ug/L			12/05/22 17:01	4
Chlorobenzene	**110**		20	1.9	ug/L			12/05/22 17:01	4
Chloroethane	ND		20	3.5	ug/L			12/05/22 17:01	4
Chloroform	ND		20	2.2	ug/L			12/05/22 17:01	4
Chloromethane	ND		20	2.5	ug/L			12/05/22 17:01	4
cis-1,3-Dichloropropene	ND		20	1.3	ug/L			12/05/22 17:01	4
Dibromochloromethane	ND		20	1.7	ug/L			12/05/22 17:01	4
Ethylbenzene	**3.2**	**J**	20	1.9	ug/L			12/05/22 17:01	4
Methylene Chloride	ND		20	3.3	ug/L			12/05/22 17:01	4
Tetrachloroethene	ND		20	1.4	ug/L			12/05/22 17:01	4
Toluene	ND		20	1.8	ug/L			12/05/22 17:01	4
trans-1,3-Dichloropropene	ND		20	1.8	ug/L			12/05/22 17:01	4
Trichloroethene	ND		20	2.4	ug/L			12/05/22 17:01	4
Trichlorofluoromethane	ND		20	1.8	ug/L			12/05/22 17:01	4
Vinyl chloride	ND		20	3.0	ug/L			12/05/22 17:01	4

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*99*		*68 - 130*		*12/05/22 17:01*	*4*
4-Bromofluorobenzene (Surr)	*99*		*76 - 123*		*12/05/22 17:01*	*4*
Dibromofluoromethane (Surr)	*103*		*75 - 123*		*12/05/22 17:01*	*4*
Toluene-d8 (Surr)	*95*		*77 - 120*		*12/05/22 17:01*	*4*

Client: Ontario Specialty Contracting, Inc.
Project/Site: Quarterly GAC

Job ID: 480-204383-1

Client Sample ID: BCC DC2 GAC Effluent 1222

Lab Sample ID: 480-204383-5

Date Collected: 12/02/22 11:00
Date Received: 12/02/22 14:45

Matrix: Water

Method: 40CFR136A 624.1 - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		5.0	0.39	ug/L			12/06/22 14:48	1
1,1,2,2-Tetrachloroethane	ND		5.0	0.26	ug/L			12/06/22 14:48	1
1,1,2-Trichloroethane	ND		5.0	0.48	ug/L			12/06/22 14:48	1
1,1-Dichloroethane	ND		5.0	0.59	ug/L			12/06/22 14:48	1
1,1-Dichloroethene	ND		5.0	0.85	ug/L			12/06/22 14:48	1
1,2-Dichlorobenzene	ND		5.0	0.44	ug/L			12/06/22 14:48	1
1,2-Dichloroethane	ND		5.0	0.60	ug/L			12/06/22 14:48	1
1,2-Dichloroethene, Total	ND		10	3.2	ug/L			12/06/22 14:48	1
1,2-Dichloropropane	ND		5.0	0.61	ug/L			12/06/22 14:48	1
1,3-Dichlorobenzene	ND		5.0	0.54	ug/L			12/06/22 14:48	1
1,4-Dichlorobenzene	ND		5.0	0.51	ug/L			12/06/22 14:48	1
2-Chloroethyl vinyl ether	ND		25	1.9	ug/L			12/06/22 14:48	1
Acrolein	ND		100	17	ug/L			12/06/22 14:48	1
Acrylonitrile	ND		100	1.9	ug/L			12/06/22 14:48	1
Benzene	ND		5.0	0.60	ug/L			12/06/22 14:48	1
Bromodichloromethane	ND		5.0	0.54	ug/L			12/06/22 14:48	1
Bromoform	ND		5.0	0.47	ug/L			12/06/22 14:48	1
Bromomethane	ND		5.0	1.2	ug/L			12/06/22 14:48	1
Carbon tetrachloride	ND		5.0	0.51	ug/L			12/06/22 14:48	1
Chlorobenzene	ND		5.0	0.48	ug/L			12/06/22 14:48	1
Chloroethane	ND		5.0	0.87	ug/L			12/06/22 14:48	1
Chloroform	ND		5.0	0.54	ug/L			12/06/22 14:48	1
Chloromethane	ND		5.0	0.64	ug/L			12/06/22 14:48	1
cis-1,3-Dichloropropene	ND		5.0	0.33	ug/L			12/06/22 14:48	1
Dibromochloromethane	ND		5.0	0.41	ug/L			12/06/22 14:48	1
Ethylbenzene	ND		5.0	0.46	ug/L			12/06/22 14:48	1
Methylene Chloride	ND		5.0	0.81	ug/L			12/06/22 14:48	1
Tetrachloroethene	ND		5.0	0.34	ug/L			12/06/22 14:48	1
Toluene	ND		5.0	0.45	ug/L			12/06/22 14:48	1
trans-1,3-Dichloropropene	ND		5.0	0.44	ug/L			12/06/22 14:48	1
Trichloroethene	ND		5.0	0.60	ug/L			12/06/22 14:48	1
Trichlorofluoromethane	ND		5.0	0.45	ug/L			12/06/22 14:48	1
Vinyl chloride	ND		5.0	0.75	ug/L			12/06/22 14:48	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*98*		*68 - 130*		*12/06/22 14:48*	*1*
4-Bromofluorobenzene (Surr)	*98*		*76 - 123*		*12/06/22 14:48*	*1*
Dibromofluoromethane (Surr)	*102*		*75 - 123*		*12/06/22 14:48*	*1*
Toluene-d8 (Surr)	*94*		*77 - 120*		*12/06/22 14:48*	*1*

Surrogate Summary

Client: Ontario Specialty Contracting, Inc.
Project/Site: Quarterly GAC

Job ID: 480-204383-1

Method: 624.1 - Volatile Organic Compounds (GC/MS)

Matrix: Water

Prep Type: Total/NA

		Percent Surrogate Recovery (Acceptance Limits)			
		DCA	BFB	DBFM	TOL
Lab Sample ID	Client Sample ID	(68-130)	(76-123)	(75-123)	(77-120)
480-204383-1	BCC DC1 GAC Influent 1222	97	95	101	96
480-204383-2	BCC DC1 GAC Middle 1222	102	103	101	95
480-204383-3	BCC DC1 GAC Effluent 1222	99	99	101	95
480-204383-4	BCC DC2 GAC Influent 1222	99	99	103	95
480-204383-5	BCC DC2 GAC Effluent 1222	98	98	102	94
LCS 480-652125/6	Lab Control Sample	99	98	101	96
LCS 480-652240/6	Lab Control Sample	98	99	101	97
MB 480-652125/8	Method Blank	98	99	102	94
MB 480-652240/8	Method Blank	101	99	101	95

Surrogate Legend

DCA = 1,2-Dichloroethane-d4 (Surr)
BFB = 4-Bromofluorobenzene (Surr)
DBFM = Dibromofluoromethane (Surr)
TOL = Toluene-d8 (Surr)

Method: 624.1 - Volatile Organic Compounds (GC/MS)

Lab Sample ID: MB 480-652125/8
Matrix: Water
Analysis Batch: 652125

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		5.0	0.39	ug/L			12/05/22 15:14	1
1,1,2,2-Tetrachloroethane	ND		5.0	0.26	ug/L			12/05/22 15:14	1
1,1,2-Trichloroethane	ND		5.0	0.48	ug/L			12/05/22 15:14	1
1,1-Dichloroethane	ND		5.0	0.59	ug/L			12/05/22 15:14	1
1,1-Dichloroethene	ND		5.0	0.85	ug/L			12/05/22 15:14	1
1,2-Dichlorobenzene	ND		5.0	0.44	ug/L			12/05/22 15:14	1
1,2-Dichloroethane	ND		5.0	0.60	ug/L			12/05/22 15:14	1
1,2-Dichloroethene, Total	ND		10	3.2	ug/L			12/05/22 15:14	1
1,2-Dichloropropane	ND		5.0	0.61	ug/L			12/05/22 15:14	1
1,3-Dichlorobenzene	ND		5.0	0.54	ug/L			12/05/22 15:14	1
1,4-Dichlorobenzene	ND		5.0	0.51	ug/L			12/05/22 15:14	1
2-Chloroethyl vinyl ether	ND		25	1.9	ug/L			12/05/22 15:14	1
Acrolein	ND		100	17	ug/L			12/05/22 15:14	1
Acrylonitrile	ND		100	1.9	ug/L			12/05/22 15:14	1
Benzene	ND		5.0	0.60	ug/L			12/05/22 15:14	1
Bromodichloromethane	ND		5.0	0.54	ug/L			12/05/22 15:14	1
Bromoform	ND		5.0	0.47	ug/L			12/05/22 15:14	1
Bromomethane	ND		5.0	1.2	ug/L			12/05/22 15:14	1
Carbon tetrachloride	ND		5.0	0.51	ug/L			12/05/22 15:14	1
Chlorobenzene	ND		5.0	0.48	ug/L			12/05/22 15:14	1
Chloroethane	ND		5.0	0.87	ug/L			12/05/22 15:14	1
Chloroform	ND		5.0	0.54	ug/L			12/05/22 15:14	1
Chloromethane	ND		5.0	0.64	ug/L			12/05/22 15:14	1
cis-1,3-Dichloropropene	ND		5.0	0.33	ug/L			12/05/22 15:14	1
Dibromochloromethane	ND		5.0	0.41	ug/L			12/05/22 15:14	1
Ethylbenzene	ND		5.0	0.46	ug/L			12/05/22 15:14	1
Methylene Chloride	ND		5.0	0.81	ug/L			12/05/22 15:14	1
Tetrachloroethene	ND		5.0	0.34	ug/L			12/05/22 15:14	1
Toluene	ND		5.0	0.45	ug/L			12/05/22 15:14	1
trans-1,3-Dichloropropene	ND		5.0	0.44	ug/L			12/05/22 15:14	1
Trichloroethene	ND		5.0	0.60	ug/L			12/05/22 15:14	1
Trichlorofluoromethane	ND		5.0	0.45	ug/L			12/05/22 15:14	1
Vinyl chloride	ND		5.0	0.75	ug/L			12/05/22 15:14	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*98*		*68 - 130*		*12/05/22 15:14*	*1*
4-Bromofluorobenzene (Surr)	*99*		*76 - 123*		*12/05/22 15:14*	*1*
Dibromofluoromethane (Surr)	*102*		*75 - 123*		*12/05/22 15:14*	*1*
Toluene-d8 (Surr)	*94*		*77 - 120*		*12/05/22 15:14*	*1*

Lab Sample ID: LCS 480-652125/6
Matrix: Water
Analysis Batch: 652125

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
1,1,1-Trichloroethane	20.0	20.4		ug/L		102	52 - 162
1,1,2,2-Tetrachloroethane	20.0	19.0		ug/L		95	46 - 157
1,1,2-Trichloroethane	20.0	20.3		ug/L		101	52 - 150

Method: 624.1 - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCS 480-652125/6
Matrix: Water
Analysis Batch: 652125

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
1,1-Dichloroethane	20.0	20.1		ug/L		100	59 - 155
1,1-Dichloroethene	20.0	20.1		ug/L		101	1 - 234
1,2-Dichlorobenzene	20.0	19.3		ug/L		96	18 - 190
1,2-Dichloroethane	20.0	20.6		ug/L		103	49 - 155
1,2-Dichloropropane	20.0	20.8		ug/L		104	1 - 210
1,3-Dichlorobenzene	20.0	19.4		ug/L		97	59 - 156
1,4-Dichlorobenzene	20.0	19.3		ug/L		96	18 - 190
2-Chloroethyl vinyl ether	20.0	20.9	J	ug/L		104	1 - 305
Benzene	20.0	20.5		ug/L		102	37 - 151
Bromodichloromethane	20.0	21.1		ug/L		105	35 - 155
Bromoform	20.0	21.9		ug/L		110	45 - 169
Bromomethane	20.0	20.5		ug/L		102	1 - 242
Carbon tetrachloride	20.0	20.3		ug/L		102	70 - 140
Chlorobenzene	20.0	20.1		ug/L		100	37 - 160
Chloroethane	20.0	21.2		ug/L		106	14 - 230
Chloroform	20.0	20.3		ug/L		102	51 - 138
Chloromethane	20.0	22.2		ug/L		111	1 - 273
cis-1,3-Dichloropropene	20.0	20.9		ug/L		105	1 - 227
Dibromochloromethane	20.0	21.2		ug/L		106	53 - 149
Ethylbenzene	20.0	19.6		ug/L		98	37 - 162
Methylene Chloride	20.0	19.6		ug/L		98	1 - 221
Tetrachloroethene	20.0	20.2		ug/L		101	64 - 148
Toluene	20.0	19.7		ug/L		99	47 - 150
trans-1,3-Dichloropropene	20.0	19.3		ug/L		96	17 - 183
Trichloroethene	20.0	20.7		ug/L		104	71 - 157
Trichlorofluoromethane	20.0	22.2		ug/L		111	17 - 181
Vinyl chloride	20.0	20.6		ug/L		103	1 - 251

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*99*		*68 - 130*
4-Bromofluorobenzene (Surr)	*98*		*76 - 123*
Dibromofluoromethane (Surr)	*101*		*75 - 123*
Toluene-d8 (Surr)	*96*		*77 - 120*

Lab Sample ID: MB 480-652240/8
Matrix: Water
Analysis Batch: 652240

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		5.0	0.39	ug/L			12/06/22 12:50	1
1,1,2,2-Tetrachloroethane	ND		5.0	0.26	ug/L			12/06/22 12:50	1
1,1,2-Trichloroethane	ND		5.0	0.48	ug/L			12/06/22 12:50	1
1,1-Dichloroethane	ND		5.0	0.59	ug/L			12/06/22 12:50	1
1,1-Dichloroethene	ND		5.0	0.85	ug/L			12/06/22 12:50	1
1,2-Dichlorobenzene	ND		5.0	0.44	ug/L			12/06/22 12:50	1
1,2-Dichloroethane	ND		5.0	0.60	ug/L			12/06/22 12:50	1
1,2-Dichloroethene, Total	ND		10	3.2	ug/L			12/06/22 12:50	1
1,2-Dichloropropane	ND		5.0	0.61	ug/L			12/06/22 12:50	1

Method: 624.1 - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: MB 480-652240/8
Matrix: Water
Analysis Batch: 652240

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,3-Dichlorobenzene	ND		5.0	0.54	ug/L			12/06/22 12:50	1
1,4-Dichlorobenzene	ND		5.0	0.51	ug/L			12/06/22 12:50	1
2-Chloroethyl vinyl ether	ND		25	1.9	ug/L			12/06/22 12:50	1
Acrolein	ND		100	17	ug/L			12/06/22 12:50	1
Acrylonitrile	ND		100	1.9	ug/L			12/06/22 12:50	1
Benzene	ND		5.0	0.60	ug/L			12/06/22 12:50	1
Bromodichloromethane	ND		5.0	0.54	ug/L			12/06/22 12:50	1
Bromoform	ND		5.0	0.47	ug/L			12/06/22 12:50	1
Bromomethane	ND		5.0	1.2	ug/L			12/06/22 12:50	1
Carbon tetrachloride	ND		5.0	0.51	ug/L			12/06/22 12:50	1
Chlorobenzene	ND		5.0	0.48	ug/L			12/06/22 12:50	1
Chloroethane	ND		5.0	0.87	ug/L			12/06/22 12:50	1
Chloroform	ND		5.0	0.54	ug/L			12/06/22 12:50	1
Chloromethane	ND		5.0	0.64	ug/L			12/06/22 12:50	1
cis-1,3-Dichloropropene	ND		5.0	0.33	ug/L			12/06/22 12:50	1
Dibromochloromethane	ND		5.0	0.41	ug/L			12/06/22 12:50	1
Ethylbenzene	ND		5.0	0.46	ug/L			12/06/22 12:50	1
Methylene Chloride	ND		5.0	0.81	ug/L			12/06/22 12:50	1
Tetrachloroethene	ND		5.0	0.34	ug/L			12/06/22 12:50	1
Toluene	ND		5.0	0.45	ug/L			12/06/22 12:50	1
trans-1,3-Dichloropropene	ND		5.0	0.44	ug/L			12/06/22 12:50	1
Trichloroethene	ND		5.0	0.60	ug/L			12/06/22 12:50	1
Trichlorofluoromethane	ND		5.0	0.45	ug/L			12/06/22 12:50	1
Vinyl chloride	ND		5.0	0.75	ug/L			12/06/22 12:50	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*101*		*68 - 130*		*12/06/22 12:50*	*1*
4-Bromofluorobenzene (Surr)	*99*		*76 - 123*		*12/06/22 12:50*	*1*
Dibromofluoromethane (Surr)	*101*		*75 - 123*		*12/06/22 12:50*	*1*
Toluene-d8 (Surr)	*95*		*77 - 120*		*12/06/22 12:50*	*1*

Lab Sample ID: LCS 480-652240/6
Matrix: Water
Analysis Batch: 652240

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
1,1,1-Trichloroethane	20.0	22.2		ug/L		111	52 - 162
1,1,2,2-Tetrachloroethane	20.0	19.8		ug/L		99	46 - 157
1,1,2-Trichloroethane	20.0	20.6		ug/L		103	52 - 150
1,1-Dichloroethane	20.0	21.2		ug/L		106	59 - 155
1,1-Dichloroethene	20.0	23.3		ug/L		116	1 - 234
1,2-Dichlorobenzene	20.0	20.0		ug/L		100	18 - 190
1,2-Dichloroethane	20.0	21.1		ug/L		106	49 - 155
1,2-Dichloropropane	20.0	21.6		ug/L		108	1 - 210
1,3-Dichlorobenzene	20.0	20.1		ug/L		100	59 - 156
1,4-Dichlorobenzene	20.0	20.1		ug/L		100	18 - 190
2-Chloroethyl vinyl ether	20.0	22.0	J	ug/L		110	1 - 305
Benzene	20.0	21.4		ug/L		107	37 - 151

Method: 624.1 - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCS 480-652240/6
Matrix: Water
Analysis Batch: 652240

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Bromodichloromethane	20.0	21.7		ug/L		109	35 - 155
Bromoform	20.0	22.4		ug/L		112	45 - 169
Bromomethane	20.0	20.5		ug/L		102	1 - 242
Carbon tetrachloride	20.0	21.6		ug/L		108	70 - 140
Chlorobenzene	20.0	20.3		ug/L		101	37 - 160
Chloroethane	20.0	21.2		ug/L		106	14 - 230
Chloroform	20.0	21.1		ug/L		106	51 - 138
Chloromethane	20.0	22.5		ug/L		113	1 - 273
cis-1,3-Dichloropropene	20.0	21.5		ug/L		107	1 - 227
Dibromochloromethane	20.0	21.2		ug/L		106	53 - 149
Ethylbenzene	20.0	20.4		ug/L		102	37 - 162
Methylene Chloride	20.0	19.5		ug/L		97	1 - 221
Tetrachloroethene	20.0	20.9		ug/L		104	64 - 148
Toluene	20.0	20.2		ug/L		101	47 - 150
trans-1,3-Dichloropropene	20.0	19.7		ug/L		98	17 - 183
Trichloroethene	20.0	21.3		ug/L		107	71 - 157
Trichlorofluoromethane	20.0	22.8		ug/L		114	17 - 181
Vinyl chloride	20.0	21.4		ug/L		107	1 - 251

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*98*		*68 - 130*
4-Bromofluorobenzene (Surr)	*99*		*76 - 123*
Dibromofluoromethane (Surr)	*101*		*75 - 123*
Toluene-d8 (Surr)	*97*		*77 - 120*

GC/MS VOA

Analysis Batch: 652125

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-204383-1	BCC DC1 GAC Influent 1222	Total/NA	Water	624.1	
480-204383-4	BCC DC2 GAC Influent 1222	Total/NA	Water	624.1	
MB 480-652125/8	Method Blank	Total/NA	Water	624.1	
LCS 480-652125/6	Lab Control Sample	Total/NA	Water	624.1	

Analysis Batch: 652240

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-204383-2	BCC DC1 GAC Middle 1222	Total/NA	Water	624.1	
480-204383-3	BCC DC1 GAC Effluent 1222	Total/NA	Water	624.1	
480-204383-5	BCC DC2 GAC Effluent 1222	Total/NA	Water	624.1	
MB 480-652240/8	Method Blank	Total/NA	Water	624.1	
LCS 480-652240/6	Lab Control Sample	Total/NA	Water	624.1	

Lab Chronicle

Client: Ontario Specialty Contracting, Inc.
Project/Site: Quarterly GAC

Job ID: 480-204383-1

Client Sample ID: BCC DC1 GAC Influent 1222
Lab Sample ID: 480-204383-1
Date Collected: 12/02/22 10:00
Matrix: Water
Date Received: 12/02/22 14:45

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	624.1		80	652125	ATG	EET BUF	12/05/22 15:49

Client Sample ID: BCC DC1 GAC Middle 1222
Lab Sample ID: 480-204383-2
Date Collected: 12/02/22 10:15
Matrix: Water
Date Received: 12/02/22 14:45

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	624.1		1	652240	ATG	EET BUF	12/06/22 18:01

Client Sample ID: BCC DC1 GAC Effluent 1222
Lab Sample ID: 480-204383-3
Date Collected: 12/02/22 10:30
Matrix: Water
Date Received: 12/02/22 14:45

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	624.1		1	652240	ATG	EET BUF	12/06/22 14:24

Client Sample ID: BCC DC2 GAC Influent 1222
Lab Sample ID: 480-204383-4
Date Collected: 12/02/22 10:45
Matrix: Water
Date Received: 12/02/22 14:45

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	624.1		4	652125	ATG	EET BUF	12/05/22 17:01

Client Sample ID: BCC DC2 GAC Effluent 1222
Lab Sample ID: 480-204383-5
Date Collected: 12/02/22 11:00
Matrix: Water
Date Received: 12/02/22 14:45

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	624.1		1	652240	ATG	EET BUF	12/06/22 14:48

Laboratory References:

EET BUF = Eurofins Buffalo, 10 Hazelwood Drive, Amherst, NY 14228-2298, TEL (716)691-2600

Accreditation/Certification Summary

Client: Ontario Specialty Contracting, Inc.
Job ID: 480-204383-1
Project/Site: Quarterly GAC

Laboratory: Eurofins Buffalo

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	Identification Number	Expiration Date
New York	NELAP	10026	03-31-23

The following analytes are included in this report, but the laboratory is not certified by the governing authority. This list may include analytes for which the agency does not offer certification.

Analysis Method	Prep Method	Matrix	Analyte
624.1		Water	1,2-Dichloroethene, Total

Method Summary

Client: Ontario Specialty Contracting, Inc.
Project/Site: Quarterly GAC

Job ID: 480-204383-1

Method	Method Description	Protocol	Laboratory
624.1	Volatile Organic Compounds (GC/MS)	40CFR136A	EET BUF

Protocol References:

40CFR136A = "Methods for Organic Chemical Analysis of Municipal Industrial Wastewater", 40CFR, Part 136, Appendix A, October 26, 1984 and subsequent revisions.

Laboratory References:

EET BUF = Eurofins Buffalo, 10 Hazelwood Drive, Amherst, NY 14228-2298, TEL (716)691-2600

Sample Summary

Client: Ontario Specialty Contracting, Inc.
Project/Site: Quarterly GAC

Job ID: 480-204383-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
480-204383-1	BCC DC1 GAC Influent 1222	Water	12/02/22 10:00	12/02/22 14:45
480-204383-2	BCC DC1 GAC Middle 1222	Water	12/02/22 10:15	12/02/22 14:45
480-204383-3	BCC DC1 GAC Effluent 1222	Water	12/02/22 10:30	12/02/22 14:45
480-204383-4	BCC DC2 GAC Influent 1222	Water	12/02/22 10:45	12/02/22 14:45
480-204383-5	BCC DC2 GAC Effluent 1222	Water	12/02/22 11:00	12/02/22 14:45

Eurofins Buffalo
10 Hazelwood Drive
Amherst, NY 14228-2298
Phone: 716-691-2600 Fax: 716-691-7991

Chain of Custody Record

eurofins | Environment Testing

Client Information	Sampler: Taylor Kunzelmann	Lab PM: Schove, John R	Carrier Tracking No(s): OSC	COC No: 480-179699-6056.1
Client Contact: Kirsten Colligan	Phone: 716-480-3282	E-Mail: John.Schove@et.eurofinsus.com	State of Origin: NY	Page: Page 1 of 1
Company: Ontario Specialty Contracting, Inc.	PWSID:	Analysis Requested		Job #: 16011

Address: 140 Lee St.	Due Date Requested:	Preservation Codes:
City: Buffalo	TAT Req: 3 Day's	A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA; M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Y - Trizma, Z - other (specify); Other:
State, Zip: NY, 14210	Compliance Project: Δ Yes Δ No	
Phone: 716-856-3333	PO #: 65229	
Email: kcolligan@oscinc.com	WO #:	
Project Name: OSC- Former Buffalo Color Sites/ Event Desc: Buffalo Color - Qu	Project #: 48003159	
Site: New York	SSOW#:	

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	624_5ml - Priority Pollutant List - VOA - 62	Total Number of containers	Special Instructions/Note:
			Preservation Code:				N		
BCC DC1 GAC Influent 12 22	12-2-22	10:00		Water			3		
BCC DC1 GAC Middle 12 22		10:15		Water			3		
BCC DC1 GAC Effluent 12 22		10:30		Water			3		
BCC DC2 GAC Influent 12 22		10:45		Water			3		
BCC DC2 GAC Effluent 12 22		11:00		Water			3		

480-204383 Chain of Custody

Possible Hazard Identification	Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological	☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months
Deliverable Requested: I, II, III, IV, Other (specify)	Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by	Date/Time	Company	Received by	Date/Time	Company
Taylor Kunzelmann	12-2-22 1415	OSC	Andrew Nikolb	12/2/22 1445	TA

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks:
		510# ICE

Ver: 06/08/2021

Login Sample Receipt Checklist

Client: Ontario Specialty Contracting, Inc.

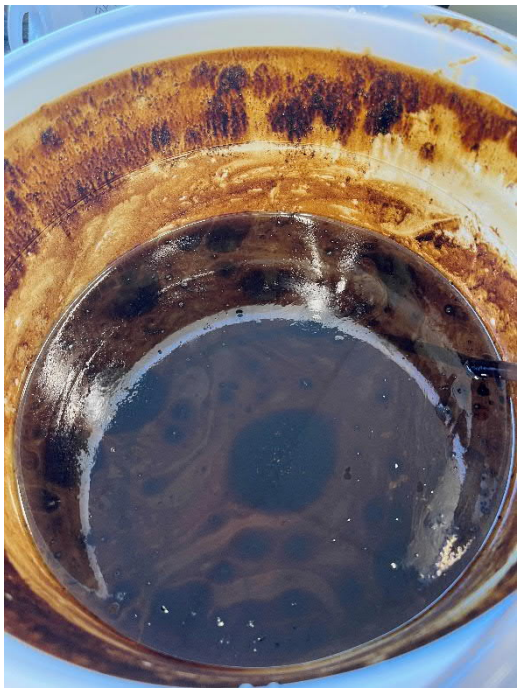
Job Number: 480-204383-1

Login Number: 204383
List Number: 1
Creator: Kolb, Chris M

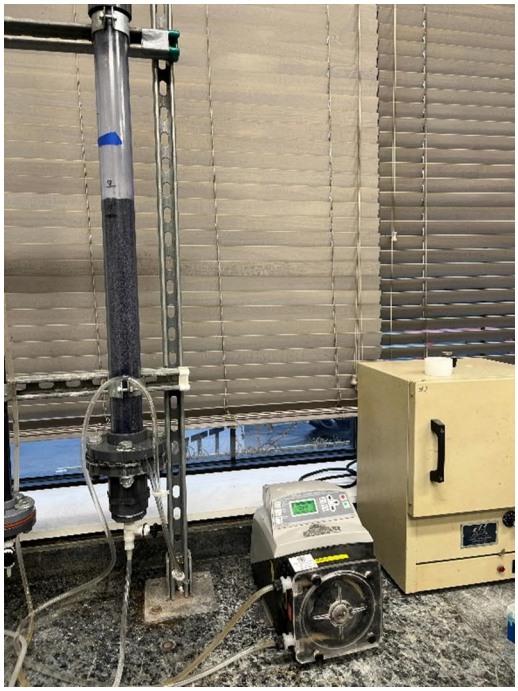
List Source: Eurofins Buffalo

Question	Answer	Comment
Radioactivity either was not measured or, if measured, is at or below background	True	
The cooler's custody seal, if present, is intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the sample IDs on the containers and the COC.	True	
Samples are received within Holding Time (Excluding tests with immediate HTs)..	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
VOA sample vials do not have headspace or bubble is <6mm (1/4") in diameter.	True	
If necessary, staff have been informed of any short hold time or quick TAT needs	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Sampling Company provided.	True	OSC
Samples received within 48 hours of sampling.	True	
Samples requiring field filtration have been filtered in the field.	True	
Chlorine Residual checked.	N/A	

Appendix C - Photographs

Client Name: SBD	CMS Design Report – Treatability Study Photographs	Project: Buffalo Color Corporation Site Areas A&B
Photo No. 1 Direction Photo Taken: N/A Description: Composited influent sample prior to Oil/Water Separation unit operation test.		

Client Name: SBD	CMS Design Report – Treatability Study Photographs	Project: Buffalo Color Corporation Site Areas A&B
Photo No. 2 Direction Photo Taken: N/A Description: Treatability Study mechanical filtration test assembly.		

Client Name: SBD	CMS Design Report – Treatability Study Photographs	Project: Buffalo Color Corporation Site Areas A&B
Photo No. 3 Direction Photo Taken: N/A		
Description: Treatability Study Granular Activated Carbon assembly.		

Client Name: SBD	CMS Design Report – Treatability Study Photographs	Buffalo Color Corporation Site Areas A&B
Photo No. 4 Direction Photo Taken: N/A		
Description: Water Quality – Treatment progression from composited influent to post-treatment effluent.		

Appendix D – Safety Data Sheets – Redux 300 and Redux 345

GHS Safety Data Sheet

Redux Technology

SECTION 1) CHEMICAL PRODUCT AND SUPPLIER'S IDENTIFICATION

Product ID:	Redux-300
Product Name:	Blended Water Treatment.
Revision Date:	Dec 10, 2018
Supersedes Date:	Nov 11, 2015
Manufacturer's Name:	Azure Water Services
Address:	280 Callegari Drive West Haven, CT, US, 06516
Emergency Phone:	Chemtrec 800-424-9300, in US and Canada only

SECTION 2) HAZARDS IDENTIFICATION

Classification

Eye Irritation - Category 2B

Skin Irritation - Category 3

Pictograms

None of the chemicals in this product are hazardous according to the GHS.

Signal Word

Warning

Hazardous Statements - Health

Causes eye irritation

Causes mild skin irritation

Precautionary Statements - General

If medical advice is needed, have product container or label at hand.

Keep out of reach of children.

Read label before use.

Precautionary Statements - Prevention

Wash thoroughly after handling.

Precautionary Statements - Response

IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

If eye irritation persists: Get medical advice/attention.

If skin irritation occurs: Get medical advice/attention.

Precautionary Statements - Storage

No precautionary statement available.

Precautionary Statements - Disposal

No precautionary statement available.

Hazards Not Otherwise Classified (HNOC)

None.

SECTION 3) COMPOSITION / INFORMATION ON INGREDIENTS

This product is not classified as Hazardous under the OSHA Hazard Communication Standard (29 CFR 1910.1200).
All of the product's ingredients are either listed or exempt from the TSCA Inventory.
Some specific chemical identity is being withheld as a trade secrets
None of the chemicals in this product are hazardous according to the GHS.

SECTION 4) FIRST-AID MEASURES

Inhalation

Remove source of exposure or move person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER/doctor/. If breathing has stopped, trained personnel should begin rescue breathing or, if the heart has stopped, immediately start cardiopulmonary resuscitation (CPR) or automated external defibrillation (AED).

Eye Contact

Remove source of exposure or move person to fresh air. Rinse eyes cautiously with lukewarm, gently flowing water for several minutes, while holding the eyelids open. Remove contact lenses, if present and easy to do. Continue rinsing for a flushing duration of 30 minutes. Take care not to rinse contaminated water into the unaffected eye or onto the face. Immediately call a POISON CENTER/doctor.

Skin Contact

Take off immediately all contaminated clothing, shoes and leather goods (e.g. watchbands, belts). Rinse skin with lukewarm, gently flowing water/shower for a duration of 30 minutes or until medical aid is available. Immediately call a POISON CENTER/doctor. Wash contaminated clothing before re-use or discard.

Ingestion

Rinse mouth with water. Do NOT induce vomiting. Give 1 to 2 cups of milk or water to drink. Never give anything by mouth to an unconscious person. If vomiting occurs naturally, lie on your side, in the recovery position. Immediately call a POISON CENTER/doctor.

Most Important Symptoms and Effects, Both acute and Delayed

No data available.

Indication of Any Immediate Medical Attention and Special Treatment Needed

No data available.

SECTION 5) FIRE-FIGHTING MEASURES

Suitable Extinguishing Media

Dry chemical, foam, carbon dioxide. Sand or earth may be used for small fires only.

Use extinguishing agent suitable for type of surrounding fire.

Unsuitable Extinguishing Media

Do not use direct water stream since this may cause fire to spread.

Specific Hazards in Case of Fire

In case of fire, hazardous decomposition products may include sulphur oxides.

Fire-Fighting Procedures

Isolate immediate hazard area and keep unauthorized personnel out. Stop spill/release if it can be done safely. Move undamaged containers from immediate hazard area if it can be done safely. Water spray may be useful in minimizing or dispersing vapors and to protect personnel. Water may be ineffective but can be used to cool containers exposed to heat or flame. Caution should be exercised when using water or foam as frothing may occur, especially if sprayed into containers of hot, burning liquid. Dispose of fire debris and contaminated extinguishing water in accordance with official regulations.

Special Protective Actions

Wear protective pressure self-contained breathing apparatus (SCBA) and full turnout gear.

SECTION 6) ACCIDENTAL RELEASE MEASURES

Emergency Procedure

Isolate hazard area and keep unnecessary people away. Remove all possible sources of ignition in the surrounding area. Notify authorities if any exposure to the general public or the environment occurs or is likely to occur.

Absorb spill with absorbent material or vacuum spill into polyethylene lined steel or plastic drums.

Do not touch or walk through spilled material.

If spilled material is cleaned up using a regulated solvent, the resulting waste mixture may be regulated.

Recommended Equipment

Positive pressure, full-facepiece self-contained breathing apparatus (SCBA), or positive pressure supplied air respirator with escape SCBA (NIOSH approved).

Personal Precautions

Avoid breathing vapor or mist. Avoid contact with skin, eye or clothing. Ensure adequate ventilation. Do not touch damaged containers or spilled materials unless wearing appropriate protective clothing.

Environmental Precautions

Stop spill/release if it can be done safely. Prevent spilled material from entering sewers, storm drains, other unauthorized drainage systems and natural waterways by using sand, earth, or other appropriate barriers.

Methods and Materials for Containment and Cleaning Up

Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations. Contaminated absorbent material may pose the same hazard as the spilled product.

SECTION 7) HANDLING AND STORAGE

General

Wash hands after use.
Do not get in eyes, on skin or on clothing.
Do not breathe vapors or mists.
Use good personal hygiene practices.
Eating, drinking and smoking in work areas is prohibited.
Remove contaminated clothing and protective equipment before entering eating areas.
Eyewash stations and showers should be available in areas where this material is used and stored.

Ventilation Requirements

Use only with adequate ventilation to control air contaminants to their exposure limits. The use of local ventilation is recommended to control emissions near the source.

Storage Room Requirements

Keep container(s) tightly closed and properly labeled. Store in cool, dry, well-ventilated areas away from heat, direct sunlight and strong oxidizers. Store in approved containers and protect against physical damage. Keep containers securely sealed when not in use. Indoor storage should meet OSHA standards and appropriate fire codes. Containers that have been opened must be carefully resealed to prevent leakage. Empty containers retain residue and may be dangerous.
Use non-sparking ventilation systems, approved explosion-proof equipment and intrinsically safe electrical systems in areas where this product is used and stored.

SECTION 8) EXPOSURE CONTROLS, PERSONAL PROTECTION

Eye Protection

Wear eye protection with side shields or goggles. Wear indirect-vent, impact and splash resistant goggles when working with liquids. If additional protection is needed for entire face, use in combination with a face shield.

Skin Protection

Use of gloves approved to relevant standards made from the following materials may provide suitable chemical protection: PVC, neoprene or nitrile rubber gloves. Suitability and durability of a glove is dependent on usage, e.g. frequency and duration of contact, chemical resistance of glove material, glove thickness, dexterity. Always seek advice from glove suppliers. Contaminated gloves should

be replaced. Use of an apron and over-boots of chemically impervious materials such as neoprene or nitrile rubber is recommended to avoid skin sensitization. The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace. Launder soiled clothes or properly disposed of contaminated material, which cannot be decontaminated.

Respiratory Protection

If engineering controls do not maintain airborne concentrations to a level which is adequate to protect worker, a respiratory protection program that meets or is equivalent to OSHA 29 CFR 1910.134 and ANSI Z88.2 should be followed. Check with respiratory protective equipment suppliers.

Appropriate Engineering Controls

Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value.

SECTION 9) PHYSICAL AND CHEMICAL PROPERTIES

Physical and Chemical Properties

Density	9.18 lb/gal
Specific Gravity	1.10

Appearance	clear, pale yellow liquid
pH	3.5 - 4.5
Odor Threshold	N/A
Odor Description	characteristic
Water Solubility	complete
Viscosity	N/A
Vapor Pressure	Similar to water
Vapor Density	N/A
Freezing Point	<32 °F
Boiling Point	>212 °F
Evaporation Rate	1.0
Flammability	Will not burn

SECTION 10) STABILITY AND REACTIVITY

Stability

Stable under normal storage and handling conditions.

Conditions To Avoid

Avoid heat, sparks, flame, high temperature and contact with incompatible materials.

Hazardous Reactions/Polymerization

Hazardous polymerization will not occur.

Incompatible Materials

Strong bases, acids, oxidizing/reducing agents, amines and sulfides.

Hazardous Decomposition Products

May produce carbon monoxide, carbon dioxide.

SECTION 11) TOXICOLOGICAL INFORMATION

Likely Routes of Exposure

Inhalation, ingestion, skin absorption.

Acute Toxicity

Oral:	Rat LD50 = ~ 9,000 mg/kg
Dermal:	Rabbit LD50= > 29,000 mg/kg
Eye Irritant:	Irritant
Skin Irritant:	Mild Irritant

Chronic Exposure Toxicity

The chronic local effect may consist of multiple areas of superficial destruction of the skin or of primary irritant dermatitis. Similarly, inhalation of dust, spray, or mist may result in varying degrees of irritation or damage to the respiratory tract tissues and an increased susceptibility to respiratory illness,

Carcinogenicity

This product does not contain any known or anticipated carcinogens according to the criteria of the NTP Annual Report on carcinogens and OSHA 29 CFR 1910,Z.

SECTION 12) ECOLOGICAL INFORMATION

Ecotoxicity

Ceriodaphnia (ceriodaphnia dubia): 48 hr LD50 = 2,000 mg/l	NOAEL = 1,000 mg/l
Fathead Minnow (pimephales promelas): 96hr LD50 = 2,000 mg/l	NOAEL = 1,000 mg/l

Mobility in Soil

Contact Manufacturer.

Bio-accumulative Potential

Contact Manufacturer.

Persistence and Degradability

Considered biodegradable.

SECTION 13) DISPOSAL CONSIDERATIONS

Waste Disposal

Under RCRA it is the responsibility of the user of the product to determine at the time of disposal whether the product meets RCRA criteria for hazardous waste. Waste management should be in full compliance with federal, state and local laws.
Empty Containers retain product residue which may exhibit hazards of material, therefore do not pressurize, cut, glaze, weld or use for any other purposes. Return drums to reclamation centers for proper cleaning and reuse.

SECTION 14) TRANSPORT INFORMATION

U.S. DOT Information

For all transportation accidents, call CHEMTREC at 800/424-9300. All spills and leaks of this material must be handled in accordance with local, state, and federal regulations.

DOT Shipping Designation:

Non-hazardous under 29-CFR 1910.1200. Water treatment compound

SECTION 15) REGULATORY INFORMATION

CAS	Chemical Name	% By Weight	Regulation List
No applicable CAS	No applicable chemical	-	-

SECTION 16) OTHER INFORMATION

Glossary

ACGIH- American Conference of Governmental Industrial Hygienists; ANSI- American National Standards Institute; Canadian TDGCanadian Transportation of Dangerous Goods; CAS- Chemical Abstract Service; Chemtrec- Chemical Transportation Emergency Center(US); CHIP- Chemical Hazard Information and Packaging; DSL- Domestic Substances List; EC- Equivalent Concentration; EH40 (UK)- HSE Guidance Note EH40 Occupational Exposure Limits; EPCRA- Emergency Planning and Community Right-To-Know Act; ESL Effects screening levels; HMIS- Hazardous Material Information Service; LC- Lethal Concentration; LD- Lethal Dose; NFPA- National Fire Protection Association; OEL- Occupational Exposure Limits; OSHA- Occupational Safety and Health Administration, US Department of Labor; PEL- Permissible Exposure Limit; SARA (Title III)- Superfund Amendments and Reauthorization Act; SARA 313- Superfund Amendments and Reauthorization Act, Section 313; SCBA- Self Contained Breathing Apparatus; STEL-Short Term Exposure Limit; TCEQ Texas Commission on Environmental Quality; TLV- Threshold Limit Value; TSCA- Toxic Substances Control Act Public Law 94-469; TWA Time Weighted Value; US DOT- US Department of Transportation; WHMIS- Workplace Hazardous Materials Information System.

Additional Information

Any concentration shown as a range is to protect confidentiality or is due to batch variation.

Version 1.0:

Revision Date: Dec 10, 2018

First Edition.

GHS Safety Data Sheet

Redux Technology

SECTION 1) CHEMICAL PRODUCT AND SUPPLIER'S IDENTIFICATION

Product ID: Redux 345

Product Description: Blended Water Treatment.

Revision Date: Dec 13, 2018

Supersedes Date: Nov 11, 2015

Manufacturer's Name: Azure Water Services

Address: 280 Callegari Drive West Haven, CT, US, 06516

Emergency Phone: Chemtrec 800-424-9300, in US and Canada only

SECTION 2) HAZARDS IDENTIFICATION

Classification

Eye Irritation - Category 2B

Skin Irritation - Category 3

Pictograms

None

Signal Word

Warning

Hazardous Statements - Health

Causes eye irritation

Causes mild skin irritation

Precautionary Statements - General

If medical advice is needed, have product container or label at hand.

Keep out of reach of children.

Read label before use.

Precautionary Statements - Prevention

Wash thoroughly after handling.

Precautionary Statements - Response

IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

If eye irritation persists: Get medical advice/attention.

If skin irritation occurs: Get medical advice/attention.

Precautionary Statements - Storage

No precautionary statement available.

Precautionary Statements - Disposal

No precautionary statement available.

Hazards Not Otherwise Classified (HNOC)

None.

SECTION 3) COMPOSITION / INFORMATION ON INGREDIENTS

This product is not classified as Hazardous under the OSHA Hazard Communication Standard (29 CFR 1910.1200). All of the product's ingredients are either listed or exempt from the TSCA Inventory.

Some specific chemical identity is being withheld as a trade secrets
None of the chemicals in this product are hazardous according to the GHS.

SECTION 4) FIRST-AID MEASURES

Inhalation

Remove source of exposure or move person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER/doctor/. If breathing has stopped, trained personnel should begin rescue breathing or, if the heart has stopped, immediately start cardiopulmonary resuscitation (CPR) or automated external defibrillation (AED).

Eye Contact

Remove source of exposure or move person to fresh air. Rinse eyes cautiously with lukewarm, gently flowing water for several minutes, while holding the eyelids open. Remove contact lenses, if present and easy to do. Continue rinsing for a flushing duration of 30 minutes. Take care not to rinse contaminated water into the unaffected eye or onto the face. Immediately call a POISON CENTER/doctor.

Skin Contact

Take off immediately all contaminated clothing, shoes and leather goods (e.g. watchbands, belts). Rinse skin with lukewarm, gently flowing water/shower for a duration of 30 minutes or until medical aid is available. Immediately call a POISON CENTER/doctor. Wash contaminated clothing before re-use or discard.

Ingestion

Rinse mouth with water. Do NOT induce vomiting. Give 1 to 2 cups of milk or water to drink. Never give anything by mouth to an unconscious person. If vomiting occurs naturally, lie on your side, in the recovery position. Immediately call a POISON CENTER/doctor.

Most Important Symptoms and Effects, Both acute and Delayed

No data available.

Indication of Any Immediate Medical Attention and Special Treatment Needed

No data available.

SECTION 5) FIRE-FIGHTING MEASURES

Suitable Extinguishing Media

Dry chemical, foam, carbon dioxide. Sand or earth may be used for small fires only.

Use extinguishing agent suitable for type of surrounding fire.

Unsuitable Extinguishing Media

Do not use direct water stream since this may cause fire to spread.

Specific Hazards in Case of Fire

In case of fire, hazardous decomposition products may include sulphur oxides.

Fire-Fighting Procedures

Isolate immediate hazard area and keep unauthorized personnel out. Stop spill/release if it can be done safely. Move undamaged containers from immediate hazard area if it can be done safely. Water spray may be useful in minimizing or dispersing vapors and to protect personnel. Water may be ineffective but can be used to cool containers exposed to heat or flame. Caution should be exercised when using water or foam as frothing may occur, especially if sprayed into containers of hot, burning liquid. Dispose of fire debris and contaminated extinguishing water in accordance with official regulations.

Special Protective Actions

Wear protective pressure self-contained breathing apparatus (SCBA) and full turnout gear.

SECTION 6) ACCIDENTAL RELEASE MEASURES

Emergency Procedure

Isolate hazard area and keep unnecessary people away. Remove all possible sources of ignition in the surrounding area. Notify authorities if any exposure to the general public or the environment occurs or is likely to occur.

Absorb spill with absorbent material or vacuum spill into polyethylene lined steel or plastic drums.

Do not touch or walk through spilled material.

If spilled material is cleaned up using a regulated solvent, the resulting waste mixture may be regulated.

Recommended Equipment

Positive pressure, full-facepiece self-contained breathing apparatus (SCBA), or positive pressure supplied air respirator with escape SCBA (NIOSH approved).

Personal Precautions

Avoid breathing vapor or mist. Avoid contact with skin, eye or clothing. Ensure adequate ventilation. Do not touch damaged containers or spilled materials unless wearing appropriate protective clothing.

Environmental Precautions

Stop spill/release if it can be done safely. Prevent spilled material from entering sewers, storm drains, other unauthorized drainage systems and natural waterways by using sand, earth, or other appropriate barriers.

Methods and Materials for Containment and Cleaning Up

Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations. Contaminated absorbent material may pose the same hazard as the spilled product.

SECTION 7) HANDLING AND STORAGE

General

Wash hands after use.
Do not get in eyes, on skin or on clothing.
Do not breathe vapors or mists.
Use good personal hygiene practices.
Eating, drinking and smoking in work areas is prohibited.
Remove contaminated clothing and protective equipment before entering eating areas.
Eyewash stations and showers should be available in areas where this material is used and stored.

Ventilation Requirements

Use only with adequate ventilation to control air contaminants to their exposure limits. The use of local ventilation is recommended to control emissions near the source.

Storage Room Requirements

Keep container(s) tightly closed and properly labeled. Store in cool, dry, well-ventilated areas away from heat, direct sunlight and strong oxidizers. Store in approved containers and protect against physical damage. Keep containers securely sealed when not in use. Indoor storage should meet OSHA standards and appropriate fire codes. Containers that have been opened must be carefully resealed to prevent leakage. Empty containers retain residue and may be dangerous.
Use ventilation systems where this product is used and stored.

SECTION 8) EXPOSURE CONTROLS, PERSONAL PROTECTION

Eye Protection

Wear eye protection with side shields or goggles. Wear indirect-vent, impact and splash resistant goggles when working with liquids. If additional protection is needed for entire face, use in combination with a face shield.

Skin Protection

Use of gloves approved to relevant standards made from the following materials may provide suitable chemical protection: PVC, neoprene or nitrile rubber gloves. Suitability and durability of a glove is dependent on usage, e.g. frequency and duration of contact, chemical resistance of glove material, glove thickness, dexterity. Always seek advice from glove suppliers. Contaminated gloves should be replaced. Use of an apron and over-boots of chemically impervious materials such as neoprene or nitrile rubber is recommended to avoid skin sensitization. The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace. Launder soiled clothes or properly disposed of contaminated material, which cannot be decontaminated.

Respiratory Protection

If engineering controls do not maintain airborne concentrations to a level which is adequate to protect worker, a respiratory protection program that meets or is equivalent to OSHA 29 CFR 1910.134 and ANSI Z88.2 should be followed. Check with respiratory protective equipment suppliers.

Appropriate Engineering Controls

Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value.

SECTION 9) PHYSICAL AND CHEMICAL PROPERTIES

Physical and Chemical Properties

Density	8.98 lb/gal
Specific Gravity	1.071 - 1.081
Appearance	Clear, pale yellow liquid
pH	3.0 - 4.0
Odor Threshold	N/A
Odor Description	characteristic
Water Solubility	complete
Viscosity	N/A
Vapor Pressure	Similar to water
Vapor Density	N/A
Freezing Point	<32 °F
Boiling Point	>212 °F
Evaporation Rate	N/A
Flammability	Will not burn

SECTION 10) STABILITY AND REACTIVITY

Stability

Stable under normal storage and handling conditions.

Conditions To Avoid

Avoid heat, sparks, flame, high temperature and contact with incompatible materials.

Hazardous Reactions/Polymerization

Hazardous polymerization will not occur.

Incompatible Materials

Strong bases, acids, oxidizing and reducing agents.

Hazardous Decomposition Products

May produce carbon monoxide, carbon dioxide.

SECTION 11) TOXICOLOGICAL INFORMATION

Likely Routes of Exposure

Inhalation, ingestion, skin absorption.

Acute Toxicity

Oral: Rat LD50 = ~9,000 mg/kg
Dermal: Rabbit LD50= > 29,000 mg/kg
Eye Irritant: Corrosive

Chronic Exposure Toxicity

The chronic local effect may consist of multiple areas of superficial destruction of the skin or of primary irritant dermatitis. Similarly, inhalation of dust, spray, or mist may result in varying degrees of irritation or damage to the respiratory tract tissues and an increased susceptibility to respiratory illness,

Carcinogenicity

This product does not contain any known or anticipated carcinogens according to the criteria of the NTP Annual Report on carcinogens and OSHA 29 CFR 1910,Z.

SECTION 12) ECOLOGICAL INFORMATION

Ecotoxicity

Ceriodaphnia (ceriodaphnia dubia): 48 hr LD50 = 4,000 mg/l NOAEL = 2,000 mg/l

Fathead Minnow (pimephales promelas): 96hr LD50 = 4,000 mg/l NOAEL = 2,000 mg/l

Mobility in Soil

Contact Manufacturer.

Bio-accumulative Potential

Contact Manufacturer.

Persistence and Degradability

Considered biodegradable.

SECTION 13) DISPOSAL CONSIDERATIONS

Waste Disposal

Under RCRA it is the responsibility of the user of the product to determine at the time of disposal whether the product meets RCRA criteria for hazardous waste. Waste management should be in full compliance with federal, state and local laws.
Empty Containers retain product residue which may exhibit hazards of material, therefore do not pressurize, cut, glaze, weld or use for any other purposes. Return drums to reclamation centers for proper cleaning and reuse.

SECTION 14) TRANSPORT INFORMATION

U.S. DOT Information

For all transportation accidents, call CHEMTREC at 800/424-9300. All spills and leaks of this material must be handled in accordance with local, state, and federal regulations.

DOT Shipping Designation:

Non-hazardous under 29-CFR 1910.1200. Water treatment compound

SECTION 15) REGULATORY INFORMATION

CAS	Chemical Name	% By Weight	Regulation List
No applicable CAS	No applicable chemical	-	-

SECTION 16) OTHER INFORMATION

Glossary

ACGIH- American Conference of Governmental Industrial Hygienists; ANSI- American National Standards Institute; Canadian TDGCanadian Transportation of Dangerous Goods; CAS- Chemical Abstract Service; Chemtrec- Chemical Transportation Emergency Center(US); CHIP- Chemical Hazard Information and Packaging; DSL- Domestic Substances List; EC- Equivalent Concentration; EH40 (UK)- HSE Guidance Note EH40 Occupational Exposure Limits; EPCRA- Emergency Planning and Community Right-To-Know Act; ESL Effects screening levels; HMIS- Hazardous Material Information Service; LC- Lethal Concentration; LD- Lethal Dose; NFPA- National Fire Protection Association; OEL- Occupational Exposure Limits; OSHA- Occupational Safety and Health Administration, US Department of Labor; PEL- Permissible Exposure Limit; SARA (Title III)- Superfund Amendments and Reauthorization Act; SARA 313- Superfund Amendments and Reauthorization Act, Section 313; SCBA- Self Contained Breathing Apparatus; STEL-Short Term Exposure Limit; TCEQ Texas Commission on Environmental Quality; TLV- Threshold Limit Value; TSCA- Toxic Substances Control Act Public Law 94-469; TWA Time Weighted Value; US DOT- US Department of Transportation; WHMIS- Workplace Hazardous Materials Information System.

Additional Information

Any concentration shown as a range is to protect confidentiality or is due to batch variation.

Version 1.0:

Revision Date: Dec 13,2018

Version 1.0

DISCLAIMER

Appendix E – Groundwater Treatment Facility Upgrade Design

Existing Below-Grade to Above-Grade Transition (see Detail).

Existing Area D GW Conveyance and Electrical Lines To Be Buried. Offset as needed

Existing Above-Grade Support Structures (see Detail) Removed to Below Grade

DISCHARGE CLEANOUT (EXISTING)

GWTF

EXISTING GWTF TO BE DECOMMISSIONED

New GWTF. Final location TBD.

ELECTRICAL HANDHOLE (EXISTING)

62'

30'

INTERMEDIATE CLEANOUT (EXISTING)

INTERMEDIATE CLEANOUT (PROPOSED)

1 – 1" WATER DISCHARGE
1 – 0.75" ELECTRICAL CONDUIT
3 – 1.25" INSTRUMENTATION CONDUIT

EXISITING EW-1/EW-2 LINES RE-ROUTED TO NEW BLDG.

ELECTRICAL HANDHOLE

INTERMEDIATE CLEANOUT

NEW TRENCH AND LINES EW-6 TO TREATMENT BUILDING

JUNCTION/PULL BOXES SHALL BE INSTALLED AT EACH NEW WELL LATERAL CONNECTION W/MAIN LATERAL TRENCH

EW-6 VAULT CLEANOUT

TIE EW-4A INTO EW-3A WATER LINES AND ELECTRICAL/CONTROL CONDUITS

1 – 1" WATER DISCHARGE
1 – 0.75" ELECTRICAL CONDUIT
1 – 1.25" INSTRUMENTATION CONDUIT

INTERMEDIATE CLEANOUT

INTERMEDIATE CLEANOUT

EW-4A VAULT CLEANOUT

TIE EW-7 AND EW-8 INTO EW-4 AND EW-5 WATER LINES AND ELECTRICAL/CONTROL WIRING. PLUG EW-4 AND EW-5 UPSTREAM OF CONNECTION.

2 – 1" WATER DISCHARGE
2 – 0.75" ELECTRICAL CONDUIT
2 – 1.25" INSTRUMENTATION CONDUIT

EXISTING GROUNDWATER EXTRACTION LINES

EXISTING TRENCH AND LINES NOW CONVEYING EW-4A, EW-7, AND EW-8

1 – 1.25" INSTRUMENTATION CONDUIT

EXISTING VERTICAL HYDRAULIC BARRIER

1.25" CONDUIT TRENCH FROM OW-A3E CROSSES ABOVE VERTICAL HYDRAULIC BARRIER. SEE DETAIL

ELECTRICAL HANDHOLE

ELECTRICAL HANDHOLE

1"ø CLEANOUT

EW-7 VAULT CLEANOUT

1 – 1" WATER DISCHARGE
1 – 0.75" ELECTRICAL CONDUIT
1 – 1.25" INSTRUMENTATION CONDUIT

INTERMEDIATE CLEANOUT

EW-8 VAULT CLEANOUT

SHEET PILING

OW-A1I
OW-A1E
OW-A2I
OW-A2E
OW-A3I
OW-A3E
OW-A4I
OW-A4E
OW-A5I
OW-A5E
OW-A6I
OW-A6E

EW-1
EW-2
EW-3A
EW-4
EW-4A
EW-5
EW-6
EW-7
EW-8

GW

Notes:
1. Red features are proposed upgraded system components
2. Black features are existing system components

D

1" = 30'
30' 15' 0' 30'

N

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APPROVED	

NOTICE: THIS DRAWING HAS BEEN PREPARED UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER. IT IS A VIOLATION OF STATE LAW FOR ANY PERSONS, UNLESS ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER THIS DOCUMENT IN ANY WAY.

SHEET 1

CM WORK PLAN
PRELIMINARY CONVEYANCE LAYOUT
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AREA A

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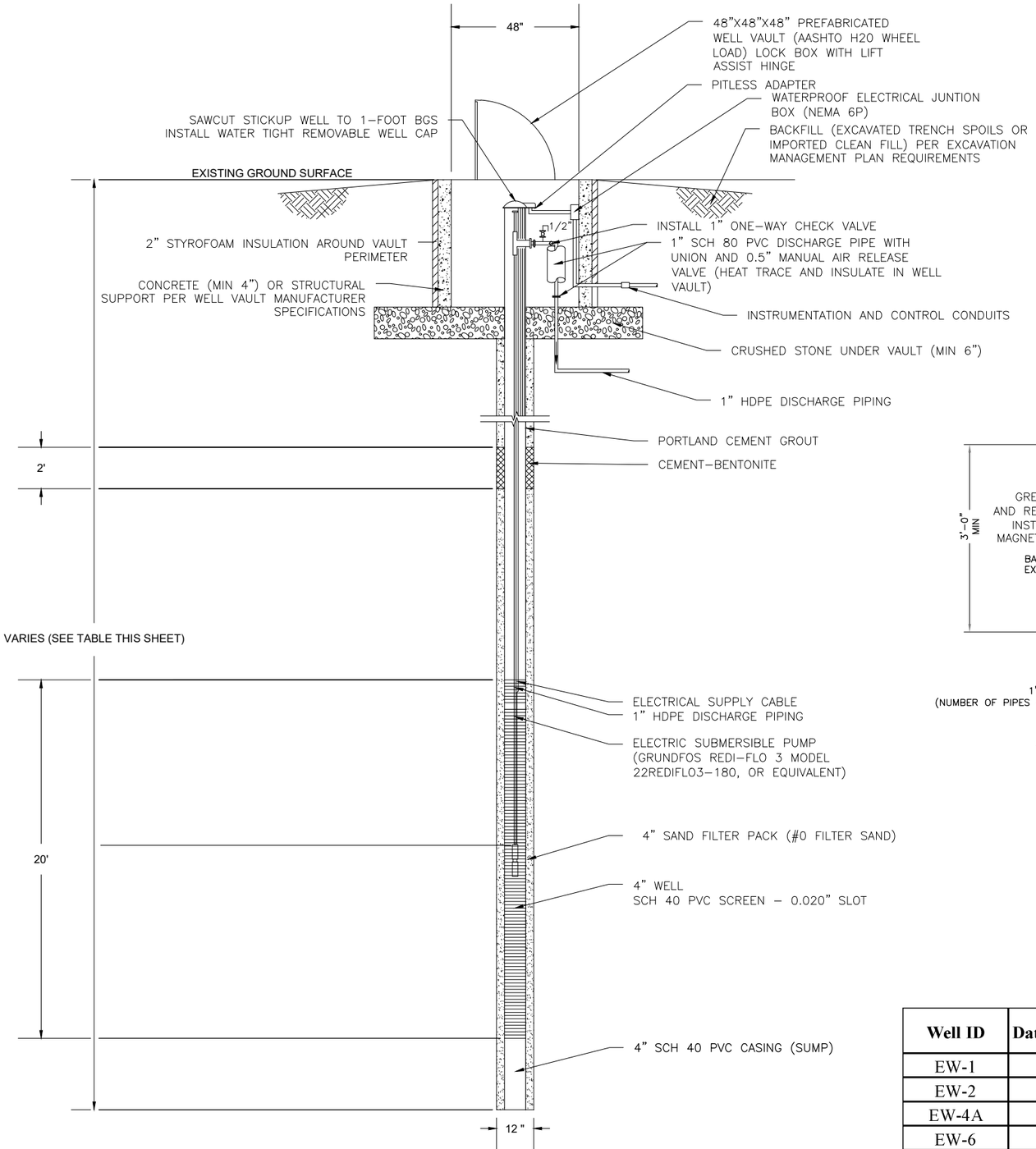
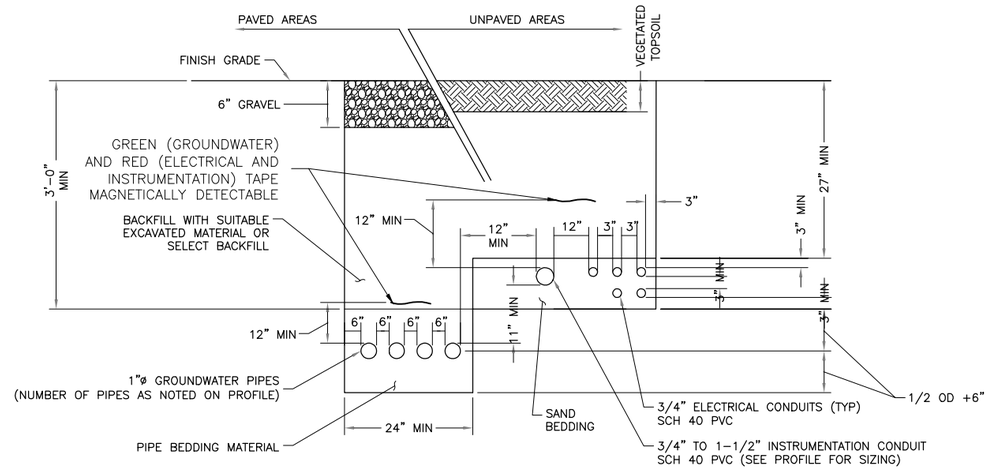
SHEET 1



TYPICAL SECTION NEW EXTRACTION WELL

NOT TO SCALE

B



EXTRACTION PIPE TRENCH (EXISTING AND NEW)

SCALE NTS

EXTRACTION WELL CONSTRUCTION (EXISTING AND NEW)

Well ID	Date Installed	Diameter (nominal)	Casing/Screen Construction	Total Depth (ft. bgs)	Screen Interval (ft. bgs)	
EW-1	Jun-06	6-inch	Stainless Steel	32	22	27
EW-2	Jun-06	6-inch	Stainless Steel	34	24	29
EW-4A	May-20	4-inch	Sch 40. PVC	34.5	13.5	33.5
EW-6	May-20	4-inch	Sch 40. PVC	37.5	15.5	35.5
EW-7	May-20	4-inch	Sch 40. PVC	34.5	13.5	33.5
EW-8	May-20	4-inch	Sch 40. PVC	34	13	33

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SHEET 2
SITE WORK DETAILS
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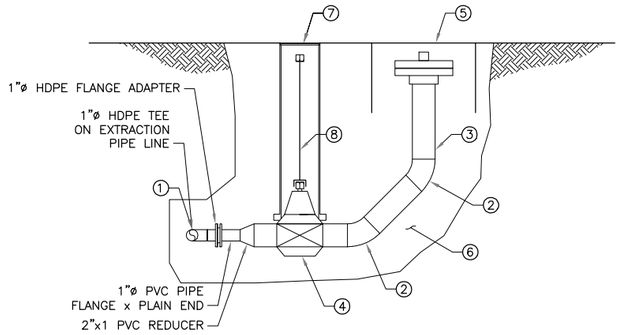
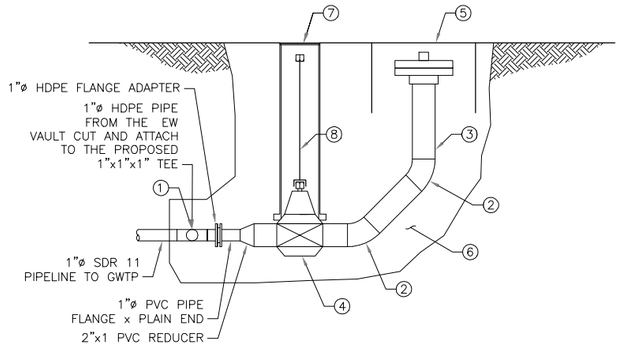
SHEET 2

NOT TO SCALE



1"ø INTERMEDIATE CLEANOUT DETAIL

SCALE: NTS

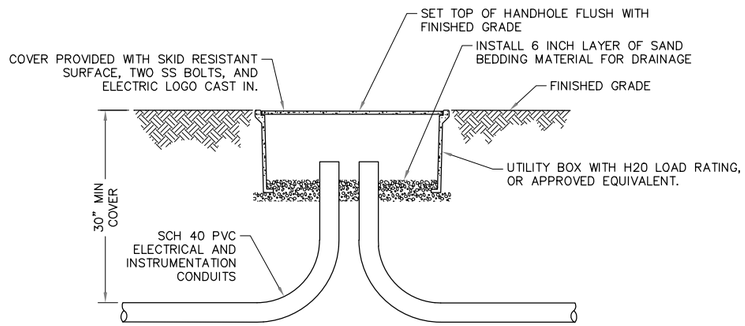


1"ø CLEANOUT DETAIL @ EW VAULTS

SCALE: NTS

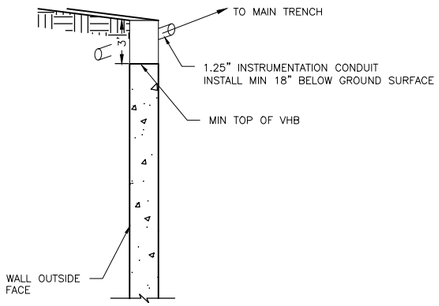
1"ø CLEANOUT NOTES:

1. 1"ø TEE – HDPE SDR 11.
2. 45° SWEEP – SCH 80 PVC.
3. SCH 80 PVC CLEANOUT TO 2" BELOW GRADE. TAPPED FLANGE WITH BRASS THREADED PLUG.
4. 2"ø PVC GATE VALVE. FLANGE ENDS, SQUARE NUT OPERATED WITH EXTENSION STEM, AND VITON O–RINGS. MODEL 2033–020 B4 SPEARS MFG CO.
5. MANHOLE – 12"ø, 3–BOLT, WATERTIGHT, NEOPRENE GASKET, 12" GALVANIZED SKIRT MADE BY MORRIS IND.
6. PIPE BEDDING MATERIAL. EXTENDS TO GRADE – WHOLE EXCAVATION.
7. CLOW, SCREW TYPE ADJUSTABLE VALVE BOX, F–2454 WITH 5¼" LID OR APPROVED EQUAL.
8. CLOW EXTENSION STEM WITH 2" BRONZE OPERATING NUT



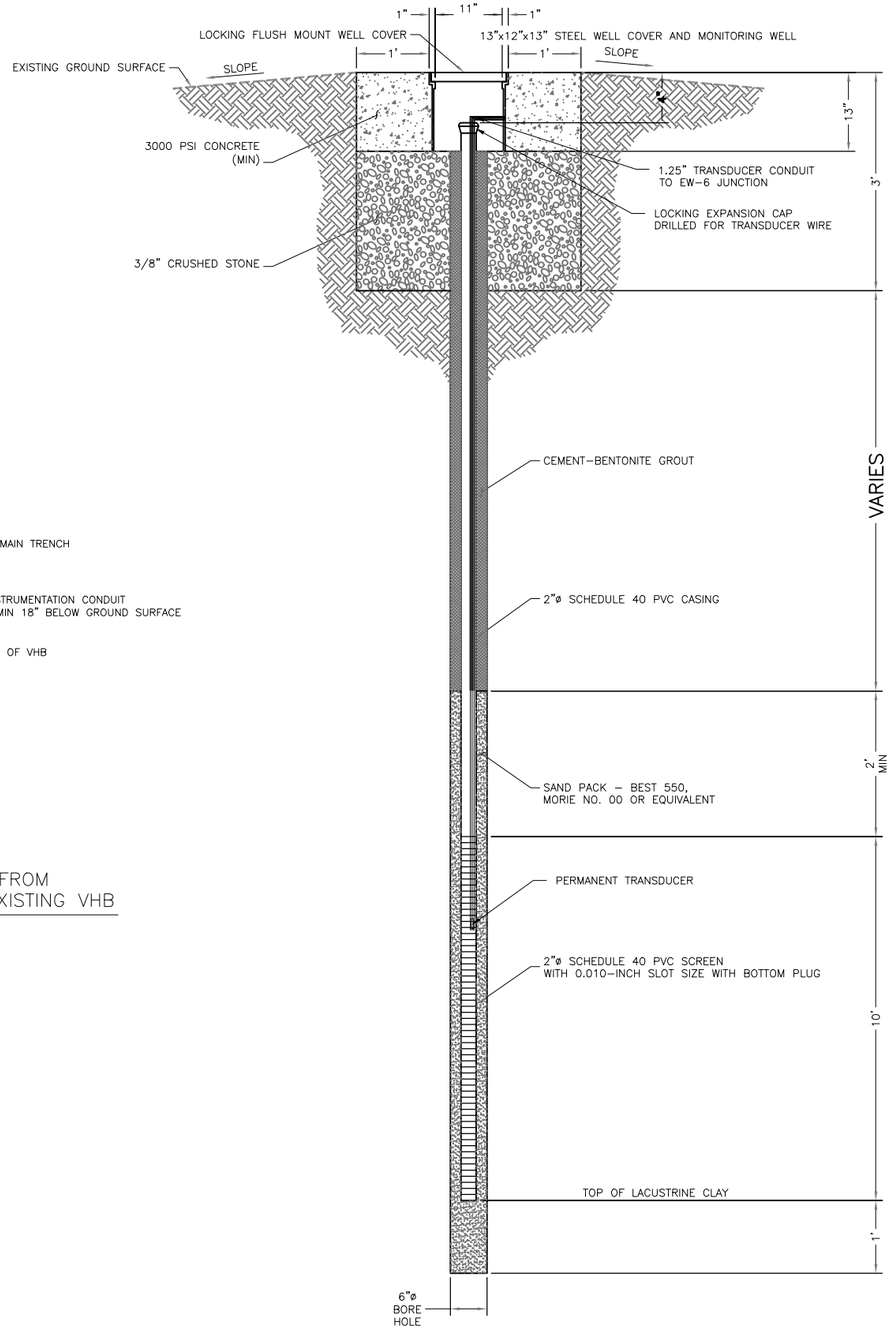
ELECTRICAL HANDHOLE DETAIL

SCALE NTS



INSTRUMENTATION CONDUIT FROM OBSERVATION WELL OVER EXISTING VHB

NTS



OBSERVATION WELL TRANSDUCER

NTS

B

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SHEET 3

SITE WORK DETAILS

SOUTH BUFFALO DEVELOPMENT, LLC

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SHEET 3

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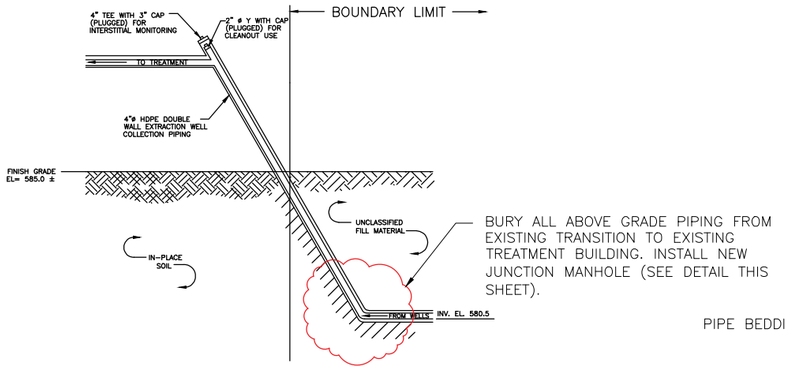
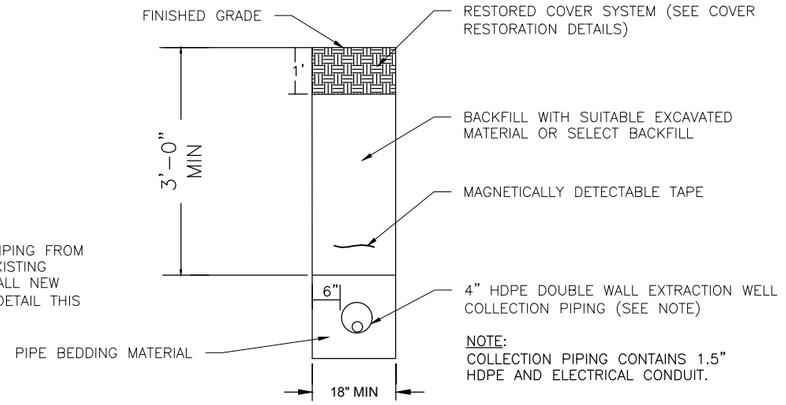


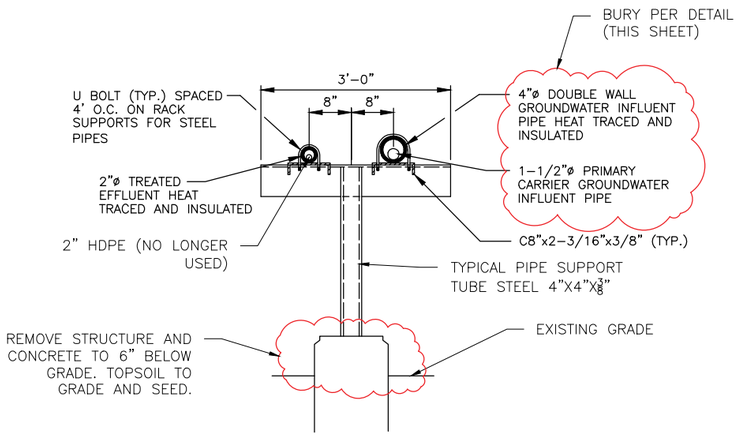
EXISTING AREA D PIPING TRANSITION FROM BELOW GRADE TO ABOVE GRADE

SCALE NTS



NEW AREA D BELOW GRADE CONVEYANCE PIPING

SCALE NTS



EXISTING ABOVE-GRADE PIPE SUPPORT DETAIL

SCALE NTS

B

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SHEET 4

TYPICAL DETAILS
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SHEET 4

NOT TO SCALE

PROCESS WATER
RECIRCULATION/DECANT
CHEMICAL FEED
SLUDGE HANDLING
POTABLE WATER
COMPRESSED AIR
INSTRUMENTATION WIRE
INSTRUMENTATION
INSULATION
HEAT TRACED W/ INSULATION
INSULATION (FREEZE PROTECTION) CLASS H
INSULATION (UV PROTECTION) CLASS B
FLOW DIRECTION
PIPE BREAK LINE
PIPE CROSS OVER
INSTRUMENTATION CROSS OVER
EQUIPMENT WITHIN BOUNDARIES TO BE PACKAGED SUPPLY

PIPE CAP
FLANGE CONNECTION
REDUCER
ECCENTRIC REDUCER
PIPING CONNECTION
PIPE UNION
CAM LOCK COUPLER
CAM LOCK CAP
CHEMICAL SEAL

KNIFE GATE
GATE
BALL
GLOBE
ORBIT
PLUG
3-WAY PLUG
BUTTERFLY
CHECK
STOP CHECK
DIAPHRAGM
PINCH
NEEDLE
3-WAY
AIR FILTER

4-WAY
ANGLE
SLIDE GATE
ROTARY
WEIGHTED RELIEF
ROOT VALVE (UNDEFINED TYPE)
SOLENOID
AIR/VAC RELEASE
SIGHT GLASS
PRESSURE REGULATOR
VIBRATION DAMPENER

(NO SYMBOL) = MANUAL FOR ON-OFF SERVICE
HANDWHEEL (MANUAL OVERRIDE)
RATE ADJUSTMENT (MANUAL)
PRESSURE-SAFETY
ELECTRIC MOTOR w/POSITIONER BOARD

ELECTRIC MOTOR
PENUMATIC
GEAR OPERATOR
ELECTRO-HYDRAULIC
(WITHOUT)
SOLENOID
(WITH)= MANUAL OVERRIDE

FO — SYMBOL LOCATED BY VALVE - USED ONLY WHERE NECESSARY TO INCREASE UNDERSTANDING OF THE SYSTEM.
FO = FAIL OPEN
FL = FAIL LOCKED
FC = FAIL CLOSED
FI = FAIL INDETERMINATE
F = USED WITH 3-WAY & 4-WAY VALVE- ARROWS SHOW PATHS OPEN TO FLOW ON POWER FAILURE.

MAGNETIC TYPE FLOW METER
TURBINE OR PROPELLER TYPE PRIMARY ELEMENT

CENTRIFUGAL PUMP
ROTARY LOBE BLOWER, COMPRESSOR OR GEAR PUMP
FAN/BLOWER
VERTICAL CENTRIFUGAL PUMP
VERTICAL TURBINE
DIAPHRAGM CHEMICAL FEED PUMP- WITH INTERNAL RELIEF VALVE
METERING PUMP
STATIC MIXER

DIAPHRAGM PUMP (PNEUMATIC OPERATION)
DIAPHRAGM PUMP-TWIN STAGE (PNEUMATIC OPERATION)
PROGRESSIVE CAVITY PUMP
PERISTALTIC (HOSE) PUMP
CAM PUMP
AGITATOR, MIXER
SUBMERSIBLE PUMP
SCREW CONVEYOR

P — PURGE OR FLUSHING DEVICE
R — RESET FOR LATCH - TYPE ACTUATOR
I AND OR — INTERLOCKING FUNCTIONS
GENERALIZED SPECIFIC
I/P — PRESSURE TRANSDUCER

	CONTROL ROOM OR MAIN CONTROL PANEL		AUXILLARY LOCATION		
	PRIMARY CONTROL PANEL NORMALLY ACCESSIBLE TO OPERATOR	BEHIND PANEL OR NORMALLY INACCESSIBLE FUNCTION	AUXILIARY PANEL OR RACK NORMALLY ACCESSIBLE TO OPERATOR	AUXILIARY PANEL OR RACK NORMALLY INACCESSIBLE TO OPERATOR	FIELD MOUNTED
DISCRETE INSTRUMENTS					
SHARED DISPLAY, SHARED CONTROL					
COMPUTER FUNCTION (INCLUDING DISTRIB. CONTROL SYS.)					
PROGRAMMABLE LOGIC CONTROLLER FUNCTION					

MEASURE OR INITIATING VARIABLE	MODIFIER (1)	READOUT OR PASSIVE FUNCTION	OUTPUT FUNCTION	MODIFIER
A = ANALYSIS (2)		ALARM		
B = BURNER, COMBUSTION		USER'S CHOICE (3)	USER'S CHOICE (3)	USER'S CHOICE (3)
C = CONDUCTIVITY (ELECTRICAL)			CONTROL	
D = DENSITY OR SP. GR.	DIFFERENTIAL			
E = VOLTAGE (EMF)		SENSOR (PRIMARY ELEMENT)		
F = FLOW RATE	RATIO (FRACTION)			
G = USER'S CHOICE (3)		GLASS OR VIEWING DEVICE		
H = HAND (MANUAL)				HIGH
I = CURRENT (ELECTRICAL)		INDICATE		
J = POWER	SCAN (5)			
K = TIME OR TIME SCHEDULE	TIME RATE OF CHANGE		CONTROL STATION	
L = LEVEL		LIGHT		LOW
M = USER'S CHOICE (3)	MOMENTARY			MIDDLE OR INTERMEDIATE
N = USER'S CHOICE (3)		USER'S CHOICE (3)	USER'S CHOICE (3)	USER'S CHOICE (3)
O = USER'S CHOICE (3)		ORIFICE (RESTRICTION)		
P = PRESSURE OR VACUUM		TEST OR SAMPLE POINT		
Q = QUANTITY	INTEGRATE OR TOTALIZE			
R = RADIATION		RECORD OR PRINT		
S = SPEED OR FREQUENCY	SAFETY		SWITCH	
T = TEMPERATURE			TRANSMIT	
U = MULTIVARIABLE		MULTIFUNCTION	MULTIFUNCTION	MULTIFUNCTION
V = VIBRATION, MECH. ANALYSIS			VALVE, DAMPER OR LOUVER	
W = WEIGHT OR FORCE		WELL		
X = UNCLASSIFIED (4)	X AXIS	UNCLASSIFIED (4)	UNCLASSIFIED (4)	UNCLASSIFIED (4)
Y = EVENT, STATE OR PRESENCE	Y AXIS		RELAY, COMPUTE, CONVERT	
Z = POSITION OR DIMENSION	Z AXIS		DRIVE , ACTUATOR, ETC.	

(1) ANY FIRST LETTER COMBINED WITH MODIFIER REPRESENTS A NEW AND SEPARATE MEASURED VARIABLE. EXAMPLES: PD= DIFFERENTIAL PRESSURE, FQ= INTEGRATED R TOTALIZED FLOW. EXCEPTION IS THE MODIFIER "J" FOR MULTIPOINT SCANNING.
(2) FOR ANALYSIS NOT IDENTIFIED BY A SPECIFIC LETTER IN THE TABLE, USE FIRST LETTER "A". NEAR THE INSTRUMENT SYMBOL, SPECIFY THE NATURE OF THE ANALYSIS. EXAMPLE: SILICA.
(3) MEANING OF A "USER CHOICE" LETTER SHALL BE CONSISTENT THROUGHOUT A PROJECT AND SHALL BE SPECIFIED IN THE DRAWING LEGEND.
(4) UNCLASSIFIED LETTER MAY HAVE A FEW DIFFERENT MEANINGS ON A PROJECT. THE MEANING SHALL BE SPECIFIED NEAR EACH INSTRUMENT SYMBOL USING THE UNCLASSIFIED LETTER.
(5) THE MODIFIER "SCAN" APPLIES TO MULTIPOINT PRINTING INSTRUMENTS, SUCH AS CJRS (MULTIPOINT CONDUCTIVITY RECORDER WITH ALARM SWITCHES).

REV.	DATE	BY	REMARKS
A	11/01/22	KAL	UPDATED.
-	05/24/22	KAL	INITIAL ISSUE.

CUSTOMER: INVENTUM ENGINEERING
SITE: FORMER BUFFALO COLOR CORP

TITLE: PIPING & INSTRUMENT DIAGRAM 100 GPM TREATMENT SYSTEM

SCALE: NTS	BY	DATE
DRAWN	KAL	5/24/22
APPROVALS	BY	DATE
MECH.	KAL	5/24/22
I&C		
PROCESS		

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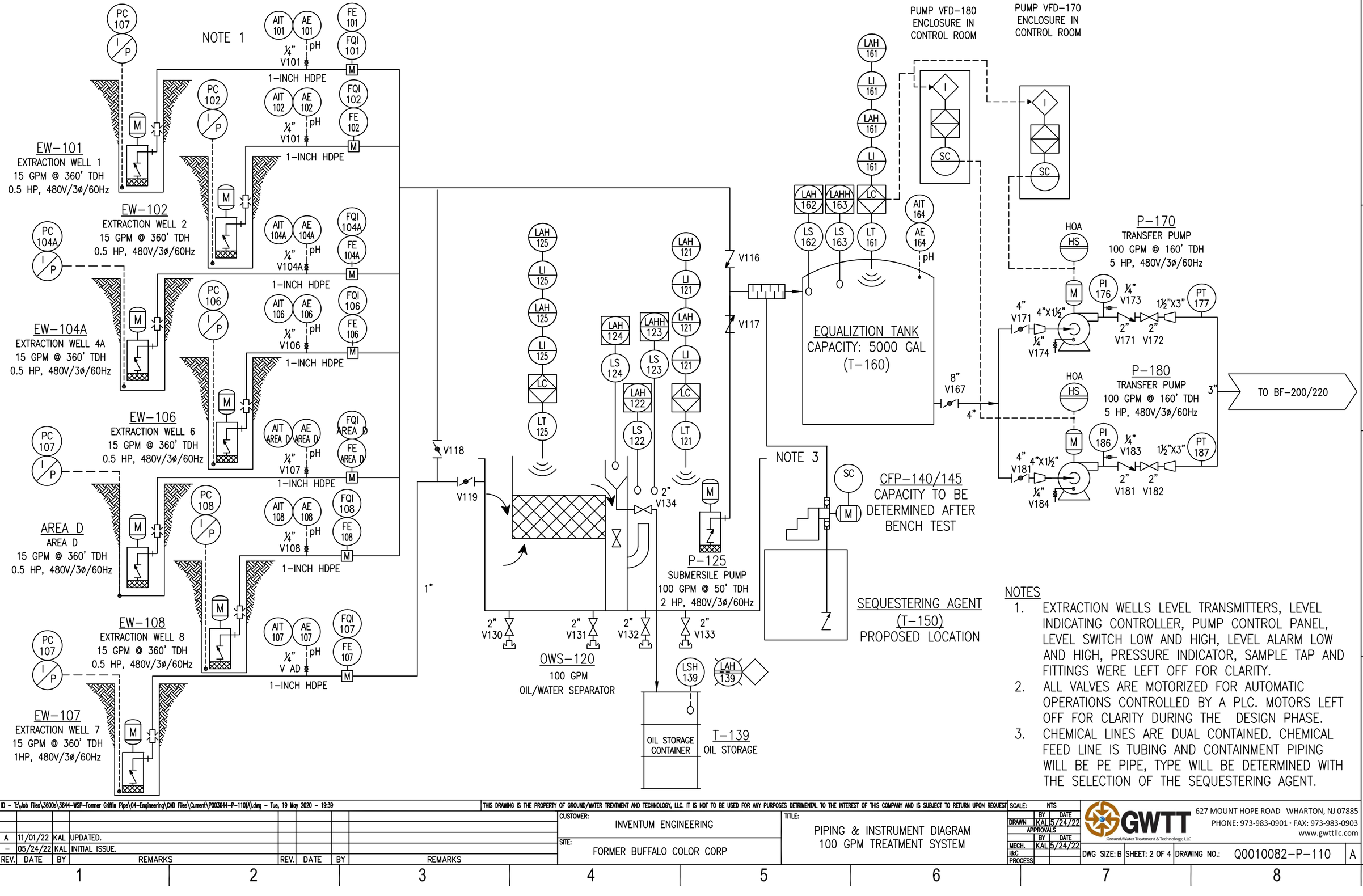
DWG SIZE: B | SHEET: 1 OF 4 | DRAWING NO.: Q0010082-P-110 | A



NOTES

1. EXTRACTION WELLS LEVEL TRANSMITTERS, LEVEL INDICATING CONTROLLER, PUMP CONTROL PANEL, LEVEL SWITCH LOW AND HIGH, LEVEL ALARM LOW AND HIGH, PRESSURE INDICATOR, SAMPLE TAP AND FITTINGS WERE LEFT OFF FOR CLARITY.
2. ALL VALVES ARE MOTORIZED FOR AUTOMATIC OPERATIONS CONTROLLED BY A PLC. MOTORS LEFT OFF FOR CLARITY DURING THE DESIGN PHASE.
3. CHEMICAL LINES ARE DUAL CONTAINED. CHEMICAL FEED LINE IS TUBING AND CONTAINMENT PIPING WILL BE PE PIPE, TYPE WILL BE DETERMINED WITH THE SELECTION OF THE SEQUESTERING AGENT.

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REV.	DATE	BY	REMARKS
A	11/01/22	KAL	UPDATED.
–	05/24/22	KAL	INITIAL ISSUE.

CUSTOMER: INVENTUM ENGINEERING

SITE: FORMER BUFFALO COLOR CORP

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SCALE: NTS	BY	DATE
DRAWN	KAL	5/24/22
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DWG SIZE: B | SHEET: 2 OF 4 | DRAWING NO.: Q0010082–P–110 | A

FROM FROM P-170 AND P-180

BF-200/BF-220
DUPLEX 20-BAG FILTER SKID
3" 2"

DPAH 228
DPS 228

¼" V226

¼" V203 PI 201 V201 V221 ¼" V223 PI 221
3"

PI 202 ¼" V204 V202 1" V205 PI 222 ¼" V224 V222 1" V225

¼" V227 3" FE 230 3"

3" BYPASS OF BF-200/BF-220

MMF-240 A / MMF-240 B / MMF-240 C
100 GPM MULTI MEDIA FILTER
5-MICRON FILTRATION

DPS

INFLUENT LINE
BACKWASH CONTROL PANEL
BACKWASH LINE

V241 V242 V243 PI 241 V244

MMF-240 A MULTI MEDIA FILTER
MMF-240 B MULTI MEDIA FILTER
MMF-240 C MULTI MEDIA FILTER

V264 2" DRAIN 3"X2" 3" 100 GPM MULTI MEDIA FILTERS V245

SG 250 FE 260 3" TO DECANT TANK T-270

EFFLUENT LINE 3" SAMPLE PORT V222 3" PRESSURE SUSTAINING VALVE TO GAC-300 AND GAC-330

LAH 237 LSH 237 M T-235 DRAIN DRUM

BACKWASH FROM MMF-240A/B/C 3" V275
BACKWASH FROM GAC-300 AND GAC-330 3" V276 1" V238

LAH 273 LAHH 274 LS 273 LS 274

DECANT TANK
CAPACITY: 2000 GAL
(T-270)
CONE BOTTOM

4" V275

HOA HS M P-280
TRANSFER PUMP
100 GPM @ 160' TDH
5 HP, 480V/3ø/60Hz
PI 281 ¼" V283 1½"X2" PT 187
4"X1½" 4" V285 ¼" V284 2" V281 2" V282

HOA HS M P-290
TRANSFER PUMP
100 GPM @ 160' TDH
5 HP, 480V/3ø/60Hz
PI 291 ¼" V293 1½"X2" PT 187
4"X1½" 4" V295 ¼" V294 2" V291 2" V292

TO EQUALIZATION TANK T-160

REV.	DATE	BY	REMARKS
A	11/01/22	KAL	UPDATED.
–	05/24/22	KAL	INITIAL ISSUE.

CUSTOMER: INVENTUM ENGINEERING

SITE: FORMER BUFFALO COLOR CORP

TITLE: PIPING & INSTRUMENT DIAGRAM 100 GPM TREATMENT SYSTEM

SCALE: NTS

APPROVALS	BY	DATE
DRAWN	KAL	5/24/22
MECH.	KAL	5/24/22
I&C		
PROCESS		

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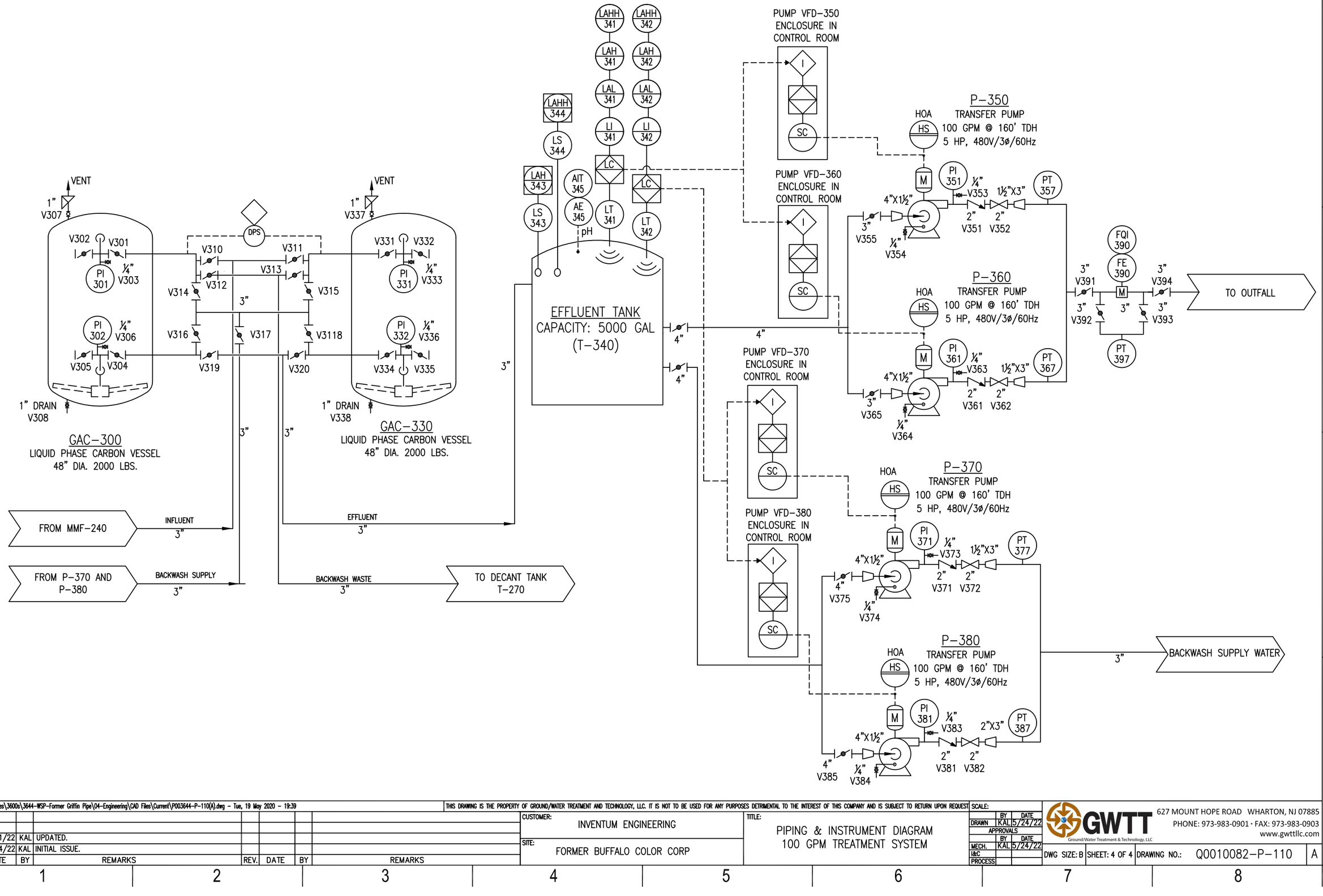
DWG SIZE: B | SHEET: 3 OF 4 | DRAWING NO.: Q0010082-P-110 | A



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REV.	DATE	BY	REMARKS
A	11/01/22	KAL	UPDATED.
–	05/24/22	KAL	INITIAL ISSUE.

CUSTOMER: INVENTUM ENGINEERING

SITE: FORMER BUFFALO COLOR CORP

TITLE: PIPING & INSTRUMENT DIAGRAM 100 GPM TREATMENT SYSTEM

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DWG SIZE: B | SHEET: 4 OF 4 | DRAWING NO.: Q0010082-P-110 | A

Appendix F – Excavation Work Plan

APPENDIX B – EXCAVATION WORK PLAN

This Excavation Work Plan (EWP) specifies requirements for excavation and grading activities, stockpiling and soil staging areas, on-Site reuse criteria, waste characterization sampling, soil loading and transportation, and requirements for offsite disposal. The plan also addresses steps that will be taken in the event that buried drums, underground storage tanks, pipes or sewers are encountered during future construction activities.

B-1 NOTIFICATION

At least 15 days prior to the start of any activity that is anticipated to encounter remaining contamination, the Site owner or their representative will notify the Department. This notification will be made to:

Regional Hazardous Waste Remediation Engineer
NYSDEC Region 9
Division of Environmental Remediation
270 Michigan Avenue
Buffalo, NY 14203

This notification will include:

- A detailed description of the work to be performed, including the location and areal extent, plans for Site re-grading, intrusive elements or utilities to be installed below the soil cover, estimated volumes of contaminated soil to be excavated and any work that may impact an engineering control,
- A summary of environmental conditions anticipated in the work areas, including the nature and concentration levels of contaminants of concern, potential presence of “grossly contaminated” media, and plans for any pre-construction sampling;
- A schedule for the work, detailing the start and completion of all intrusive work,
- A summary of the applicable components of this EWP,
- A statement that the work will be performed in compliance with this EWP and 29 CFR 1910.120,

- A copy of the contractor's health and safety plan, in electronic format, if it differs from the HASP provided in Appendix D of this SMP,
- Identification of disposal facilities for potential waste streams, and
- Identification of sources of any anticipated backfill, along with all required chemical testing results.

B-2 SOIL SCREENING METHODS

Visual, olfactory, and instrument-based soil screening will be performed by a qualified environmental professional during all remedial and development excavations into known or potentially contaminated material (remaining contamination). Soil screening will be performed regardless of when the invasive work is done and will include all excavation and invasive work performed during development, such as excavations for foundations and utility work, after issuance of the Certificate of Completion COC.

Where possible, soils will be segregated based on previous environmental data and screening results into material that requires offsite disposal, material that requires testing, material that can be returned to the subsurface, and material that can be used as cover soil.

Additional discussion pertaining to soil screening for on-Site reuse or offsite disposal is contained in Section B-7 of this EWP.

B-3 STOCKPILE METHODS

Excavated soil associated with remaining contamination will be stockpiled on the property for characterization when direct load-out of soil for offsite disposal is not appropriate. Specific locations for the stockpile areas will be determined during construction. Stockpile areas will be lined with poly sheeting having a thickness of at least 10 mils.

Soil stockpiles will be continuously encircled with a berm consisting of poly covered earth, hay bales, wooden frames, compost sock, and/or silt fence. Hay bales will be used as

needed near catch basins, surface waters and other discharge points. Existing concrete curbs and slabs may also be used as part of the stockpile system provided that they are covered with the 10-mil poly sheeting.

Stockpiles will be kept covered at all times with appropriately anchored tarps. Stockpiles will be routinely inspected, and damaged tarp covers will be promptly replaced. Spray-on dust suppression agents may be applied when soil is not being added or removed to reduce the infiltration of precipitation and the migration of dust. When a temporary stockpile area is no longer needed, all used plastic liners and berm construction materials will be properly disposed.

As an alternative to temporary stockpiles, rolloff boxes (tarped and lined as necessary) may be used for on-Site accumulation of excavated materials.

Stockpiles will be inspected at a minimum of once each week and after every storm event. Results of inspections will be recorded in a logbook and maintained at the Site and available for inspection by NYSDEC.

A daily record of the accumulation date(s), origination point, estimated volume (in cubic yards), date/location of on-Site reuse, sampling and characterization details, and date of offsite transportation, as appropriate, for each separate soil stockpile will be maintained by the owner.

Soils that require offsite disposal will not be stockpiled for more than 90 days after completion of the specific excavation. Characterization samples of the stockpiled material will be collected within two weeks (14 calendar days) after completion of an excavation; standard laboratory turnaround (approximately 3 weeks) will be used for all laboratory testing unless an expedited turnaround time is required. Soils identified for on-Site reuse beneath the cover system, as determined via the process described below, will not be stockpiled onsite for more than 180 days without NYSDEC approval.

B-4 MATERIALS EXCAVATION AND LOAD OUT

A qualified environmental professional or person under their supervision will oversee all invasive work and the excavation and load-out of all excavated material.

For excavation work below the cover system, a Professional Engineer's (P.E.'s) representative with construction/remediation experience, representing the property owner or developer, will monitor excavations or disturbances that will extend below the Site cover system. The Site owner at the time of intrusive work must provide a P.E. stamped/signed certification that excavation work below the cover system and subsequent repair/replacement of the cover system was conducted in a manner consistent with this EWP and applicable sections of the SMP.

The owner of the property and its contractors are solely responsible for safe execution of all invasive and other work performed under this EWP.

The presence of utilities and easements on the Site will be investigated by the qualified environmental professional. It will be determined whether a risk or impediment to the planned work under this SMP is posed by utilities or easements on the Site.

Loaded vehicles leaving the Site will be appropriately lined, tarped, securely covered, manifested, and placarded in accordance with appropriate Federal, State, local, and NYSDOT requirements (and all other applicable transportation requirements).

A truck wash will be operated onsite when determined necessary by the qualified environmental professional. The qualified environmental professional will be responsible for ensuring that all outbound trucks will be washed at the truck wash before leaving the Site until the activities performed under this section are complete.

Locations where vehicles enter or exit the Site shall be inspected daily for evidence of offsite soil tracking.

The qualified environmental professional will be responsible for ensuring that all egress points for truck and equipment transport from the Site are clean of dirt and other materials derived from the Site during intrusive excavation activities. Cleaning of the

adjacent streets will be performed as needed to maintain a clean condition with respect to Site-related materials.

B-5 MATERIALS TRANSPORT OFFSITE

All transport of materials will be performed by licensed haulers in accordance with appropriate local, State, and Federal regulations, including 6 NYCRR Part 364. Haulers will be appropriately licensed and trucks properly placarded.

Material transported by trucks exiting the Site will be secured with tight-fitting covers. Loose-fitting canvas-type truck covers will be prohibited. If loads contain wet material capable of producing free liquid, truck liners will be used.

All trucks will be inspected and, if determined necessary by the qualified environmental professional, washed prior to leaving the Site. Truck wash waters will be collected and disposed of in an appropriate manner.

Truck transport routes will be developed to take into account: (a) limiting transport through residential areas and past sensitive Sites; (b) use of city mapped truck routes; (c) prohibiting offsite queuing of trucks entering the facility; (d) limiting total distance to major highways; (e) promoting safety in access to highways; (f) overall safety in transport; and (g) community input [where necessary].

Trucks will be prohibited from stopping and idling in the neighborhood outside the project Site.

Egress points for truck and equipment transport from the Site will be kept clean of dirt and other materials during Site remediation and development.

Queuing of trucks will be performed on the Site in order to minimize offsite disturbance. Offsite queuing will be prohibited.

B-6 MATERIALS DISPOSAL OFFSITE

All soil/fill/solid waste excavated and removed from beneath the Site cover system will be treated as contaminated and regulated material and will be transported and disposed

in accordance with all local, State (including 6NYCRR Part 360), and Federal regulations. If disposal of soil/fill from this Site is proposed for unregulated offsite disposal (i.e., clean soil removed for development purposes), a formal request with an associated plan will be made to the NYSDEC. Unregulated offsite management of materials from this Site will not occur without formal NYSDEC approval.

Offsite disposal locations for excavated soils will be identified in the pre-excavation notification. This will include estimated quantities and a breakdown by class of disposal facility if appropriate (i.e., hazardous waste disposal facility, solid waste landfill, petroleum treatment facility, C/D recycling facility, etc). Actual disposal quantities and associated documentation will be reported to the NYSDEC in the Periodic Review Report. This documentation will include: waste profiles, test results, facility acceptance letters, manifests, bills of lading and facility receipts.

Non-hazardous historic fill and contaminated soils taken offsite will be handled, at a minimum, as a Municipal Solid Waste per 6NYCRR Part 360-1.2. Material that does not meet Track 1 unrestricted soil cleanup objectives (SCOs) is prohibited from being taken to a New York State recycling facility (6NYCRR Part 360-16 Registration Facility).

B-7 ON-SITE MATERIALS REUSE

Chemical criteria for on-Site reuse of material have been approved by NYSDEC and are discussed in the following paragraphs. The qualified environmental professional will ensure that procedures defined for materials reuse in this SMP are followed and that unacceptable excavated material does not remain onsite. Contaminated on-Site material, including historic fill and contaminated soil, that is acceptable for re-use onsite will be placed below the demarcation layer or impervious surface, and will not be reused within a cover soil layer, within landscaping berms, or as backfill for subsurface utility lines.

Any demolition material proposed for reuse onsite will be sampled for asbestos and the results will be reported to the NYSDEC for acceptance. Concrete crushing or processing onsite will not be performed without prior NYSDEC approval. Organic matter (wood, roots,

stumps, etc.) or other solid waste derived from clearing and grubbing of the Site will not be reused onsite.

B-7.1 Site-Specific Action Levels

To evaluate soils for potential reuse onsite as fill beneath the Site cover system, the following process will be used.

Step 1 - Determine if Excavated Material is "Grossly Contaminated": For the purposes of this project, "grossly contaminated" soil exhibits one or more of the following characteristics:

- Visual indication of non-aqueous phase liquid (NAPL);
- Visual indication of other separate phase materials of concern, such as elemental mercury; and/or
- Sustained or repeated periodic photoionization detector (PID) readings, as obtained in ambient air at the surface of the excavated material, of greater than 10 ppm above background levels over a 1-minute interval.

Discolored soil will not be considered "grossly contaminated" if it does not exhibit any of the above characteristics.

If excavated material is identified as "grossly contaminated", it will be characterized for offsite disposal. Any excavated material that does not meet the definition of "grossly contaminated" will be evaluated as defined in Step 2 below.

Step 2 – Compare to Site-Specific Action Levels (SSALs): Samples of the excavated material will be sampled and characterized at a NYSDEC-approved offsite laboratory using the procedures described in this document. The results of the characterization testing will then be screened against the SSALs. The soils will be considered to meet the SSALs if concentrations of tested constituents meet the following parameters:

- Individual Volatile Organic Compounds (VOCs) < Commercial SCOs

- Total Semivolatile Organic Compounds (SVOCs) < 500 ppm
- Individual Polychlorinated Biphenyls (PCBs) Aroclors < Commercial SCOs
- Metals < 10x Commercial SCOs

It should be noted that the SSALs are not remedial action levels or cleanup goals for the Site remedy. It is further understood that the SSALs will not be used as triggers for additional remediation beyond that specified in the Alternatives Analysis Report (AAR, Mactec, 2009), except as follows: If concentrations of any analyzed metal exceeds the SSAL, then Toxicity Characteristic Leaching Procedure (TCLP) testing will be completed on that sample for that metal. If the TCLP result exceeds the TCLP limit for that metal, then additional sampling in the area of excavation from which the soil originated will be proposed to determine if additional remediation is warranted. The determination of whether additional action is warranted will be made by assessing the TCLP data, as well as Site-specific information. If it is determined that additional investigation is warranted, that investigation should focus on the potential for those metals to have an impact on groundwater.

If discolored soils are encountered during the field work, special attention will be given to that area to assess possible impacts upon groundwater.

If the excavated material is not "grossly contaminated" and all sample results meet the SSALs, then the excavated material can be reused on Site as structural fill placed beneath the cover system. If the excavated material does not meet the requirements of either Step 1 or Step 2, or if for any reason the material is not suitable for reuse onsite, it will be taken offsite for proper disposal

B-7.2 Sampling And Characterization Of Stockpiled Soil

For stockpiled soil that may be reused as fill and is not "grossly contaminated" as determined based on Step 1 above, one composite sample will be collected for every 100 cubic yards (or portion thereof) of stockpiled soil. The composite sample will be collected from five locations from each 100 cubic yard volume. PID measurements will be recorded for each of the five individual locations. One grab sample will be collected from the

individual location with the highest PID measurement. If none of the five individual sample locations exhibit PID readings, one location will be selected at random. The composite sample will be analyzed by a New York State Department of Health (NYSDOH) Environmental Laboratory Approval Program (ELAP) certified laboratory for Target Compound List (TCL) SVOCs (plus aniline), PCBs, and Target Analyte List (TAL) metals plus cyanide. The grab sample will be analyzed for TCL VOCs. The full list of TCL VOCs and SVOCs is provided as Attachment B-1 of this EWP. If offsite disposal is expected, an additional composite sample will be collected for TCLP analysis and other characterization tests, as specified by the disposal facility.

Soil samples will be composited by placing equal portions of soil from each of the five individual sample locations into a pre-cleaned, stainless steel (or Pyrex glass) mixing bowl. The soil will be thoroughly homogenized using a stainless steel or disposable plastic scoop or trowel and transferred to pre-cleaned jars provided by the laboratory. Sample jars will then be labeled and a chain-of-custody form will be prepared.

Any stockpiled soil with TCLP/characterization results that indicate the material is hazardous waste (as defined by the Resource Conservation Recovery Act) will be subject to the applicable hazardous waste storage, labeling, handling, transportation and disposal regulations.

B-8 FLUIDS MANAGEMENT

As may be required, pumping of water (i.e., groundwater and/or storm water) that has accumulated in an excavation will be done in a manner to prevent the migration of particulates, soil, or unsolidified concrete materials and prevent damage to the existing subgrade. Water pumped from the excavations may be discharged to the BSA sewer system, after BSA approval has been obtained. If the water quality is such that the BSA will not approve the discharge to a sewer, or if the water cannot be sufficiently treated so that BSA approval is obtained, it will be stored in temporary storage tanks, characterized, and transported offsite for proper disposal. Runoff from the surface will be controlled to prevent discharges to storm sewers or the Buffalo River.

All liquids to be removed from the Site, including excavation dewatering and groundwater monitoring well purge and development waters, will be handled, transported and disposed in accordance with applicable local, State, and Federal regulations. Dewatering, purge and development fluids will not be recharged back to the land surface or subsurface of the Site unless otherwise approved.

Any discharge of water generated during large-scale construction activities to surface waters (i.e., the Buffalo River) will be performed under a State Pollutant Discharge Elimination System (SPDES) permit.

B-9 COVER SYSTEM RESTORATION

After the completion of soil removal and any other invasive activities, the cover system will be restored in a manner that complies with the Remedial Action Work Plan (RAWP) and cover system design details. The demarcation layer, consisting of black woven geotextile, will be replaced to provide a visual reference of the zone that requires adherence to special conditions for disturbance of remaining contaminated soils defined in this Site Management Plan. If the type of cover system changes from that which exists prior to the excavation (i.e., a soil cover is replaced by asphalt), this will constitute a modification of the cover element of the remedy and the upper surface of the 'Remaining Contamination'. A figure showing the modified surface will be included in the subsequent Periodic Review Report and in any updates to the SMP.

B-10 BACKFILL FROM OFFSITE SOURCES

All materials proposed for import onto the Site will be approved by the qualified environmental professional and will be in compliance with provisions in this SMP prior to receipt at the Site.

Material from industrial sites, spill sites, other environmental remediation sites, or potentially contaminated sites will not be imported to the Site.

All imported soils will meet the backfill and cover soil quality standards established in 6 NYCRR 375-6.7(d). Backfill and cover soil must not exceed the lower of the Commercial or Protection of Groundwater SCOs as discussed in sections B-10.1 and B-10.2. Soils that meet 'exempt' fill requirements under 6 NYCRR Part 360, but do not meet backfill or cover soil objectives for this Site, will not be imported onto the Site without prior approval by NYSDEC. Solid waste will not be imported onto the Site without a Beneficial Use Determination and a prior NYSDEC approval.

Trucks entering the Site with imported soils will be securely covered with tight fitting covers. Imported soils will be stockpiled separately from excavated materials and covered to prevent dust releases.

B-10.1 Structural Fill beneath the Cover System

Excavated material, crushed asphalt or concrete from building demolition, and clean fill/borrow material brought on Site for use as structural fill beneath the Site cover system must meet the following criteria:

All materials from on-Site sources must be shown through testing to have concentrations of constituents that are less than or equal to the SSALs.

Material from offsite sources intended for use as Site backfill shall meet the Commercial SCOs (Protection of Public Health) or Protection of Groundwater SCOs established in 6 NYCRR 375-6.7(d), whichever is more stringent, except as follows:

The following material may be imported for use as backfill, without chemical testing, for use beneath pavement, buildings, or below the cover system, provided it contains less than 10% by weight of material which would pass through a size 200 sieve and consists of:

- Rock or stone, consisting of virgin material from a permitted mine or quarry; or
- Recycled concrete or brick from a Department registered construction and demolition debris processing facility which conforms to Section 304 of the

New York Department of Transportation Standard Specifications Construction and Materials Volume I (2002).

Offsite borrow materials intended for use on the Site which require chemical testing will be tested via collection of one composite sample per 500 cubic yards of material from each source area. The sample will be analyzed for TCL VOCs, TCL SVOCs, PCBs, and TAL metals plus cyanide. If more than 1,000 cubic yards of material are borrowed from a given offsite source area and both samples of the first 1,000 cubic yards meet the SSALs, the sample collection frequency will be reduced to one composite for every 2,500 cubic yards of additional material from the same source, up to 5,000 cubic yards. For borrow sources greater than 5,000 cubic yards, sampling frequency will be reduced to one sample per 5,000 cubic yards, provided all earlier samples met the SSALs.

B-10.2 Cover System Soils

The cover soil material will meet the following criteria:

- Offsite borrow soils will be documented as having originated from locations having no evidence of disposal or release of hazardous, toxic or radioactive substances, wastes or petroleum products.
- Offsite soils intended for use as Site cover will not be defined as a solid waste in accordance with 6 NYCRR Part 360-1.2(a).

If offsite soil intended for use as cover material is considered “virgin”, it will be further documented in writing to be native soil material from areas not having supported any known prior industrial or commercial development or agricultural use.

Offsite soils to be used as cover soils must not exceed the lower of the Commercial or Protection of Groundwater SCOs.

Non-virgin soils will be tested via collection of one composite sample per 500 cubic yards of material from each source area. The sample will be analyzed for TCL VOCs, TCL SVOCs, PCBs, and TAL metals plus cyanide. If more than 1,000 cubic yards of soil are borrowed from a given offsite non-virgin soil source area and both samples of the first 1,000

cubic yards meet the specified SCOs, the sample collection frequency will be reduced to one composite for every 2,500 cubic yards of additional soils from the same source, up to 5,000 cubic yards. For borrow sources greater than 5,000 cubic yards, sampling frequency will be reduced to one sample per 5,000 cubic yards, provided all earlier samples met the specified SCOs.

The topsoil used for the final cover will be fertile, friable, natural loam surface soil, capable of sustaining plant growth, and free of clods or hard earth, plants or roots, sticks or other extraneous material harmful to plant growth.

Grassed areas will be seeded with a sustainable perennial mixture with appropriate erosion control measures taken until the perennial grasses are established, as specified by the local soil conservation district.

To reduce the disturbance of the surface cover material, clean soil berms will be constructed in areas where shallow-rooted trees and shrubs will be planted. The berms will be of sufficient thickness to allow the excavation of only clean fill deep enough to plant the tree or shrub root ball. The berm material will contain sufficient organic material to allow tree and/or shrub growth, and will be of sufficient strength to support trees and/or shrubs at their maximum height.

B-11 STORMWATER POLLUTION PREVENTION

For excavations that will exceed 1-acre in surface area, coverage will be obtained under the NYSDEC SPDES General Permit for Storm Water Discharges from Construction Activities that are classified as "Associated with Industrial Activity", Permit #GP-93-06 (Construction Storm Water General Permit). Requirements for coverage under the Construction Storm Water General Permit include the submittal of a Notice of Intent (NOI) form and the development of a Storm Water Pollution Prevention Plan (SWPPP). The SWPPP will fulfill all permit requirements and will be prepared in accordance with the latest NYSDEC guidance for preparing SWPPP and with latest version of the New York State Stormwater Management Design Manual. This SWPPP, in accordance with permit requirements, will provide the following information:

- A background discussion of the scope of the construction project.
- A statement of the storm water management objectives.
- An evaluation of post-development runoff conditions.
- A description of proposed storm water control measures.
- A description of the type and frequency of maintenance activities required to support the control measure.

The SWPPP will address issues such as erosion prevention, sedimentation control, hydraulic loading, pollutant loading, ecological protection, physical Site characteristics that impact design, and site management planning. All descriptions of proposed features and structures at the Site will include a description of structure placement, supporting engineering data and calculations, construction scheduling, and references to established detailed design criteria. The SWPPP will conform to all requirements as established by applicable regulatory agencies.

Proven soil conservation practices, including Best Management Practices such as those described in the latest version of the New York State Stormwater Management Design Manual, will be incorporated in construction and development plans to mitigate soil erosion, offsite sediment migration, and water pollution from erosion. Temporary erosion control measures such as silt fencing and/or hay bales will be placed around soil stockpiles and bare surface soil during demolition activities, as specified by the local soil conservation district. Stockpiles will be graded and compacted as necessary for positive surface water runoff and dust control. Stockpiles of soil will be placed a minimum of 50 feet from the property boundaries.

Temporary erosion and sedimentation control measures will be used during active demolition/construction stages. Prior to any demolition/construction activity, temporary erosion and sediment control measures will be installed and maintained until such time that permanent erosion control measures are installed and effective. The following temporary measures will be incorporated into demolition/construction activities:

- Silt fences will be placed around active demolition/construction areas that result in soil disturbance;

- Hay bales will be placed and staked around stockpiled soil under the plastic to create a berm; and
- Plastic covers will be placed on stockpiled soil to reduce precipitation infiltration and dust.

Barriers and hay bale checks will be installed and inspected once a week and after every storm event. Results of inspections will be recorded in a logbook and maintained at the Site and available for inspection by NYSDEC. All necessary repairs shall be made as soon as practical.

Accumulated sediments will be removed as required to keep the barrier and hay bale checks functional.

All undercutting or erosion of the silt fence toe anchor shall be repaired immediately with appropriate backfill materials.

Manufacturer's recommendations will be followed for replacing silt fence damaged due to weathering.

Erosion and sediment control measures identified in this SMP shall be observed to ensure that they are operating correctly. Where discharge locations or points are accessible, they shall be inspected to ascertain whether erosion control measures are effective in preventing significant impacts to receiving waters

Silt fencing or hay bales will be installed around the entire perimeter of the construction area.

Removed sediment will be stockpiled and characterized as specified for excavated soil. The perimeter silt fences will remain in place until demolition/construction activities in the area are completed and vegetative cover or other erosion control measures are adequately established. Silt fences will be provided and installed in accordance with the New York Guidelines for Urban Erosion and Sediment Control.

Permanent erosion control measures will be incorporated into future construction plans for changes to the Site-wide cover system and will include limiting steep slopes, routing runoff to surface water collection channels, limiting flow velocities in the collection

channels to the extent practical, and lining collection channels, where appropriate. In areas where flow will be concentrated (i.e., collection channels) the channel slopes and configuration will be designed to maintain channel stability. Permanent measures and facilities will be installed as early as possible during construction phases.

Any final slopes greater than 33 percent will be reinforced, and will have a demarcation layer under the clean cover to indicate if erosion has extended to the subgrade. Following the placement of final cover soil over re-graded areas, a re-vegetation program will be implemented to establish permanent vegetation. The disturbed areas will be seeded in stages as construction is completed using a sustainable perennial seed mixture at a rate of 100 pounds/acre.

In addition to the above seed mixture, mulch, mulch blankets, or synthetic fabric will be placed to prevent erosion during turf establishment. Mulch will be placed on all slopes less than 15% and a mulch blanket on all slopes greater than 15%. Synthetic erosion control fabric will be placed in drainage ditches and swales.

B-12 CONTINGENCY PLAN

If underground tanks or other previously unidentified contaminant sources are found during post-remedial subsurface excavations or development related construction, excavation activities will be suspended until sufficient equipment is mobilized to address the condition.

Sampling will be performed on product, sediment, surrounding soils, etc. as necessary to determine the nature of the material and proper disposal method. Chemical analysis will be performed for a full list of analytes (TAL metals, TCL VOCS, TCL SVOCs, TCL pesticides and PCBs), unless the Site history and previous sampling results provide a sufficient justification to limit the list of analytes. In this case, a reduced list of analytes will be proposed to the NYSDEC for approval prior to sampling.

Identification of unknown or unexpected contaminated media identified by screening during invasive Site work will be promptly communicated by phone to NYSDEC's Project Manager. Reportable quantities of petroleum product will also be reported to the NYSDEC

spills hotline. These findings will also be included in the periodic reports prepared pursuant to this SMP.

If "grossly contaminated" soil is encountered in an excavation, the owner may choose to expand the excavation until no further "grossly contaminated" material remains visible within the excavation, or the owner may develop a plan for the characterization and remediation of the material for NYSDEC approval. The plan will be based on the type and extent of material encountered.

B-12.1 Buried Drums Or Underground Storage Tanks

If buried drums or underground storage tanks (USTs) are encountered during excavation activities, NYSDEC will be notified. USTs will be registered with NYSDEC as required per 6 NYCRR Part 375-1.8. Any buried drums and/or USTs encountered will be evaluated within the excavation via visual assessment and PID readings, provided that worker health and safety is protected. Subsequently, a Removal Plan will be prepared for NYSDEC approval. Drums and/or USTs will be excavated and removed in accordance with a Site-specific Health and Safety Plan while following all applicable Federal, State, and local regulations. Removed drums and underground storage tanks will be properly characterized and disposed of offsite. The soil surrounding the buried drums or underground storage tanks will be considered potentially contaminated and will be characterized in accordance with methods prescribed in this EWP.

B-12.2 Underground Pipes And Sewers

Inactive storm or sanitary sewer pipes that will not be reused and are encountered within the limits of an excavation will be removed and any exposed ends will be plugged/capped at the walls of the excavation. If pipes are large, the use of flowable fill may be considered. Based on Site knowledge, no underground chemical/process pipes are expected; if any are encountered during grading or excavation activities, they will be cut, drained, and removed from within the excavation limits. Drained materials will be collected and properly disposed of offsite. Pipe sections left in the ground (if any) that will not be

reused will be capped/plugged after draining and the potential for migration of contaminants along the pipe bedding will be assessed and mitigated via placement of impermeable collars or other barriers, as appropriate.

B-13 COMMUNITY AIR MONITORING PLAN

A Community Air Monitoring Plan (CAMP) prepared following the guidance in Appendix 1A of DER-10, Generic Community Air Monitoring Plan, will be provided as part of the project Health and Safety Plan for activities involving subgrade excavation, grading, and soil handling activities. Particulate and VOC monitoring will be performed along the downwind occupied perimeter in accordance with the CAMP. The CAMP will include:

- Details of the perimeter air monitoring program
- Action levels to be used
- Methods for air monitoring
- Analytes measured and instrumentation to be used
- A figure showing the location of air sampling stations based on generally prevailing wind conditions. These locations will be adjusted on a daily or more frequent basis based on actual wind directions to provide an upwind and at least two downwind monitoring stations.

Exceedances of action levels listed in the CAMP will be reported to NYSDEC and NYSDOH Project Managers.

B-14 ODOR CONTROL PLAN

An Odor Control Plan may not be required. However, if nuisance odors are identified at the Site boundary, or if odor complaints are received, work will be halted and the source of odors will be identified and corrected. Work will not resume until all nuisance odors have been abated. NYSDEC and NYSDOH will be notified of all odor events and of any other

complaints about the project. Implementation of all odor controls, including work stoppage, is the responsibility of the property owner's qualified environmental professional, and any measures that are implemented will be discussed in the Periodic Review Report.

All necessary means will be employed to prevent nuisance odors. At a minimum, these measures will include: (a) limiting the area of open excavations and size of soil stockpiles; (b) shrouding open excavations with tarps and other covers; and (c) using foams to cover exposed odorous soils. If odors develop and cannot be otherwise controlled, additional means to eliminate odor nuisances will include: (d) direct load-out of soils to trucks for offsite disposal; (e) use of chemical odorants in spray or misting systems; and, (f) use of staff to monitor odors in surrounding neighborhoods. Trucks or rolloff containers used to contain odor-producing soils prior to offsite disposal will be covered or tarped.

If nuisance odors develop during intrusive work that cannot be corrected, or where the control of nuisance odors cannot otherwise be achieved due to on-Site conditions or close proximity to sensitive receptors, odor control will be achieved by sheltering the excavation and handling areas in a temporary containment structure equipped with appropriate air venting/filtering systems.

B-15 DUST CONTROL PLAN

Dust suppression techniques will be used at the Site in accordance with applicable NYSDEC guidance to control fugitive dust. The surface of unvegetated earthen or disturbed soil/fill areas will be wetted with water or other dust suppressive agents to control dust during demolition/construction. Any subgrade material left exposed during extended interim periods (greater than 90 days) prior to placement of a final cover will be covered with a temporary cover system (i.e., tarps, spray type cover system, etc.) or planted with vegetation to control fugitive dust to the extent practicable. Particulate and VOC monitoring will be performed along the downwind occupied perimeter during subgrade excavation, grading, and handling activities in accordance with the CAMP to be provided as part of the project Health and Safety Plan.

Dust suppression techniques that may be used at the Site include applying water on roadways, wetting equipment, spraying water on buckets during excavation and dumping, hauling materials in properly covered or watertight containers, covering excavated areas and material after excavation activity ceases, establishing vegetative cover immediately after placement of cover soil, and reducing the excavation size and/or number of excavations. The use of atomizing sprays is recommended where practical so that excessively wet areas will not be created, but fugitive dust will be suppressed.

A dust suppression plan that addresses dust management during invasive on-Site work will include, at a minimum, the items listed below:

- Dust suppression will be achieved though the use of dedicated on-Site water truck for road wetting. The truck will be equipped with a water cannon capable of spraying water directly onto off-road areas including excavations and stockpiles.
- Clearing and grubbing of larger areas will be done in stages to limit the area of exposed, unvegetated soils vulnerable to dust production.
- Gravel will be used on roadways to provide a clean and dust-free road surface.
- On-Site roads will be limited in total area to minimize the area required for water truck sprinkling.

B-16 OTHER NUISANCES

A plan will be developed and utilized by the contractor for all work to ensure compliance with local noise control ordinances.

ATTACHMENT B-1

TARGET COMPOUND LIST OF VOLATILE AND SEMI-VOLATILE ORGANIC COMPOUNDS

VOCs	SVOCs
1,1,1-Trichloroethane	1-Methyl-2,4-Dinitrobenzene
1,1,2,2-Tetrachloroethane	2,2-Dichlorodiisopropylether
1,1,2-Trichloroethane	2,4,5-Trichlorophenol
1,1,2-Trichlorotrifluoroethane	2,4,6-Trichlorophenol
1,1-Dichloroethane	2,4-Dichlorophenol
1,1-Dichloroethene	2,4-Dimethylphenol
1,2,4-Trichlorobenzene	2,4-Dinitrophenol
1,2-Dichlorobenzene	2,4-Dinitrotoluene
1,2-Dichloroethane	2,6-Dinitrophenol
1,2-Dichloropropane	2,6-Dinitrotoluene
1,3-Dichlorobenzene	2-Chloronaphthalene
1,4-Dichlorobenzene	2-Chlorophenol
2-Butanone	2-Methylnaphthalene
2-Chloroethyl Vinyl Ether	2-Methylphenol
2-Hexanon	2-Nitroaniline
4-Methyl-2-Pentanone	2-Nitrophenol
Acetone	3,3-Dichlorobenzidine
Benzene	3-Methylphenol
Bromodichloromethane	3-Nitroaniline
Bromoform	4,6-Dinitro-2-Methylphenol
Bromomethane	4-Bromophenol Phenyl Ether
Carbon Disulfide	4-Chloro-3-Methylphenol
Carbon Tetrachloride	4-Chloroaniline
Chlorobenzene	4-Chlorophenyl Phenyl Ether
Chlorodibromomethane	4-Methylphenol
Chloroethane	4-Nitroaniline
Chloroform	4-Nitrophenol
Chloromethane	Acenaphthene
Cis-1,2-Dichloroethene	Acenaphthylene
Cis-1,3-Dichloropropene	Acetophenone
Cyclohexane	Aniline
Ethylbenzene	Anthracene
Isopropylbenzene	Benzidine
Methyl Acetate	Benzo(a)anthracene
Methylcyclohexane	Benzo(a)pyrene
Methylene Chloride	Benzo(b)fluoranthene
Styrene	Benzo(g,h,i)perylene
Tetrachloroethene	Benzo(k)fluoranthene
Toluene	Benzoic Acid

VOCs

Trans-1,2-Dichloroethene
Trans-1,3-Dichloropropene
Trichloroethene
Trichlorofluoromethane
Vinyl Acetate
Vinyl Chloride
Xylenes (Total)

SVOCs

Benzyl Alcohol
Biphenyl
Bis(2-chloroethoxy)methane
Bis(2-chloroethyl)ether
Bis(2-ethylhexyl)phthalate
Butylbenzyl Phthalate
Caprolactam
Carbazole
Chrysene
Di-n-butyl Phthalate
Di-n-octyl Phthalate
Dibenzo(a,h)anthracene
Dibenzofuran
Diethyl Phthalate
Dimethyl Phthalate
Fluoranthene
Fluorene
Hexachlorobenzene
Hexachlorobutadiene
Hexachlorocyclopentadiene
Hexachloroethane
Indeno(1,2,3-cd)pyrene
Isophorone
N-nitrosoi-n-propylamine
N-nitrosodimethylamine
N-nitrosodiphenylamine
Naphthalene
Nitrobenzene
O-nitroaniline
Pentachlorophenol
Phenanthrene
Phenol
Pyrene

Appendix G – Health and Safety Plan

Health, Safety & Environmental

OSC Corporate Policies and Procedures Manual

OSC
140 Lee Street, Suite 200
Buffalo, New York 14210

Revision Date:
9/16/2022

Table of Contents

OSC STATEMENT OF POLICY

Ontario Specialty Contracting, Inc. (OSC) is committed to providing a place of employment that is free from recognized safety and environmental hazards. This Policy Statement is the basis for the Company's Health, Safety & Environmental management process and is communicated to all employees, customers, vendors and subcontractors. It is considered equally as important as any other primary business objectives.

The OSC HSE philosophy is simple: while performing our work, our primary concern is the health and welfare of the people involved and the protection of assets and the environment.

NO JOB IS SO IMPORTANT THAT WE CANNOT TAKE THE TIME TO DO IT SAFELY AND WITHOUT CONSEQUENCE TO THE ENVIRONMENT.

The HSE Management System (HSEMS) outlines how we identify hazards and how to eliminate them or provide a means to minimize risk. The HSE management process is intended to demonstrate to OSC management, appropriate regulatory agencies, customers and other interested parties, that equipment and operations associated with the performance of work are capable of being utilized without undue risk to those involved or the environment.

We believe that incidents are caused by conditions and behaviors, and therefore, can be prevented. The safety and health of individuals involved in operations, the protection of assets and the environment is everyone's responsibility. Employees at all levels of the company are accountable and responsible for preventing job related illnesses and injuries as well as equipment and environment losses through the diligent and consistent application of the HSE management process. Employee HSE performance is considered in decisions affecting promotions, salary actions and continued employment.

Matthew Goss, MS, GSP Corp. Dir. Health, Safety & Environment	John W. Yensan President & CEO

1.0 INTRODUCTION

At OSC we believe that our employees are our most valuable resource which is why safety is so important to us. Safety is the core competency in OSC's success, profitability and continued existence. The OSC company primary and constant objective in everything we do is to achieve zero injuries.

The OSC safety program is a people-based safety process where all employees are active participants in a fully integrated behavior-based safety system that focuses on what promotes safe work behavior. Simply having only rules to manage safety is not a very effective method for promoting safe work behavior. Rule based programs tend to create a work force of blind rule followers which can be very dangerous when the rules do not apply and following them creates a hazard or a work cultural where obeying safety rules are based on convenience. Safety rules alone do not keep workers safe; thinking, involved and responsible employees do. The program is designed to first assure all employees are effectively trained in the current applicable government regulations and industry best safety practices and then to involve all employees at every level for hazard identification, recognition, protection and accountability (developing safe work methods, procedures and hazard controls). All workers are active participants in the safety improvement process through involvement in the following key program elements:

- Safety Task Analysis Card and safe work observations (STAC).
- Activity Hazard Analysis (aka Job Safety Analysis).
- Project safety management (See HSE responsibilities).
- Peer inspection, auditing and training (mentoring new hires & transfers by experienced employees).
- Incident investigation and reporting.
- Daily morning safety briefs, including;
    - Review of scheduled tasks and protective measures (AHA review & development).
    - Safety updates, information exchange and coordination between workers.
    - Team observations from STAC.
- Safety rewards and recognition (incentives).
- Employee performance review including self-assessment and supervisor assessment in which safety is a major component.

The objective of this program and procedures manual is to provide the minimum requirements to protect the health and safety of OSC employees and subcontracted personnel, OSC facilities/equipment and to prevent releases to the environment. This program manual is available for all employees to review. The elements of this program include but are not limited to, education and training programs, medical surveillance programs, general construction standard operating procedures, policies, safety task analysis and safe work observations (STAC), documentation and record retention requirements. Site specific program details, air monitoring, emergency response procedures, site task specific work procedures, spill prevention plans, and evacuation procedures are developed for each project under separate cover (project specific Health and Safety Plans).

1.1 HSE PROGRAM

As part of our commitment to provide a safe and healthy workplace that assures compliance with all applicable regulations, company policy, as well as promote continuous HSE performance, we have instituted a formal HSE process. An important aspect of the implementation of this process is employee participation where each employee understands the following:

- All employees have the authority to stop work at any time for safety concerns. "If you see it" you are responsible for taking proper action (reporting, corrective action, and stopping work).
- Management is committed to preventing incidents through leadership, training, motivation and recognition. The natural response to place blame is replaced with focusing efforts on the solution that eliminates unsafe conditions and promotes safe behaviors. Any undesired incident represents failure in the safety program.
- Each employee is expected to immediately report any unsafe conditions or potential unsafe situations to their supervisor.
- No employee shall undertake a task until they have been properly trained, mentored and authorized (by supervision) to perform the task.
- If an employee suffers a work-related injury or illness, even a slight one, they shall report it at once (the day it occurs or is realized); and
- Each employee is expected to understand and follow all company HSE policies and procedures as well as participate in the improvement process.

Any questions concerning OSC's HSE Program, or any other HSE issues, contact the site supervisor, HSE personnel or Project Manager.

OSC	Director, HS&E	(716) 560-7542, mgoss@oscinc.com
OSC	President	(716) 856-3333, jyensan@oscinc.com

2.0 RESPONSIBILITIES

This program provides guidelines for selected HSE procedures. The goal is to provide procedures primarily related to site specific work. The omission of other procedures does not imply their lack of importance. Rather, it reflects that the focus here is on-site specific hazards and the proper protective measures for those hazards.

The Corporate Director, HS&E has full responsibility for the execution of the Company's HSE Program. Should a potential problem arise in planning or execution, each project manager involved has the responsibility to see that proper and effective action is taken. Any safety-related matter which cannot be resolved by the project manager will be referred to the Corporate HSE Director.

Supervision is responsible for employees assigned to projects and for the protection of all facilities, equipment, tools, etc. furnished them for the performance of their project.

2.1 OSC DUTIES

- Identify a Site Safety Officer (SSO) who is responsible for HSE issues.
- Assure that no employee is exposed to conditions that are unsanitary, hazardous, unsafe, or dangerous to their health.
- Maintain a process designed to prevent incidents.
- All equipment and machinery must be safe to operate or identified as unsafe, removed from service and tagged or locked to be inoperable.
- Assure only trained and proficient personnel shall operate any equipment.
- Shall provide such equipment, protective clothing, and respiratory protection as is necessary to ensure worker safety.
- Shall provide all required training to ensure that employee is able to complete tasks in a safe manner.

2.2 SUPERINTENDENT RESPONSIBILITIES

- The superintendent must have a thorough knowledge and understanding of the regulations associated with the work. They must be familiar with the hazards associated with the work and explain them to his crew as necessary to ensure HSE performance. They shall assess the job site, define any and all potential HSE related problems, and implement corrective actions and/or the necessary precautions.

- Is responsible for identifying and providing necessary personal protective equipment (PPE) and to assure that employees are trained in how to use it. After issuing the equipment, the supervisor must make sure that the workers use it whenever necessary.

- The superintendent is responsible for barricading the area to isolate it from the non-work area. Barricades should also keep the general public out of the work area as well, assuming the public is typically curious, and a construction/demolition site is considered an attractive nuisance.

- Site maintenance is also the site supervisor's responsibility. Sites that are cluttered or dirty can lead to incidents. A site that is maintained in a clean and orderly fashion will impress personnel to follow the example in their own work habits.

- The superintendent is responsible for assuring safety corrective measures are corrected immediately in a timely fashion, safety audit, incident investigations and project safety committee recommendations.

- The site supervisor is responsible to assure that all hazardous chemicals have an SDS on-site. These must be placed in an accessible location on the job site. Examples of these chemicals include spray paints, special lubricants for rented machinery, and starting fluids.

- Many job sites will require some sort of air monitoring or personnel monitoring. The documentation generated during air monitoring could be valuable if there is ever a question about incidental exposure or the causes of an incident. Be sure that all documentation is complete and correct.

- The superintendent is responsible for the waste removal at each site. When any type of hazardous material or asbestos or demolition debris is taken off site, a manifest or

bill of lading must be completed and signed. The paperwork is important, within both the contract specifications and legal requirements. In most cases, the material is not our property, and therefore, it must be recorded that the material is not in our hands and has been disposed of properly.

- Each supervisor is required to maintain a project log. It shall include any issues and corrective actions.
- The superintendent is responsible for staging the first aid kits, making sure that they remain stocked, and informing all personnel of their locations.
- The site supervisor is responsible for identifying and supplying required firefighting equipment, checking them, and informing all personnel of their locations.
- The supervisor is responsible for notifying all other contractors on site of the nature of the work, shift times, hazardous materials, locations of SDS's, and any other information they may need to protect their workers.
- The supervisor is responsible for posting the emergency phone numbers to be used for fire or medical emergencies and for notifying all personnel where they are located.
- In cases where hazardous materials are being handled, the superintendent is responsible for notifying the local fire and police departments communicating that access is restricted and other issues that may be encountered in case of emergency.
    - All issues should be entered in the log by the supervisor and include the time and persons informed and all other pertinent information. This information is helpful for the purpose of HSE assurance and confirmation of protocols and procedures in the event of an incident or questions that might arise pertaining to the site.
- The site supervisor is responsible for posting required paperwork and signs at the site office.
- The supervisor is responsible for reviewing the site and developing fire prevention plans and site emergency plans. These plans shall be explained to all site personnel and they shall be made to understand them. The plans shall be posted so all employees have access to them.

- The supervisor shall be aware of all applicable federal, state and local regulatory requirements.
- The superintendent also has the authority to enforce the HSE regulations and can remove anyone from the project or work site that do not comply. For employees choosing to not comply with company policy, a progressive disciplinary process will be followed depending on severity of infraction but, similar to:
    - At the first offense, verbally warn the employee.
    - At the second offense, give the employee a signed and dated written notice.
    - At the third offense, time off w/o pay up to dismissal.

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2.3 EMPLOYEE RESPONSIBILITY

Employees are responsible for their own actions and, at a minimum, shall:

- Comply with all federal, state, local regulations, OSC policies and procedures, and client requirements.
- Follow all instructions from their immediate supervisors.
- Shall use only company approved personal protective clothing, equipment, and devices.
- Report all incidents, injuries, illnesses and near misses immediately; and
- All employees have the responsibility and authority to stop work for safety which includes their own assigned tasks as well as those of others. "If you see it you own it."

2.4 HSE RESPONSIBILITIES

HSE personnel are responsible for interpreting applicable federal, state, local regulations, client rules and procedures applicable to the work. They have no authority to waive or alter regulations or permit violations by others. As a minimum, they are responsible for:

- Anticipate the potential hazards of each work site and developing plans to mitigate or minimize them; this includes enlisting the participation of workers.
- Expediting corrective action to correct unsafe acts or unsafe conditions.
- Work with the Site Superintendent to investigate all incidents, injuries, illnesses and near misses immediately.
- Assist in explaining all applicable work practices, procedures, rules, and regulations to employees as needed.
- Ensure that employees understand their accountability relative to HSE issues.
- Enforcing all rules and regulations within the scope of their work.
- Trending project STAC data and safe work observations for review and analysis to help improve the safety process (hazard recognition and protective methods).
- Developing and reporting project safety performance (leading and lagging indicators) as well establish new project goals for improvement and methods to achieve those goals.
- Participate in project safety communication for each project which shall include field personnel, the site superintendent, project manager, and safety representative from each subcontractor. The OSC project site safety officer (SSO) shall serve as point of communications. Safety communication meetings shall be held to review site safety performance, improvement measures and achievements. Safety developments from each project shall be shared globally with each job site, incidents, improvement measures, best practices, safety data trends, employee awards and recognition.

2.5 PRE-PROJECT HAZARD EVALUATION

Prior to site mobilization, site supervisors, HSE, and/or management will conduct an evaluation of the site. The review should include any information available concerning the site conditions, known or assumed hazards, potentially hazardous waste issues, etc. Observations will be documented and the information communication to the site personnel along with the proper precautions to be used when dealing with these hazards.

A pre-project hazard survey as well as a review of sampling results will be performed. An Activity Hazard Analysis (AHA) or Job Safety Analysis (JSA) shall be developed for all definable tasks of the work. The AHA/JSA's shall include initial exposure assessment for the specific tasks, the hazards identified for each task and the proper protective measures including Personal Protective Equipment (PPE), training, equipment, and conditional requirements. Applicable AHA/JSA's shall be reviewed and acknowledged prior to commencing work by employees and will be updated as conditions change or improvement measures are recognized and implemented.

Procedure

Following are "high risk" tasks for which OSC has developed standard procedures and AHAs which will be amended according to actual conditions/procedures. The Site Superintendent shall be responsible for reviewing all work tasks and decide when an amendment is necessary or recommended. The SSO and/or Director HSE is to be consulted with questions that may arise.

Working with any health hazard substance e.g. Asbestos, Lead, Mercury, Silica, Vinyl Chloride;

- Working with any hazardous materials or corrosive chemicals that could pose a serious health risk or environmental concern e.g. caustic soda, sulfuric acid, hydrazine, PCBs, etc.;
- Cutting or Torching.
- Excavating and trenching.
- Handling contaminated soil and/or water.
- Working in a confined space.
- The demolition of any structure.
- Working on or near water where there is a risk of drowning.

- Work involving other organizations, contractors, or sub-contractors, that has potential for miscommunication that lead to unsafe conditions.
- Engineered scaffold or shoring.
- Hoisting or lifting.

Note: An AHA/JSA is mandatory for hazard identified tasks, not just the high hazard tasks noted above.

The AHA must be written as a formal document using the form in each project HASP. The AHA must remain on the site until the project is completed and updated as conditions change. It must be kept in the project file for record keeping once the project is finished.

All Superintendents involved in performing the job and the on-site Site Safety Officer (SSO), must be involved in preparing the AHA. Trained and experienced workers shall be included in preparing the AHA/JSA.

When an operation involving more than one crew/shift, or another contractor or owner, then all parties will have input in the development and approval of the AHA.

The Site Superintendent or SSO will review the AHA/JSA with all involved workers before the job starts and at the start of each shift. Employees are expected to raise any concern with the task not adequately addressed in the AHA so it may be properly amended. Each employee assigned to the task must sign and acknowledge the AHA/JSA. Subsequent changes to an AHA must be presented to and acknowledged/signed by the crew.

The Safety Department will be responsible for ensuring that proper training in hazard identification and AHA/JSA development is provided to all Superintendents, SSO's, and employees. Training will be provided in the annual safety refresher classes provided to all OSC field employees.

2.6 RESPONSIBILITIES OF SUBCONTRACTORS

Subcontractors have HSE responsibilities and duties on the job site. Failure to follow all federal, state, local regulations, OSC and/or client requirements could be considered a breach of contract. Permission and special instructions related to the HSE issues and security of the job site must be agreed upon before beginning work in any area on-site. In addition, prior to starting work, all insurance certificates and/or other permits required shall be on file in the Site Field Office.

Each subcontractor shall maintain a program consistent with the project HSE requirements, complying with the following:

- Furnishing approved personal safety equipment for employees such as hard hats, eye protection, and safety belts;
- Providing training, instruction, and monitoring for personal protective equipment to work in hazardous locations or perform special projects;
- Giving instructions to all employees as to the nature of the work, hazards of the job, use of protective equipment, safety rules and site rules under which they will work;
- Reporting all incidents and injuries immediately, filling out any required reports or records, and transporting injured employees;
- Following the job site housekeeping rules dealing with proper disposal and storage of debris or materials;
- Fire Prevention - Keeping combustibles and flammable materials protected from fire including combustible and flammable liquids in approved safety containers, and storage cabinets and stored in specific areas as assigned with proper firefighting equipment (See Also Fire Prevention Program);
- Providing their own fire extinguishers to protect their equipment including rentals, trucks, fork lifts, materials, buildings, storage, and work areas;
- Seeing that all scaffolds, work platforms, or open sided floors are protected with handrails and toe boards and that personal fall protection is used for work being performed above 6 feet where other fall protection controls (hand rails), are not provided;

- Ensuring that any trench, cut, or hole over 5 feet deep will be properly shored, sloped, or otherwise protected and that access to and from such areas is provided within 25 feet of where employees are working;

- Ensuring that all trucks, cranes, dozers, and other mobile equipment is parked in designated areas and locked or otherwise secured after normal working hours;

- Monitoring or ventilating any work areas and confined or enclosed spaces for oxygen and/or hazardous gas before employees are allowed to enter, identifying and marking these areas, and maintaining proper access, along with instructing employees as to the hazards and proper working procedures in such areas.

- Blocking off or barricading any work area that presents a hazard, such as overhead work areas or open holes;

- Providing the proper protection for slag and/or sparks in the area under or close to welding, cutting, or hot work being performed;

- Properly erecting and providing fire protection for all outside buildings, trailers, tool rooms, fabrication shops, or other building.

- Listing and filing an SDS for any hazardous chemical used in the performance of the work and instructing employees in the proper use and/or disposal of said hazardous material.

3.0 MEDICAL SURVEILLANCE PLAN

Medical surveillance is the collection and analysis of personal health data to look for exposures that may be occurring in the workplace. It is required for certain contaminates such as lead, asbestos, and may hazardous waste sites.

3.1 ADMINISTRATIVE DUTIES

OSC has established a medical surveillance program to monitor worker health and fitness when they are exposed to excessive noise, respiratory hazards, toxic substances, etc.

The OSC Corporate Director, HS&E is responsible for developing and maintaining this program. The program shall be updated at least annually or as warranted by change in governing regulations, development of new effective industry recognized best practices as well as other recognized safety improvement measures. All managers and affected employees shall be made aware of program changes as the manual is updated.

Program training shall be documented with the OSC Safety Training attendance or declaration form (See Attachments HSE Forms). A copy of the program can be reviewed by employees. Copies are available at the project field offices and the home corporate office located at 333 Ganson Street, Buffalo, NY 14203.

3.2 MEDICAL EVALUATIONS

In certain workplace situations (i.e. exposure above action level), medical monitoring is required. Medical examinations may be part of this program. At OSC, examinations are given:

- Prior to job assignment **(pre-employment)** and as per project requirements and or as frequent as physician determines is necessary).
- Before **reassignment** to an area where medical examinations are required (exposure assessments and controls).
- As soon as possible for employees becoming ill from **exposure** to hazardous substances during an emergency, or who develop signs or symptoms of overexposure from hazardous substances.
- Employees **returning to work** following a lost time illness or injury will be examined by a qualified physician who must certify that the employee is able to return to work. A written certificate signed by the physician must be presented to the Director HS&E before beginning work again.

Specific hazards and hazardous materials that typically have a medical surveillance requirement include the following (Note this is not meant as a complete list, other hazardous materials not given may require surveillance as determined by the initial exposure assessment:

Acrylonitrile

Asbestos (General Industry & Construction)

Benzene

Bloodborne Pathogens

1,3-Butadiene

Cadmium

13 Carcinogens

Hexavalent Chromium

Coke Oven Emissions

Compressed Air Environments

Cotton Dust	Lead	Respiratory Protection
1,2-Dibromo, 3-Chloropropane	4,4' Methylenedianiline (MDA)	Silica, Crystalline
Ethylene Oxide		Tuberculosis
Formaldehyde	Methylene Chloride	Vinyl Chloride
HAZWOPER	Noise and Hearing Conservation	

The examining physician plays an important role in OSC's medical monitoring program. Exams are performed under the supervision of a licensed physician, without cost to the employee, without loss of pay and at a reasonable time and place.

- OSC provides the examining doctor with a work description including the need to wear any required personal protective equipment under conditions that may be expected at the work site.

  NOTE: Following any medical exams, the OSC Director, HS&E receives a written opinion from the physician that contains the results of the medical examination and any detected medical conditions that would place the employee at an increased risk from exposure, any recommended limitations on the employee or upon the use of personal protective equipment, and a statement that the employee has been informed by the physician of the results of the medical examination.

3.3 SUBSTANCE ABUSE POLICY AND EMPLOYEE SCREENING

OSC maintains a drug and alcohol free workplace. The use, possession, manufacture, sale or distribution of alcohol or illegal drugs is prohibited on OSC or client property. Reporting for work "under the influence" is also prohibited. OSC conducts pre-employment, post-accident, reasonable suspicion and random substance abuse testing (Random DOT Testing for CDL license holders only). All employees as a minimum are given breath alcohol and NIDA 10 panel drug screen test as part of the annual medical physical.

A worker on prescribed medication with side effects that could jeopardize his/her or other's safety, must inform their supervisor for re-assignment. Furthermore;

- Use of alcohol or controlled substances at work is prohibited;
- Employees may not bring illegal drugs to any OSC workplaces;
- Any employee under the influence of intoxicants or controlled substance drugs, other than legally prescribed, is not permitted to work and may be subject to termination;

- Supervisors, who suspect an employee is "under the influence" will stop the employee from working and contact the Director HSE;
- The Director HSE may make arrangements for employee testing;
- Any employee medically deemed under the influence during work due to alcohol and/or drug use is subject to disciplinary action, including termination.

NIDA 10 PANEL TABLE

SYMBOL	TARGET DRUG	CONC.
THC	MARIJUANA	50 ng/ml
COC	COCAINE	300 ng/ml
PCP	PHENCYCLIDINE	25 ng/ml
MOR	OPIATES	2000 ng/ml
MET	METHAMPHETAMINE	1000 ng/ml
MTD	METHADONE	300 ng/ml
AMP	AMPHETAMINE	1000 ng/ml
BAR	BARBITURATES	300 ng/ml
BZO	BENZODIAZEPINES	300 ng/ml
TCA	TRICYCLIC ANTIDEPRESSANTS	30 ng/ml

3.4 EMERGENCY MEDICAL PROCEDURES

During the mobilization phase of projects emergency response procedures will be developed and an emergency contact form completed and posted in each job trailer so as to facilitate these activities in the event of an incident.

- First-Aid and Medical Treatment
    - Employees should be proficient in first-aid, including and especially the treatment of traumatic shock, application of artificial respiration and the control of bleeding. Detailed instruction for first-aid treatment and bloodborne pathogens is not included in this document as such information is readily available from other sources, such as the American Red Cross textbook on first-aid training. On every project there shall be at least one employee trained in First Aid and CPR per the American Heart Association and

or American Red Cross programs. Training shall be updated as required by the certifying agency. All OSC project HSE personnel should be trained in CPR and First Aid.

- First-aid supplies have been furnished based on recommendation by OSHA, and are easily accessible when required. The first-aid kits consist of supplies in a weather-proof container, with individually sealed packages. The quantity and contents of the kit are based on the OSHA recognized items per man and should be inventoried by the supervisor before being sent out on each job and at least weekly on each job to ensure that the used items are replaced. Likewise, First-aid kit inspection is a regular audit item for projects (initial, ongoing and final phase audits and inspections). Each employee shall learn to use this equipment so that he can render treatment when needed. Except for minor injuries, the Director HS&E must be contacted for further support.
- On all projects the HASP will identify the nearest urgent care and emergency facilities and notify employees of the locations, route of travel, and phone number. Site specific details of emergency response shall be developed for every project under separate cover (Site Specific Health and Safety Plan).

3.5 INJURY MANAGEMENT

The purpose of this program is to provide the necessary support for employees to return to productive employment as quickly and as safely as possible following a work-related injury or illness. Whenever possible, injured employees that, under a medical professional's direction, cannot perform their regular duties, will be provided with alternative work tasks (i.e., light duty) or amended work schedule. This applies to temporary and full time OSC employees.

The following procedure is to be followed in cases where an employee has or may have been injured on the job or there is significant property damage. In the case of serious (i.e. significant blood loss, unconsciousness, head trauma) employee injury, immediately after providing rescue and life-saving steps;

- Notify the SSO and job superintendent who will, if necessary, contact emergency medical/rescue services (911);
- The SSO or superintendent will then call Shawn Johnston, Director HS&E at (716)560-7542 to provide information regarding the incident. Depending on circumstances, the Director will

contact either the local Urgent Care, Emergency Care, or MEDCO to make jointly determine the appropriate response (i.e., additional medical diagnosis, treatment, etc.).

- In the event the Director HS&E is not immediately available, leave a voice mail message and then call John Yensan at (716) 583-4400. You may then be advised to contact MEDCO (800) 775-5866 or Linda Roblee, Company Health, at (716) 875-5495 or 725-7249 for medical consultation.
- Finally, notify the Project Manager of the incident.

For incidents involving only property damage and not injury, follow the steps above for a determination as to whether substance abuse testing is necessary. Following injury diagnosis or treatment, OSC will place, if feasible, an employee on light or alternate duty to accommodate medically prescribed restrictions. Amendment of work schedule and job rotation will also be prescribed as necessary. This temporary condition may continue as long as the employee is medically restricted and as long as the company is able to accommodate the employee.

3.6 RECORDKEEPING

Medical, training, background investigation, and personal air monitoring records for OSC employees are maintained in the HSE Office located at the Corporate Headquarters at 333 Ganson Street in Buffalo NY. General access is limited to Director, HS&E (or designee). These records include, at a minimum:

- The name and social security number of the employee;
- Any physician's written opinions, recommended limitations, and results of examinations and tests;
- Any employee medical complaints related to exposure to hazardous substances;
- A copy of the information provided to the examining physician by the employer, with the exception of the standard and its appendices; and
- Criminal background data collected with the employee's approval.

We have established and maintain, for each employee, an accurate record of exposure monitoring results and any medical consultation and examination, including tests or physician medical opinions, in accordance with OSHA's rule governing access to employee exposure and medical records, 29 CFR 1910.1020.

In order for employees to get a copy of their personal medical and exposure records they (or designated representative) must submit a written request describing the record(s) of interest, work location associated with the information (i.e. project site), and approximate date of the record to the Director HS&E. Copies of the record(s) will be provided free of charge and within 15 days or reasonable time.

4.0 TRAINING PROGRAM & FIT FOR DUTY

OSC requires that employees be trained and educated in the recognition of hazards in the workplace and the proper protective measures that shall be taken against those hazards (proper personal protective equipment to be used, safe work procedures, engineering and administrative controls). Job competency is tested at orientation to assure the employee has the proper knowledge and skills to perform his job safely and effectively. Likewise all employees are evaluated by a licensed medical professional prior commencing work to assure they are physically fit to perform the physical requirements of their job. This exam includes substance abuse testing (NIDA 10 Panel Drug and Alcohol). All employee's activities and behaviors shall be monitored by their supervisors to determine if the employee should be removed from the work task and/or site. See previous section 3.3 Substance Abuse Testing.

Persons employed by OSC shall receive safety training concerning recognized potential hazards and associated protective measures for their jobs. The training as a minimum shall be in compliance with required governing regulations, standards and industry recognized best practices which includes federal as well as state licensing requirements for specified tasks (i.e. asbestos, lead abatement with exposure greater than established PEL). Training shall be conducted initially at the time of hire or job transfer prior to the start of work and refresher training shall be conducted at least annually or sooner as warranted by updates, inspection, audit or incident investigation recommendations and or other improvement measures. All employees and subcontractor employees with less than 3 months experience shall be subject to policies and procedures established under the Short Service Program in this manual. The Director, HS&E is responsible for overall management of the OSC training program, its review and update (minimum annually). All personal are required to speak and read English fluently which shall be verified during the employee initial interviewing process and re-evaluated

during employee orientation. All training shall be documented and the records maintained at the OSC Corporate Headquarters. The list below is a summary of common training topics covered for new hires. These same topics are covered again at the beginning of each project and as a minimum reviewed at least annually. This list is not intended as a complete list but an example. Additional topics are included depending on the type of project, scope of work and hazards identified.

1. Corporate HASP/Project Specific HASP (AHA's, Safety Brief & STAC Card Process)
2. Short Service Employees and Mentoring
3. Injury/Incident Reporting/Emergency Response
4. Bloodborne Pathogens (taught as part of First Aid)
5. Auto Crashes and Police Reports
6. Substance Abuse Policy
7. Confined Space Entry (Authorized, Unauthorized Employee)
8. Industrial Fork Truck - (Authorized, Unauthorized Employee)
9. Earth Moving Equipment Operation (Authorized, Unauthorized Employee)
10. Powered Aerial Platforms/Lifts, Boom/Scissor (Authorized, Unauthorized Employee)
11. Lockout/Tagout, Control of Hazardous Energy (Authorized, Unauthorized)
12. Fire Protection (Types ABC, Fire Extinguisher Use/Inspection)
13. Fall Protection (4ft, 6ft, Guardrails, PFAS, PFRS, Warning Lines 15ft)
14. Excavation Work - Trenching & Shoring (5ft, 4ft, 25ft)
15. Ergonomics & Material Handling (51/81lb Rule/Back Safety, MSD, CTD)
16. Assured Grounding, Ground Fault Circuit Interrupters – (GFCI)
17. Electrical Safe Work Practices (GROUNDING, CAPACITANCE, PPE, LOTO)
18. Ladders (Type1, Angle 1-4, 3 ft Past, Tied Off/Secure)
19. Scaffolding (Authorized, Unauthorized User, Scaffold Tags, Inspection Competent Person)
20. Hazard Communication Program (MSDS, Labeling, Handling)
21. Asbestos, Silica, & Lead Awareness

22. Heat Stress and Hypothermia (Physiological Monitoring-Pulse/Temp)
23. Safety Incentives/Disciplinary Policy/Employees Responsibility and Authority to Stop Work
24. Safety Audits (Peer and Focused Audits) & Self-Inspections
25. Defensive Driving and Journey Management
26. Fatigue Management

The Corporate Director, HS&E is responsible for assuring that training is effective and current.

4.1 HAZARD COMMUNICATION (SEE ATTACHMENT 2 FOR ADDITIONAL INFORMATION)

OSHA Standard 29 CFR 1910.1200 "Hazard Communication" requires that all employees handling or using chemicals which may be hazardous be advised and informed as to the hazard potential associated with those materials. A current, printed copy of the OSC Hazard Communication Program shall be located at each job site/trailer and ALL employees shall be made aware of its location. The program, at a minimum shall contain the following information:

- Definition of Material Safety Data Sheets (MSDS) and Safety Data Sheets (SDS);
- Purpose of Material Safety Data Sheets and Safety Data Sheets;
- Location of MSDS/SDS;
- Availability of MSDS/SDS;
- How to read a Material Safety Data Sheet/Safety Data Sheet; and
- Labeling;
- Training.

4.2 HSE FIT FOR DUTY PROGRAM

All OSC employees shall participate in HSE Fit for Duty Program as required. The purpose of the program is to assure employees are physically fit and trained to perform their work safely and efficiently. Key elements of the fit for duty program require employees to pass:

1. A fit for duty physical exam by a licensed medical professional.
2. Substance abuse test (NIDA 10 Panel Drug and Alcohol Screen).
3. Complete OSC Safety Orientation and pass a competency evaluation.

4. Employee's authority and responsibility to stop work for others as well as themselves for unsafe conditions which includes physical fatigue (too tired to perform task safely).

Focused training shall provide employees with a thorough knowledge of hazards that may exist in their work place and the proper protective measures that should be taken in accordance with federal, state and local requirements and industry established safe work practices (consensus standards i.e. NFPA, NEC, ANSI, NIOSH).

Employees are required to demonstrate their knowledge of procedures and competence prior to starting work. Competency shall be reviewed at the start of each project or sooner as warranted (job change, incident, inspection findings, etc.).

In addition, prior to starting work a daily morning Safety Brief shall be conducted at each job site to refresh employees in safety subjects as well as to address site specific conditions; planned activities for the day, associated hazards and protective measures; proper PPE, work procedures and controls (i.e. Lockout, Tagout, Tryout, air gapping, pre-inspection, controlled work zones, personal fall arrest systems, alarms, air monitoring, etc). Safety Briefs shall be conducted daily by either the Site Safety Officer or Superintendent. Each daily brief shall cover the work tasks for the day and required protective measures. At least one safety topic shall be selected from one of the recognized hazards and protective measures identified in the daily brief and discussed in detail; i.e. review of an Activity Hazard Analysis, STAC card or other safe work observation. (See Daily Safety Brief Form, AHA, STAC Card).

4.3 RESPIRATORY PROTECTION

All persons required to wear respirators will receive training to include, at a minimum, the following:

- Past monitoring results;
- Limitations and capabilities of the respirator selected;
- How the respirator works;
- Inspection of the respirator;
- Donning the respirator and checking its fit;
- Actual handling, wearing, and fit testing of respirator in normal and test atmospheres;
- Maintenance and storage procedure; and
- Respirator fit testing procedures.

SEE ATTACHMENT 13 - PERSONAL PROTECTIVE EQUIPMENT for additional program requirements.

4.4 PERSONAL PROTECTIVE EQUIPMENT (PPE) (SEE ATTACHMENT 13)

All persons required to use PPE will receive training to include, at a minimum, the following

- Requirements for body, head and eye protection;
- Requirements for work clothing;
- Heat stress factors relating to earring equipment;
- Limitations and capabilities of equipment;
- How equipment works;
- Inspection of equipment;
- Actual wearing of equipment; and
- Maintenance and storage procedures.

4.5 CONFINED SPACE ENTRY (SEE ATTACHMENT 1 FOR ADDITIONAL INFORMATION)

All persons required to work in confined spaces will receive training to include, at a minimum, the following

- Entry permit system;
- Entry and rescue procedures;
- Use of safety equipment;
- Use of respirators;
- Prohibited practices;
- Rescue Procedures;
- Work practices as described in the Confined Space Entry Plan; and
- Monitoring program.

Affected personnel will be made aware of hazards associated with confined spaces. Before entering a confined space, all participants will review the Confined Space Entry Permit, including, specific hazards of each confined space.

4.6 MEDICAL SERVICES (SEE SECTION 3 "MEDICAL SURVEILLANCE PLAN")

All employees potentially exposed to hazardous materials or substances will be made aware of the following:

- Pre-employment examinations;
- Periodic examinations;
- Post-termination examinations;
- Location of medical records;
- Access to medical records;
- Emergency services; and
- Monitoring programs.

4.7 ASBESTOS, LEAD AND HAZARDOUS WASTE TRAINING (SEE ATTACHMENTS)

Specialized training is required for workers exposed to specific hazardous materials at or above PEL. OSC will ensure that all employees potentially exposed to air borne asbestos fibers at or above PEL will receive at a minimum, the state specific licensing/accreditation requirements for asbestos handlers and supervisors. These employees will receive eight (8) hours of annual refresher training thereafter. Written materials related to training program will be readily available to affected employees.

Likewise, specialized training is required for workers and supervisors who may be exposed to lead. OSC will ensure that all employees potentially exposed to lead will receive hazard awareness training prior to any potential exposure. These employees will then receive refresher training as needed.

Training is also required for workers and supervisors who may come in contact with hazardous waste. OSC will ensure that all employees, potentially exposed to hazardous waste, will receive a minimum of 40 hours of initial training (HAZWOPER) prior to any potential exposure. Supervisors will receive an additional 8 hours of initial training. All employees working with hazardous waste will receive annual refresher training as required by 1910.120 but not less than an equivalent 8-hours. Specific HAZWOPER training by job function is as described below;

i) First responder awareness level: Shall have sufficient training or sufficient experience to have;

- An understanding of what hazardous substances are, and the risks associated with them in an incident.

- An understanding of the potential outcomes associated with an emergency created when hazardous substances are present.
- The ability to recognize the presence of hazardous substances in an emergency.
- An understanding of the role of the first responder awareness individual

ii) First responder operations level: Shall have received at least eight hours of training or have had sufficient experience to have:

- Knowledge of the basic hazard and risk assessment techniques.
- Know how to select and use proper personal protective equipment provided to the first responder operational level.
- An understanding of basic hazardous materials terms.
- Know how to perform basic control, containment and/or confinement operations within the capabilities of the resources and personal protective equipment available with their unit.
- Know how to implement basic decontamination procedures.
- An understanding of the relevant standard operating procedures and termination procedures.

iii) Hazardous materials technician: Shall have received at least 24 hours of training equal to the first responder operations level and in addition;

- Know how to implement OSC's emergency response plan
- Know the classification of known and unknown materials via field instruments and equipment
- Be able to function within an assigned role
- Know how to select and use proper specialized chemical personal protective equipment
- Understand hazard and risk assessment techniques
- Be able to perform advance control, containment, and/or confinement operations
- Understand and implement decontamination procedures
- Understand basic chemical and toxicological terminology and behavior.

Employees who are trained in accordance with the plan shall receive annual refresher on or before the initial training date of expiration. A record of methods used must be kept.

4.8 SITE SPECIFIC TRAINING

Prior to start of a project, a pre-project meeting will be conducted. Employees will be made aware of the following information, at a minimum, regarding known or potential hazards identified on the site:

- Results of pre demolition engineering survey;
- Results of asbestos or lead or other hazardous materials requiring a formal survey;
- Results of supervisors site inspection;
- Nature of work and anticipated hazards;
- Work site layout; and
- Special rules or requirements.

5.0 ENVIRONMENTAL MONITORING PLAN

Personal, work area, and perimeter monitoring strategies shall be devised to identify what PPE, engineering, and administrative controls are required for a specific project. Monitoring will be conducted and documented by HSE personnel to assure that appropriate PPE, engineering, and administrative controls are in place to protect the workers, the general public, and the environment. Monitoring will be conducted based on the known or potential chemical and physical hazards on site. Monitoring may include asbestos monitoring, lead surveillance monitoring, and monitoring for explosive gases. The type and frequency of monitoring will be determined on a case by case basis. Task-based monitoring will be detailed in the Activity Hazard Analysis (AHA).

The Project Manager and HSE personnel will ensure appropriate monitoring equipment is available prior to commencing work at the site. The instruments will be operated only by competent personnel trained in the care, calibration, operation, and limitations of the equipment. All instruments will be inspected regularly and calibrated per manufacturers specifications and will then be field calibrated to determine background concentrations prior to use.

Sampling will be performed with said samples analyzed using published methodologies that have been validated by OSHA or NIOSH. Action level contaminant concentrations are based on 50 percent of the OSHA PEL or ACGIH TLV for each contaminant. If air samples indicate that personal exposures are greater than the action levels, then personal protection, engineering, and administrative controls will be reviewed according to the procedures outlined below.

5.1 AIR MONITORING PROCEDURE

Air monitoring will be conducted in accordance with the following subsections by the site Superintendent or SSO:

- Check and record calibration before and after use each day, ensure that all instruments are calibrated and operated in accordance with the manufacturer's specifications, and confirm that equipment manuals for all monitoring instruments are present on-site during all operations;
- Note weather conditions;
- Collect and record a background reading on each air monitoring instrument to be used at day's start in an area free of site-generated airborne contaminants. This area will be located upwind of the work area.
- Determine and record ambient levels within the contaminated work areas prior to the initiation of operations;
- Report ambient conditions periodically;
- Check and record breathing zone levels during remediation and/or abatement activities;
- Check and record levels at the perimeter of the work zone if elevated concentrations are detected in the worker's breathing zone;
- Check and record levels following completion of any intrusive work by monitoring upwind and downwind locations at the edge of the work zone;
- Check and record airborne particulate levels periodically by monitoring upwind and downwind locations at the edge of the work zone.
- Check and record daily (pre/post-work) outside exclusion zone ambient air readings by monitoring upwind and downwind locations at the edge of the work zone.

Air Monitoring Reports/Logs will be made available to any regulatory personnel and/or Engineer upon request. The Air Monitoring Report/Log will indicate the location, time, type, and value of each reading and/or sampling event.

ATTACHMENT 1 - CONFINED SPACE ENTRY

CONFINED SPACE ENTRY PROGRAM

INTRODUCTION AND PURPOSE:

The purpose of this program is to establish procedures for working safely in confined spaces. *It is intended for confined space work which as it applies to OSHA regulations for construction.*

This program shall be reviewed annually or sooner as warranted by change in regulations, equipment up dates, incident investigations, and inspections findings as well as other improvement measures. Prior to issuing a new entry permit under the program previous cancelled permits performed within the last 12 months shall be reviewed for opportunities to improve the program and assure employees are properly protected. The Director, HS&E is responsible for leading the review, updating the program and managing the retraining of employees. The following guidelines outline the minimum acceptable criteria to be utilized for all confined space entry. Projects requiring confined space entry must be reviewed thoroughly by the appropriate HSE personnel.

Personnel entering and working in confined spaces will be required to adhere to the OSC and client Permit-Required Confined Space requirements. Personnel will be instructed in the applicable regulations as part of the employee training program. The SSO will be responsible for reviewing the safe work protocol with field team members before commencing confined space entry. The review shall provide all confined space workers the opportunity to review and clearly understand the permit requirements and planned procedures which includes assuring all equipment required is functioning properly for performing confined space work safely (i.e. extraction unit inspected, rescue measures in place, air monitor pre-calibration results acceptable, monitor functional, monitoring results acceptable to all workers). NOTE: No confined space work shall be performed until all workers are satisfied that everything is in order for safe confined space entry ("…All employees have the authority to stop work at any time for safety concerns…").

DEFINITIONS:

Authorized person means a person approved or assigned by the employer to perform a specific type of duty or duties or to be at a specific location or locations at the jobsite.

Attendant – Authorized and trained confined space employee assigned by the confined space supervisor who is responsible to stay top side, at confined space entry point and monitor entrant status as well as confined space conditions (See Attendant Responsibilities).

Confined space IS ANY SPACE having the following characteristics:

1. The space is large enough that it can be bodily entered;
2. The space has restricted means of entry and exit; and
3. The space is not designed for continuous human occupancy;

Permit Required Confined Space – is a confined space as previously defined that also may have a potential life threatening hazard;

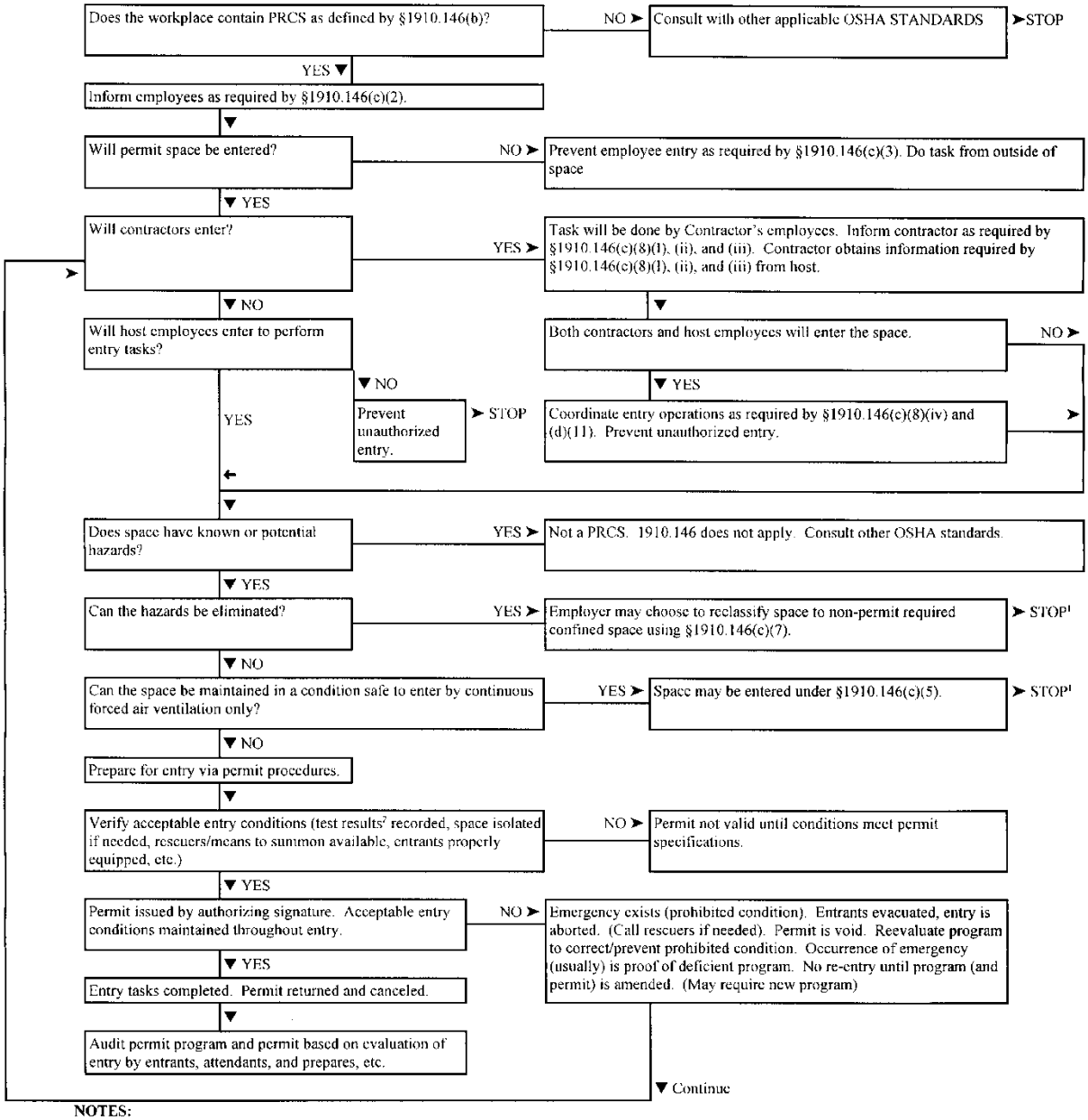
- The space contains, or has the potential to contain, a hazardous atmosphere, defined as oxygen below 19.5% or above 23.5%, combustible vapors above 10% LEL, or high toxic concentrations which may cause death, incapacitation, or an impaired ability to self-rescue;
- The space contains a material that may engulf an entrant;
- The space has an internal configuration that may trap or asphyxiate entrants; and/or
- The space contains any other serious health and life threatening safety hazard.

Competent Person is one who is capable of identifying existing and predictable hazards in the surroundings or working conditions, which are unsanitary, hazardous, or dangerous to employees. A competent person has the ability and authority to take prompt corrective measures to eliminate the previously mentioned conditions.

Entrant – Employee who is authorized and trained to enter and perform designated confined space work.

Entry Supervisor – competent authorized person responsible for supervision of confined space work (See Also Supervisor Responsibilities and Training).

FIGURE 1



NOTES:

1. Spaces may have to be evacuated and re-evaluated if hazards arise during entry.

2. Test conditions in the permit space to determine if acceptable entry conditions exist before entry is authorized to begin. If isolation of the space is feasible because the space is large or is part of a continuous system (e.g. sewer system), pre-entry testing will be performed to the extent feasible before entry is authorized. If entry is authorized, entry conditions will be continuously monitored in the areas where authorized entrants are working. Test or monitor the permit space as necessary to determine if acceptable entry conditions are maintained during entry operations.

PRCS Evaluation Procedures and Decision Flow Chart

PERMIT-REQUIRED CONFINED SPACE (PRCS)

OSHA defines a permit-required confined space (PRCS) as having one or more of the following hazards:

- The space contains, or has the potential to contain, a hazardous atmosphere, defined as oxygen below 19.5% or above 23.5%, combustible vapors above 10% LEL, or high toxic concentrations which may cause death, incapacitation, or an impaired ability to self-rescue;
- The space contains a material that may engulf an entrant;
- The space has an internal configuration that may trap or asphyxiate entrants; and/or
- The space contains any other serious health and and life threatening safety hazard.

When appropriate, PRCSs shall be identified with a sign reading:

DANGER

PERMIT-REQUIRED CONFINED SPACE

DO NOT ENTER

The above sign will be prominently posted on-site by the SSO in the immediate vicinity of the PRCS to inform personnel of the existence and location of and the danger posed by the PRCS.

Entry into a PRCS requires special training, rescue procedures, and a confined space entry permit.

NON-PERMIT REQUIRED CONFINED SPACE

OSHA defines a non-permit required confined space as a PRCS in which all serious hazards have been eliminated. Non-permit required confined spaces shall be reevaluated by the SSO using the "PRCS Evaluation Procedures and Decision Flow Chart" (Figure 1) whenever they or their characteristics change in a way that could lead to reclassification as a PRCS.

PERSONNEL RESPONSIBILITIES (Also See Manual Sections 2.0 – 2.6 "RESPONSIBILITIES")

Entry Supervisors

OSC shall designate an entry supervisor to oversee confined space entry and ensure that all personnel engaged in PRCS entry operations comply with this procedure. Entry supervisors shall:

- Verify that all tests specified by the permit have been conducted and that all procedures and equipment specified by the permit are in place before endorsing the permit and allowing entry to begin;
- Terminate the entry and cancel the permit when the entry operations covered by the entry permit have been completed or whenever a condition that is not allowed under the entry permit arises in or near the PRCS;
- Verify that rescue services are qualified and available and that the means for summoning them are operable;
- Remove unauthorized individuals who enter or who attempt to entry the PRCS during entry operations;
- Determine, at intervals dictated by the hazards and operations performed within the PRCS and whenever responsibility for a PRCS entry operation is transferred, that entry operations are consistent with terms of the entry permit and that acceptable entry conditions are maintained.

Attendants

The Entry Supervisor shall designate a qualified attendant for each PRCS entry operation. To be qualified, an attendant must know the hazards that authorized entrants may encounter during entry, including information on the mode, signs and symptoms, and consequences of exposure, and must be aware of behavioral effects or symptoms of hazard exposure.

Attendants shall:

- Remain outside the PRCS during entry operations until relieved by another attendant;
- Warn that unauthorized entrants that they must stay away from the PRCS or that they must immediately exit if they have entered the PRCS;
- Inform authorized persons and the Entry Supervisor if unauthorized persons have entered the PRCS;
- Continuously maintain an accurate count of authorized entrants in the PRCS and ensure that the means used to identify authorized entrants are accurate;
- Communicate with authorized entrants as necessary to monitor entrant status and to alert entrants of the need to evacuate the PRCS;
- Monitor activities inside and outside the PRCS to determine if it is safe for entrants to remain in the PRCS;
- Immediately order evacuation of the PRCS if the attendant detects a prohibited condition, the behavioral effects of hazard exposure in an authorized entrant, or a situation outside the PRCS that could endanger the authorized entrants, or if he cannot effectively and safely perform any of his or her duties and responsibilities; and
- Perform non-entry rescues as specified by the Confined Space Entry Permit and summon rescue and other emergency services as soon as it is determined that authorized entrants may need assistance to escape from PRCS hazards.

Attendants shall NOT, under any circumstances:

- Monitor more than one occupied PRCS at any given time;
- Perform any duty that might interfere with their primary duty to monitor and protect the authorized entrants; or
- Enter into the PRCS for rescue purposes.

Authorized Entrants

Authorized PRCS entrants shall be identified on each Confined Space Entry Permit. Authorized entrants shall:

- Know the hazards, including information on the mode, signs, symptoms, and consequences of exposure;
- Properly use PPE provided for PRCS entry;
- Communicate with the attendant as necessary so the attendant can monitor entrant status and alert entrants of any need to evacuate the PRCS; and
- Evacuate the PRCS and alert the attendant whenever they recognize any warning sign or symptom of exposure to a dangerous situation, detect a prohibited condition, or the attendant or entry supervisor orders evacuation or an evacuation alarm is activated.

TRAINING (See Also Section 2 - 4 Responsibilities, Record Keeping and Training)

All employees shall be instructed not to enter PRCSs without the proper permit and without following the procedures and practices outlined in this SOP and the Confined Space Entry Permit. Training of all affected and authorized employees shall be conducted initially at the time of hire, job transfer and thereafter as a minimum annually or sooner as warranted by regulatory change, program and equipment updates, incident/audit recommendations as well as improvement measures. Note – all confined space training for all authorized personnel (entrants, supervisor's attendants and rescue personnel) shall be site specific for the specific confined space and work required which includes multiple trade and subcontractor training including coordination of duties. This site and task specific confined space training shall be documented by the associated confined space AHA (Activity Hazard Analysis) for the job and its training attendance sheet. Copies of training shall be kept on file at field office and corporate office located at 333 Ganson Street, Buffalo, New York.

Employees who are required to enter PRCS or act as an attendant or entry supervisor shall be trained to the understanding, knowledge, and skills necessary for the safe performance of their assigned responsibilities and duties. These employees also must be familiar with the kinds of hazards they might face during entry and understand the modes, signs and

symptoms, and consequences of exposure. All trained confined space personal (team members = entrant, supervisor & attendants) shall for every confined space entry be required to review the confined space permit requirements and work procedures prior to commencing work. Review shall include monitor calibration, initial monitor readings as well as any prior canceled confined space work permits for that particular space. No work shall commence until all confined space team members are confident conditions are safe for entry, procedures, equipment and conditions are safe for entry (O2= 19.5 – 23.5 %, CO, LEL, H2S and VOC = 0). All employees have the authority to stop work at any time for safety concerns.

Entrants will receive training on:

- The methods used to communicate with attendants and the means attendants will use to notify them of emergencies;
- The operation of any specialized equipment they are expected to use, including monitoring and rescue equipment; and
- Evacuation signals and procedures and the need for entrants to notify the attendant and evacuate the PRCS if they detect any dangerous condition.

Attendants will receive training on:

- Procedures for monitoring inside and outside the PRCS and in recognizing conditions that might be hazardous to entrants;
- Procedures for communicating with entrants;
- Procedures for evacuating entrants from the PRCS, under what conditions evacuation is required, and how to call for emergency medical/rescue support;
- Procedures for controlling access to the PRCS and to warn unauthorized people away from the space;
- Their responsibility to remain outside the PRCS during entry unless they are relieved by another attendant; and
- Non-entry rescue procedures.

Entry Supervisors will receive training on:

- Verifying that the Confined Space Entry Permit has been completed properly;
- Procedures for verifying that all tests specified by the permit have been conducted;
- Requirements for verifying that all procedures and equipment specified by the permit are in place before allowing entry to begin;
- Procedures for determining if conditions are acceptable for entry;
- Authorizing entry operations; and
- Terminating entry.

The above training will be conducted:

- Before the employee is first assigned confined space duties (initial training);
- Before a change in assigned duties;
- Whenever there is a change in permit space operations that presents a hazard about which an employee has not previously been trained; and
- Whenever project management, involved regulatory officials, or the project engineer has reason to believe that there are inadequacies in knowledge or use of these procedures.

All training shall be documented and will include: the names of the personnel presenting and receiving the training and the dates of training. Training certification documentation shall be maintained as part of the project file and in individual personnel files.

PRCS ENTRY PROCEDURE

Atmospheric Testing

Before an employee enters any confined space, the Entry Supervisor will test the internal atmosphere with a calibrated, direct-reading instrument to determine if acceptable entry conditions exist for the following conditions in the order given:

Condition	Acceptable Parameter(s)
Oxygen Content	Above 19.5% and Below 23.5%
Flammable Gases and Vapors	Less than 10% LEL
Potential Toxic Air Contaminants	Below Action Levels for Selected PPE

Continuous systems which cannot be isolated (i.e., sewers) or activities which (generate significant airborne contaminants (i.e., welding) will be continuously monitored during entry even when forced mechanical ventilation is used and has been shown to maintain an acceptable atmosphere. Air monitoring shall be continuous while ventilation is applied.

PRCS Entry Procedure

The SSO will utilize the "PRCS Evaluation Procedures and Decision Flow Chart" (Figure 1) to verify the presence of a PRSC. If it is determined that a PRSC does exist, the SSO will review confined space entry procedures with entry personnel; post OSHA-required danger signs at entrances to the PRCS and notify site personnel of PRCS locations; notify off-site rescue/emergency response services of the required PRCS; and prepare a Confined Space Entry Permit.

Hazard Elimination or Control

The SSO will determine if hazards can be controlled with continuous forced mechanical ventilation or eliminated by removing potential sources of air contaminants by using proper shoring or sloping, installing standard guardrails, locking out electrical systems, or using some other approved method. If potential hazards can be eliminated, then the PRCS may be reclassified as a non-permit confined space. If potential hazardous are controlled with continuous forced mechanical ventilation, then the Non-PRCS Entry Procedure can be used.

Confined Space Entry Permit

The Entry Supervisor will be responsible for completing the Confined Space Entry Permit (sample provided in Appendix A). All items on the permit MUST be completed. The Entry Supervisor MUST verify that all entry personnel are aware of the specific hazards associated with the PRCS; that all necessary safety equipment and materials are in place; that emergency response procedures, including non-entry rescue, are in place; and that pre-entry air monitoring results indicate acceptable entry conditions before signing the permit. NOTE: Only one permit at a time may be used for PRCS entry.

Pre-Entry Briefing (Complete Review and Participation by All for Assurance)

The Entry Supervisor will conduct a pre-entry briefing with attendants and authorized entrants to discuss the requirements of the permit and to ensure that all involved personnel understand their responsibilities and the specific hazards associated with the PRCS. A pre-entry briefing will be conducted once for each attendant and authorized entrant prior to entry and whenever new hazards are identified. The space shall be re-evaluated whenever there is a reason to believe conditions have changed or if any confined space worker (supervisor, entrant, attendant or rescue personal) feel it is warranted weather for suspected changes or reassurance. All employees have the authority to stop work and cancel the permit for any safety concern. Entrants or their representatives shall be given the opportunity to participate in and review calibrated air monitoring data before entry. Air monitoring/testing shall be continuous when ventilation is applied.

Entry Authorization

The Entry Supervisor will sign the Confined Space Permit AFTER the permit has been completed, safety equipment is in place, air monitoring results are acceptable, the pre-entry briefing has been conducted, and rescue procedures have been established.

Once the permit has been signed

- Entrants will don all necessary safety and rescue equipment;
- The permit will be posted at, or near, the PRCS entrance; and
- Entry will begin.

Confined Space Entry Permit Expiration and Cancellation

Each Confined Space Entry Permit will be valid for only one (1) shift. Permits will be canceled if:

- A new hazard is identified or encountered;
- An entrant is seriously injured and requires evacuation and/or rescue; or if
- A change in the scope of the work requires new activities which may create previously unanticipated hazards that may cause serious injury or death.

Expired and cancelled permits must be returned to the Site Superintendent who will file and maintain them with the project documents. Re-issuance of expired or cancelled permits will be as specified above.

NON-PRCS ENTRY PROCEDURE

The following procedure may be utilized only if all of the following conditions have been met:

- The only serious hazard that cannot be eliminated is an actual or potential hazardous atmosphere;
- Continuous forced ventilation is sufficient to prevent a hazardous atmosphere; and
- Monitoring data is available to support the adequacy of ventilation.

If the conditions of this non-PRCS entry procedure can be met, then the entry permit, attendant, and rescue procedures (except for non-entry rescue) specified in this SOP are not required. It is necessary, however, to complete a Confined Space Entry Permit prior to entry. The permit will document that the space has been classified as a non-PRCS. CONTINUOUS AIR MONITORING AND NON-ENTRY RESCUE IS REQUIRED DURING NON-PRCS ENTRY.

All non-PRCS entrants will be required to have completed PRCS training, comply with all other applicable site safety regulations, and adhere to the following procedure:

- Eliminate conditions making it unsafe to remove an entrance cover prior to removing the cover (i.e., use non-sparking tools);

- Setup barriers around the opening to prevent adjacent work activities from endangering entrants;

- Conduct pre-entry air monitoring;

- Setup forced mechanical ventilation if a hazardous atmosphere is encountered or anticipated. Continue ventilation for as long as entrants are in the space;

- Evacuate entrants if a hazardous atmosphere develops and implement corrective actions to prevent recurrence; and

- Check the Non-PRCS box on the Confined Space Entry Permit and document the date of entry, location of the space, description of the work to be conducted within the space, and pre-entry air monitoring results. The person authorizing the Non-PRCS procedure will sign the permit in the space provided.

RESCUE/EMERGENCY PROCEDURES

On-Site Rescue/Emergency Response Teams

Each member of the on-site rescue/emergency response teams shall:

- Be provided with and trained in the proper use of PPE and equipment necessary for making rescues from PRCSs; and

- Receive the same level of training as authorized entrants and shall be trained in basic first-aid and CPR. Provisions shall be made so that whenever the team is on call, at least two members of the team will have current certification in first aid and CPR.

Off-Site Rescue and Emergency Services

Off-site rescue/emergency service personnel will be alerted prior to entry and informed by the SSO of the hazards they may confront if called on to perform rescue. The rescue/emergency service personnel will be provided access to all permit spaces from which rescue may be necessary so that the emergency responders can develop appropriate rescue plans and conduct rescue operations.

Non-Entry Rescue Procedures

To facilitate non-entry rescues, retrieval systems or methods will be used whenever an authorized entrant enters a PRCS, unless the retrieval equipment would increase the overall risk of entry or would not contribute to the rescue of the entrant.

Each authorized entrant will use a chest or full body harness, with a retrieval line attached at the center of the entrant's back near the shoulder level or above the entrant's head. Wristlets may be used in lieu of the chest or full body harness if it can be demonstrated that the use of such a harness is infeasible or creates a greater hazard and that the use of wristlets is the safest and most effective alternative.

Retrieval lines will be attached to a mechanical device or fixed point outside the permit space in such a manner that rescues can begin as soon as the rescuer becomes aware that rescue is necessary. The mechanical device will be ready to retrieve personnel from vertical any PRCS more than five feet (5 ft) deep.

ATTACHMENT 2 - HAZARD COMMUNICATION PROGRAM

HAZARD COMMUNICATION PROGRAM

INTRODUCTION AND PURPOSE

OSHA Standard 29 CFR 1910.1200 "Hazard Communication Standard" requires that all employees handling or using chemicals which may be hazardous, are informed as to the hazard potential associated with those materials. The main elements of this program include a health and biological surveillance program, an employee education and training program, and an employee exposure determination program. See also section 4 Training Program.

The purpose of the OSC Hazard Communication Program is to ensure the hazards of chemicals produced or imported are evaluated and that the information is communicated to affected employees. This information is communicated through the Hazard Communication Program Training including information on Safety Data Sheets (SDSs).

PERSONNEL RESPONSIBILITIES (Also See Previous Manual Sections 2.0 – 2.6 "RESPONSIBILITIES")

- Director, HS&E - The Director, HS&E is responsible for assuring this program is reviewed and updated as necessary (product changes and updates, regulatory updates, program performance improvements). The program shall be as a minimum reviewed and updated annually.

- Managers and Supervisors - Managers and Supervisors are responsible for assuring their projects/operations and employees are in compliance with the requirements of this program (training, application, practice and procedures).

- Employees – Employees are responsible for following all policies and procedures as required by this program as well as report any perceived program deficiencies (violations and errors) or improvement measures to their supervisor). NOTE – All employees have the authority and responsibility to stop work for safety concerns. "If you see it, you own it".

- Subcontractors – All subcontractors are responsible for following policies and procedures as well as report any perceived program deficiencies (violations and errors) or improvement measures to their superior). NOTE – All employees have the authority and responsibility to stop work for safety concerns. "If you see it, you own it".

DEFINITIONS (See Also Attachment 32 Standard Program Definitions)

Exposure or exposed means that an employee is subjected in the course of employment to a chemical that is a physical or health hazard, and includes potential (e.g. accidental or possible) exposure. "Subjected" in terms of health hazards includes any route of entry (e.g. inhalation, ingestion, skin contact or absorption.)
Foreseeable emergency means any potential occurrence such as, but not limited to, equipment failure, rupture of containers, or failure of control equipment which could result in an uncontrolled release of a hazardous chemical into the workplace.
GHS – Globally Harmonized System of Classification and Labeling of Chemicals
Hazard category means the division of criteria within each hazard class, e.g., oral acute toxicity and flammable liquids include four hazard categories. These categories compare hazard severity within a hazard class and should not be taken as a comparison of hazard categories more generally.
Hazard class means the nature of the physical or health hazards, e.g., flammable solid, carcinogen, oral acute toxicity.
Hazard not otherwise classified (HNOC) means an adverse physical or health effect identified through evaluation of scientific evidence during the classification process that does not meet the specified criteria for the physical and health hazard classes addressed in this section. This does not extend coverage to adverse physical and health effects for which there is a hazard class addressed in this section, but the effect either falls below the cut-off value/concentration limit of the hazard class or is under a GHS hazard category that has not been adopted by OSHA (e.g., acute toxicity Category 5).
Hazard statement means a statement assigned to a hazard class and category that describes the nature of the hazard(s) of a chemical, including, where appropriate, the degree of hazard.
Hazardous chemical means any chemical which is classified as a physical hazard or a health hazard, a simple asphyxiate, combustible dust, pyrophoric gas, or hazard not otherwise classified.
Health hazard means a chemical which is classified as posing one of the following hazardous effects: acute toxicity (any route of exposure); skin corrosion or irritation; serious eye damage or eye irritation; respiratory or skin sensitization; germ cell mutagenicity; carcinogenicity; reproductive toxicity; specific target organ toxicity (single or repeated exposure); or aspiration hazard. The criteria for determining whether a chemical is classified as a health hazard are detailed in Appendix A to 1910.1200—Health Hazard Criteria.
Immediate use means that the hazardous chemical will be under the control of and used only by the person who transfers it from a labeled container and only within the work shift in which it is transferred.
Importer means the first business with employees within the Customs Territory of the United

States which receives hazardous chemicals produced in other countries for the purpose of supplying them to distributors or employers within the United States.

Label means an appropriate group of written, printed or graphic information elements concerning a hazardous chemical that is affixed to, printed on, or attached to the immediate container of a hazardous chemical, or to the outside packaging.

Label elements means the specified pictogram, hazard statement, signal word and precautionary statement for each hazard class and category.

Mixture means a combination or a solution composed of two or more substances in which they do not react.

Physical hazard means a chemical that is classified as posing one of the following hazardous effects: explosive; flammable (gases, aerosols, liquids, or solids); oxidizer (liquid, solid or gas); self-reactive; pyrophoric (liquid or solid); self-heating; organic peroxide; corrosive to metal; gas under pressure; or in contact with water emits flammable gas. See OSHA CFR Hazard Communication Standard Appendix B to §1910.1200—Physical Hazard Criteria.

Pictogram means a composition that may include a symbol plus other graphic elements, such as a border, background pattern, or color, that is intended to convey specific information about the hazards of a chemical. Eight pictograms are designated under this standard for application to a hazard category.

Precautionary statement means a phrase that describes recommended measures that should be taken to minimize or prevent adverse effects resulting from exposure to a hazardous chemical, or improper storage or handling.

Produce means to manufacture, process, formulate, blend, extract, generate, emit, or repackage.

Product identifier means the name or number used for a hazardous chemical on a label or in the SDS. It provides a unique means by which the user can identify the chemical. The product identifier used shall permit cross-references to be made among the list of hazardous chemicals required in the written hazard communication program, the label and the SDS.

Pyrophoric gas means a chemical in a gaseous state that will ignite spontaneously in air at a temperature of 130 degrees F (54.4 degrees C) or below.

Responsible party means someone who can provide additional information on the hazardous chemical and appropriate emergency procedures, if necessary.

Safety data sheet (SDS) means written or printed material concerning a hazardous chemical that is prepared in accordance with federal regulation under the Hazard Communication Standard.

Signal word means a word used to indicate the relative level of severity of hazard and alert the reader to a potential hazard on the label. The signal words used in this section are "danger" and "warning." "Danger" is used for the more severe hazards, while "warning" is used for the less severe.

Simple asphyxiate means a substance or mixture that displaces oxygen in the ambient

atmosphere, and can thus cause oxygen deprivation in those who are exposed, leading to unconsciousness and death.
Specific chemical identity means the chemical name, Chemical Abstracts Service (CAS) Registry Number, or any other information that reveals the precise chemical designation of the substance.
Substance means chemical elements and their compounds in the natural state or obtained by any production process, including any additive necessary to preserve the stability of the product and any impurities deriving from the process used, but excluding any solvent which may be separated without affecting the stability of the substance or changing its composition.
Trade secret means any confidential formula, pattern, process, device, information or compilation of information that is used in an employer's business, and that gives the employer an opportunity to obtain an advantage over competitors who do not know or use it. Appendix E to §1910.1200—Definition of Trade Secret, sets out the criteria to be used in evaluating trade secrets.
Use means to package, handle, react, emit, extract, generate as a byproduct, or transfer.
Work area means a room or defined space in a workplace where hazardous chemicals are produced or used, and where employees are present.
Workplace means an establishment, job site, or project, at one geographical location containing one or more work areas.

MATERIAL SAFETY DATA SHEET (MSDS) OR SAFETY DATA SHEET (SDS)

A Material Safety Data Sheet or Safety Data Sheet is a document from the material manufacturer that provides specific identification information, ingredients and hazards, physical data, fire and explosion information, reactivity data, health hazard information, spill risk and disposal procedures, special protection information, and special precautions. It is the manufacturer's responsibility to provide this information for any hazardous or potentially hazardous materials.

A comprehensive collection of MSDS/SDS's is maintained in OSC's Corporate Office and prior to any project startup, it is the project supervisor and/or project manager's responsibility to ensure that data sheets for any hazardous or potentially hazardous materials expected to be encountered during project work are located on-site and are available to ALL OSC employees, sub-contractors, clients, regulatory officials, etc. MSDS's which are not available from this collection should be secured from the manufacturer and/or the client for whom services are going to be performed and a copy shall be forwarded to the Director, HS&E to be filed in the master MSDS/SDS database.

LABELS

It is the responsibility of the project superintendent to ensure that all potentially hazardous chemicals brought to a project site are properly labeled as to the contents of the container and the appropriate hazard warnings.

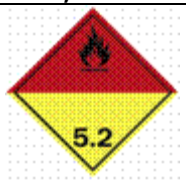
SPECIAL NOTE SDS HAZARD RATING OPPOSITE OF MSDS HAZARD RATING

Be aware of the fact that a significant change has occurred with respect to hazard ratings under the new global harmonization system (GHS). Numeric hazard ratings in GHS are the OPPOSITE of what they were with the Hazardous Materials Identification System (HMIS) and the National Fire Protection Agency (NFPA). Now, the **lower** the rating (number), the **higher** the hazard! The numeric hazard ratings for a chemical will be included on the SDS. In most cases, this should be found in the Hazards Identification section (section 2). In every case the user should not rely on the numerical hazard identification label but should review the products appropriate MSDS or SDS before use.

PICTOGRAM LABELS AND HAZARDS:

Pictograms and Hazard Classes		
		
▪ Oxidizers	▪ Flammables ▪ Self Reactives ▪ Pyrophorics ▪ Self-Heating ▪ Emits Flammable Gas ▪ Organic Peroxides	▪ Explosives ▪ Self Reactives ▪ Organic Peroxides
		
▪ Acute toxicity (severe)	▪ Corrosives	▪ Gases Under Pressure
		
▪ Carcinogen ▪ Respiratory Sensitizer ▪ Reproductive Toxicity ▪ Target Organ Toxicity ▪ Mutagenicity ▪ Aspiration Toxicity	▪ Environmental Toxicity	▪ Irritant ▪ Dermal Sensitizer ▪ Acute toxicity (harmful) ▪ Narcotic Effects ▪ Respiratory Tract ▪ Irritation

Transport "Pictograms"

		
Flammable Liquid Flammable Gas Flammable Aerosol	**Flammable solid Self-Reactive Substances**	**Pyrophorics (Spontaneously Combustible) Self-Heating Substances**
		
Substances, which in contact with water, emit flammable gases (Dangerous When Wet)	**Oxidizing Gases Oxidizing Liquids Oxidizing Solids**	**Explosive Divisions 1.1, 1.2, 1.3**
		
Explosive Division 1.4	**Explosive Division 1.5**	**Explosive Division 1.6**
		
Compressed Gases	**Acute Toxicity (Poison): Oral, Dermal, Inhalation**	**Corrosive**
		
Marine Pollutant	**Organic Peroxides**	

NON-ROUTINE TASKS

When employees are required to perform hazardous non routine tasks, such as confined space entry, line breaking, or tank cleaning, special training shall be conducted to inform affected employees as to the hazardous materials to which they may be exposed and the proper procedures and personal protective equipment required to minimize exposure potential.

EDUCATION AND TRAINING

Prior to any project start up, a pre-project training session is conducted with all affected employees. Included in this training session are, at a minimum, the following items:

- An overview of the hazard communication requirements as per 29 CFR 1910.1200;
- A review of the chemicals present and anticipated to be encountered during the course of project work, including any chemicals or materials already present at the site, chemicals or materials which will be utilized by OSC personnel during the project, and chemicals or materials which will be utilized by any subcontractor during the project;
- The location and availability of the written hazard communication program, an inventory of chemicals expected to be utilized and/or encountered, and the SDS's for those materials;
- Methods and observation techniques that may be used to detect the presence of hazardous chemicals in the work area in case they are released;
- The physical and health hazards associated with the chemical on the work site;
- Methods for prevention of exposure to hazardous workplace chemicals;
- Emergency procedures to follow if employees are exposed to hazardous chemicals;
- An explanation of the hazard communication program, including how to read labels; and
- MSDS/SDS's to obtain appropriate hazard information.

INFORMING OTHER EMPLOYERS

To ensure that the employees of subcontractors have access to information on the hazardous chemicals at a project site, it is the responsibility of the project supervisor/manager to provide the following information:

- The location of SDS's;
- The name and location of the hazardous chemicals to which employees may be exposed and the appropriate protective measures; and
- An explanation of the labeling system used at the site.

ATTACHMENT 3 - INCIDENT INVESTIGATION

INCIDENT INVESTIGATION

INTRODUCTION AND PURPOSE:

OSC has developed this program to assist supervision in determining the root cause of work related injuries. This program will also be followed in the event of "near misses," or incidents which may have occurred if conditions had been slightly different.

All incidents are a result of conditions and behaviors and therefore are preventable. By analyzing the investigation information and taking corrective action, similar and perhaps more severe incidents may be prevented. The purpose of the investigation is not to blame anyone, but to determine how and why the incident occurred and what measures can be implemented to prevent similar events from occurring.

An incident is an unplanned event or condition, some of which result in personal injury, releases to the environment or property damage. Investigate all incidents regardless of how minor the outcome may seem. Incidents are part of a broad group of events that adversely affect the completion of a task.

PERSONNEL RESPONSIBILITIES (Also See Manual Sections 2.0 – 2.6 "RESPONSIBILITIES")

- Director, HS&E - The Director, HS&E is responsible for reviewing all incident reports as well as supporting implementation of corrective measures and that this program is reviewed and updated as required. The program shall be as a minimum reviewed and updated annually.

- Managers and Superintendents - are responsible for assuring their projects/operations and employees are in compliance with the requirements of this program and that corrective actions are implemented. All incidents (near miss, injuries, property damage) shall be reported immediately to the supervisor and Director, HS&E. See investigative procedures.

- Employees – Employees are responsible for following all policies and procedures as required by this program as well as report any perceived program deficiencies (violations and errors) or improvement measures to their supervisor). All incidents (near miss, injuries, property damage) shall be reported immediately to the supervisor. NOTE – All employees have the authority and responsibility to stop work for safety concerns. "If you see it, you own it".

DEFINITIONS (See Attachment 32 Standard Program Definitions):

INCIDENT PREVENTION

Incidents are usually complex having several, if not many conditions and behaviors that can be causes. A detailed analysis will normally reveal three cause levels: basic, indirect, and direct.

An incident results when a person or object receives an amount of energy or hazardous material that cannot be absorbed safely. This energy or hazardous material is the direct cause of the incident. The direct cause is usually the result of one or more unsafe acts, unsafe conditions, or both. Unsafe acts and conditions are the indirect causes or symptoms. In turn, indirect causes are usually traceable to poor management policies and decisions, or to personal or environmental factors; these are the basic causes.

In spite of their complexity, most incidents are preventable by eliminating one or more causes. Incident investigations determine not only what happened, but also how and why. The information gained from these investigations can prevent recurrence of similar or perhaps more disastrous incidents. Incident investigators are interested in each event as well as in the sequence of events that lead to an incident. Type is also important to the investigator. The recurrence of incidents of a particular type or those with common causes indicates areas needing special prevention emphasis.

FACT FINDING

Gather evidence from many sources during an investigation. Get information from witnesses and reports as well as by observation. Interview the witnesses as soon as an incident has occurred. Inspect the site before any changes occur. Take photographs and make sketches of the scene. Record all pertinent data on maps. Get copies of all reports.

CHANGE ANALYSIS

As its name implies, this technique emphasizes change. To solve a problem, an investigator must look for deviations from the norm. Consider all problems to result from some unanticipated change. Make an analysis of the change to determine its causes. The following steps are helpful using this method:

- Define the problem (What happened?).
- Establish the norm (What should have happened?).
- Identify, locate, and describe the change (What, where, when, to what extent?).
- Specify what was and what was not affected.
- Identify the distinctive features of the change.
- List the possible causes.
- Select the most likely causes.

REPORT OF INVESTIGATION

Special report forms are available. Such reports include a cover page, a commentary or narrative portion, a discussion of probable causes, and a section on conclusions and recommendations.

INTERVIEWS

After interviewing all witnesses, the interviewer should analyze each witness' statement. He may wish to re-interview one or more witnesses to confirm or clarify key points. While there may be inconsistencies in witnesses' statements, investigators should assemble the available testimony into a logical order.

CORRECTIVE ACTIONS

Investigations are an effort to prevent a similar or perhaps more disastrous sequence of events. Most incident investigations follow formal procedures. There are a number of procedures such as change analysis, 5-why, and fishbone. The end results is always corrective action, and whatever techniques determines proper corrective action, is good.

Besides identifying corrective actions, the final report must also specify implementation dates and responsible parties. Confirmation of implementation should also be included.

RECORD KEEPING

29 CFR 1904; Recording and Reporting Occupational Injuries and Illnesses

- OSHA 301 Form **(Incident Report – Doc# INC-01-07)**
- OSHA 300 Logs **(Past and present logs located in OSC Corporate Office)**

ATTACHMENT 4: EMERGENCY RESPONSE PLAN

EMERGENCY REPONSE PLAN (CONTINGENCY PROCEDURES)

PURPOSE AND INTRODUCTION:

The purpose of the emergency response plan is to provide an organized group with an action plan for efficient response in any emergency situation. Site specific plans shall be developed for each project location identifying the following;

- distinct evacuation alarm used to signal personnel,
- communication method for directions (radio, voice, public announcement) specific project personnel responsibilities,
- evacuation route diagram and assembly points including emergency contacts (name & phone number). Evacuation route diagrams shall be posted at all occupied work areas and will indicate present location,
- egress, emergency lighting and directional signs for safe entry and exit (all entry/exits and paths to and from) which shall be inspected daily and documented weekly.
- plan shall indicate frequency of documented practice evacuation drills (minimum once a month).
- In all cases the primary goal is to evacuate the building quickly and safely. There are no critical process within any OSC operation that requires personnel to stay and not evacuate when signaled.

Special Note: In many cases depending on type of project and phase the typical inspection and maintenance for building emergency lighting and egress signs do not apply because there are no occupied buildings (Demolition and Environmental Remediation Projects).

This written plan and the site specific plans are available to all employees, subcontractors and visitors for review. Plan shall be reviewed (verbally and in writing/read by employee) with employees initially at time of hire, transfer and at the beginning of each project and thereafter at least annually or sooner as warranted by responsibility changes, procedure changes, job conditions, inspection/incident recommendations and other improvement requests. When there are less than ten employees the plan can be communicated orally. Training shall include orderly practice evacuations with distinctive alarm(See Also Section 2-4

PERSONNEL RESPONSIBILITIES (Also See Manual Sections 2.0 – 2.6 "RESPONSIBILITIES")

- Director, HS&E - The Director, HS&E is responsible for assuring this plan is reviewed and updated as necessary (product changes and updates, regulatory updates, plan performance improvements). The plan shall be as a minimum reviewed and updated annually.

- Managers and Supervisors - Managers and Supervisors are responsible for assuring their projects/operations and employees are in compliance with the requirements of this plan (training, application, practice and procedures).

- Employees – Employees are responsible for following all policies and procedures as required by this plan as well as report any perceived plan deficiencies (violations and errors) or improvement measures to their supervisor). NOTE – All employees have the authority and responsibility to stop work for safety concerns. "If you see it, you own it".

- Subcontractors – All subcontractors are responsible for following all policies and procedures as required by this plan as well as report any perceived deficiencies (violations and errors) or improvement measures to their superior). NOTE – All employees have the authority and responsibility to stop work for safety concerns. "If you see it, you own it".

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Plan objectives are as follows:

- Safeguard project personnel and property;
- Protect general public and neighboring areas; and
- Resume normal operations as soon as possible

In the event of a fire or sudden release of contaminants, OSC personnel will quickly evacuate the area impacted. OSC's emergency response and contingency plan presents procedures that will be followed in case of an injury or in case OSC observes an emergency unrelated to the field work.

The SHSO will identify and arrange for emergency medical assistance. The location, telephone number, and transportation capabilities of the nearest emergency medical facilities are an

integral part of the site health and safety plan. For particularly hazardous operations, on-site medical assistance should be considered or the nearest medical facility alerted.

In the event of any emergency associated with the project, OSC will, without delay, alert the Owner's Representative and institute whatever measures which might be necessary to prevent any repetition of the conditions or actions leading to or resulting in the emergency.

In the event of an incident resulting in a spill on public roadways or travel ways, OSC will employ an independent emergency response company approved by the Owner's Representative. OSC will be liable for all costs associated with the cleanup of spills. The Owner's Representative will direct the emergency response company in the event of a spill.

In the event of an OSC site incident, the SHSO (or designee) will assume incident command and shall do so until mutual aid or additional trained personnel arrive on-site. The injured or ill person will be transferred to the medical facility designated in the site specific Emergency Response Plan.

When an evacuation is necessary, all field team members will go to the refuge area specific to the project. The site emergency contingency plan shall identify the refuge areas for contractor personnel in the event of an evacuation.

For emergency situations, oral or hand safety signals will be established by the SHSO. These should be developed, reviewed, and made available to personnel for all phases of operation before going on-site. This will ensure quick communications for use during adverse or emergency situations.

If an emergency develops at the site, the discoverer will take the following course of action:

- Notify the proper emergency services (fire, police, ambulance, etc) for assistance;
- Notify other affected personnel at the site;
- Contact the client representative to inform them of the incident as soon as possible; and
- Prepare a summary report of the incident for the client representative.

EMERGENCY EQUIPMENT REQUIRED ON-SITE

OSC will provide appropriate emergency equipment, including an approved industrial-type first aid kit. A 20-pound ABC-rated fire extinguisher shall be maintained in each work area of the site. Emergency retrieval equipment will be provided for each confined space entry.

LOCAL EMERGENCY RESOURCES (Unless otherwise specified See Site Specific HASP)

Ambulance	911	Hospital Emergency Room	911
Police	911	Fire Department	911

EMERGENCY CONTACTS

Ontario Specialty Contracting, Inc.:

Home Office Emergency Phone Number	(716) 856-3333
24 Hour 7 Days Week Cell	(716) 560-7542 (Bill Fleck)

EMERGENCY RESPONSE TEAM

The emergency response team will consist of individuals with the following titles or responsibilities:

- Initial Incident Commander;
- Project Coordinator; and
- Trained HSE personnel.

TYPES OF EMERGENCIES

- Controllable: Minor fire, mechanical problem, or any disturbance from normal operation that affects the immediate area.
- Minor: A condition that could endanger life and property on the project site that requires outside help for correction or control, but generally can be contained.
- Major: Any condition deemed at the time uncontrollable that could endanger life and property on the project site as well as adjacent properties. Requires considerable outside help.

HSE RESPONSIBIITIES IN A EMERGENCY (See Section "2 Responsibilities…")

In the event of a release, the Director, HS&E (or designee), in conjunction with other trained personnel, will determine whether there has been any exposures to personnel. He will also attempt to determine the level of exposure where feasible.

The Director, HS&E will then consult with the physicians assigned to the project and the certified industrial hygienist to determine if any health effects are to be expected. If appropriate, medical treatment will be recommended to those individuals.

REPORTING AN EMERGENCY

Controllable: Project personnel will notify HSE personnel of the incident.

Minor: The HSE personnel will immediately notify project superintendent and state the following:

- Name;
- Location of emergency;
- Describe Problem;
- State whether fire department is needed; and
- State whether personnel are needed.

The project superintendent will react as follows:

- Call fire department if required and
- Call personnel from emergency call-in-list

Major: The HSE personnel will immediately notify the project superintendent and state the following:

- Name;
- Location of emergency;
- Describe the problem; and
- State that this is a major emergency.

The project superintendent will react as follows:

- Call fire department;
- Call rescue personnel;
- Call police; and
- Call Contracted Emergency Responder Coordinator.

EMERGENCY CALL IN LIST

The emergency team members are responsible for maintaining the emergency response plan and contacting the OSC Director, HS&E. Said person shall contact local officials, utility companies, and regulatory agencies as appropriate.

Should the emergency be classified as major, all available outside assistance shall be commissioned to the project site immediately. In addition, other emergency response team units shall be made available 24 hours per day upon request.

FUNCTIONS OF EMERGENCY RESPONSE TEAM MEMBERS

The initial incident commander shall be in charge of the major emergency until additional trained personnel (I.E – Mutual Aid personnel: EMS, Fire Department, etc.) arrives on site and relieves OSC Incident Command. Upon arrival of the additional emergency personnel, the initial incident commander shall review and update conditions of the emergency with the Contracted Emergency Response Coordinator. At this point in time, the initial incident commander shall turn the authority of command over to the Contracted Emergency Coordinator.

Initial Incident Command

This position will be filled by the job site superintendent and SHSO.

- Coordinates response activities with appropriate personnel.
- Responsible for the overall direction of the emergency staff.
- Arranges for notification of appropriate individuals in case of injury.
- Acts in advisory capacity on policy matters.

- Provides technical data and advice at the time of an emergency.
- Pre-informs appropriate local government officials of the safety aspects of remedial program.
- During emergency, acts as the liaison with governmental agencies.
- This position will be filled by the job site superintendent.
- Contacts park officials and other government agencies.
- Will minimize all contact with public.
- Depending on wind conditions, coordinate notification of neighboring plants and residents with local authorities.
- Ascertains the extent of air and sewage contamination and notifies the proper authorities.

Project Coordinator

This position will be filled by the project foreman.

- Coordinates with police authorities with respect to notification of neighbors.
- Arranges and provides for equipment and materials needed to cope with emergency conditions including showers, eye wash stations, fire fighting equipment capable of extinguishing chemical fires, first aid supplies, and construction equipment.
- Directs on-site inquiries from the public to appropriate individuals.
- Notifies the contracting officer of any scheduled meetings with local government officials.

SHSO

This position will be filled by OSC's SHSO.

- Responsible for the safety of personnel at the emergency scene.
- Recommends proper protective clothing and equipment as well as proper fire fighting techniques.
- Tests downwind areas for levels of chemicals.
- Coordinates medical personnel and rescue work.
- Maintains contact with field office

- Establishes and maintains crowd control until local authorities arrive
- Will have a current inventory (number of units) of protective clothing equipment that is available at the project site. Manufacturer's specification information will be in the field office for the various types of protective clothing and equipment available at the project site for emergencies.
- Responsible for the safety of personnel at the emergency scene

EMERGENCY COMMUNICATIONS

A distinctive alarm system shall be used to give signal to all personnel in the event of an emergency. A portable air-horn will be located at each working site and at OSC's field office. This horn will be sounded in case of an emergency.

Emergency Situation	*Air Horn Response*
Personal Injury	4 Short Blasts (2 or 3 Seconds)
Emergency requiring working site evacuation	2 Short Blasts

Additionally, all OSC emergency response personnel will be equipped with two-way radios.

EVACUATION ROUTES AND PROCEDURES

Each OSC job-site shall have a wind direction indicator (e.g., small flags or ribbons, etc). If informed to evacuate the site, all personnel in the immediate vicinity shall proceed at right angles to the wind direction to pre-selected upwind assembly areas. At the refuge area, the SHSO will take a head count and compare it against the log book to ensure that all personnel have been evacuated.

The SHSO will also determine if the refuge area chosen is outside the influence of the emergency situation. If not, he will redirect the group to a new area. Prior to re-entry of the project site after evacuation, the SHSO will conduct an evaluation to determine the type of protective clothing and equipment necessary to address the potential hazards.

EMERGENCY INCIDENT REPORT

An emergency incident report will be reviewed by the OSC Director, HS&E and maintained with the project information. The report will include, but is not limited to, the nature of the problem; time, location, areas affected; manner and methods used to control the emergency; sampling and/or monitoring data; impact, if any, to the surrounding community; and corrective actions necessary to minimize future occurrences.

NOTE: Within eight (8) hours after the death of any employee from a work-related incident or the in-patient hospitalization of three or more employees as a result of a work- related incident, the OSC Director, HS&E shall report (orally) the fatality/multiple hospitalization by telephone or in person to the Area Office of the Occupational Safety and Health Administration (OSHA), U.S. Department of Labor, that is nearest to the site of the incident. OSHA toll-free central telephone number, 1-800-321-OSHA (1-800-321-6742

EMERGENCY PLAN POSTING

All emergency plans will be posted at the project site.

EMERGENCY INVENTORY

In addition to those items specified elsewhere, the SHSO will ensure that the following inventory of equipment and protective clothing is available in the event of emergencies:

- Washable coveralls;
- Outer gloves;
- Inner gloves;
- Face shields;
- Safety glasses;
- Respirators;
- Disposable coveralls;
- Outer boots;
- Hard hats; and
- Rain suits.

MASTER PHONE LIST

The master phone list will be prominently posted at OSC's field office.

INCIDENT RESPONSE

Personal Injury Incidents

Physical injuries can range from a sprained ankle to a compound fracture, or from a minor cut to massive bleeding. For less serious injuries, treatment may be given in the field by any First Aid/CPR trained personnel; for more serious injuries, additional assistance may be required in the field or at a medical facility. Trained personnel will assess the injury and consult by phone with a physician, if necessary. If hospitalization is required, the SHSO will notify the project superintendent, who will arrange for an ambulance. Anyone on-site can initiate the emergency response process (most commonly 911).

If soiled clothing cannot be removed, the injured person will be wrapped in blankets for transportation to the hospital. The hospital shall put into effect a contingency plan for providing emergency treatment for a person who may have contaminated clothing or chemical contamination on his body.

ATTACHMENT 5 - DISCIPLINARY POLICY

DISCIPLINARY POLICY

PURPOSE

Each employee is expected to follow the OSC company rules and policies and all federal, state agencies, local regulations and those of the owner for whom the work is being done. In order to ensure a safe and healthy workplace, has a Disciplinary Policy and Procedures to ensure compliance to all rules and regulations.

RESPONSIBILITIES (Also See Manual Sections 2.0 – 2.6 "RESPONSIBILITIES")

- Director, HS&E - The Director, HS&E is responsible for assuring this policy is reviewed and updated as necessary. The policy shall be as a minimum reviewed and updated annually.
- Managers and Supervisors - Managers and Supervisors are responsible for assuring their projects/operations and employees are in compliance with the requirements of this policy.
- Employees – Employees are responsible for following all company policies and procedures as required and reporting any deviation from this policy to upper management.
- Subcontractors – All subcontractors are responsible for following all policies and procedures as required.

PROCEDURE

Employees are subject to a **progressive counseling process** if considered insubordinate, resulting in the following (or similar to):

- First Violation: Warning
- Second Violation: Mandatory three (3) day work suspension without pay
- Third Violation: Termination.

In each case, the employee will be provided written notice. A copy of the notice will be issued to the employee's project manager, and appropriate HSE personnel.

When issuing a notice, meet with the employee(s) to discuss the performance issue. Inform the individual(s) of the issue and the corrective action to be taken. Complete the notice in its entirety and issue the copies as directed on the form.

Nothing in this policy prohibits the immediate dismissal or removal from the job site of any employee whose conduct constitutes a compromise of HSE requirements which could cause serious danger to him, his co-workers, property, equipment, or other employees.
Questions regarding the Disciplinary Policy are to be directed to the Director, HS&E.

SUPERVISOR RESPONSIBILITY

The on-site supervisory personnel will be judged by the same rules as field employees and bear responsibility for overall site conditions.

Project managers, HSE personnel, and other company officials will make physical inspections of the job sites. If an inspection of activities and areas indicates findings demonstrating overall lack of commitment to company HSE goals, the project superintendent and/or foreman will be issued a written warning.

Two (2) written warnings will be considered cause for disciplinary lay-off or demotion. Three (3) written warnings will be considered cause for dismissal.

Failure to institute corrective action shall be considered insubordination and could be cause for dismissal. It is required that the suspension and termination process is completed under the direction of the project manager.

ATTACHMENT 6: CONTROL OF HAZARDOUS ENERGY

(Electrical, Thermal, Chemical, Mechanical, Stored, Kinetic, Under Pressure)

LOCKOUT/TAGOUT PROGRAM

PURPOSE:

To assure employees are properly protected from unwanted release of hazardous energy during repair, maintenance and service of equipment).

PERSONNEL RESPONSIBILITIES (Also See Manual Sections 2.0 – 2.6 "RESPONSIBILITIES")

- Director, HS&E - The Director, HS&E is responsible for assuring this program is reviewed and updated as necessary (product changes and updates, regulatory updates, program performance improvements). The program shall be as a minimum reviewed and updated annually.

- Managers and Supervisors - Managers and Supervisors are responsible for assuring their projects/operations and employees are in compliance with the requirements of this program (training, application, practice and procedures).

- Employees – Employees are responsible for following all policies and procedures as required by this program as well as report any perceived program deficiencies (violations and errors) or improvement measures to their supervisor). NOTE – All employees have the authority and responsibility to stop work for safety concerns. "If you see it, you own it".

- Subcontractors – All subcontractors are responsible for following all policies and procedures as required by this program as well as report any perceived program deficiencies (violations and errors) or improvement measures to their superior). NOTE – All employees have the authority and responsibility to stop work for safety concerns. "If you see it, you own it".

DEFINITIONS (See Also Attachment Y Standard Program Definitions)**:**

1. **Accepted Engineering Practices** are those requirements, which are compatible with standards of practice required by a registered professional engineer.
2. **ANSI"** means American National Standards Institute.
3. **Approved"** means sanctioned, endorsed, accredited, certified, or accepted as satisfactory by a duly constituted and nationally recognized authority or agency including OSC, its clients or client representatives as specified.

4. **Authorized person"** means a person approved or assigned by the employer to perform a specific type of duty or duties or to be at a specific location or locations at the jobsite.
5. **Competent Person** is one who is capable of identifying existing and predictable hazards in the surroundings or working conditions, which are unsanitary, hazardous, or dangerous to employees. A competent person has the ability and authority to take prompt corrective measures to eliminate the previously mentioned conditions.
6. **Controlled** *access zone (CAZ)* means an area in which certain work (e.g., overhand bricklaying, decontaminating, abating, and other task specific work) may take place without the use of guardrail systems, personal fall arrest systems, or safety net systems and access to the zone is controlled for safety.
7. **Confined space** one having:
    a) Limited access and egress.
    b) Ventilation, which could produce or contain a hazardous atmosphere.
    c) Is not designed for continuous human occupancy.
    d) Is deeper than four (4) feet (excavation and pits).
8. **Dangerous** *equipment* means equipment (such as pickling or galvanizing tanks, degreasing units, machinery, electrical equipment, and other units) which, as a result of form or function, may be hazardous if employee falls onto.
9. **"Defect"** means any characteristic or condition which tends to weaken or reduce the strength of the tool, object, or structure of which it is a part.
10. **"Designated person"** means "authorized person" as defined in use.
11. **Equivalent** means alternative designs, materials, or methods to protect against a hazard which the employer can demonstrate will provide an equal or greater degree of safety for employees than the methods, materials or designs specified.
12. **Failure** is the breakage, displacement, or permanent deformation of a structural member or connection that would reduce its structural integrity and its support and protective capabilities.
13. **Hazardous energy** means any type of harmful energy, thermal, electrical, stored, mechanical, hydraulic, under pressure, kinetic, chemical that could cause injury or death if exposed.
14. **Hazardous atmosphere** is an atmosphere that may be harmful, cause death, illness, or injury by being explosive, poisonous, flammable, corrosive, oxidizing, irritating, or toxic.
15. **Infeasible** - means that it is impossible to perform.
16. **Lockout-tagout (LOTO)** or **lock and tag** is a safety procedure which is used in industry and research settings to ensure that dangerous machines are properly shut off and not started up again prior to the completion of maintenance or servicing work. It requires that hazardous power sources be "isolated and rendered inoperative"

before any repair procedure is started. "Lock and tag" works in conjunction with a *lock* usually locking the device or the power source with the hasp, and placing it in such a position that no hazardous power sources can be turned on. The procedure requires that a *tag* be affixed to the locked device indicating that it should not be turned on.

17. **NIOSH** – National Institute of Occupational Safety and Health. Institute which develops safety standards and specifications which the Occupational Safety and Health Act (OSHA) frequently reference.
18. **Registered Professional Engineer** is a professional engineer registered in the state where the work is to be performed.

Many industrial incidents are caused by the uncontrolled release of hazardous energy. Energy is movement or the possibility of movement and exposure. There are two kinds of energy, kinetic and potential. Kinetic energy is the force caused by the motion of an object, such as the spinning of a wheel. Potential energy is the force stored in an object that isn't moving, such as a spring under tension.

When designating lines/utilities for removal a unique color, label, or tag must be used, that is easily identifiable but not confused with facility or other designations. Such conditions should be brought to the attention of the Project Supervisor and/or Safety Manager. Furthermore, prior to demolition, at least one person who has firsthand knowledge of the designation must review the planned removal with the employee assigned to carry out the demolition.

Only trained and authorized employees shall be permitted perform lockout tagout (LOTO). LOTO procedures shall be developed for each type of equipment. Every LOTO procedure is unique to each piece of equipment. Training shall be specific to each type of equipment and completed prior to start or work and thereafter as a minimum at least annually. Only the authorized user may remove his or her lock. In emergency situations the supervisor may remove another users lock but only after it is verified that it is safe to remove the lock. **Always verify isolation** (Lockout, Tagout, Tryout)**. Power lines/conduit must be visually gapped before touching or cutting AND when a direct trace between the gapped portion and cut location cannot be traced the line must be tested with a meter to confirm it is de-energized.**

Isolation (or lockout/tagout/tryout) is something that should be considered by all employees, especially those involved in an operation where service is being performed around equipment

which could cause injury if stored energy is unexpectedly released. Some situations that are most likely to require lockout/tagout include:

- Removing a guard or other safety device;
- Placing a part of your body where it may be caught by a moving machine; and
- Working with or around any potentially electrical equipment.

Once work is complete, lockout/tagout is to be removed as follows:

Make sure the equipment is safe to operate:

- Remove all tools from the work area; and
- Be sure the system is fully assembled.

Safeguard all employees:

- Conduct a head count to make sure everyone is clear of the equipment.
- Notify everyone who works in the area that lockout/tagout is being removed.

Remove the lockout/tagout devices. Except in emergencies, each device must be *removed by the person who put it on*.

SIX STEP LOCKOUT/TAGOUT PROCEDURE

STEP 1: PREPARATION FOR SHUTDOWN

Before any equipment is turned off for the purpose of lockout/tagout you must know:

- The types and amounts of energies that power it (i.e., electrical, hydraulic, etc.);
- The hazards of that energy; and
- How the energy can be controlled.

STEP 2: EQUIPMENT SHUTDOWN

- Shut the system down by raising operating controls;
- Follow whatever procedure is right for the equipment so no one is endangered during shutdown.

STEP 3: EQUIPMENT ISOLATION

- Operate all energy isolating devices so that equipment is isolated from its energy sources;
- Be sure to isolate all energy sources (secondary power supplies as well as main ones);
- Never pull an electrical switch while under power;
- Never remove a fuse instead of disconnecting.

STEP 4: APPLYING LOCKOUT/TAGOUT DEVICES

- All energy isolating devices must be locked, tagged, or both;
- Only the standardized devices are to be used. They are not to be used for anything else;
- Use a lockout device if your lock cannot be placed directly on the energy control;
- More than one employee can lock out a single energy isolating device by using a multiple-lock system;
- If tags are used instead of locks, attach at the same point as a lock, or as close to it as possible;
- Fill tags out completely and correctly (Name of Individual Applying LOTO, Date Applied, Company and Contact Information-Cell/Phone No.).

STEP 5: CONTROL OF STORED ENERGY

Take any of the following steps to guard against energy left in the equipment after isolation from its energy sources:

- Check system to ensure all parts have stopped moving;
- Install ground wires;
- Relieve trapped pressure;
- Release the tension on springs, or block the movement of spring-driven parts;
- Block/brace parts that could fall because of gravity;
- Block parts in hydraulic and pneumatic systems that could move from loss of pressure. Bleed the lines and leave vent valves open;
- Drain process piping systems and close valves to prevent the flow of hazardous materials;
- If a line must be blocked where there is no valve, use a blank flange;
- Purge reactor tanks and process lines;

- Dissipate extreme cold or heat, or wear protective clothing; or
- Monitor stored energy levels if it could re-accumulate to make sure that it stays below hazardous levels.

STEP 6: VERIFYING ISOLATION OF EQUIPMENT

Take any of the following steps to verify isolation:

- Make sure all danger areas are clear of personnel;
- Verify that the main disconnect switch or circuit breaker can't be moved to the on position;
- Use voltmeter or other equipment to check switch; or
- Press all start buttons and other activating controls on the equipment itself.

ATTACHMENT 7 - HAND TOOLS

HAND TOOLS

PURPOSE:

Provide guidelines that shall assure employee safe use of hand tools. All employees shall be trained in the proper inspection and use of hand tools as prescribed by the manufacturer.

PERSONNEL RESPONSIBILITIES (Also See Manual Sections 2.0 – 2.6 "RESPONSIBILITIES")

- Director, HS&E - The Director, HS&E is responsible for assuring this program is reviewed and updated as necessary (product changes and updates, regulatory updates, program performance improvements). The program shall be as a minimum reviewed and updated annually.

- Managers and Supervisors - Managers and Supervisors are responsible for assuring their projects/operations and employees are in compliance with the requirements of this program (training, application, practice and procedures).

- Employees – Employees are responsible for following all policies and procedures as required by this program as well as report any perceived program deficiencies (violations and errors) or improvement measures to their supervisor). NOTE – All employees have the authority and responsibility to stop work for safety concerns. "If you see it, you own it".

- Subcontractors – All subcontractors are responsible for following all policies and procedures as required by this program as well as report any perceived program deficiencies (violations and errors) or improvement measures to their superior). NOTE – All employees have the authority and responsibility to stop work for safety concerns. "If you see it, you own it".

DEFINITIONS (See Also Attachment Y Standard Program Definitions)

- HAND TOOLS – various small devices operated by hand to perform or facilitate manual or mechanical work (hammers, wrenches, pliers, side cutters, pry bar, screw drivers, utility knife, chisels, punches, drills, sasw, clamps, etc) refers to heavy duty powered vehicles specially designed for executing construction tasks which typically include but are not limited to earth moving equipment; excavators, loaders, bulldozers, compactors and rollers.
- Electric Power Tools – tools powered by electricity
- Pneumatic Powered Tools – tools powered by air

HAND TOOLS

- Inspect each tool prior to use. Never use defective tools.
- Tools will be used as per the product manufactures designed use, Never use "cheaters" to increase capacity (pipe handle extensions to increase leverage).
- Impact tools (chisels, star drill, and iron wedges) tend to "mushroom" and create flying spalls unless dressed.
- Wooden handles on hammers and axes must be free of splinters and cracks and must sit securely in the head.
- Dull cutting tools will cut you more easily than sharp ones.

ELECTRIC POWER TOOLS

- Tools will be inspected daily before starting work. Never use defective tools.
- Portable electric equipment and tools must be grounded if they are not "double insulated" in type.
- Inspect all electric cords and tools prior to use and remove any that are damaged from use.
- Never carry or lower an electric tool by the cord.
- Never yank the cord to disconnect it from the receptacle.
- Never carry a plugged in tool while your finger is on the switch.
- Loose clothing can become caught in moving parts.
- Electrical cords must be unplugged before adjusting electric tools.
- Proper guards and shields must be maintained on all power tools.
- Machines must be shut down before adjusting, servicing, or repairing to prevent incidental starting. This may require lock out and tagging.

- Secure work in a set of clamps or a vise to allow two free hands for operation.
- All AC corded 120/110 Volt power tools shall be powered through a inspected, tested and fully functional GFCI- ground faulty circuit interrupter.

PNEUMATIC POWER TOOLS

- Air supply to pneumatic tools must be shut off and expunged before disconnecting.
- Eye protection and ear protection is required when using pneumatic tools.
- Ensure hoses are securely attached to equipment before start up.
- Safety clips must be fully engaged prior to equipment start up.

ATTACHMENT 8 - HEAVY EQUIPMENT SAFETY

HEAVY EQUIPMENT SAFETY

PURPOSE and Introduction:

Assure safe operation of heavy equipment without incident, injury and or property damage. All operators shall be properly trained in the safe operation of heavy equipment per the manufacturers guidelines. Likewise, all affected ground personnel shall trained in the proper safe practices and procedures when working around heavy equipment.

PERSONNEL RESPONSIBILITIES (Also See Manual Sections 2.0 – 2.6 "RESPONSIBILITIES")

- Director, HS&E - The Director, HS&E is responsible for assuring this program is reviewed and updated as necessary (product changes and updates, regulatory updates, program performance improvements). The program shall be as a minimum reviewed and updated annually.
- Managers and Supervisors - Managers and Supervisors are responsible for assuring their projects/operations and employees are in compliance with the requirements of this program (training, application, practice and procedures).
- Employees – Employees are responsible for following all policies and procedures as required by this program as well as report any perceived program deficiencies (violations and errors) or improvement measures to their supervisor). NOTE – All employees have the authority and responsibility to stop work for safety concerns. "If you see it, you own it".
- Subcontractors – All subcontractors are responsible for following all policies and procedures as required by this program as well as report any perceived program deficiencies (violations and errors) or improvement measures to their superior). NOTE – All employees have the authority and responsibility to stop work for safety concerns. "If you see it, you own it".

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DEFINITIONS (See Also Attachment Y Standard Program Definitions)

- **Heavy Equipment** – refers to heavy duty powered vehicles specially designed for executing construction tasks which typically include but are not limited to earth moving equipment; excavators, loaders, bulldozers, compactors and rollers.
- **Operator** – one trained and authorized to operate equipment.
- **Ground Personnel** – employees who are on the ground working near or around heavy equipment

GROUND PERSONNEL RULES AND PROCEDURES (Laborers, Supervisors, Non-Operators)

- Always ensure that you make eye contact with the operator before approaching a piece of heavy equipment.
- Never walk under a boom or load when hoisting, lowering, crawling, and turning.
- Keep hands clear of cables feeding drums and sheaves.
- Be aware of the locations of all pieces of equipment on a site.
- Do not walk up to equipment that is moving.
- Stay out of the swing radius of a piece of equipment unless you have the permission of the operator.
- Only the operator is allowed to ride on a piece of heavy equipment.

OPERATOR RULES AND PROCEDURES (Equipment Operators)

- Ensure that each piece of equipment is operating properly and report all defects to your supervisor.
- The maintenance of each piece of heavy equipment is the responsibility of the operator of that piece of equipment.
- Never backup without ensuring that the path is clear of equipment and personnel.
- Never swing a load over ground personnel.
- Be sure that all slings, hooks, and ties are properly placed and secured before lifting a load.
- The operator shall only take signals from one person.
- Keep steps on the machine free of dirt, grease, and oil.

- The operator will not overload buckets or booms.
- Seat belts must be worn where provided during all operations.
- Ensure all glass and mirrors are clean before starting operations.
- Tag lines must be used on all lifts. Ensure tag lines are long enough before starting lift.
- All equipment must have charged and inspected fire extinguishers.
- Ensure that grapples only pick up long materials when square to the load.
- Keep the cab clear of debris, dirt, and coffee cups.

ATTACHMENT 9 - SAFETY TASK ANALYSIS CARD/BBS Safe Work Observations

SAFETY TASK ANAYLYSIS CARD & BBS SAFE WORK OBSERVATIONS (STAC CARDS)

INTRODUCTION AND PURPOSE:

The OSC STAC card process is a proactive system that is an integral part of the company's safety process management and behavioral based safety program. The card is an employee tool for identifying and reporting safety concerns and safe work observations.

PERSONNEL RESPONSIBILITIES

- Director HSE - The Director HSE is responsible for assuring this program is functioning as intended and updated as necessary. The program shall be reviewed and updated on an ongoing basis.
- Managers and Superintendents - Managers and Superintendents are responsible for assuring this program is implemented on their projects/operations; that safety concerns raised by employees are addressed; that safety improvements recommended by employees are made and that employee incentives are applied in line with OSC intentions.
- Employees – Employees are expected to honestly and accurately complete the program forms (i.e., STAC) and be open to suggestions for improving their own safety performance. A minimum of one STAC shall be completed per week.

STAC card is intended to;

- Provide peer BBS safe work observations and information for additional hazard assessment, awareness, employee recognition and rewards (safety incentives for employees participating in the STAC process);
- Help individual employee's identify the specific hazards and protective measures for their assigned daily work activities and conditions;
- Provide additional reinforcement and awareness of the hazards they are exposed to and the proper protective measures that should be used;
- Provide data for developing process improvements; and
- Provide a supplemental reporting means for safety concerns.

DEFINITION

The STAC is a pre-printed, bi-fold card that is intended to be completed by an employee prior to starting a new task or when conditions change. It is also intended to encourage employees to intervene when they observe their co-workers in hazardous situations. When properly implemented, the STAC process should support project management in addressing potential hazards before an injury occurs.

STAC PROCESS

The STAC is designed to be an as-needed, ongoing tool for observing workplace conditions and behaviors. A MINIMUM of 1 STAC PER WEEK FROM EACH EMPLOYEE SHALL BE SUBMITTED.

The STAC will be used by OSC employees and supervisors at the job-site to identify new conditions or potential hazards. STAC's will be used in addition to Safe Work Permits and/or approved work procedures.

Use of the STAC is determined by both employees and project management (i.e., superintendents, HSO's and project managers). Employees completing and submitting properly completed STACs will automatically be eligible for program incentives. There are no employee disciplinary actions associated with not submitting a STAC although minimal participation is required. Likewise for project management, incentives are in place to encourage implementation of the STAC process. While previous versions of the STAC process, which required participation, did improve the company safety culture; the changes in this version of the program are intended to continue the improvement.

STAC cards will be provided for each project. The cards are to be distributed to employees with instructions to hand the card in when completed, minimally at the end of each week. The HSO will give a new card when one is turned in. Employees do not have to put their name on the card if they wish to be anonymous however this will not be included in the monthly participation incentive.

ATTACHMENT 10 - LEAD PROGRAM

LEAD PROGRAM:

INTRODUCTION AND PURPOSE:

OSHA finds that risks associated with lead are magnified by improper and uninformed manners in which lead (materials) are handled. Improper design, implementation, or inspection of projects involving lead creates unnecessary health and safety hazards which are detrimental to the employees and citizens involved with the work.

The purpose of this policy and program is to reduce lead related hazards by conducting proper training, before exposure to lead materials by personnel needing to design, implement, inspect, or perform duties on projects which contain potential exposure to lead.

PERSONNEL RESPONSIBILITIES (Also See Manual Sections 2.0 – 2.6 "RESPONSIBILITIES")

- Director, HS&E - The Director, HS&E is responsible for assuring this program is reviewed and updated as necessary (product changes and updates, regulatory updates, program performance improvements). The program shall be as a minimum reviewed and updated annually.
- Managers and Supervisors - Managers and Supervisors are responsible for assuring their projects/operations and employees are in compliance with the requirements of this program (training, application, practice and procedures).
- Employees – Employees are responsible for following all policies and procedures as required by this program as well as report any perceived program deficiencies (violations and errors) or improvement measures to their supervisor). NOTE – All employees have the authority and responsibility to stop work for safety concerns. "If you see it, you own it".
- Subcontractors – All subcontractors are responsible for following all policies and procedures as required by this program as well as report any perceived program deficiencies (violations and errors) or improvement measures to their superior). NOTE

– All employees have the authority and responsibility to stop work for safety concerns. "If you see it, you own it".

DEFINITIONS (See Also Attachment Y Standard Program Definitions):

INORGANIC LEAD (General Description and characteristics)

- "Inorganic lead" is defined as lead oxides, metallic lead and lead salts, including organic salts such as lead sump products and lead arsenate. This guideline summarizes pertinent information about inorganic lead for workers and employers. Recommendations may be superseded by new developments in this field; therefore, readers are advised to regard these recommendations as general guidelines.

- Inorganic lead enters the body primarily through the respiratory tract by the inhalation of fumes, dust, or mist. A secondary, but not significant, means is entry through the gastrointestinal tract. This occurs by the swallowing of lead particles trapped in the upper respiratory tract or introduced into the mouth on food, tobacco, fingers, and other objects.

- Inorganic lead compounds are not absorbed through the skin. Many of the organic lead compounds however, are absorbed through the intact skin.

<u>Type of Work</u>

Workers involved in the following types of work are at risk for lead exposure:

- Demolition or salvage of structures;
- Removal of lead materials;
- Construction, alteration, repair or renovation of structures, substrates or portions; and
- Installation, cleanup, transportation, disposal, storage, or containment of materials and maintenance operations.

Lead Related Tasks

Lead related tasks include:

- Abrasive blasting;
- Welding, cutting and burning on steel structures;
- Lead burning or torch melting or fusing of lead;
- Manual scraping and sanding associated with paint removal;
- Manual demolition of structures coated with lead based paint;
- Heat gun application to melt lead paint; and
- Cleanup activities where dry expendable abrasives are used.

HEALTH HAZARD INFORMATION

Routes of Exposure

Inorganic lead may cause adverse health effects following exposure via inhalation or ingestion. In animals tested, an increase fetal mortality and malformation of the posterior and urogenital and intestinal tracts were noted in the offspring. In humans, cases of peripheral neuropathy with paralysis of the muscles of the wrists and ankles; decreased red blood cell life and kidney function as well as kidney disease have been logged as being caused by exposure to lead via inhalation and ingestion. Lead can accumulate in the soft tissues and bones with the highest accumulation in the liver and kidneys. The elimination of lead from the body is extremely slow. Lead can penetrate the placental barrier, resulting in neurological disorders in infants.

Signs and Symptoms of Exposure

- Short term or acute exposure to inorganic lead can cause decreased appetite, insomnia, headache, muscle and joint pain, colic, and constipation.

- Long term or chronic exposure to inorganic lead can cause weakness, weight loss, nausea, vomiting, constipation, blue-black dot-like pigmentation on the gums (“lead line”), severe headache and abdominal cramps, delirium, convulsions, and coma.

Exposure Limits

- The current Occupational Safety and Health Administration Permissible Exposure Limit (PEL) for inorganic lead are 0.05 milligrams of lead per cubic meter of air (50 ug/m^3) as a Time Weighted Average (TWA) concentration over an eight hour work shift. The National Institute of Occupational Safety and Health (NIOSH) Recommended Exposure Limit (REL) is 0.10 milligrams per cubic meter as a TWA for up to a ten hour work shift, forty hour work week. The American Conference of Governmental Industrial Hygienist (ACGIH) Threshold Limit Value (TLV) is 0.15 milligrams per cubic meter as a TWA for a normal eight hour work day in a forty hour work week.

- If employee exposure to lead will be longer than an eight hour work shift, then the PEL must be calculated using the following formula:

  (ug/m^3)=400 divided by hours worked in a day, so that in a ten hour work shift, the PEL for lead according to OSHA would be 40ug/m^3.

<u>Exposure Assessment & Monitoring</u>

- In accordance with OSHA Guidelines regarding the use of lead in the work atmosphere (29 CFR 1926.62), initial determinations must be made to determine if any employee may be exposed to lead at or above the Action Level (Action Level for lead is 0.03 mg/m^3 or 30 ug/m^3). Also, employees in an area where there is a potential exposure to airborne lead at any level must be informed of the danger of using lead. Thirdly, a copy of 29 CFR 1926.62 and its appendices must be made readily available to all employees who have a potential exposure to airborne lead at any level.

- OSC will obtain objective data on the extent of lead exposure at the job site and monitor the lead exposure.

- OSC must determine the exposure limits through sampling for all tasks which involve exposure to lead. Employees must be protected from potential lead exposure during the lead exposure assessment period. This may be accomplished by providing the

proper protection during the exposure assessment period following the criteria set forth in CFR 1926.62(d) (2) or by using data from a previously monitored project where the data, obtained in the last 12 months, was acquired on a project with conditions that closely resemble the process, type of material, control methods, work practices, and environmental conditions of the current project. 1926.62(d) (3) (iii).

DETERMINATION

A positive or negative determination must be made as to whether there is the possibility that any employee may be exposed to lead at or above the action level. The determination can be made either by sampling for exposure assessment, or by using a previous, similar job documentation as a model.

Negative Determination

- If the determination is made that no employee is exposed to airborne concentrations of lead at or above the action level, then a written record of this negative determination will be created including date of determination, location within the work site, and the name and social security number of each employee being monitored. If the initial determination reveals that the employee exposure is below the action level then no further monitoring is required unless there is a change in the equipment, process, control, personnel, or tasks for that specific work site.

Positive Determination

- If the results prove positive and there is exposure at or above the action level and below the PEL, then monitoring must occur at least every six (6) months. Monitoring will continue at the required frequency until two (2) consecutive samples taken seven (7) days apart are below the action level. At this time, the monitoring can stop unless there is a change in equipment, process, control, personnel, or tasks for that specific work site.

- If the initial determination reveals that the employee exposure is above the PEL, monitoring should be done at least quarterly. The monitoring should continue at this frequency until two consecutive samples, taken seven (7) days apart are below the PEL.

- Airborne exposure levels will be made by "breathing zone" air sampling of individuals involved in activities that potentially present exposure to inorganic lead. Samples will be collected which are representative of the exposure for each employee who may be exposed to lead. Initial monitoring will be conducted to determine the frequency of further sampling.

- Employees will be notified of sample results which represent the employee's exposure in writing within five (5) working days. Whenever the results indicate that the representative employee exposure is at or above the PEL, the employee shall receive a written statement that the employee's exposure was at or above that level. A description of the corrective action which will be taken to reduce exposure will also be included in the written statement to employees.

- All areas potentially releasing airborne inorganic lead will be regulated. Limited access will be enforced in a manner that will minimize the number of persons authorized to enter the area(s).

METHODS OF COMPLIANCE

Engineering, work practice, and administrative controls will be utilized to reduce and maintain employee exposure to lead to reduce employee exposure to the lowest feasible level. Once these measures are taken, then the use of respiratory protection will be utilized to provide further protection. A compliance program will be written for each job site which will include:

- A description of each activity in which lead will be emitted;
- Description of the means in which any controls will be utilized to limit exposure;

- Any technology which will be utilized to meet the PEL; and
- Any monitoring data which documents lead emissions, schedule, work practice program.

The written program will be made available to any employee, along with copies of the 1926.62 standard along with all appendices.

CONTROL METHODS

Feasible engineering controls and work practices will be implemented to reduce occupational exposure to inorganic lead. Engineering plans and studies will be conducted should levels of personal exposures exceed the action level of 0.03 mg/$m^{3.}$ If the action level is reached, the employer will install engineering controls and institute work practices on the quickest feasible schedule.

RESPIRATORY PROTECTION

- OSC will ensure that respirators are used when the action level is realized and monitoring results indicate that control methods and supplemental work practices do not yet sufficiently reduce exposure to or below the Permissible Exposure Limit.

- Respirators must be used when the employee's exposure to lead may exceed the PEL. Respirators are also required when work operations and work practice controls are not sufficient to reduce employee exposure to or below the PEL. Respirators will be provided to any employee who requests one.

- Where respirators are required, OSC will provide to their employees the appropriate respirator or combination of respirators from Table I (taken from 29 CFR 1926.62)

- Respirators specified for higher concentrations can be used for lower concentrations of lead

- Full face piece is required of the lead aerosols that cause eye or skin irritation at the use concentrations

- A high efficiency particulate air filter (HEPA) means a filter that is 99.97 percent efficient against particles of 0.3 micron size or larger.

TABLE I:

Airborne Concentration of Lead or condition of Use	Required Respirator
Not in excess of 500 ug/m3	½ mask air purifying respirator with high efficiency filters. ½ mask supplied air respirator operated in demand (negative pressure) mode. **This is the minimum OSC requirement for *any* hot work on lead-painted surface.**
Not in excess of 1,250 ug/m3	Loose fitting hood or helmet powered air purifying respirator with high efficiency filters
Not in excess of 2,500 ug/m3	Full face piece air purifying respirator with high efficiency filters. Tight fitting powered air purifying respirator with high efficiency filters. Full face piece supplied air respirator operated in demand mode. ½ mask or full face piece supplied air respirator operated in a continuous-flow mode. Full face piece self-contained breathing apparatus (SCBA) operated in demand mode. ½ mask supplied air respirator operated in pressure demand or other positive pressure mode.
Not in excess of 50,000 ug/m3	Full face piece supplied air respirator operated in pressure demand or other positive-pressure mode
Not in excess of 100,000 ug/m3	Full face piece SCBA operated in pressure demand or other positive pressure mode

PROTECTIVE CLOTHING

Whenever the employee is exposed to lead above the PEL, without regard to the use of respirators, or where employees are exposed to lead compounds which may cause skin or eye irritation (i.e., lead arsenate and lead azide), OSC shall provide, at no cost to the employee, the proper protective clothing. OSC will ensure that the employees use the appropriate protective clothing and equipment and that the equipment is utilized in the proper manner to ensure additional protection. Types of protection may include:

- Gloves;
- Hard Hats;
- Coveralls;
- Shoes;
- Disposable over boots;
- Face shields;
- Goggles; and/or
- Other appropriate protective equipment.

OSC will provide this protective equipment in a clean and dry condition. The cleaning, laundering and disposal of such equipment will also be provided by OSC. All protective clothing must be removed at the completion of the work shift in the change areas provided at the job site. The laundering facility, if applicable, must be notified that the garments contain lead material and must be notified not to shake or dust off clothing and to dispose of lead contaminated wash water in accordance with all applicable laws and regulations.

HOUSEKEEPING

All surfaces shall be maintained as free as is practical of accumulations of lead. Surfaces where lead accumulates should be promptly cleaned with the use of a vacuum or other method which will minimize the likelihood of the lead becoming airborne. Shoveling, dry or wet sweeping and brushing is only permitted when vacuuming or other equally effective methods have been tried and found to be not effective in such application. Vacuums used in housekeeping and protective clothing gross decontamination procedures should have HEPA filters used and should be emptied in a manner which minimizes reentry of the lead dust into the workplace.

HYGIENE FACILITIES AND PRACTICES

In areas where exposure to lead is above the PEL, without regard to respirators, no employee is permitted to consume any food, beverage, or tobacco products. Employees must wash their hands and face prior to eating, drinking, smoking, or applying cosmetics.

EATING FACILITIES

OSC will provide lunchroom facilities or eating areas for employees who are exposed to airborne concentrations of lead over the PEL. The lunchroom or eating areas will be as free of lead contamination a possible. The lunchroom areas and eating facilities should not be entered by employees who are wearing contaminated protective clothing.

CHANGING ROOMS

Employees whose exposure is at or above the PEL, without regard to the use of respirators, will be provided with a clean change area which will be equipped with separate storage facilities for protective work clothes and equipment from street clothes to ensure that there is no cross contamination. When feasible, shower facilities may also be provided to those employees who are exposed to airborne lead over the PEL.

OSC will provide facilities for employees working in areas where exposure, without regard to the use of respirators, is above the PEL to vacuum their protective clothing and clean or change shoes worn in such areas before entering change rooms, lunchrooms, or shower rooms.

HAND WASHING FACILITIES

OSC will provide adequate hand washing facilities for use by employees exposed to lead. Where showers are not provided, employees must wash their hands and faces at the end of each work shift.

SHOWERS

OSC will ensure that employees who are working in regulated areas at or above the PEL, or who are subject to the possibility of skin or eye irritation from lead, shower at the end of the work shift.

MEDICAL SURVEILLANCE

PERIODIC EXAMINATIONS

OSC will provide examinations as least annually for each employee for whom a blood sampling test conducted anytime during the preceding 12 months indicated a blood level at or above 40ug/100g.

OSC will make available all medical records to employees who are occupationally exposed to lead on any day at or above the action level. Initial medical monitoring consists of biological monitoring in the form of blood sampling and analysis for lead and zinc protoporphyrin levels.

If the employee may be exposed to lead at or above the action level for 30 days or more in a consecutive 12 month period, then monitoring must occur at least every two (2) months for the first six (6) months and every six (6) months thereafter. If the employee has had previous exposure or prior testing show that there is an elevation in the blood lead level, then a different monitoring frequency will apply. Within five (5) working days after receipt of biological monitoring results, the employee will be notified, in writing, of his blood lead level.

Medical examinations and consultations for employees whose blood sampling results indicated a blood lead level at 40 ug/dl or above shall occur at least annually. If an employee develops any signs or symptoms associated with lead intoxication, a medical examination shall be provided immediately.

OSC will select the initial physician who will conduct any medical examination or consultation. The employee may designate a second physician to review any medical findings or determinations from the initial physician and to conduct such exams or consultations.

No OSC employee is permitted to engage in the prophylactic chelating. This practice is only to be done by the direction of and under the supervision of a physician.

MEDICAL REMOVAL PROTECTION

The requirement that an employer provide medical removal protection benefits means that, as long as the job the employee was removed from continues, the employer shall maintain the total normal earnings, seniority and other employment rights and benefits of an employee, including the employee's right to his or her former job status as though the employee had not been medically removed from the employee's job or otherwise medically limited.

An employee shall be removed from the job site if that employee has been exposed to lead at or above the action level and on each occasion that a periodic and follow-up blood sampling test conducted indicates the employee's blood level to be at or above 50 ug/dl, or if the final medical determination results in a medical finding, determination, or opinion that the employee has developed a medical condition which places the employee at an increased risk of material impairment from exposure to lead.

For an employee who was removed based on high blood lead levels, that employee may be returned to work when two (2) consecutive blood sample results indicate that the employees blood level is at or below 40 ug/dl.

For an employee who was removed due to final medical determination, that employee may be returned to work when a subsequent final medical determination results in a medical finding, determination, or opinion that the employee no longer has a detected medical condition which places the employee at increased risk from material impairment to health from exposure to lead.

RECORD KEEPING

An accurate record of all monitoring and other data used in conducting employee exposures assessments shall be recorded. Exposure monitoring records should include the following information:

- Description of sampling and analytical methods used;
- Type of respiratory protection worn;
- Name, social security number, and job classification of the employee monitored and all other employees which that monitoring is supposed to represent; and
- Environmental conditions/variables.

An accurate record of all employee medical surveillance shall also be established and maintained. This record shall include:Name, social security number, job duties of that employee;

- Copy of physicians written opinions;
- Results of any airborne monitoring done on or for that employee and provided to the physician; and
- Any employee medical complaints related to lead exposure.

The medical record data must be maintained by either the employer or physician in accordance with 29 CFR 1910.1020. Medical record keeping is also required for employees who are removed from their job due to lead exposure.

SIGNS

OSC will utilize all signs required by other statutes regulations or ordinances in addition to or in combination with signs required by 1926.62. No signs near the signs required by this

regulation shall contradict this one. Signs required by this section should be kept illuminated and cleaned as necessary so that they are readable.

OSC shall post signs demarcating regulated areas reading (or similar):

WARNING
LEAD WORK AREA
POISON
NO SMOKING OR EATING

EMPLOYEE INFORMATION AND TRAINING

OSC will provide training for all employees subject to lead exposure. Training shall communicate information regarding the OSHA lead standard, including information regarding warning signs, labels, and MSDS/SDS. Employees will be made aware that copies of this plan along with the 1926.62 standard and appendices are available for their use and information.

The training program will be provided at the time of initial assignment for those subsequently covered by this provision, and will be repeated at least annually. The training will ensure that each employee is informed of the following:

- The standard and its penalties;
- The nature of the operations which could result in exposure to lead above the action level;
- The engineering controls and work practices associated with the employee's job assignment;
- The purpose, proper selection, fitting, use, and limitations of respirators;
- The purpose and description of the medical surveillance program and medical removal protection plan;
- Information on the adverse health effects associated with excessive exposure to lead; and
- Instructions to employees that chelating agents should not be used unless under the direction and supervision of a physician.

Employees must receive a copy of the standard.

ATTACHMENT 11 - ASBESTOS PROGRAM

(All Abatement shall be as Per Governing State Requirements)

ASBESTOS PROGRAM

PURPOSE:

To assure all asbestos work is completed without injury or adverse impact to the environment.

PERSONNEL RESPONSIBILITIES (Also See Manual Sections 2.0 – 2.6 "RESPONSIBILITIES")

- Director, HS&E - The Director, HS&E is responsible for assuring this program is reviewed and updated as necessary (product changes and updates, regulatory updates, program performance improvements). The program shall be as a minimum reviewed and updated annually.

- Managers and Supervisors - Managers and Supervisors are responsible for assuring their projects/operations and employees are in compliance with the requirements of this program (training, application, practice and procedures).

- Employees – Employees are responsible for following all policies and procedures as required by this program as well as report any perceived program deficiencies (violations and errors) or improvement measures to their supervisor). NOTE – All employees have the authority and responsibility to stop work for safety concerns. "If you see it, you own it".

- Subcontractors – All subcontractors are responsible for following all policies and procedures as required by this program as well as report any perceived program deficiencies (violations and errors) or improvement measures to their superior). NOTE – All employees have the authority and responsibility to stop work for safety concerns. "If you see it, you own it".

DEFINITIONS (See Also Attachment Y Standard Program Definitions):

- **Abatement** – Procedures to control fiber release from asbestos containing building material. Includes encapsulation, enclosure, and removal.
- **Air Monitoring** – The process of measuring the fiber content of a specific volume of air in a stated period of time.
- **Airlock** – A system for entering or exiting, without permitting air movement, the decontamination unit, typically consisting of two curtained doorways, at least 3 feet apart.

- **Amended Water** - Water to which a surfactant has been added. The surfactant shall be a 50/50 mixture of polyethylene ether and polyethylene ester, or equivalent, mixed in a proportion of 1 fluid ounce to 5 gallons of water or as specified by the manufacturer.
- **Asbestos Control Area** – A temporary, fabricated physical barrier that separates the asbestos removal area from the non-work area, designed to maintain a negative air pressure within the fabricated structure with respect to the outside area.
- **Authorized Visitor** – The building owner or a representative of any regulatory or other agency having jurisdiction over the project.
- **Building Owner** – The actual owner or his authorized representative.
- **Clean Room** – An uncontaminated area, which is part of the worker decontamination enclosure system, with provisions for storage of workers' street clothes and protective equipment.
- **Curtained Doorway** – A device to allow entering and exiting from one room to another while permitting minimal air movement between the rooms. This is typically constructed by placing two overlapping sheets of plastic over an existing or temporarily framed doorway, securing each along the top of the doorway and then securing the vertical edge of one sheet along one side of the doorway and the other on the opposite side of the doorway. Two curtained doorways spaced a minimum of three (3) feet apart from an airlock.
- **Decontamination Enclosure System** – A series of connected rooms, with airlocks between any two adjacent rooms, for the decontamination of workers, material, or equipment.
- **Encapsulant (Sealant)** – Liquid material which can be applied to asbestos-containing materials and which controls the possible release of asbestos fibers from the material either by creating a membrane over the surface (bridging Encapsulant) or by penetrating into the material and binding its components together (penetrating Encapsulant).
- **Enclosure** – All procedures necessary to complete the sealing of asbestos containing materials behind fabricated, airtight, impermeable, or permanent barriers.
- **Equipment Decontamination Enclosure System** – A decontamination enclosure system for materials and equipment, typically consisting of a designated section of the work area, a washroom, a holding area, and an uncontaminated area.
- **Equipment Room** – A contaminated room that is part of the worker decontamination enclosure system that provides for storage of contaminated clothing and equipment.

- **Fixed Object** – A unit of equipment or furniture which cannot be removed from the work area.
- **HEPA Filter** – A High Efficiency Particulate Air (HEPA) filter capable of trapping and retaining 99.97% of asbestos fibers greater than 0.3 microns in length.
- **HEPA Vacuum Equipment** – A high efficiency particulate air filtered vacuum cleaner with a filter capable of trapping and retaining 99.97% of asbestos fibers greater than 0.3 microns in length.
- **Holding Area** – A room between the washroom and the uncontaminated area in the equipment decontamination enclosure system, separated from other rooms by an airlock.
- **Moveable Object** – A unit of equipment or furniture which can be removed from the work area.
- **Negative Air Pressure Equipment** – A local exhaust system capable of maintaining constant low velocity airflow in through the decontamination enclosure system and out of the work area. Air exchange should be at a rate of 4 complete air changes per hour.
- **Personal Decontamination Enclosure System** – A decontamination enclosure system for workers and equipment, typically consisting of a designated section of the work area, an equipment room, a shower room, and an uncontaminated clean room.
- **Phase Contrast Microscopy (PCM)** – An analytical method of determining concentrations of asbestos fibers in a stated period of time.
- **Removal** – all herein specified procedures necessary to strip all applied asbestos containing materials from the designated areas and to dispose of these materials at an approved site.
- **Shower Room** – a room between the clean room and the equipment room in the worker decontamination enclosure systems, with hot and cold running water, that is suitably arranged for complete showering during decontamination. The shower room has airlocks at either end separating the clean room from the contaminated or work area.
- **Surfactant** – a chemical wetting agent added to water to improve penetration, thus reducing the quantity of water required for a given operation.
- **Transmission Electron Microscopy (TEM)**– an advanced method for measuring airborne asbestos or determining asbestos concentrations in non-friable, organically bound material
- **Washroom** – a room between the work area and the holding area in the equipment decontamination enclosure system. An airlock separates the washroom.

- **Wet Cleaning** – the process of eliminating asbestos contamination from building surfaces and objects by using cloths, mops or other cleaning tools, which have been dampened with water, and afterward disposing of these cleaning tools as asbestos contaminated waste.
- **Worker Decontamination Enclosure System**- a decontamination enclosure system for workers typically consisting of a clean room, a shower room, and an equipment room.

WARNINGS

OSC is aware that exposure to asbestos fibers, without proper protection measures, has been determined to significantly increase the possibility of contracting asbestos related disease: lung cancer, certain gastrointestinal cancers, mesothelioma, and asbestosis. Care must be taken to avoid causing the release of asbestos fibers into the atmosphere so that they are not inhaled or ingested. The OSHA regulation 29 CFR 1926.1101 has set standards for permissible exposure to airborne concentrations of asbestos fibers, methods of compliance, personal protective equipment and other measures that must be taken when working with or in proximity to asbestos in the U.S., its territories, possessions, and remote operating locations. OSC shall reduce and maintain exposures at lower, reasonably achievable levels and in all cases shall comply with applicable federal, state, and local standards or request variances from such standards.

EMPLOYEE PHYSICALS

OSC shall provide, for all employees, at no charge to the worker, a physical examination by a qualified physician prior to initiation of work. Physicals shall comply with applicable federal, state, and local regulations, assure the qualifications of physicians to be used; or other aspects of physical examination for asbestos workers. The results of the physicals shall be maintained by the Director, HS&E. Fit for duty statements may be submitted to the owner's representative or their designated representative for their files, if requested.

Only a licensed physician who is familiar with asbestos disease issues and who has been provided with copies of the applicable medical surveillance sections of federal, state, and local asbestos regulations shall make the final determination as to appropriate diagnostic measures, testing frequencies, and other matters in each individual case and may make the determination that an employee shall not be allowed to perform asbestos work because of smoking habits, existing impairment, etc.

HEALTH HAZARD TRAINING

The purpose of this training is to inform all employees about the hazards of asbestos in the work place. How harmful it can be, how to eliminate the hazards, and how to minimize the risk of exposure to it. All employees shall as a minimum shall have asbestos awareness training prior to start of work. Employees who have a potential to be exposed to air born concentrations of asbestos at levels equal or above the OSHA established PEL shall as a minimum have training as outlined in the Environmental Protection Agencies OSC shall use only personnel who are trained in asbestos removal in accordance with generally accepted industrial hygiene practice and applicable regulations.

OSC shall hold a meeting at job sites after all the fit for duty statements have been provided to the owner's representative and all the employees have been moved to the job site.

Attendance at the meetings shall be mandatory for all OSC employees and anyone designated by the owner's representative. Attendance shall be documented and a copy provided to the owners representative. During this meeting, OSC shall provide, at a minimum, training in the following areas:

- Asbestos Abatement Worker Protection;
- Proper use, wear, fitting, and care of half face piece and full face piece respirators and supplied air respiratory equipment;
- Respiratory fit testing copy sheets shall be signed;
- The particular details of the present job site's air lock doors' set-up and all procedures to be followed for entry and exit to and from the work area, emphasizing the importance of the warning signs, plastic barriers, and air locks;
- Project established emergency and fire exits from the work area with emphasis that emergency procedures shall have priority over decontamination procedures; and
- Where to find the emergency telephone numbers for the site and the map to the hospital.

PERSONAL/ENVIRONMENTAL AIR SAMPLING

- Laboratory Qualifications: All analytical laboratory analysis for asbestos conducted for this project shall be done by a laboratory with an established and ongoing quality

assurance program which includes, at a minimum, participation in the Profiency Analytical Testing (PAT) program for air sample analyses and in the National Voluntary Laboratory Accreditation program (NVLAP). Such QA program shall indicate that the laboratory is proficient in the analyses it conducts, as gauged by applicable standards of the AIHA, EPA, OSHA, or other generally accepted consensus standards or regulatory requirements.

- Air Monitoring Personnel: As necessary, a certified asbestos air sampling firm will be retained by OSC for environmental and personal air monitoring and they shall employ a competent technician to conduct all air monitoring for airborne asbestos and dusts in and around the project work area.

- Personnel monitoring strategies have been devised to ensure that the identification of areas for which PPE, engineering, and administrative controls are required. Monitoring and documentation will be conducted by the SHSO to confirm that the levels of PPE, engineering, and administrative controls are adequate to protect the workers. Monitoring will be conducted based on the known or suspect chemical and physical hazards on site.

- Monitoring may include asbestos monitoring, lead surveillance monitoring, and monitoring for explosive gases. The type and frequency of monitoring will be determined on a case by case basis.

- The Project Manager and SHSO will ensure that an adequate supply of the appropriate monitoring equipment is available prior to commencing work at the site. The instruments will be operated only by persons with appropriate training in the care, calibration, operation, and limitations of the equipment. All instruments will be inspected regularly and field calibrated.

- Sampling will be performed and samples will be analyzed using published methodologies that have been validated by OSHA or NIOSH.

- Action level contaminant concentrations are based on 50 percent of the OSHA PEL or ACGIH TLV for each contaminant. If air samples indicate that personal exposures are greater than the action levels, then personal protection, engineering, and administrative controls will be reviewed according to the procedures outlined below.

AIR MONITORING PROCEDURE

Air monitoring will be conducted in accordance with the following subsections by the SHSO or by a designated technician as follows:

- Check and record calibration before and after use each day. All instruments will be calibrated and operated in accordance with manufacturer's specifications. Equipment manuals for all monitoring instruments will be present on-site during all operations.

- Check and record breathing zone levels during remediation and/or abatement activities.

- Sample the breathing zone of 25% of the work force on a daily basis until the completion of the project. Samples will be sent to the laboratory as soon as feasible. Results shall be made available to the employees within 24 hours of receipt.

- Air Monitoring Reports/Logs will be made available to involved regulatory personnel and/or Engineer upon request. The Air Monitoring Report/Log will indicate the location, time, type, and value of each reading and/or sampling event.

SECURITY

OSC shall provide for adequate security to ensure that no unauthorized persons enter the contaminated area. Walls and locked doors are adequate security.

NOTIFICATIONS

OSC shall notify the appropriate State agency and the EPA at least ten (10) working days prior to the commencement for the abatement activities.

WORKER PROTECTION

OSC will ensure that its employees are adequately protected in accordance with generally accepted industrial hygiene practice and federal, state, and local regulations. OSC shall ensure that asbestos contamination is completely confined to the work area using a

combination of approved work area enclosures (including glove bags), work practices, wetting/sealing agents, and HEPA-filtered ventilation.

At a minimum, all personnel within an asbestos enclosure shall wear polypropylene or similar disposable clothing, hard hats, gloves and half face respiratory protection, equipped with P-100 filters. In addition, OSC shall provide/set up proper employee decontamination areas and change facilities at the job site. Such facilities shall be self-contained and designed to avoid contamination of the area or embarrassment to bystanders.

Any time that employees are exposed to fall hazards or leading edge hazards, the SHSO will install protection or provide fall protection to prevent any personnel from falling during the course of project. The SHSO will attempt to limit these exposures with proper project planning. If at any time employees can not be kept from fall hazards or leading edges, employees will be issued and will use proper fall protection. Fall protection is required when employees work four feet or more above the next lowest level. All personnel will utilize fall protection whenever on a straight ladder.

MATERIALS AT ASBESTOS REMOVAL SITE

- **Materials**: All materials will be in the original packages, containers, bundles, etc., bearing the name of the manufacturer and the brand name.
- **Storage**: All materials subject to damage will be stored off the ground (floor), away from wet or damp surfaces, and under cover.
- **Damage**: Damaged or deteriorating materials shall not be used and these shall be removed from the premises and properly disposed.
- **Plastic**: Six (6) and four (4) mL polyethylene sheeting and six (6) mL bags shall be used.
- **Amended Water**: Amended water that meets the following mixture requirements shall be used. At least one ounce wetting agent in every five (5) gallons of water with the wetting agent consisting of equal amounts of polyethylene ester and polyethylene ether. (See definitions.)
- **Surface Encapsulant**: OSC shall use surface Encapsulants that meet applicable EPA standards.
- **Tape**: OSC shall use tape capable of sealing joints of adjacent sheets of plastic, and also for attachment of plastic sheet to finished or unfinished surfaces or dissimilar materials. This should be capable of adhering under both dry and wet conditions, including use of amended water,

- **Spray Adhesive**: OSC shall use spray adhesive capable of adhering the plastic sheeting to finished or unfinished surfaces of dissimilar materials and also under both dry and wet conditions.
- **Impermeable Containers**: Impermeable containers shall be suitable to receive and hold any asbestos containing or contaminated materials until disposal at an acceptable disposal site. The containers shall be air tight and not penetrable by water. OSC shall label the containers in accordance with all applicable federal, state, and local regulations.
- **Warning Signs and Labels**: OSC shall provide warning signs and labels as specified in type and location.

- **Vacuum**: OSC shall use only HEPA type vacuum cleaners and vacuum devices.
- **Tools**: OSC shall provide tools for asbestos removal and encapsulation procedures. These tools shall be suitable for use inside the confines of the asbestos contained environment and be able to be decontaminated at the end of the job. Tools used inside the work area to clean or pick up waste material from plastic shall be made of rubber so as not to tear the plastic.
- **Negative Air Pressure Equipment**: OSC shall provide HEPA filtration systems equipped with filtration equipment in compliance with ANSI Z9.2-79, local exhaust ventilation. The equipment shall be configured as per recommendation of Appendix J, EPA 560/5-85-024.
- **Water Filtration Equipment**: OSC shall provide final filtration for wastewater. Final filter grade shall be five-(5) micron.
-

SIGNS

OSC shall provide and post a 20" x 14" manufactured warning signs at each entrance to the work area.

DANGER
CONTAINS ASBESTOS FIBERS
AVOID CREATING DUST CANCER AND LUNG DISEASE HAZARD
BREATHING AIRBORNE ASBESTOS, TREMOLITE, ANTHOPHYLLITE,
OR ACTINOLITE FIBERS IS HAZARDOUS TO YOUR HEALTH

OSC is responsible for ensuring compliance with all regulations noted, and posting warning signs.

Caution labels shall be provided and affixed to all bags and containers filled with asbestos waste material.

Disposal containers shall be labeled with four labels with text as follows:

- First Label:

CAUTION
CONTAINS ASBESTOS FIBERS
AVOID OPENING OR BREAKING CONTAINER
BREATHING ASBESTOS IS HAZARDOUS TO YOUR HEALTH

- Second Label: Provide in accordance with 29 CFR 1910.1200(f) of OSHA's Hazard Communication standard:

DANGER
CONTAINS ASBESTOS FIBERS
AVOID CREATING DUST CANCER AND LUNG DISEASE HAZARD
BREATHING AIRBORNE ASBESTOS, TREMOLITE, ANTHOPHYLLITE,
OR ACTINOLITE FIBERS IS HAZARDOUS TO YOUR HEALTH

- Third Label: Provide in accordance with U.S. Department of Transportation regulation on hazardous waste marking, 49 CFR parts 171 and 172. Hazardous Substances: Final Rule. Published Nov. 21, 1986 and revised Feb. 17, 1987:

RQ HAZARDOUS SUBSTANCE
SOLID, NUMBERS. ORM-E, NA 9188
(ASBESTOS)

- Fourth Label: (NESHAP) Owner, address and originating location of Asbestos-Containing Material.

PROTECTION OF NON-WORK AREA

- In performing the work, OSC shall prevent building areas other than the work area from becoming contaminated with asbestos-containing dust or debris by use of plastic sheeting, negative air machinery, and additional engineering controls as required.

- Should areas outside the work area become contaminated with asbestos containing dust or debris, OSC shall be responsible for cleaning these areas in accordance with the procedures indicated in this specification.

- OSC shall perform a daily wet cleaning of any area outside the sealed work area which becomes visibly contaminated with airborne or tracked in dust or other debris as a consequence of work performed on that day.

REMOVAL PROCEDURE

- Prior to removal of any asbestos, OSC personnel shall spray asbestos material with amended water, using spray equipment capable of providing a “mist” application to reduce the release of fibers. OSC will saturate the material sufficiently to wet it to the substrate without causing excess dripping. OSC shall spray the asbestos material repeatedly during the work process, to maintain set conditions and to minimize asbestos fiber dispersion.

- During asbestos removal operations, OSC shall make deliberate efforts to handle the asbestos material carefully. OSC shall not cause any unnecessary agitation of the loose material. OSC shall avoid using removal tools that have high cutting-tip speeds or blasting characteristics.
- Drop cloths will be utilized under the abatement area below any non-friable exterior material. Drop cloths will typically extend 10 feet from the area except for second story removals when the drop cloth will extend 20 feet. At the conclusion of the exterior abatement the drop cloths will be folded and disposed of as asbestos waste.

- OSC shall ensure that the disposal containers are sealed and labeled as required by all applicable regulations.

- OSC shall ensure that all surfaces from which asbestos has been removed are wet brushed and sponged, or cleaned by an equivalent method, to remove all visible material. During this work, the surfaces being cleaned shall be kept wet.

- After they are dry, OSC shall visually inspect the surface from which the asbestos material has been removed. If any suspect asbestos laden material appears on any surface in the work area, OSC shall repeat the procedure of paragraph 12.

DECONTAMINATION OF WORK AREA

OSC shall commence the work area decontamination only after ensuring the following have been completed:

- All accumulated waste material resulting from the removal of asbestos has been properly sealed and removed from the work area; and
- OSC shall visually inspect the work area to ensure that all suspect asbestos containing material has been removed and properly disposed.

An OSC representative will conduct a thorough visual inspection of the work area to ensure that all suspect asbestos containing material has been removed and properly disposed and the area is clean and dust free. If any suspect asbestos contaminated dust remains in the work area, OSC personnel will be directed to perform a thorough re-cleaning. After satisfactory completion of the visual inspection work the IH (or designee) shall collect air samples throughout the work area. Samples taken will conform to all applicable federal, state, and local regulations and with generally accepted industrial hygiene practice. Upon satisfactory completion of the above, the work area will be cleaned for unrestricted entry.

RECORD KEEPING

The following records will be maintained at the on site office trailer and at OSC's corporate office located in Buffalo New York:

- Copies of all Asbestos related correspondence;
- Copies of Asbestos Entity License;
- Copies of all worker certifications, fit tests and fit for duty statements;
- Name and address of the disposal facility;
- Methodology and results of all air sampling;

- Name and address of the air sampling consultant;
- Name and address of the air sampling laboratory;
- Incident investigation forms;
- Medical and fire emergency procedures;
- Copies of all bills of lading; and
- Logs of all regulatory and owner inspections.

ATTACHMENT 12 - ERGONOMICS

ERGONOMICS PROGRAM

PURPOSE

To assure all employees are aware of the hazards and preventive measures for back strains and cumulative trauma disorders (CTD's); carpal tunnel, tendonitis, trigger finger and other muscle skeletal disorders caused.

PERSONNEL RESPONSIBILITIES (Also See Manual Sections 2.0 – 2.6 "RESPONSIBILITIES")

- Director, HS&E - The Director, HS&E is responsible for assuring this program is reviewed and updated as necessary (product changes and updates, regulatory updates, program performance improvements). The program shall be as a minimum reviewed and updated annually.
- Managers and Supervisors - Managers and Supervisors are responsible for assuring their projects/operations and employees are in compliance with the requirements of this program (training, application, practice and procedures). This must be achieved through direct observation, work place inspections, and updated hazard assessments.
- Employees – Employees are responsible for following all policies and procedures as required by this program as well as report any perceived program deficiencies (violations and errors) or improvement measures to their supervisor). Employees are required to use mechanical lifting devices whenever they are made available.
- Subcontractors – All subcontractors are responsible for following all policies and procedures as required by this program as well as report any perceived program deficiencies (violations and errors) or improvement measures to their superior). NOTE – All employees have the authority and responsibility to stop work for safety concerns. "If you see it, you own it".

DEFINITIONS(See Also Standard Program Definitions):

- Cumulative Trauma Disorders (i.e. carpal tunnel, trigger finger, tendonitis etc.) – repetitive motion injuries that can affect bones, muscles, tendons, nerves and other anatomical features. It develops when micro traumas or minute injuries occur repeatedly from overuse or miss use of a body part.
- Tendonitis – cumulative trauma disorder caused by repetitive sliding of the tendon over a bone which cause irritation and inflammation. Overtime those micro traumas cause serious pain and injury.
- Musculoskeletal Disorders – repetitive motion injuries that affect muscles and bones which can lead to body deformation.
- Trigger finger – locking of fingers in a curled position as a result of repetitive damage to the flexor tendons from direct trauma or repetitive stress.

BACK STRAINS AND CTD PREVENTION

Back injuries are commonly associated with manual material handling (MMH) activities (lifting, placing and carrying). It is probably fair to say that every worker who lifts or does other manual handling tasks is at some risk for musculoskeletal injury. Lower back injury is the most likely kind of injury. Likewise cumulative trauma injuries are common with repetitive motion activities (RMA's) where stiffness in joints is initially noticed; i.e. stiffness from constant squeezing and gripping (trigger finger, tendonitis) or flexing of the wrist (carpal tunnel syndrome). It is important that workers are aware of typical causes of these injuries, early signs and symptoms and how to prevent them. People can reduce the number and the severity of back strains and CTD's substantially by using safe work practices. To prevent occupational back injuries and CTD's it is essential to identify the factors that make the worker more susceptible to injury or that directly contributes to injury.

When efforts to prevent injuries focus on only one risk factor, they do not significantly reduce the injury rate. A more successful approach, such as the one offered by ergonomics, combines knowledge of engineering, environment, and human capabilities and limitations. The following aspects should be considered:

- organization of work flow;
- job design/redesign, including environment; replacing manual processes with mechanical process, avoiding repetitive manual processes, breaking the routine and taking additional breaks with repetitive tasks; i.e. utilize lifting equipment and carts, replace manual hand tool with cordless screw gun, switching hands and give the dominate hand a break, changing work position, rotating tasks with others.
- pre-placement procedures, where necessary; and
- training

Often, poor organization and planning of the work flow results in needless or repeated handling of the same object. When articles are temporarily stored in one place, moved to another, stored again, and moved again, a more efficient work flow can eliminate many potentially harmful MMH tasks and RMA's. Each task involving heavy lifting must be assessed using the following concepts before manual lifting is permitted;

The design or redesign of jobs involving MMH and RMA's should be approached in the following stages:

- eliminate heavy MMH & RMA's;
- provide mechanical lifting devices and other engineered controls when possible;
- reduce stressful body movements; and
- improve environmental conditions

It may be difficult to entirely eliminate all MMH and RMA's but the number can be substantially reduced. Consider using powered or mechanical handling systems if eliminating MMH tasks is not possible. Mechanical aids lower the risk for back injury substantially by reducing the physical effort required to handle heavy objects.

Manual handling such as lifting and carrying can be easier and safer if mechanized by using lift tables, conveyors, yokes, or trucks. Gravity dumps and chutes can help in disposing of materials. Mechanical aids also reduce the need to select workers for the task, but it is essential that the worker is properly trained in the safe use of the available equipment.

If mechanical aids cannot eliminate manual handling, decrease the MMH demands. There are several ways to achieve this:

- Decrease the weight of handled objects to acceptable limits.

- Reduce the weight by assigning two people to lift the load or by splitting the load into two or more containers. Using light plastic containers also decreases the weight of the load.

- Change the type of MMH movement. Lowering objects causes less strain than lifting. Pulling objects is easier than carrying. Pushing is less demanding than pulling.

- Change work area layouts. Reducing the horizontal and vertical distances of lifting substantially lowers MMH demands. Reducing the travel distances for carrying, pushing, or pulling also decreases work demands.

- Assign more time for repetitive handling tasks. This reduces the frequency of handling and allows for more work/rest periods.

- Alternate heavy tasks with lighter ones to reduce the build-up of fatigue.

It is important that the design of MMH allows the worker to do tasks without excessive bending and twisting. These body motions are particularly dangerous and can cause back injury even when not combined with handling loads. To reduce stressful body movements in MMH:

- Provide all materials at a work level that is adjusted to the worker's body size;
- Eliminate deep shelves to avoid bending;
- Ensure sufficient space for the entire body to turn;
- Locate objects within easy reach;
- Ensure that there is a clear and easy access to the load;
- Use slings and hooks to move loads without handles;
- Balance contents of containers;
- Use rigid containers; and

- Change the shape of the load so the load can be handled close to the body.

The design of the work environment is an important element of back injuries prevention. To improve the work environment to reduce the risk of MMH-related injury:

- Keep the temperature of the working area between 18C and 21C when practical;
- In extreme cases that require heavy MMH in temperatures above 30C, rest periods or light work load tasks may account for 75 percent of the work time to ensure an adequate work/rest schedule;
- Wear properly designed clothing to decrease the heat absorption by the body and to increase evaporation, particularly important people required to work in high temperature environment;
- Encourage the use of proper protective clothing for people working in a cold environment to protect the worker from hypothermia and to preserve dexterity needed for safe work;
- Illuminate the work area for MMH tasks at the level of 200 lux;
- Use task lights or other additional light sources to improve the ability to see clearly where MMH requires fine visual discrimination;
- Use angular lighting and color contrast to improve depth perception, which helps the worker where MMH involves climbing stairs or moving in passageways;
- When the MMH tasks are done outdoors, the temperature conditions including the humidex (in hot weather) or wind-chill factor (in cold weather) have to be monitored very closely;
- Reduce MMH tasks by half when the temperature exceeds 28^{o}C;
- Stop MMH when the temperature exceeds 40^{o}C;
- Restrict MMH to the minimum possible when wind-chill drops below -25^{o}C; and
- Stop MMH when wind-chill drops to -35^{o}C.

More details about working and doing MMH activities in hot and cold environments are available in CCOHS publications Groundskeepers Safety Guide and Cold Weather Worker's Safety Guide.

PRE-PLACEMENT SCREENING

The objective of pre-placement screening is to select individuals less likely to be injured in work involving MMH.

One way in which pre-placement screening may be justified as a preventive measure is where a job involves heavy MMH in an unpredictable and uncontrollable environment. Examples of these are firefighting, mine and water rescue, and police work. Even here, the selected tests should closely reflect with the anticipated requirements of the job. By far the best pre-selection method, if one must be used, is performance of the actual task.

TRAINING

There is little evidence to indicate that training alone reduces the number of MMH injuries. When combined with work design, training is an important element in the prevention of injuries. Proper training also shows the worker how to actively contribute to the prevention of injuries. A good training program should:

- make the worker aware of the hazards of MMH;
- demonstrate ways of avoiding unnecessary stress; and
- teach the worker to handle materials safely.

Instruction on how to lift "properly" is the most controversial issue concerning training in MMH. There is no single correct way to lift because lifting can always be done in several ways. Because of this, on-site, task specific training is essential. In fact, it is sometimes safer to allow the worker to use common sense acquired by experience rather than to force new biomechanical procedures. There are, however, some general lifting rules:

- Prepare to lift by warming up the muscles;
- Stand close to the load, facing the way you intend to move;
- Use a wide stance to gain balance;
- Ensure a good grip on the load;
- Keep arms straight;
- Tighten abdominal muscles;
- Tuck chin into the chest;
- Initiate the lift with body weight;
- Lift the load close to the body;
- Lift smoothly without jerking;
- Avoid twisting and side bending while lifting; and
- Do not lift if you are not convinced that you can handle the load safely.

It is also important that workers:

- Take advantage of rest periods to relax tired muscles to prevent fatigue from building up; and
- Report discomforts experienced during work to help to identify hazards and correct working conditions.

Finally, there is an aspect of training that cannot be overlooked if training is to be part of an effective prevention program.

Workers should be educated that muscles, tendons, and ligaments are not prepared to meet the physical stress of handling tasks when they are not "warmed up." They are more likely to pull, tear, or cramp when stretched or contracted suddenly under such conditions. This--painful enough by itself--can lead to more serious and permanent injury if physically stressful work is continued. Warming up and mental readiness for physically demanding tasks is important for any kind of MMH, but particularly for occasional tasks where the worker is not accustomed to handling loads. Workers are more likely to have "ready-to-go" attitude for the task ahead when they understand that other preventive measures are also tried.

ATTACHMENT 13 - PERSONAL PROTECTIVE EQUIPMENT

PERSONNEL PROTECTIVE EQUIPMENT PROGRAM & POLICY

INTRODUCTION AND PURPOSE:

To assure proper selection, safe use and maintenance for Personal Protective Equipment (PPE) as required by the OSHA 1926 Construction Standards including Subpart C (1926.28), Subpart E (1926.95-.96 and 1926.100-1926.107) as well as 1910 General Industry Standards which OSHA has referenced as applicable to the Construction Industry (1910.132(b); 1910.132(c); 1910.136y). All employees, subcontractor and visitors shall be trained in the proper selection, safe use and maintenance of personal protective equipment required at all OSC locations and project sites. PPE training shall be conducted initially at the time of hire, job transfer, at the start of a new project (project orientation) and thereafter annually or sooner as warranted by product change, PPE change and or employee demonstrates improper use or lack of use and understanding. The use of employee owned PPE shall is prohibited. All PPE shall be purchased by the company for the employees use to insure adequacy. Selected PPE shall be fitted to each affected employee. The company is responsible for assuring adequacy of the PPE selected, its use and maintenance as necessary.

PERSONNEL RESPONSIBILITIES (Also See Manual Sections 2.0 – 2.6 "RESPONSIBILITIES")

- Director, HS&E - The Director, HS&E is responsible for assuring this program is reviewed and updated as necessary (product changes and updates, regulatory updates, program performance improvements). The program shall be as a minimum reviewed and updated annually.
- Managers and Supervisors - Managers and Supervisors are responsible for assuring their projects/operations and employees are in compliance with the requirements of this program (training, application, practice and procedures).
- Employees – Employees are responsible for following all policies and procedures as required by this program as well as report any perceived program deficiencies (violations and errors) or improvement measures to their supervisor). NOTE – All employees have the authority and responsibility to stop work for safety concerns. "If you see it, you own it".

- Subcontractors – All subcontractors are responsible for following all policies and procedures as required by this program as well as report any perceived program deficiencies (violations and errors) or improvement measures to their superior). NOTE – All employees have the authority and responsibility to stop work for safety concerns. "If you see it, you own it".

DEFINITIONS (See Also Attachment Y Standard Program Definitions:

- ***Air-purifying respirator*** means a respirator with an air-purifying filter, cartridge, or canister that removes specific air contaminants by passing ambient air through the air-purifying element.
- **"ANSI"** means American National Standards Institute. Non-profit organization that oversees the development voluntary consensus standards for products, services, processes, systems and personnel in the United States. OSHA typically requires all PPE rigging meet ANSI standards.
- ***Assigned protection factor (APF)*** means the workplace level of respiratory protection that a respirator or class of respirators is expected to provide to employees when the employer implements a continuing, effective respiratory protection program as specified by this section.
- ***Atmosphere-supplying respirator*** means a respirator that supplies the respirator user with breathing air from a source independent of the ambient atmosphere, and includes supplied-air respirators (SARs) and self-contained breathing apparatus (SCBA) units.
- **"Body Belt"** (NOTE - Safety Belt for Positioning and Restraint Only, Not for Fall Arrest Protection) - A strap with means both for securing it about the waist and for attaching it to a restraining device.
- **"Body Harness" -** Straps which may be secured about the employee in a manner that will distribute the fall arrest forces over a least the thighs, pelvis, waist, chest and shoulders with means for attaching it to other components of a personal fall arrest system.
- **"Contaminant"** means any material which by reason of its action upon, within, or to a person is likely to cause physical harm.

- Canister or cartridge means a container with a filter, sorbent, or catalyst, or combination of these items, which removes specific contaminants from the air passed through the container.
- **"Lanyard"** means a rope, suitable for supporting one person. One end is fastened to a safety belt or harness and the other end is secured to a substantial object or a safety line.
- **"Lifeline"** means a rope, suitable for supporting one person, to which a lanyard or safety belt (or harness) is attached.
- **"Radiant energy"** means energy that travels outward in all directions from its sources.
- **"Safetybelt"** means a device, usually worn around the waist for fall restraint which, by reason of its attachment to a lanyard and lifeline or a structure, will prevent a worker from free falling. NOTE – Prohibited for fall arrest use.
- "NIOSH" – National Institute of Occupational Safety and Health. Institute which develops safety standards and specifications which the Occupational Safety and Health Act (OSHA) frequently reference.
- **"NR Rating"** – Noise reduction rating given for hearing protection. Indicates level of protection provided in decibels. Example a NR 22 = effective noise reduction of 22 decibels for given exposure. If ambient noise levels were 92 decibels then hearing protection with a noise reduction rating of NR 22 would reduce the noise level to 72 decibels.
- *Demand respirator* means an atmosphere-supplying respirator that admits breathing air to the facepiece only when a negative pressure is created inside the facepiece by inhalation.
- *Emergency situation* means any occurrence such as, but not limited to, equipment failure, rupture of containers, or failure of control equipment that may or does result in an uncontrolled significant release of an airborne contaminant.
- *Employee exposure* means exposure to a concentration of an airborne contaminant that would occur if the employee were not using respiratory protection.
- *End-of-service-life indicator (ESLI)* means a system that warns the respirator user of the approach of the end of adequate respiratory protection, for example, that the sorbent is approaching saturation or is no longer effective.
- *Escape-only respirator* means a respirator intended to be used only for emergency exit.

- ***Filter or air purifying element*** means a component used in respirators to remove solid or liquid aerosols from the inspired air.
- ***Filtering facepiece*** (dust mask) means a negative pressure particulate respirator with a filter as an integral part of the facepiece or with the entire facepiece composed of the filtering medium.
- ***Fit factor*** means a quantitative estimate of the fit of a particular respirator to a specific individual, and typically estimates the ratio of the concentration of a substance in ambient air to its concentration inside the respirator when worn.
- ***Fit test*** means the use of a protocol to qualitatively or quantitatively evaluate the fit of a respirator on an individual. (See also Qualitative fit test QLFT and Quantitative fit test QNFT.)
- ***Helmet*** means a rigid respiratory inlet covering that also provides head protection against impact and penetration.
- ***High efficiency particulate air (HEPA) filter*** means a filter that is at least 99.97% efficient in removing monodisperse particles of 0.3 micrometers in diameter. The equivalent NIOSH 42 CFR 84 particulate filters are the N100, R100, and P100 filters.
- ***Hood*** means a respiratory inlet covering that completely covers the head and neck and may also cover portions of the shoulders and torso.
- ***Immediately dangerous to life or health (IDLH)*** means an atmosphere that poses an immediate threat to life, would cause irreversible adverse health effects, or would impair an individual's ability to escape from a dangerous atmosphere.
- ***Interior structural firefighting*** means the physical activity of fire suppression, rescue or both, inside of buildings or enclosed structures which are involved in a fire situation beyond the incipient stage.
- ***Loose-fitting facepiece*** means a respiratory inlet covering that is designed to form a partial seal with the face.
- ***Maximum use concentration (MUC)*** means the maximum atmospheric concentration of a hazardous substance from which an employee can be expected to be protected when wearing a respirator, and is determined by the assigned protection factor of the respirator or class of respirators and the exposure limit of the hazardous substance. The MUC can be determined mathematically by multiplying the assigned protection factor specified for a respirator by the required OSHA permissible exposure limit, short-term exposure limit, or ceiling limit. When no OSHA exposure

limit is available for a hazardous substance, an employer must determine an MUC on the basis of relevant available information and informed professional judgment.

- ***Negative pressure respirator (tight fitting)*** means a respirator in which the air pressure inside the facepiece is negative during inhalation with respect to the ambient air pressure outside the respirator.
- ***Oxygen deficient atmosphere*** means an atmosphere with an oxygen content below 19.5% by volume.
- ***Physician or other licensed health care professional (PLHCP)*** means an individual whose legally permitted scope of practice (***i.e.,*** license, registration, or certification) allows him or her to independently provide, or be delegated the responsibility to provide, some or all of the health care services required by paragraph (e) of this section.
- ***Positive pressure respirator*** means a respirator in which the pressure inside the respiratory inlet covering exceeds the ambient air pressure outside the respirator.
- ***Powered air-purifying respirator (PAPR)*** means an air-purifying respirator that uses a blower to force the ambient air through air-purifying elements to the inlet covering.
- ***Pressure demand respirator*** means a positive pressure atmosphere-supplying respirator that admits breathing air to the facepiece when the positive pressure is reduced inside the facepiece by inhalation.
- ***Qualitative fit test (QLFT)*** means a pass/fail fit test to assess the adequacy of respirator fit that relies on the individual's response to the test agent.
- ***Quantitative fit test (QNFT)*** means an assessment of the adequacy of respirator fit by numerically measuring the amount of leakage into the respirator.
- ***Respiratory inlet covering*** means that portion of a respirator that forms the protective barrier between the user's respiratory tract and an air-purifying device or breathing air source, or both. It may be a facepiece, helmet, hood, suit, or a mouthpiece respirator with nose clamp.
- ***Self-contained breathing apparatus (SCBA)*** means an atmosphere-supplying respirator for which the breathing air source is designed to be carried by the user.
- ***Service life*** means the period of time that a respirator, filter or sorbent, or other respiratory equipment provides adequate protection to the wearer.

- ***Supplied-air respirator (SAR) or airline respirator*** means an atmosphere-supplying respirator for which the source of breathing air is not designed to be carried by the user.
- ***Tight-fitting facepiece*** means a respiratory inlet covering that forms a complete seal with the face.
- ***User seal check*** means an action conducted by the respirator user to determine if the respirator is properly seated to the face.

REQUIREMENTS FOR PERSONAL PROTECTIVE EQUIPMENT (PPE)

Clothing

With a few exceptions, no special clothing is required for general work on most projects. Clothing should be sturdy, well fitting, and suitably protective. For example, long sleeves are better than short ones. All employees must wear an outer shirt or equivalent–no muscle shirts are permitted.

OSC provides personal protective clothing and equipment that is designed and approved for specific hazards for the employees' protection and mandatory use. For work which may involve particular hazards such as exposure to chemicals or harmful materials, special personal protective clothing and equipment will be supplied.

Eye and Face Protection

Employees will be provided with eye and face protection. Additional items, including face shields or mono goggles, will be issued when the hazard warrants its use. The use of contact lenses is discouraged, particularly in those instances where work assignments require goggles/eye protection, such as in areas where acid or caustics are present.

Head Protection

Head injuries are caused by falling or flying objects, or by bumping the head against a fixed object. Head protection, in the form of protective hats, must do two things—resist penetration and absorb the shock of a blow. This is accomplished by making the shell of the hat of a material hard enough to resist the blow, and by utilizing a shock–absorbing lining composed of headband and crown straps to keep the shell away from the wearer's skull. Protective hats are also used to protect against electrical shock.

In 1997 a new ANSI standard was introduced that eliminates the old hard hat classifications. The old designations for hats (Type 1) and caps (Type 2) are no longer used. The old classifications are also a thing of the past. The classes A, B, and C are gone and in their places you find Class G, E, and C. The following tables show the new types and classes.

Type	Impact
1	Helmets intended to reduce the force of impact resulting from a blow only to the top of the head.
2	Helmets intended to reduce the force of impact resulting from a blow which may be received off center or to the top of the head.
Electrical Class	
G (General)	Class G helmets are intended to reduce the danger of contact exposure to low voltage conductors. Test samples are proof–tested at 2200 volts (phase to ground). However, this voltage is not intended as an indication of the voltage at which the helmet protects the wearer.
E (Electrical)	Class E helmets are intended to reduce the danger of exposure to high voltage conductors. Test samples are proof–tested at 20,000 volts (phase to ground). However, this voltage is not intended as an indication of the voltage at which the helmet protects the wearer.
C (Conductive)	Class C helmets are not intended to provide protection against contact with electrical conductors

Hearing Protection

Exposure to high noise levels is a potential hazard associated with the operation of heavy equipment, power tools, generators, compressors, pumps, and similar activities. Exposure to intermittent high noise levels exceeding accepted standards might result in hearing loss.

Whenever noise levels are measured or anticipated to exceed a time-weighted average (TWA) level of 90 decibels as measured on the A scale (dBA), worker protection against the effects of noise exposure will be required in accordance with 29 CFR 1926.52 and 1926.101 as appropriate. At times double protection may be required.

The following OSHA permissible exposure table shall be used to initially determine the use of hearing protection devices. Minimally, all employees subjected to impact or instantaneous noise levels greater than 140 dB shall be required to use hearing protection.

Duration per day (in hours)	Sound level dBA – Slow Response
8	90
6	92
4	95
3	97
2	100
1.5	102
1	105
.5	110
.25 or less	115

Sound suppression devices will be utilized on pneumatic, gasoline, and diesel powered construction equipment and pneumatic tools as available to maintain noise exposure levels below the limits specified above (29 CFR 1926) or as determined through actual noise level measurements. If noise exposures are suspected of exceeding those levels then formal noise exposure monitoring, using OSHA approved noise dosimeter, will be conducted. If any measured exposure exceeds the OSHA allowable (90 dB TWA-8hr.) hearing protective PPE shall be required. Engineering and administrative controls will be applied before PPE.

If administrative and engineering controls fail to reduce exposure to below 90 dBA TWA 8-hr, appropriate hearing protection will be provided, and the work area or equipment will be posted with warning signs to alert workers to the requirements for hearing protection. Furthermore, a hearing conservation program will be put in place to assure employees are not exposed above the OSHA limit.

A variety of hearing protectors—plugs and muffs--are available to employees. Hearing protection will be provided and may be used on a voluntary basis. OSC provides the following;

- Formable plugs: which are rolled and compressed into a very thin cylinder. While compressed, insert the plug well into the ear canal. Reach around the head to pull the ear outward and upward during insertion.

- Earmuffs: which fully enclose the ears to seal against the head. Adjust the headband so the cushions exert even pressure around the ears. Pull hair back and out from beneath the cushions.

Formable plugs and ear muff cushions must be kept clean and free from material that can irritate the ear canal. Formable plugs are disposable and ear muff cushions must be washed in a mild detergent and warm water. Discard plugs if they harden, or do not return to their original size and shape. Ear muff cushions normally need replacing whenever they become stiff, cracked, or do not seal.

Foot Protection

Footwear will consist of shoes which have a substantial sole and upper support made of a liquid resistant material such as leather or rubber. Hard or steel toed shoes are required. Foot guards are required when using a pneumatic tamper or concrete breaker. Cloth-type fabric (i.e., tennis shoes), sandals, open toes, or soft-soled shoes are not acceptable. Safety footwear is classified according to its ability to meet minimum requirements for both compression and impact tests. These requirements and testing procedures may be found in American National Standards Institute standard ANSI Z41-1999 and ASTM F-2412-2005.

General

Personal Protective Equipment (PPE) will be selected, used, maintained, and stored in accordance with 29 CFR 1910 Subpart I, 29 CFR 1926 Subpart E, and the manufacturer's recommendations. Engineering, administrative, and/or work practice controls will be implemented where feasible, rather than relying exclusively on PPE.
Standard protective equipment (i.e., general construction safety attire) is to be worn at all times by all personnel at the site includes:

- Safety glasses with permanently mounted side shields, or mono goggles in chemical areas;
- Safety boots; and
- A hard hat.

DESCRIPTION OF LEVELS OF PROTECTION

PPE will be used when project and support activities involve known or suspected atmospheric contamination; when vapors, gases, or particulate may be generated by site activities; or when direct contact with skin-affecting substances may occur. Full face-piece respirators protect the lungs, gastrointestinal tract, and eyes against airborne toxicants. Chemical resistant clothing protects skin from contact with destructive and absorbable chemicals.

The specific levels of protection and necessary components for each have been divided into four categories according to the degrees of protection afforded:

Level A: Should be worn when the highest level of respiratory, skin, and eye protection is needed.

The Level A PPE ensemble includes a self-contained breathing apparatus inside a fully-encapsulating, air-tight, vapor-tight, chemical protective suit. Only specially trained and qualified individuals may don Level A, and usually only under emergency conditions.

Level B: Should be worn when the highest level of respiratory protection, but a lesser level of skin protection is needed.

The Level B PPE ensemble includes a full-face positive-pressure SCBA or air respirator equipped with 5-minute escape capability; work cloths; chemical suit; over boots; inner and outer latex gloves; chemical resistant work gloves; a hard hat; and work boots. Hearing protection shall be utilized as directed by the SHSO.

Level C: Should be worn when the criteria for using air-purifying respirators are met, and a lesser level of skin protection is needed.

The Level C PPE ensemble includes work clothing as dictated by weather; coated PVC Tyvek coveralls; inner and outer latex gloves; chemical resistant work gloves; a full- or half-face air-purifying respirator with an organic vapor acid gas cartridge/filter; a hard hat; booties; work boots; and safety glasses. Hearing protection (ear plugs) shall be worn as directed by the SHSO.

Level D: Level D provides minimal protection against chemical hazards. It is normally worn only as a work uniform and not in any area of significant respiratory or skin contact hazards.

The Level D PPE ensemble will include work clothing as dictated by weather; a hard hat; work gloves (as directed by the SHSO based on work task); work boots; and safety glasses. Hearing protection (ear plugs) will be worn as directed by the SHSO. **Level D Modified** includes the aforementioned latex gloves and, if directed by the SHSO coated PVC Tyvek coveralls.

Modifications of these levels are permitted by the SHSO and routinely employed during site work activities to maximize efficiency. Likewise, the type of chemical protective ensemble will depend upon contaminants, concentration, and extent of contact.

SELECTION AND USE OF PPE

Selection and use of PPE is based on the performance characteristics of the PPE and task or site-specific hazards.

The minimum levels of PPE identified in Table 3 may be changed by the SHSO in consultation with the Director, HS&E and Project Engineer based on field reconnaissance, results of site monitoring or additional hazard analysis.

MAINTENANCE AND STORAGE

Assigned PPE shall be maintained and stored in a clean and sanitary manner. Adequate facilities and supplies for cleaning, maintenance, storage, and issue of PPE, including respiratory protection, will be provided at the project site.

INITIAL LEVELS OF PROTECTION

The minimum levels of PPE for site-specific work tasks are defined in Table 3, below.

Work Task (TABLE 3)	Anticipated Protection Level (1,2)
Mobilization/Site Set-Up	Non-Hazardous, General Construction Safety Attire
Access and Haul Road Improvement/Maintenance	Non-Hazardous, General Construction Safety Attire
Asbestos Removal	Level C with Half-Face APR with HEPA cartridges. Upgrade to Full-Face APR if levels are > 1 fiber/cc. Full-face APR good up to 5 fibers/cc.
Removal/Handling Hazardous Chemicals (If Residual Product is Encountered in Existing Equipment or Lines)	To Be Determined
Mechanical Demolition	Modified Level D
Selective Pipe Removal	Modified Level D
Confined Space Entry (If Required)	Level B or Level C (Based on Air Monitoring Results)
Lead Abatement (If Required)	Level C (Respiratory Protection to be determined per risk assessment)
Work in Restricted NORM Areas	See Section 4.2.4, Item G
General Site Cleanup/Work Area Restoration	Non-Hazardous, General Construction Safety Attire

NOTES:

(1) Specific requirements of protection levels (e.g., B, C, Modified D, D) are detailed in Section 8.1.1 of this HASP.

(2) Alternate protection levels will be used if monitoring indicates that conditions are appropriate, or the SHSO and the Owner's Representative agree that there is a reduced or increased potential of exposure.

TRAINING (See also section 2-4 Responsibilities, Record Keeping and Training).

Appropriate training shall be provided to PPE users. Training shall be documented as required by 29 CFR 1910.132

RESPIRATORY PROTECTION

Following the implementation of all engineering controls and work practices to limit exposure, employees may be required to use respiratory protection to reduce their exposure to airborne hazardous substances.

Table 3 addresses the need for respiratory protection and who should wear it. The standard requirements that determine the selection and use of respirators depend on the site and hazards present, but respirators for emergency use will always be available.

Employees must only use respirators that are approved by the Mine Safety and Health Administration (MSHA) and the National Institute for Occupational Safety and Health (NIOSH) and adhere to the regulatory requirements set forth by the Occupational Safety and Health Administration (OSHA) in 29CFR1910.134 and 29CFR1926.103.

Respirators must be cleaned, disinfected, maintained, inspected, and stored pursuant to 29CFR1910.134, OSC's Corporate Health and Safety Program, and as described herein.

MEDICAL CLEARANCE / FIT TESTING

All employees assigned to tasks where they must wear a respirator must have prior medical clearance. Fit test records and employee medical documentation will be maintained on-site by HSE personnel. This information will be available for inspection upon request. Medical limitations and restrictions will be strictly enforced and only those employees having successfully completed fit testing shall be permitted to use a respirator.

RESPIRATOR TRAINING

Any employee who may be required to wear a respirator will receive training from the SHSO on the use, maintenance and inspection of respirators. Training shall be documented and records will be maintained on-site and will be available for inspection upon request

RECORDKEEPING

All records required by 29 CFR 1910.134 and any other regulations; company policy or client requests will be maintained on-site with official records maintained at the Corporate Offices.

INSPECTION

All respirators to be used on a job will be inspected by the employees prior to using them. Respirators will be inspected be inspected for damage before and after each use. Each employee, after training, will be responsible for inspection.

The following will be inspected:

- Tightness of connections;
- Face piece;
- Headbands;
- Inhalation valve;
- Cartridge or filter fittings;
- Pliability of rubber or elastic parts; and
- Signs of deterioration.

Any malformation, distortion, missing parts, or cracks in the respirator will cause the respirator to be deemed useless until a qualified technician properly repairs the respirator. If necessary, a new respirator will be issued.

CLEANING AND DISINFECTION

Reusable respirators will be cleaned after each use either by the employees or a person assigned to the decontamination of personal protection equipment. The steps required to clean a respirator after use includes:

- Removing the cartridges and headbands;
- Disassembling all respirator parts;
- Washing all respiratory parts--except cartridges and headbands--in a cleaner-disinfectant solution or in soap and hot (100^{o}F) water;
- Rinsing them completely in clean, warm water to remove all traces of detergent and disinfectant;
- Air-drying them in a clean and sanitary area;

- Re-assembling the respirator;
- Storing the cleaned respirator in a sealed bag to protect it against dust, sunlight, extreme temperature, moisture or abrasives; and
- Performing any necessary maintenance.

Qualified personnel will conduct respirator maintenance in accordance with the manufacturer's recommendations.

STORAGE

Respirators will be stored in a sealed bag to protect against dust, sunlight, extreme temperature, moisture or abrasives. Inhalation holes will be covered with duct tape (or equivalent) immediately after leaving a contaminated area. The tape will be left on until the respirator is donned for the next entry into a contaminated area. This tape will prevent any contaminants from being dislodged from the cartridge.

Respirators should be packed or stored so that the face piece and exhalation valve will rest in a normal position and function will not be impaired by the elastic setting in an abnormal position. The respirator shall not be hung to store or air-dry by the straps.

STANDARD PROCEDURES FOR USE OF RESPIRATORS

Each employee will adhere to the following Standard Operating Procedures (SOPs) for respirator use:

- Carefully inspect the respirator using the procedures set forth in Section 8.5.3 prior to entering potentially contaminated work areas.
- Remove duct tape from cartridge prior to entering potentially contaminated work areas, if applicable.
- Conduct positive and negative pressure leak tests each time a respirator is donned, as follows:

- Positive Pressure Leak Test: Close off the exhalation valve with hand. Breathe into the mask. The face-to-face piece seal is satisfactory if some pressure can be built up inside the mask and sustained.

- Negative Pressure Leak Test: Close off the inlet openings of the cartridge with the palm of the hand. Inhale gently so that a vacuum occurs inside the mask. Hold breath for 10 seconds. If the vacuum is sustained and no inward leakage is detected, the respirator fits properly.

- Do not remove respirator in contaminated work areas. In the event of a medical emergency or if breathing becomes difficult, remove respirator and immediately leave or remove injured person(s) from the contaminated work area.

- Wear respirator with straps inside disposable garments in order to maintain respiratory protection during personnel decontamination/contaminated garment removal.

ATTACHMENT 14 - LADDERS AND SAFFOLDING

PURPOSE:

To assure proper and safe use of ladders and scaffolds without incident and injury at all OSC locations. Training for all employees shall be conducted at the time of hire, prior to project start.

PERSONNEL RESPONSIBILITIES (Also See Manual Sections 2.0 – 2.6 "RESPONSIBILITIES")

- Director, HS&E - The Director, HS&E is responsible for assuring this program is reviewed and updated as necessary (product changes and updates, regulatory updates, program performance improvements). The program shall be as a minimum reviewed and updated annually.

- Managers and Supervisors - Managers and Supervisors are responsible for assuring their projects/operations and employees are in compliance with the requirements of this program (training, application, practice and procedures).

- Employees – Employees are responsible for following all policies and procedures as required by this program as well as report any perceived program deficiencies (violations and errors) or improvement measures to their supervisor). NOTE – All employees have the authority and responsibility to stop work for safety concerns. "If you see it, you own it".

- Subcontractors – Subcontractors are responsible for following all policies and procedures as required by this program as well as report any perceived program deficiencies (violations and errors) or improvement measures to their superior). NOTE – Employees have the authority and responsibility to stop work for safety concerns. "If you see it, you own it".

LADDERS: GENERAL

Ladders must be inspected prior to use. If found defective, they must be taken out of service and tagged as "Dangerous, Do Not Use".

- Metal ladders are electrical conductors and will not be used near wiring
- Wood ladders must be painted with only varnish. Opaque materials are not to be used
- Do not overreach while working from a ladder. Keep belt buckle between rungs.
- Face the ladder and use both hands while climbing or descending a ladder. Tools and materials must be hauled up with the use of a hand line or belt carrier

- Only manufacturer's approved hooks or those certified by a professional engineer are acceptable
- Exercise care when working from ladders or when placing or carrying ladders to prevent injury to other employees
- Lock or bolt the door when it is necessary to place a ladder in front of or over a doorway
- Barricade the area or position a workman in front of the ladder when it is necessary to place it in an aisle or any location where there is a possible danger of it being struck by another person or object.

STRAIGHT LADDERS

- Select ladders of proper length for the work. Ladders will never be used that have been spliced together. Makeshift extensions are dangerous and their use is prohibited;
- Use only ladders with safety feet or sharp spurs. Where the ladders appear insecure, lash the top to a fixed support. This is particularly advisable with long ladders or where there is a possibility of the ladder slipping, shifting position or being bumped;
- When used to access an elevated work level the ladder must extend at least three feet beyond the supporting object
- Carry the ladder by placing the upper rail on the shoulder, and the bottom rail resting against the body. The end with the safety feet or spurs should be in front and elevated above the horizontal. Heavy ladders should be carried horizontally, in like manner, by two men; the first man placing his arms through the first two rungs;
- Set the ladder on a secure footing. Ladders with spurs shall not be used on metal floor plates, cement floor or other smooth surfaces
- Place the base of the straight ladder so that a one to four (1-4) lean ratio, from the vertical, is established in order to obtain a safe working angle
- Face the ladder going up or down. Maintain three points of contact on the ladder
- Keep hands free for use in climbing up and down the ladder. Small articles should be carried pockets or on a tool belt. Larger articles should be lifted to or lowered from elevated positions by hand lines
- Shut down machine tools before working overhead on a ladder
- Securely lash or fasten ladders to prevent displacement
- Keep ladders clean and free from dirt and paint which may conceal defects. Rungs and steps are to be kept free of oil, grease, and debris

- Avoid using ladders in a strong wind, except in emergencies and then only when they are securely lashed or tied in position
- Never use ladders for platforms, walk boards, or shoring
- Ladders will only be utilized by one person at a time
- After the extension section has been raised to the desired height, the safety dogs or latches must be engaged and the extension rope secured to a rung on the base section of the ladder before use
- Extension ladder sections are not to be used separately

STEP LADDERS

- Step-ladders will be equipped with a metal spreader or locking device of sufficient size and strength to securely hold the front and back sections in open position
- Open a step ladder fully before mounting. Step ladders are never to be used as straight ladders and the top platform of a step ladders is not to be mounted
- Step ladders will only be utilized by one person at any one time
- Never stand on the top or first step below the top of a stepladder or as indicated
- Stepladders must be tied off when used close to the edge of an elevated platform, roof, floor opening, or when they exceed eight feet in height.

SCAFFOLDING

Scaffolds and swing stages must be used whenever needed and erected by or under the direction of an experienced and competent person. All scaffolding erection and adjusts will be performed only under the direction of a competent person. Generally, OSC does not erect or dismantle scaffolding. Personnel required to work on scaffolding shall be trained and authorized to do so. Training shall be documented with the specific Activity Hazard Analysis required for the job.

The following work practices will be adhered to at all times:

- Scaffolds, man lifts and swing stages must be inspected before each use to ensure their good condition and adherence to all regulations. Tagging may be used as required at the job site
- All scaffolds higher than ten (10) feet must have adequate guardrails, midrails and toe boards
- Access to and from a scaffold or swing stage will be by stairs, runway ramp, or secured ladder. These must be kept clear of obstructions

- Swing stage stirrups must be clamped to the float with U-bolts only
- Electrically operated scaffolding will be inspected by a competent person before use
- All safety chains must be hooked up during use;
- Personnel must wear properly rigged fall restraint (not fall arrest) on scaffold platforms not equipped with standard handrails or completed decking
- No one will ride a rolling scaffold while it is being moved, rock or otherwise cause a scaffold to move while workers are on it, or move a rolling scaffold without removing and/or securing all tools
- Scaffold handrails, mid-rails, or brace members should not be climbed--use ladders for access
- All scaffolds must be erected level and plumb on a firm base
- Scaffolds that are three or more times higher than the smallest base dimension will be secured to the building or structure at the second lift and every other lift thereafter, and running scaffolds will be secured every 30 feet horizontally at the same intervals
- All scaffold platforms must be equipped with standard 42-inch-high rigidly secured handrails, mid-rails, and toe boards and be completely decked with safety plank or manufactured scaffold decking
- Never exceed safe working loads on scaffolds
- Never rig from scaffold handrails or braces
- Scaffold or safety planks should not be used for skids, ramps, runways, or purposes other than scaffold decking
- No scaffold, man lift, or swing stage will be loaded in excess of the load for which it is designed and constructed to bear, and loads will be distributed so as not to create localized stress loads in excess of the designed specifications
- Scaffold planks will extend over their end supports not less than six (6) inches or more than 12 inches
- Scaffold planking will be overlapped a minimum of 12 inches or secured from movement
- Railings and toe boards will be installed on all open sides and ends of platforms more than ten feet above the floor, except where wholly within the interior of a building and covering the entire floor area of any room therein and not having any side exposed to a hoist way, elevator shaft, stairwell, or other floor opening, needle-beam scaffolds and floats in use by structural iron workers
- There will be a screen with 1/2-inch maximum openings between the toe board and the guardrail where persons are required to work or pass under the scaffold.

ATTACHMENT 15 – HOISTING, RIGGING & CRANES

HOISTING, RIGGING & CRANES

PURPOSE:

To assure all rigging and hoisting operations are completed safely without injury and incident. See also previous sections 2 - 4 "Responsibilities" and "Training Program" and attachment Y Standard Program Definitions).

CRANES

Purpose: to ensure all rigging and hoisting activities are completed safely without incident and in compliance with all recognized industry accepted consensus standards and Federal requirements as per OSHA CFR 1926 (subpart CC and subpart N).

INSPECTIONS

Before each use, it is the operator's responsibility to thoroughly inspect his equipment. Monthly or periodic inspections will be made and records maintained of all inspections and maintenance activities. All inspections will be carried out by a qualified person with a thorough knowledge of the equipment involved. Inspections will be performed according to the guidelines included at the end of this section.

LOAD CHARTS

Every crane must be equipped with a load chart posted in the operator's control station. The chart must include nameplate identification information; load ratings for the boom at all stated operating radii or angles for different counterweights, boom lengths, and types; and jib ratings, along with the method for calculating boom jib ratings.

HAND SIGNALS

An authorized signalman should be appointed to work with the operator. The operator should take directions, using standard hand signals or approved electronic communication equipment, only from the designated signalman. Hand signal instructions will be posted on the job site. If an operator loses sight or communication with the signalman he should stop operation immediately.

LOAD WEIGHT

The load weight is the single changing variable in mobile crane operation. Its effects should never be overlooked. It is very important to determine the weight of any load before rigging and to make allowances for unknown factors. Rigging equipment must be included in the load weight. When approaching the upper 25 percent of the crane's rated capacity, it is a good idea to measure the load radius. The crane outriggers should always be used for lifting.

DEMOLITION BALL

When a crane is being used with a demolition ball, the weight will not exceed 50 percent of the safe load of the boom at maximum length and angle of operation, or 25 percent of the nominal breaking strength of the supporting line, whichever is less. The boom swing must not exceed 309 degrees from the center line (front to back) of the crane mounting. The load lie and swivel type attachment must be checked at least twice daily.

The demolition ball will be attached to the load lie with a swivel-type connection to prevent twisting of the load line. It will be attached by positive means in such a manner that the ball cannot become disconnected by slack in the load line or other causes. The use of tires for the swivel connection will be prohibited. Under no circumstances will a person be allowed to ride on or work from a demolition ball.

The use of a clamshell bucket may present special problems. The operator should be ready to release the closing line if an overly heavy weight is bitten off. When using a clamshell bucket, special care must be taken by workers to stay clear of debris hanging out or falling from the bucket. Never work under a suspended load.

All equipment, ropes, and slings must be in good condition, free of kinks or bends, and/or exposed to corrosives, rusting, or welding operations. If defects are found during inspection, the equipment must be destroyed or tagged and removed form the project for repair. The working capacity of all rigging equipment should be known prior to its use, and it should never be exceeded.

The problem of cranes and electrical hazards simply cannot be overstated. Electrocution is the largest cause of crane fatalities. Live power lines have areas called the "absolute limit of approach." No exceptions to the rule prohibiting entry into this area can be made unless the line has been insulated or de-energized.

LINE RATING	CRANE OR LOAD TO LINES MINIMUM CLEARANCE
< 50 KV	10 feet
> 50 KV	10 feet plus .4 inches for KV over 50, or twice the length of the line insulator.

A authorized and trained signalman must be assigned to warn the operator when he is nearing the limit of approach. The operator must be notified when he is within a boom's length of the limit. The limit of approach can never be compromised.

Except in certain emergencies, the operator must never leave the crane while a load is suspended.

When elevating personnel, only personnel baskets will be used. All employees entering a personnel basket for the purpose of being elevated must wear safety belts tied off securely to the safety cable above them.

If, despite all precautions, the crane makes contact with a live circuit, the operator should stay inside the cab. All personnel must stay away from the machine, its load, and the surrounding area which will be charged. The operator can try, by himself, to back the crane away from the power lie, or to lower the boom and then move away from the line. If he cannot do so, he should wait for electrical authorities to de-energize the line. If the operator is forced to leave the machine, he must jump completely clear of it with his/her feet together.

STEPPING DOWN OR ALLOWING ANY PART OF HIS/HER BODY TO TOUCH THE MACHINE AND GROUND AT THE SAME TIME, COULD RESULT IN ELECTROCUTION.

RIGGING, HOISTING EQUIPMENT AND CRITICAL LIFT PLANS

- All rigging shall be completed by a qualified and trained rigger. Only ANSI rated rigging with positive locking connections shall be used. No load shall exceed 75 % of the lifting capacity of the hoisting equipment or any of its rigging components.
- Slings shall never be used in a configuration greater than 90 degrees.
- All hoisted loads greater than 25,000 lbs shall require an approved written critical lift plan.
- Critical lift plans shall be developed by a qualified person and contain the following:
    - MFG Specifications for lifting equipment – lifting capacity, maximum radius, tip height, equipment limits, warning devices, inspection and service requirements.
    - Recent annual and current certified inspection.
    - Rigging manufactures lifting specifications including certified test results
    - Diagram/foot print of proposed lift, showing required height, radius, and lifting capacity/limits for lift.
    - Weight of item hoisted.
    - Lift calculations.
    - Activity Hazard Analysis for proposed lift.
    - Training Records/Certifications and Licenses for Crane/Equipment Operator, Rigger and Flagger.

- All hoisting equipment shall be inspected by a qualified person prior to use.
- The weights to be handled must be known before proceeding.
- A shackle will be used to hold two or more eyes of a choker in a hook.
- All hooks must have a safety latched.
- Do not rig from a structural member until it has been ascertained that the member will support the load.
- Use only rigging equipment designed for the intended use.
- Hooks, shackles, chain hoists, beam clamps, and all rigging equipment will be inspected prior to use.
- Rigging equipment must never be used to handle loads beyond its rated capacity. Riggers must know the capacity and proper use of handling the device--crane, forklift, chain fall, come-a-long, clamp, choker, and shackle--before proceeding.
- Tag lines must be used to control loads. Unsecured and unattended loads must not be left suspended.
- No part of the body will be allowed below a suspended load. Never raise or swing a load over people.
- The load chain must not be wrapped around the load.
- Softeners should be used where possible to obtain a "bite" on the material being rigged.
- All protruding nails and wires must be removed or bent over flush, and ragged metal edges must be protected before material is handled.
- Fiber rope--manila and synthetics--must not be used in or near operations involving the use of corrosive substances and will be visually inspected before each use for excessive broken fibers, wear, and deteriorated strands.
- Wire rope must not be used on hoisting equipment if:
    - It is exposed to fire or extreme heat;
    - It is burned from contact with electricity;
    - The normal rope diameter is visibly reduced;
    - Heat damage or weld splatter is noticed;
    - More than 10 percent of the wires are broken in one lay;
    - One or more strands are broken;
    - Three or more wires are broken in any one strand of one rope lay;
    - Considerable corrosion exists in the valleys between strands; or
    - If severely kinked, crushed, bird-caged, or unraveled sections of rope exist in any section of the rope.

EQUIPMENT INSPECTIONS

All lifting/hoisting equipment shall be expected at least annually by a competent person and prior to each use. A record of each inspection shall be made and kept in the job trailer for verification and audit purposes.

Inspections will be carried out as provided in the following guide which shall be available with the equipment in each job trailer.

INSPECT PRIOR TO USE – EVERY PIECE MUST HAVE KNOWN RATED CAPACITY

Wire rope
- No knots or kinks or crushed areas, or other permanent deformity
- Protruding strand ends must be covered
- Wire rope clips must be used per OSHA table H-2, 1926.251 (see below)
- In any 8-diameter length there must not be more than 10% broken strands

Webbing
- No knots
- No damage including cuts, abrasion, “powdered” webbing, discoloration, or deterioration
- No sharp edges must come in contact with the webbing when under load.
- Webbing slings, chokers, etc. may not be used in presence of chemicals or fumes where they may become damaged during use

Chain
- Wear in each link must be less than OSHA table H-1, 1926.251 (see below)
- No stretched or otherwise deformed links
- Only use 80 Grade (alloy) or better for lifting. 70 Grade or less is for binding (plated).

Hooks
- Must have stamped rating (80 Grade or better for lifting; usually colored)
- No deformity or other damage. Safety hasp must not be damaged and properly functioning

Slings
- Load ratings must be known for each lifting angle that will be used

Choker/Hitch
- Must have load rating for configuration

TABLE H - 1. -- MAXIMUM ALLOWABLE WEAR AT ANY POINT OF LINK

Chain size, (inches)	Maximum allowable wear (inch)
1/4	3/64
3/8	5/64
1/2	7/64
5/8	9/64
3/4	5/32
7/8	11/64
1	3/16
1 1/8	7/32
1 1/4	1/4
1 3/8	9/32
1 1/2	5/16
1 3/4	11/32

TABLE H - 2. -- NUMBER AND SPACING OF U-BOLT WIRE ROPE CLIPS

Improved plow steel, rope diameter (inches)	Number of clips		Minimum spacing (inches)
	Drop forged	Other material	
1/2	3	4	3
5/8	3	4	3 3/4
3/4	4	5	4 1/2
7/8	4	5	5 1/4
1	5	6	6
1 1/8	6	6	6 3/4
1 1/4	6	7	7 1/2
1 3/8	7	7	8 1/4
1 1/2	7	8	9

ATTACHMENT 16 - WELDING, CUTTING, AND BURNING

WELDING, CUTTING & BURNING

PURPOSE:

To assure all welding, cutting and burning activities are completed safely without injury and incident. See also previous sections Responsibilities and Training Program.

PERSONNEL RESPONSIBILITIES (Also See Manual Sections 2.0 – 2.6 "RESPONSIBILITIES")

- Director, HS&E - The Director, HS&E is responsible for assuring this program is reviewed and updated as necessary (product changes and updates, regulatory updates, program performance improvements). The program shall be as a minimum reviewed and updated annually.
- Managers and Supervisors - Managers and Supervisors are responsible for assuring their projects/operations and employees are in compliance with the requirements of this program (training, application, practice and procedures).
- Employees – Employees are responsible for following all policies and procedures as required by this program as well as report any perceived program deficiencies (violations and errors) or improvement measures to their supervisor). NOTE – All employees have the authority and responsibility to stop work for safety concerns. "If you see it, you own it".
- Subcontractors – All subcontractors are responsible for following all policies and procedures as required by this program as well as report any perceived program deficiencies (violations and errors) or improvement measures to their superior). NOTE – All employees have the authority and responsibility to stop work for safety concerns. "If you see it, you own it".

WELDING OPERATIONS

- Whenever possible, object to be heated or welded should be moved to an area free of hazards. If materials cannot be relocated, the area must be free of combustible materials, flammable and combustible liquids, and debris of all kinds.

- A Permit will be issued to address Hot Work.

- All exposed combustible materials below welding areas must be removed to a safe location, covered with a fire retardant material, or protected by containing all spark and slag.

- A 20 lb. ABC rated or larger dry chemical fire extinguisher will be provided and located within 30 feet of any welding or hot work operation.

- No welding is to be done on or in any closed vessel, tank, line, or confined space unless it has been decontaminated, tested, and permit issued.

- Welding machines shall be grounded. When grounding to building components, paint must be removed to assure proper ground. Good electrical contact shall be maintained: sparking, arcing, or heating are evidence of poor ground and will not be allowed. The ground cable shall be capable of carrying the maximum electrical output of the welding unit. The use of frayed or broken cables is prohibited.

- Full face welding mask with no less than a number eleven-density lens is required for all welding operations.

CUTTING AND BURNING

- The user must inspect all leads, grounds, clamps, welding machines, hoses, gauges, torches, and cylinders before they are put into operation.

- All fittings, couplings, and connections are to be leak-free. Testing will be done with soap and water.

- All burning rigs must be broken down with regulators and removed. Protective caps screwed down hand tight prior to vehicular transportation.

- Gas cylinders must be secured vertically to an adequate support while in use.

- Burning goggles with no less than a number five density lens with plastic cover plates on both sides are required for all gas burning operations.

- Ventilation shall be provided during all cutting or burning operations. At a minimum, the operator shall work with the wind at his back to allow fumes to move away from him.

- It is corporate policy that all burners may be exposed to lead fumes. Respiratory protection and personal sampling is required during all burning and cutting operations.

COMPRESSED GAS

GENERAL

- Use only hoses and couplings designed to handle compressed air and inspect them before each use. Chicago or similar type couplings will be secured by metal fasteners where holes are provided.

- Cylinders that are heavy or difficult to carry by hand may be rolled on their bottom edge. NEVER DRAG THEM.

- All cylinders shall be transported in an upright position with the protective caps securely screwed on. All such cylinders shall be chained to a brace welded to the vehicle.

- Do not use cylinders for rollers, supports or any purpose other than containing gas.

- When cylinders are empty, close valves and replace valve protection caps. Clearly write "EMPTY" or "MT" in chalk on empty cylinders that are to be returned to the vendor, or use the appropriate tags.

- Always consider cylinders as full, and handle them with the proper care.

- All hoses, couplings and connections shall be inspected prior to use. Testing of couplings and connections shall be with liquid soap and water, or similar method, to check for bubbling of leaking gas.

- Only hoses and couplings designed to be used with compressed gases shall be used.

- Oxygen shall not be used as a substitute or in place of other gases. Cleaning, purging, pressurizing or operating pneumatic equipment with oxygen is prohibited.

- Regulators, hoses, couplings, and connections shall be kept grease and oil free.

- Oxygen cylinders or cylinders containing oxidizing gases should not be stored within 35 feet of combustible materials or other cylinders containing flammable gases. If the area does not permit, the cylinders should be separated by a fire resistant partition at least 5 feet high with a fire resistant rating of at least 60 minutes.

- Cylinder should be stored on a level, fireproof floor. Use cylinders in an upright position, ensuring that they are firmly secured with a dedicated chain against being knocked over.

- To prevent rusting, cylinders stored in the open should be protected from contact with the ground and against extremes of weather – i.e., accumulations of ice and snow in winter and continuous direct rays of the sun in the summer.

CYLINDER USE

- Open cylinder valves slowly. A cylinder not provided with a hand wheel valve should be opened with a spindle key or other tool provided by the supplier. DO NOT USE A PIPE WRENCH.

- Before making a connection to a cylinder valve outlet, "Crack" the valve for an instant to clear the opening of particles of dust and dirt. Always point the valve and opening away from the body and not toward anyone else.

- Never crack a fuel gas cylinder valve near other welding work or near sparks, flames, or other possible ignition sources.

- Use regulators and pressure gauges only with gases for which they are designed and intended. Do not attempt to repair or alter cylinders, valves, or attachments.

- Unless the cylinder valve has first been closed tightly, do not attempt to stop a leak between the cylinder and the regulator by tightening the union nut.

- Do not let sparks, molten metal, electric currents, excessive heat, or flames come into contact with a gas cylinder.

- Never crimp, couple or uncouple a pressurized hose. Shut off valve and bleed down hose. All hoses exceeding 1/2 inch inside diameter will have a safety device at the source of supply or a branch line to reduce pressure in case of hose failure.

LEAKING CYLINDERS

- Leaking fuel gas cylinders should be taken out of use immediately and handled as follows:

- Close the valve and take the cylinder outdoors well away from any ignition source;

- Properly tag the cylinder and notify the supplier;

- A regulator attached to the valve may be used to temporarily stop a leak through the valve seat;
- If the leak occurs at a fuse plug or other safety device, take the cylinder outdoors well away from any source of ignition, open the cylinder valve slightly and permit the fuel gas to escape slowly ;
- Post warnings against approaching with lighted cigarettes or other sources of ignition;
- Properly notify the supplier and follow the instructions for returning the cylinder; and
- Tag the cylinder as “DEFECTIVE.”

FIRE CONSIDERATIONS

- Emergency plans will be developed to include alternate exits in emergency situations. These must be familiar to all personnel entering the work area.
- Perform a pre-work survey to determine potential fire hazards, sources of ignition, hot spots and potential exits.
- Protective clothing will burn and/or melt.
- Ensure all sources of ignition are removed from the work area. Pilot lights are prime examples.
- Locate hot spots such as transformers and switch panels.
- Cut off supply to steam lines, heaters and radiators.
- Check the other side of the wall and floor below when using a cutting torch.

- Post a fire watch when cutting. Have a fire extinguisher at hand. Do not use CO_2 when in a confined space.
- Remove all chemicals, flammable liquids and heat sensitive materials.
- Keep trash and debris to a minimum and/or eliminate it.
- Mark exit ways with directional arrows.
- Properly illuminate exits and exit ways.
- Post emergency phone numbers at a prominent location.
- Type "ABC" fire extinguishers are to be used in all work areas.
- Pressurized water is preferred in enclosed or confined areas.
- All fire extinguishers are to be checked weekly. Anyone discharging a fire extinguisher--incidentally or on purpose--shall inform the supervisor.

ATTACHMENT 17 – HEAT/COLD STRESS

PERSONNEL RESPONSIBILITIES (Also See Manual Sections 2.0 – 2.6 "RESPONSIBILITIES")

- Director, HS&E - The Director, HS&E is responsible for assuring this program is reviewed and updated as necessary (product changes and updates, regulatory updates, program performance improvements). The program shall be as a minimum reviewed and updated annually.
- Managers and Supervisors - Managers and Supervisors are responsible for assuring their projects/operations and employees are in compliance with the requirements of this program (training, application, practice and procedures).
- Employees – Employees are responsible for following all policies and procedures as required by this program as well as report any perceived program deficiencies (violations and errors) or improvement measures to their supervisor). NOTE – All employees have the authority and responsibility to stop work for safety concerns. "If you see it, you own it".
- Subcontractors – All subcontractors are responsible for following all policies and procedures as required by this program as well as report any perceived program deficiencies (violations and errors) or improvement measures to their superior). NOTE – All employees have the authority and responsibility to stop work for safety concerns. "If you see it, you own it".

The Site Health and Safety Officer (SHSO) will be responsible for implementing the following program when the ambient air temperatures either exceeds 75^{o}F of falls below 35^{0}F.

The SHSO will visually monitor personnel for signs of heat/cold overexposure such as weakness, dizziness, fainting, nausea, headaches, cool and clammy skin, profuse sweating, slurred speech, weak pulse, and dilated pupils.

HEAT STRESS PROCEDURE

Site personnel who wear protective clothing that allows body heat to be accumulated can cause an elevation of the body temperature. Heat cramps, heat exhaustion, and heat stroke can be experienced, which, if not remedied, can threaten life or health. Therefore, a current edition of

an American Red Cross Standard -First Aid book or equivalent will be maintained on site at all times so that the SHSO and site personnel will be able to recognize symptoms of heat emergencies and be capable of controlling the problem.

When protective clothing is worn, especially Levels A, B, and C, the suggested guidelines for ambient temperature and maximum wearing time per excursion are:

Ambient Temperature (°F)	Maximum Wearing Time per Excursion (Minutes)
Above 90	15
85 to 90	30
80 to 85	60
70 to 80	90
60 to 70	120
50 to 60	180

One method of measuring the effectiveness of employees' rest-recovery regime is by monitoring the heart rate as follows:

- During a 3-minute period, count the pulse rate for the last 30 seconds of the first minute, the last 30 seconds of the second minute, and the last 30 seconds of the third minute.
- Double the count.
- If the recovery pulse rate during the last 30 seconds of the first minute is at 110 beats/minute or less and the deceleration between the first, second, and third minutes is at least 10 beats/minute, the work-recovery regime is acceptable. If the employee's rate is above that specified, a longer rest period is required, accompanied by an increased intake of fluids.

In the case of heat cramps or heat exhaustion, water and "Gatorade" or its equivalent is suggested as part of the treatment regime. The reason for this type of liquid refreshment is that such beverages will return much-needed electrolytes to the system. Without these electrolytes, body systems cannot function properly, thereby increasing the represented health hazard.

This liquid refreshment will be stored in a cooler at the edge of the decontamination zone in plastic squeeze bottles. The plastic bottles will be marked with individual's names. Disposable cups with lids and straws may be used in place of the squeeze bottles. Prior to drinking within

the decontamination zone, the project personnel shall follow the following decontamination procedures:

- Personnel shall wash and rinse their outer gloves and remove them;
- Personnel shall remove their hard hats and respirators and place them on the table;
- Personnel shall remove their inner gloves and place them on the table;
- Personnel shall wash and rinse their faces and hands;
- Personnel shall carefully remove their personal bottle or cup from the cooler to ensure that their outer clothes do not touch and other bottles or cups;
- The used bottle or cup will not be returned to the cooler, but instead placed in a receptacle or container to be cleaned or disposed of; and
- Personnel shall put respirators and hard hats back on and don a new pair of disposable gloves prior to re-entering the hazardous zone.

When personnel are working in situations where the ambient temperatures and humidity are high--and especially in situations where protection Levels A, B, and C are required--the SHSO must:

- Ensure that all employees drink plenty of fluids (water, "Gatorade" or its equivalent);
- Ensure that frequent breaks are scheduled so overheating does not occur; and
- Revise work schedules, when necessary, to take advantage of the cooler parts of the day (i.e., 5:00 a.m. to 1:00 p.m., and 6:00 p.m. to nightfall).

COLD STRESS PROCEDURE

Susceptibility to cold injury varies from person to person. “Table 1” summarizes some of the factors involved in cold stress.

Factors Involved in Cold Stress

Environmental	Personal Characteristics	Other
• Temperature • Wind • Humidity	• Age • Weight • Fitness • Impaired Circulation • Previous Cold Injury • Acclimatization to Cold	• Clothing • Physical Activity • Fatigue • A Worker’s use of Medication(s) • Consumption of Alcohol or use of Nicotine

If workers are or may be exposed to conditions that could cause hypothermia or cold-related injury, a risk assessment should be performed to determine areas and tasks where the workers may be at risk. The potential for accidental exposure to cold conditions should be included,

1. **Environmental Measures**

a) Temperature and wind conditions at the work site should be known e.g. weather report on the radio and/or current, weather office information.

b) Steps should be taken to protect workers from wind and slippery surfaces. The combination of low temperatures and winds that are even more moderate can quickly create dangerous working conditions. Walkways must be kept ice-free.

c) Ensure that heated rest areas such as a truck cab, tent or hut are available.

2. Work Practices

A schedule of regular rest breaks should be established to allow workers to warm up. These breaks should be not less than ten (10) minutes in length and should be taken in a heated area. Returning to cold work while damp or sweaty may result in rapid chilling. The following recommended work practices should be followed:

Under conditions of continuous work in the cold:

a) heated warming shelters (tents, trailers, rest rooms etc.) should be provided. Workers should be encouraged to use these at regular intervals, the frequency of use depending on the severity of environmental exposure;

b) when entering the heated shelter, outer and middle clothing layers (as necessary) should be removed to prevent overheating and to permit dampness to evaporate. A change of dry clothing may be necessary;

c) warm fluids should be consumed at the work site to provide energy, warmth, and replace fluids lost during work. Significant fluid loss can occur in the cold due to sensible and insensible sweating, breathing, and the extra energy requirements of working in the cold. Dehydration in the cold is a serious concern, increasing a worker's susceptibility to hypothermia; and

d) the onset of severe shivering, the feeling of excessive fatigue, drowsiness, irritability or euphoria are indicators for immediate return to shelter.

The following additional precautions apply at colder temperatures:

e) workers should be under constant protective observation by a buddy or Coordinator;

f) work rate should not be high enough to cause sweating. If heavy work must be performed, rest periods should be provided;

g) no employees should be permitted to work full-time in the cold until they have acquired the required protective clothing;

h) weight and bulkiness of clothing should be included in estimating required work performance;

i) workers should be appropriately trained

3. Personal Measures

a) Diet

Workers have increased energy requirements when working in the cold. Consider adding additional wholesome foods to the diet such as pasta, potatoes, rice, dairy products, nuts, meat and salmon. Light snacks and warm fluids should be taken during rest breaks.

Alcohol must not be consumed while working on the job. Alcohol consumption produces a deceptive feeling of warmth and may contribute to dehydration and impair judgment.

b) Dressing for the Cold

To stay warm in the cold,

1. clothes must be layered to manage moisture and keep dry,
2. insulating layers must trap air to stay warm, and
3. the worker must be protected from the wind and weather.

To remain comfortable as weather and work conditions change, clothing layers should be added or removed, or ventilation openings in clothing opened or closed to remain comfortable. Clothing layers should be managed to remain comfortably warm.

Every effort must be made to avoid sweating and becoming damp. Clothing selections are normally made on this basis of staying warm while inactive. Consider the work to be performed and the weather conditions, then recommend workers dress so those layers can be shed while they remain comfortably warm. If clothing layers do become damp and remain that way, workers should be prepared to replace them before becoming chilled and hypothermic. If a worker is sweating, their clothing is probably too warm for the conditions and tasks being performed.

The following approach of using three (3) clothing layers – inner, middle and outer – is applicable to all situations. Our work generally doesn't require employees to wear fire resistant or anti-static clothing, however, the recommended synthetic fabrics may not be appropriate for situations requiring clothing with fire resistant or anti-static properties. If required, FR clothing next to the skin must be made of non-melting natural fibers such as wool or silk or an acceptable fire retardant material. The general practices described below should be followed; recognizing that the fabrics selected may be limited by specific, special work applications.

Inner Layer

The first layer of clothing should manage moisture by moving perspiration away from the skin to keep the worker dry and comfortable.

- Avoid cotton, especially in long underwear and socks. Once cotton is wet, whether through perspiration, rain, or snow, it loses all insulating properties.

- For long underwear, brands made of synthetic fibers (e.g. polyester, polypropylene, etc.), silk, or wool retain body heat when wet and transfers perspiration to outer clothing layers for evaporation, leaving the body dry. Many types of long underwear are available in varying thickness' or weights depending upon intended activity level and weather conditions. Select an appropriate style and thickness of long underwear.

Middle Layer

The second layer or middle layer(s) should trap warm air escaping from the body and hold it in open spaces within the layer(s) to keep the worker warm and insulated. Workers should wear several thin layers of clothing rather than one heavy garment. Layers can be added or removed, depending upon weather and activity level.

- Select lightweight clothing that provides freedom of movement. Multiple middle layers give a worker the ability to tailor their need for warmth based on environmental temperature and activity level.

- Look for middle layers that can be added or easily removed. Zippered neck openings and zippered neck leggings allow for ventilation.

- A down vest or jacket may be an appropriate middle layer.

Outer Layer

The outer layer should provide protection from the wind, rain, sleet, snow and identified workplace hazards. It should also keep cold air and moisture from penetrating the middle layer(s). Breathable fabrics may or may not be necessary. Selection of windproof garments is a critical feature of an outer layer used in the cold outdoors.

- Two-way, zippered front openings can be used to regulate heat load and ventilate the body.

- An outer layer having armpit zippers can be helpful in providing ventilation.
- Windproof pants or “wind pants”, fully zippered from ankle to hip, can be added or removed without footwear having to be removed.
- Jackets with hoods offer an additional layer of protections for the head. Newer hood designs provide unimpeded views and free movement.
- Cotton twill made water and windproof may be an alternative.

The extremities must also be protected.

Hand Protection

Mittens keep hands warmer than gloves since fingers are together. With gloves, fingers are separated, losing heat from one another. Depending on the task at hand, mittens may not be the most practical choice as finger dexterity is limited.

- Have workers wear thin glove liners under gloves or mittens. Liners need not be removed when removing the gloves.
- Removable glove and mitten liners can be replaced and dried when they become damp.
- New mitten styles include three-finger “lobster claws” which keep fingers warm yet offer good dexterity.
- Windproof over-mitts offer additional hand protection without adding significant bulk.

Head Wear

Up to 50 percent of body heat is lost through the head. A hat, hard hat liner or other head protection must be worn in the cold.

- Avoid cotton and use synthetic fabrics, fur or wool instead.
- Workers must use an appropriate hard hat liner to reduce heat loss when wearing a hard hat.
- Select a hat appropriate for the weather conditions and activity level. Consider thickness, extent of head coverage (e.g. open-faced or full balaclava, ear coverage, etc.),

ability to protect from the wind, effect on vision and hearing, and ability to fit into or over protective headwear if required.

- A face mask and eye protection may be necessary under some circumstances

Footwear

- Warm, insulated safety footwear is essential. Boots should have thick soles for insulation while standing in snow or on cold concrete. Footwear selection should be based on the work being performed, the surfaces on which the worker will work, and the weather conditions to which the worker will normally be exposed. Tight-fitting boots reduce circulation and can make feet feel cold.

- Footwear should be sized so that it will accommodate an extra layer(s) of socks. A synthetic sock liner worn beneath a synthetic blend or wool outer sock directs moisture away from the skin, keeping feet drier and warm.

Worker Training

Workers potentially exposed to cold weather exposure shall be instructed in health and safety procedures appropriate to the tasks and environment in which those tasks are performed. This instruction will be conducted as needed and shall include:

a) Proper re-warming procedures and appropriate first aid treatment;

b) How to dress for the cold;

c) Recognition of frost nip and frostbite

ATTACHMENT 18 - SUBCONTRACTOR RISK MITIGATION PLAN

Subcontractor Risk Mitigation Plan

I. Purpose

The purpose of this plan is to help ensure subcontractors with low safety program assessments (grades < "C") meet the safety standard established for the project (Zero Incidents).

II. Scope

This plan shall cover the following risk mitigation elements:

a) Subcontractor Site Specific Training and Orientation
b) Daily Morning Safety Brief
c) Subcontractor Task/Risk Analysis
   - Activity Hazard Analysis
   - Safety Task Analysis Cards (STAC) and Behavioral Based Safe Work Observations
d) Responsibilities

III Subcontractor Training and Orientation

SITE TRAINING

- All subcontractors shall be provided with the training required to comply with the project HASP.
- Copies of all training documentation (training certificates & attendance rosters) shall be stored and maintained onsite by the SHSO and will be made available for inspection upon request. Training documentation will be kept in an organized manner that shows that each individual worker has the proper training to be onsite.

HSE PREREQUISITE TRAINING

All personnel working onsite must have the following:

- Successfully completed an initial OSHA 40 Hour HAZWOPER training (Hazardous Waste Operations and Emergency Response) and if the initial 40 Hour training is greater than 1 year then an 8

hour HAZWOPER refresher training shall be completed prior to performing field work at the project site.

- Medical clearance for respirator use, fit test and training for the type of respirator required.

SITE SPECIFIC TRAINING

Documented site orientation training will be provided by the SHSO for the following topics:

- OSC Project Site Specific Orientation & HASP Review
- Job Safety Analysis & Safe work procedures (JSA/AHA Review)
- OSC Behavior Based Safety (BBS) & Safety Task Analysis Card Process (STAC Cards, BBS Observations, Trending & Use)
- Hazard Communication and Project Hazard Awareness Training
- PPE requirements
- Decontamination procedures
- Demolition Procedures
- Site security requirements
- Heat/Cold Stress (Signs, Symptoms, Protective Measures and Monitoring)
- Ladders, Stairs, Scaffolds and Powered Aerial Platforms
- Fall Protection
- Traffic Control (Personnel, Equipment, Trucks and Railway)
- Heavy Equipment Operation (Authorized, Unauthorized)
- Powered Industrial Fork Truck Operation (Authorized, Unauthorized)
- Lockout/Tagout (Plant Procedures - Locks Tags and Lock Boxes)
- Incident reporting
- Emergency response (medical, fire, weather, signals and procedures)
- Available emergency services
- Respirator use, maintenance and inspection (when required)
- Excavation Hazards and Protective Measures
- Confined Space
- Dust, Erosion and Sediment Control
- Noise Control Measures

IV Daily Morning Safety Brief

All Subcontractor employees shall be required to attend a Daily Morning Safety Brief prior to starting work. Attendance at all safety meetings will be documented and kept on file in the OSC field office.

Prior to the beginning of each work task and/or each work day, all involved workers will be required to attend a safety meeting to review task-specific health and safety requirements pertinent to the days tasks (JSA/AHA review - job hazards and protective measures).
Topics discussed at the morning meetings include, but are not limited to:

- JSA/AHA – review for all definable features of work
- STAC/BBS Observations and trends
- Previous days "safe work observations" and recommendations
- Audit/Inspection findings and recommendations for improvement
- Analytical data (material sampling and air monitoring results)
- Project employee recognition and rewards
- Necessary training requirements and site work rules;
- Changes in work practices and/or work conditions;
- Precaution and work practices for scheduled site activities;
- New or modified site wide procedures or requirements;
- Incident alerts;
- Discussion of potential hazards or hazardous operations;
- Procedures on restricted areas;
- Equipment rules and requirements;
- Restrictions on the handling of materials;
- PPE requirements, and
- Delegation of responsibility (emergency backup personnel, competent persons, etc.).

V Subcontractor Task/Risk Analysis (AHA and STAC Cards)

An Activity Hazard Analysis (AHA) shall be developed for every definable feature of work and reviewed by workers prior to starting the task. The AHA shall break jobs down into their individual step by step tasks defining the potential hazard of each task and the proper protective measures (Safe methods and required PPE). AHA's shall be modified

as warranted by safe work observations, audits, incident investigations and improvement measures.

Likewise, to pre-mote individual hazard awareness and involvement each subcontractor employee shall be required to complete and maintain a daily Safety STAC card for the work week. As jobs are assigned, the subcontractor employee evaluates and defines new tasks, equipment to be used and associated hazards and protective measures. At least one BBS safe work observation per week shall be completed on the card and turned in (See STAC program).

VI. Specific Responsibilities

Project management shall be responsible for monitoring work daily to assure compliance with the Subcontractor Risk Mitigation Plan. Likewise, the Corporate Director, HS&E is responsible for conducting periodic audit the site to ensure project compliance and effectiveness of the plan.

The Project Safety Officer is responsible for overall administration of the Subcontractor Mitigation Plan which includes but is not limited to the following:

- Act as a point of contact for all subcontractor site health and safety concerns for the project.
- Conduct initial project safety orientation training as required and previously specified above in III.
- Review submitted AHA's for approval and update as required.
- Manage the OSC STAC card process (distribution, training and review) and BBS observations – conduct, collect and trend BBS observations data and incorporate findings into the daily safety process; report observations in the daily safety meetings and update JSAs/AHAs and training accordingly.
- Conduct the daily morning safety briefs as well as other project HSE meetings.
- Maintain separation of the exclusion zone (dirty) from the support zone (clean) areas. This includes worker authorization for entry and restrictions.
- Supervising any additional subcontractor HSE requirements that are required for this Project.

The SHSO will monitor the jobsite health and safety work performance daily to ensure compliance with the project HASP and Subcontractor Mitigation Plan. Any HSE violations will be promptly corrected and reported to the subcontractor's immediate supervisor and OSC project manager. All observed violations will be explained to the perpetrator and reviewed at the following safety meeting. Violations of the site HSE regulations will be grounds for disciplinary action, which could lead to the removal of subcontractor worker and/or expulsion of subcontractor from site.

ATTACHMENT 19 – AERIAL LIFT POWERED PLATFORM PROGRAM

AERIAL & SCISSORS LIFT SAFETY PROGRAM

Purpose

The purpose of this program is to outline policies and procedures for the safe operation and use of powered aerial platforms (boom, articulating boom and scissor lifts). It applies to all operations, programs and locations that require employees to access elevated locations and/or use powered aerial work platforms.

PERSONNEL RESPONSIBILITIES (Also See Manual Sections 2.0 – 2.6 "RESPONSIBILITIES")

- Director, HS&E - The Director, HS&E is responsible for assuring this program is reviewed and updated as necessary (product changes and updates, regulatory updates, program performance improvements). The program shall be as a minimum reviewed and updated annually.
- Managers and Supervisors - Managers and Supervisors are responsible for assuring their projects/operations and employees are in compliance with the requirements of this program (training, application, practice and procedures).
- Employees – Employees are responsible for following all policies and procedures as required by this program as well as report any perceived program deficiencies (violations and errors) or improvement measures to their supervisor). NOTE – All employees have the authority and responsibility to stop work for safety concerns. "If you see it, you own it".
- Subcontractors – All subcontractors are responsible for following all policies and procedures as required by this program as well as report any perceived program deficiencies (violations and errors) or improvement measures to their superior). NOTE – All employees have the authority and responsibility to stop work for safety concerns. "If you see it, you own it".

Definitions (See Also Attachment Y Standard Program Definitions)

Aerial Lift – A piece of equipment, extendable and/or articulating, designed to position personnel and/or materials in elevated locations.

ANSI – American National Standards Institute.

Lanyard – ANSI approved line designed for supporting one person, with one end connected to a safety harness and the other end attached to a suitable anchorage able to support 5,400 pounds of force. The anchorage can be a structural steel member, an approved lifeline, or other approved anchorage points.

Full Body Harness – ANSI approved body device designed for fall protection, which by reason of its attachment to a lanyard and safety line or an approved anchorage point, which will limit a fall to six (6) feet or less.

Fall Protection

Full body harnesses and lanyards shall only be used, as intended by the manufacturer, for employee fall protection. Appropriate devices shall be used to provide 100% fall protection. The "D" ring on the body harness shall be positioned in the back up between the shoulder blades to minimize impact forces of the body in the event of a fall.

All fall protection equipment shall be carefully inspected prior to each use and periodically throughout the day. Safety equipment showing any signs of mildew, torn or frayed fabric or fiber, burns, excessive wear, or other damage or deterioration which could cause failure shall be permanently removed from service. All fall protection equipment shall be properly maintained and stored when not in use. This includes keeping dry and out of sunlight, away from caustics, corrosives or other materials that could cause defects.

Hard hats and safety harnesses shall be worn by employees in the bucket or platform of any aerial lift device. Other safety personal protective items may be required by either company or client safety policies.

Equipment

Aerial lift devices shall conform to ANSI Standards applicable to the type of equipment being used – bucket truck, under-bridge inspection vehicle, portable and/or self-propelled personnel lift. Aerial lift devices shall only be used for the purpose(s) intended by the manufacturer. All manufacturer and maintenance department recommendations and warnings regarding operation, capacity and safety precautions shall be strictly followed. Permanent labeling must be conspicuously posted to indicate lifting capacity and travel height.

Only devices approved for lifting personnel shall be used as aerial lifts. Loaders, forklifts or other material lift devices shall NOT be used to transport employees to elevated locations nor as work platforms. Forklifts and cranes may ONLY be used as a last resort, and then only with approved personnel baskets.

Modifications shall not be made to any aerial lift device without the expressed written authorization from the manufacturer. Buckets and bucket liners shall not be drilled, cut, welded on, etc.

Procedures

Lift equipment shall be inspected upon delivery to the jobsite, and daily prior to use. The daily inspection will include testing the controls prior to use, and all inspections shall be documented on the Aerial Lift Daily Inspection form.

Before extending or raising the boom or platform, outriggers (if so equipped), shall be positioned properly and the lift will be level. Outriggers shall be placed on mud mats or other SOLID surface, and shall not be used to level the vehicle. If the lift is on unleveled ground, the wheels shall be chocked and the parking brake set. Sufficient clearance shall be checked before raising the lift. For under-bridge units, adequate clearance beneath the boom shall be assured.

Employees shall keep both feet on the floor of the bucket or platform at all times. When the lift has to be moved, it shall only be moved when the bucket or platform is at the lowered position. For scissors-lifts, this is lowered all the way down, and for aerial lifts, this is lowered to the lowest point that the operator can safely see to drive the vehicle.

Employees are required to wear full body safety harnesses with lanyards. The lanyards shall be attached to an engineered anchorage point inside the lift. Do Not wrap the lanyard around a rail and tie back onto itself. Employees are Not to anchor on structural members outside of the lift, unless exiting the lift to get on the structural members.

Platform lifts (scissors-lifts) shall have a top and mid rail and a kick plate (toe board), along with an engineered anchorage point to tie off. Employees shall not climb nor stand on the mid or top rails, keeping both feet on the floor of the platform.

Tools, parts or any materials shall not be dropped or thrown from the bucket or platform. When using welding or heating equipment from the bucket or platform, the vehicle shall be protected from sparks and slag and special care shall be taken to remove flammable objects away from the lifts.

Electrical Safety

When working near electrical lines or equipment, avoid direct or indirect contact. Direct contact is body contact. Indirect contact is when the body touches or is in dangerous proximity to any object that is in contact with energized systems. Always assume lines are "live" and

carry high voltage. Electrical lines can only be considered "dead" when verified by licensed electricians from the utilities department, and proper lockout and tagout has been performed.

Employees shall not position any aerial lifts closer than ten (10) feet to a power line that carries up to fifty (50) kilovolts. For each kilovolt over 50, add four (4) inches.

Employees are to be trained concerning the hazards and precautions of working near power lines.

Ensure posted warning placards are in place concerning electrical lines.

If the operator is unable to assess the clearances while operating the aerial lift, then a "spotter" must be used to observe the clearances and warn the operator.

Training

All company authorized powered aerial lift operators shall be properly trained in the safe operation of man lifts per the lift MFG's requirements.

Training shall be conducted by an authorized lift instructor (OSC, MFG or Rental Company Authorized Trainer). Training shall be completed initially prior to use and as a minimum annually thereafter or sooner as warranted by MFG equipment, change, regulatory change and incident investigation/inspection recommendations.

All authorized employees who have successfully completed operating man lift training shall be issued an operator's certificate. Copies of all training certificates shall be kept on file at the Job Site Field Office and Corporate Office. g procedures.

POWERED AERIAL LIFT INSPECTION FORM (INSPECT APPLICABLE ITEMS PER TYPE OF LIFT)

CONTRACTOR	
RENTAL COMPANY	
JOBSITE	
INSPECTED BY (PRINT NAME)	
MAKE (Fuel Type) /SERIAL OR UNIT No.	
DATE (S) – WEEK ENDING	

ITEMS (⁄ = SATISFACTORY, X = NEEDS ATTENTION, NA = Not Applicable for type of lift)	MON	TUE	WED	THU	FRI	SAT	SUN
Brakes							
Operating Controls Labeled							
Operating and Emergency Controls							
Fuel System							
Guards and Handrails							
Entrance Gate (Safety Chain, Bar or Gate)							
Batteries							
Load Charts & Labels							
Muffler/Exhaust Pipes							
Operating Manual							
Engineered Tie Off Points							
Tires, Wheels or Tracks, Outriggers							
Cylinders, Lines, Hoses, Wires (air, fluid leaks, electrical wires cables intact)							
Loose, Missing/Damaged Parts, Physical Condition							
Air System Leaks Signs of Damage							

ATTACHMENT 20 - SHORT SERVICE PROGRAM

PURPOSE:

The purpose of the OSC Short Service Employee (SSE) program is to prevent work related injuries and illnesses to new hires and temporary workers. The Supervisors and co-workers must be able to readily identify Short Service Employee participants. OSC Management will assign experienced employees to oversee the daily activities of those assigned to the SSE program.

SCOPE:

- Applies to all OSC operations; shop as well as field operations.
- Applies to all newly hired OSC employees (regardless of experience), temporary agency personnel or our independent contractors working on company or client locations/ facilities.

DEFINITIONS:

- Short Service Employee (SSE) – An employee or sub-contractor employee with less than six months experience in the same job or with his/her present employer.
- Mentor – An experienced employee, who has been assigned to help and work with a new Short Service Employee by his/her supervisor.

RESPONSIBILITIES:

- Managers and Supervisors shall ensure that this program is implemented and followed.
- OSC supervision shall monitor its employees, including SSE personnel, for HES awareness. If, at the end of the six-month period, the SSE has worked safely, adhered to HES policies and has no disciplinary actions, the SSE identifier may be removed at the discretion of OSC Management. OSC Management shall require any employee that does not complete the six-month period violation free to get retrained and safety approval prior to returning the employee to the program.
- OSC Project Managers shall manage its sub-contractors in alignment with this process.
- All affected Employees shall follow the requirements of this program.
- The Director, HS&E is responsible for reviewing the program annually for effectiveness and revising it as required for improvements.

PROCEDURE:

- Supervisors will assure that all new, transferred and temporary employees shall have successfully completed the OSC Safety Orientation process and have a complete knowledge of the expectations for their job.
- SSE may never be allowed to work alone.

- Supervisors will identify all employees and temporary personnel with less than 180 days of service, or those employees they desire to return to a mentoring status for improvement in job and/or safety performance. Any SSE subject to safety disciplinary action during the initial 180 days will repeat the mentoring program or shall be dismissed for poor performance.
- Short Service Employee participants will wear high visibility (orange) SSE decal to help identify them.
- Mentors will set the proper safety example for any SSE assigned them.
- All subcontractors must have in place some form of mentoring process, acceptable to management, designed to provide guidance and development for SSE personnel. A mentor can only be assigned one SSE per crew and the mentor must be onsite with the SSE to be able to monitor the SSE.
- Prior to the job mobilization the OSC project manager will communicate to the client, contractor contact and on-site supervisor all jobs containing SSE personnel. The project coordinator, contractor contact or on-site supervisor will determine approval status of the crew makeup.
- Mentors will converse daily with those persons assigned to them, preferably at the start of the day. This will be in addition to other tailgate or daily safety meetings held in the work area.
- Managers and the Safety Department will randomly audit for process compliance. This will involve interviewing employees in the Short Service Employee program (documentation is not required).
- A single person crew cannot be an SSE and crew sizes of less than five shall have no more than one SSE.

ATTACHMENT 21 – ELECTRICAL SAFETY AND ASSURED GROUNDING

1 Purpose

To prevent shock, electrocution, arc flash, and property damage from potential exposure to energized or defective circuits.

2 Scope

Summary: Electrical equipment MUST be de-energized (see OSC Lockout/Tagout program) prior to maintenance. Exposed de-energized circuits must be treated as though energized. OSC personnel may not work on energized equipment without a specific AHA which details training, procedures, conditions, and equipment necessary to safely do so. Ground Fault Interrupter's (GFI's) must be used on all extension cords.

- Specific Responsibilities;
- Procedures:
  - Safe Work Practices;
  - Assured Grounding Program, Ground Fault Circuit Interrupters;
  - Corded Tools, Flexible Extension Cords, Wiring, and Plugs;
  - Protection of Employees;
  - Passageways, and Open Spaces;
  - Qualification and Limited Approach Boundaries;
  - Batteries and Battery Charging;
  - Installation; and
  - Training

3 Specific Responsibilities

3.1 Site Supervisor

To ensure that all individuals working near unprotected energized circuits review this program; to ensure that all affected employees are trained in the safe work practices, and that each affected employee understands the content of this program. Notify the owner of unique hazards that may arise from OSC work and what precautionary measures and controls are to be put in place.

3.2 Employees/Subcontractors/Visitors

Understand and abide by all applicable training, comply with all signage, advise appropriate personnel of deficiencies in the program and/or new hazards on site, and follow ALL Health and Safety rules at the facility and meet all the health and safety

requirements of their contracts. Unqualified employees shall not enter electrical hazard areas or perform work unless they are qualified, by OSC, to do so.

4 Procedures

4.1 Shock Prevention and Safe Work Practices

A. If handling or adjustment of equipment is required, it must be done with the power turned off. When it is necessary to work on or near equipment having exposed or live electrical circuitry it may only be done by a qualified person as described herein and with the following precautions:

1. Do not work alone. Another person familiar with POWER OFF controls must be in the immediate vicinity and available in case of emergency. No OSC employee may work on live circuits that carry over 480 volts; This work must be done by a qualified third party.

2. Do not wear rings, wristwatches, chains, bracelets, metal cuff links, metal-rimmed eyeglasses, or any other electrically conductive article;

3. Use only insulated tools and meters. Portable ladders must be non-conductive side rail type (fiberglass) ;

4. Read and understand instructions before using unfamiliar equipment;

5. Be certain that controls are set correctly, and that proper capacity test instruments and insulated probes are used. Meters and equipment must always be examined for cracks or other faults before being used;

6. Avoid contacting ground potential (metal floor strips, machine frames, interlocks, etc.). Use suitable rubber mats (purchased locally) if necessary. Ground-fault circuit interrupters (GFCI) and isolation transformers are necessary in some cases; and

7. A specific Activity Hazard Analysis (AHA) must be prepared for wet areas and work on grounded surfaces (metal, concrete) that conduct electricity. Electrical safety shoes and other insulating devices must be used. Conductive clothing must not be worn unless covered with an adequate insulator.

8. Varying means of communicating electrical hazards shall be employed to assure effectiveness. Such means include safety signs and tags, barricades, and attendants. Safety signs must meet the requirements of ANSI Z535 Table

130.7(F). Barricades must be used in conjunction with safety signs and never by themselves. Any technique used must not increase the potential for employee injury.

B. Only a qualified employee will be permitted to work, conduct tests, or troubleshoot within a designated Limited Approach Boundary (LAB):

1. Prior to working in a LAB an arc flash risk assessment must be prepared which details the electrical hazards and whether the equipment ca be de-energized. All team members must review and conform with the risk assessment requirements;
2. An Energized Equipment Work Permit will be prepared detailing work to be done, equipment, procedures, insulating shields/barriers, PPE and employees performing work. The permit must be reviewed and signed by each affected employee, and acknowledged by the owner;
3. All insulating PPE must conform to NFPA 70E 130.7(D)(14) and be inspected prior to use, immediately after any incident, and as follows; 1) Blankets-before first issue/every 12 months thereafter, 2) Gloves-before first issue and every 6 months, 3) Sleeves before first issue and every 12 months. Covers and Line hose shall be tested if insulating value is suspect.

4. All test instruments, equipment and accessories must be rated for the circuits and equipment to which they will be connected and verified in proper working condition before and after any voltage measurements are performed;

C. Before work is begun, it will verified by inquiry, or direct observation, or by instruments, whether any part of an energized electric power circuit, exposed or concealed, is so located that the performance of the work may bring any person, tool, or machine into physical or electrical contact with the electric power circuit.

Note: Proper warning signs will be posted and maintained where such a circuit exists. Employees will be advised of the location of such lines, the hazards involved, and the protective measures to be taken.

E. Only employees having training, equipment (tools and meters), and designated as qualified shall be allowed within LAB areas.

4.2 Assured Grounding and Ground Fault Circuit Interrupters (GFCI), Flexible Extension Cords, Wiring, and Plugs

A. Ground fault circuit interrupters (GFCI) are an essential protective device that shall be utilized to supplement the assured grounding program. GFCI's shall be used with all corded 120 volt single phase tools and 120 volt single phase power sources. All employees shall be trained in their proper use and inspection.

B. GFCI's shall be plugged in at the source and inspected/tested prior to each use, defective GFCI's shall be discarded and replaced with a properly operating GFCI.

C. All power sources (receptacles), power cords and corded tools shall be inspected for assured grounding initially prior to use and thereafter as a minimum monthly to assure proper ground (assured ground/continuity) and wiring (neutral and hot). These inspections shall be conducted by a company authorized and qualified person. Acceptable cords, tools and receptacles which pass inspection shall be marked with the designated colored electric tape for that month (color assignments for each month shall be determined by the Site Safety Officer). In no case shall red, white, green or black electric tape be used. Tape shall be applied to the cord male and female cord end and not the cord. Tape for receptacles shall be applied directly above the receptacle. A documented list shall be maintained of items inspected indicating description of item, location, inspection findings and corrective measure taken if required. The marking is to provide a visual aid to identify inspected verses uninspected items. Defective receptacles, power cords and tools shall be taken out of service immediately and replaced. Note – double insulated tools that have power cords with no ground shall not be excluded from this inspection. The tool, cord, cord end and wiring (Neutral and Hot) shall be inspected. Although double insulated these tools shall only be used with a protected GFCI power source. See also Wiring Design and Protection Section of this program.

D. Flexible cord shall not be used if spliced unless suitable molded or vulcanized splices are properly made, the insulation is equal to the cable being spliced, and wire connections are soldered.

E. Worn or frayed electric cords or cables shall not be used.

F. Temporary lights shall not be suspended by their electric conductor cords unless cords and lights are designed for this means of suspension.

G. Flexible cords and cables shall be protected from damage. Sharp corners and projections shall be avoided. Flexible cords and cables may pass through doorways or other pinch points if protection is provided to avoid damage.

H. Electric cords and cables in work areas and walkways shall be located so as to minimize hazards for all personnel.

I. Extension cords shall not be fastened with staples, hung from nails or suspended by wire.

J. A plug should never be disconnected by yanking the cord. The plug itself should be grasped.

K. A plug should never be modified by bending or removing the blades. When plug blades or prongs are bent, lose or missing, the device should be replaced.

L. In existing installations, no changes in circuit protection will be made to increase the load in excess of the load rating of the circuit wiring.

4.3 Passageways and Open Spaces

A. Barriers or other means of guarding will be provided to ensure that work space for electrical equipment will not be used as a passageway during periods when energized parts of electrical equipment are exposed.

B. Working spaces, walkways, and similar locations will be kept well lighted and clear of cords so as not to create a hazard to employees.

C. Sufficient access and working space will be provided and maintained around all electrical equipment in order to allow for safe operation and maintenance of such equipment.

D. Materials shall not be placed or stored in front of circuit boxes.

E. A minimum of thirty (30) inches must be maintained from the outside of the circuit box to any materials or equipment.

F. When parts that are normally enclosed are exposed for inspection or servicing, the working space, if in a passageway or general open space, will be guarded and well lighted.

G. At least one (1) entrance will be provided to give access to the working space around electric equipment.

H. Where there are live parts normally exposed on the front of switchboards or motor control centers, the working space in front of such equipment will not be less than three (3) feet.

I. The minimum headroom of working spaces around service equipment, switchboards, panel boards, or motor control centers will be six (6) feet three (3) inches.

Note: Live parts will be guarded in accordance with 29CFR1926.403.

J. Over 220 volts, but less than 480 volts nominal: Electrical installations having exposed live parts will be accessible to qualified persons only and will comply with the applicable provisions of 29CFR1926.403; and

K. When working near overhead lines the minimum approach distances in Table S5 must be maintained by personnel, vehicles, and mechanical equipment. If this cannot be accomplished the power authority must be contacted and the line de-energized. If the line cannot be de-energized or moved OSC are not permitted to perform the work.

4.4 Equipment

A. It is imperative that all equipment be maintained in the proper working order. If **ANY** shock is received by a piece of equipment immediately remove the equipment from service and tag "**DO NOT USE - DEFECTIVE**" and DO NOT RETURN THE EQUIPMENT TO SERVICE UNTIL THE PROBLEM IS MITIGATED:

B. Electrical equipment shall not be used unless the manufacturer's name, trademark or other descriptive marking, by which the organization responsible for the product may be identified, is placed on the equipment, and unless other markings are provided which give voltage, current, wattage or other ratings as necessary. The marking shall be durable enough to withstand the environment involved.

C. Listed, labeled or certified equipment shall be used in accordance with included instructions.

D. All conductors used for general wiring shall be insulated. The conductor installation shall be suitable for the voltage, operating temperature, and location of use. Insulated conductors shall be distinguishable by appropriate color or other means as being grounded conductors, ungrounded conductors, or equipment grounding conductors.

E. Conductors shall be spliced or joined with splicing devices designed for the use or by brazing, welding, or soldering with a fusible metal or alloy. Soldered splices shall first be so spliced or joined as to be mechanically and electrically secure without solder and then soldered. All splices and joints and the free ends of conductors shall be covered with an insulation equivalent to that of the conductors or with an insulating device designed for the purpose.

F. Parts of electric equipment which in ordinary operation produce arcs, sparks, flames, or molten metal shall be used.

G. Receptacles, cord connectors, and attachment plugs (caps) shall be of approved, concealed contact type with a contact for extending ground continuity. They shall be constructed so the plug may be pulled out without leaving any live parts exposed.

H. Receptacles shall be of a type that plugs of different voltages, frequencies, or types of current (AC or DC) cannot be used.

I. Extension cord sets used with portable electric tools and appliances shall be of three (3) wire type and shall be designed for hard or extra-hard usage. Flexible cords used with temporary and portable lights shall be designed for hard or extra-hard usage.

J. Plugs shall be able to withstand rough use and have a cord grip to prevent strain on the terminal screws.

K. All temporary lights shall have covered bulbs or deep recessed sockets.

L. Any equipment purposely operated out of the manufacturer's recommendations is grounds for dismissal.

M. Power tools or spark producing tools will NEVER be used in potentially explosive or flammable atmospheres.

N. Power tools will not be used in damp or wet areas unless specifically designed for those areas.

O. Equipment intended to break current will have an interrupting rating at system voltage sufficient for the current that must be interrupted.

P. Parts of electric equipment which in ordinary operation produce arcs, sparks, flames, or molten metal will be enclosed or separated and isolated from all combustible material.

Q. Marking of equipment will be of sufficient durability to withstand the environment involved.

R. Each disconnecting means for motors and appliances will be legibly marked to indicate its purpose, unless located and arranged so the purpose is evident.

S. Each service, feeder, and branch circuit, at its disconnecting means or over current device, will be legibly marked to indicate its purpose, unless located and arranged so the purpose is evident.

T. These markings will be of sufficient durability to withstand the environment involved. All electrical conductors and equipment must be of an approved type.

4.5 Maintenance

A. All wiring components and utilization equipment in hazardous locations will be maintained in a dust-tight, dust-ignition-proof, or explosion-proof condition, as appropriate. Do not use the equipment if there are loose or missing screws, gaskets, threaded connections, seals, or other impairments to a tight seal.

B. Environmental Deterioration of Equipment - Unless identified for use in the operating environment, no conductors or equipment will be located:

1. In damp or wet locations;

2. Where exposed to gases, fumes, vapors, liquids, or other agents having a deteriorating effect on the conductors or equipment; or

4. Where exposed to excessive temperatures.

4.6 Batteries and Battery Charging

A. General:

1. Face shields, aprons, and rubber gloves will be provided for workers handling acids or batteries;

2. Facilities for quick drenching of the eyes and body will be provided within five (5) feet of battery handling areas; and

3. Facilities will be provided for flushing and neutralizing spilled electrolyte and for fire protection.

B. Charging:

1. Battery charging installations will be located in well ventilated areas designated for that purpose;

2. Charging apparatus will be protected from damage by traffic; and

3. When batteries are being charged, the vent caps will be kept in place to avoid electrolyte spray. Vent caps will be maintained in functioning condition.

C. Batteries cannot be disposed of as burnable waste.

D. Wet or Storage Batteries:

1. Because of the use of acids or electrolyte solutions, several hazards, all of which must be considered as dangerous, are introduced by the wet or storage battery. Acid or alkali electrolytes cause burns on the skin, severe eye injury, damage clothing, and may present explosion hazards from the emitted hydrogen gas. No smoking is permitted in any storage battery installation, crib, charging, or repair areas; and

2. To prevent arcing when removing or installing battery leads, the load should be removed from the circuit first, if possible, away from the battery cells. Larger batteries may have high energy (greater than 240 volt-amperes).

E. Dry Cell Batteries

Dry cell batteries should not be exposed to excessive heat. This can cause them to explode since a gas is generated.

F. Rechargeable Dry Cells:

1. Nickel cadmium batteries, commonly called "NiCad" batteries, should be enclosed in a ventilated chamber for heat dissipation and containment if there is an explosion; and

2. Nickel cadmium and other rechargeable, sealed dry cells may explode if charged at an excessive current rate, or if disposed of in a fire. Never exceed the manufacturer's specifications or disregard safety measures.

4.7 Wiring Design and Protection

A. Use and Identification of Grounded and Grounding Conductors.

1. A conductor used as a grounded conductor will be identifiable and distinguishable from all other conductors. A conductor used as an equipment grounding conductor will be identifiable and distinguishable from all other conductors;

2. No grounded conductor will be attached to any terminal or lead so as to reverse designated polarity; and

3. A grounding terminal or grounding-type device on a receptacle, cord connector, or attachment plug will not be used for purposes other than grounding.

B. Branch Circuits - Ground-Fault Protection

1. Any and all 120-volt, single-phase, 15 and 20 ampere receptacle outlets on construction sites, which are not a part of the permanent wiring of the building or structure and are in use by employees, will have approved ground-fault circuit interrupters for personnel protection. Receptacles on a two (2) wire, single-phase portable or vehicle-mounted generator rated not more than five (5) kW, where the circuit conductors of the generator are insulated from the

generator frame and all other grounded surfaces, need not be protected with ground-fault circuit interrupters;

2. Branch circuit, feeder, and service conductors rated 600 volts, nominal, or less and run outdoors as open conductors will be in compliance with 29CFR1926.04;

3. Means to disconnect all conductors in a building or other structure will be in compliance with 29CFR1926;

4. Over-current protection:

   a. The requirements in 29CFR1926.03 apply to overcurrent protection of circuits rated 600 volts, nominal, or less; and

   b. Over 600 volts, nominal. Feeders and branch circuits over 600 volts, nominal, will have short-circuit protection.

5. The following systems which supply premises wiring will be grounded:

   a. Systems to be grounded:

      (i) All three (3) wire DC systems will have their neutral conductor grounded;

      (ii) Two (2) wire DC systems operating at over 50 volts through 300 volts between conductors will be grounded unless they are rectifier-derived from an AC system complying with 29CFR1926.303 of this section;

      (iii) AC circuits, less than 50 volts. AC circuits of less than 50 volts will be grounded if they are installed as overhead conductors outside of buildings or if they are supplied by transformers and the transformer primary supply system is ungrounded or exceeds 150 volts to ground;

      (iv) AC systems, 50 volts. AC circuits of less than 50 volts will be grounded if they are installed as overhead conductors outside of buildings or if they are supplied by transformers and the transformer primary supply system is ungrounded or exceeds 150 volts to ground under any of the following conditions, unless exempted by part (v) of this section:

(a) If the system can be so grounded that the maximum voltage to ground on the underground conductors does not exceed 150 volts;

(b) If the system is nominally rated 480Y/277 volt, three (3) phase, four (4) wire in which the neutral is used as a circuit conductor;

(c) If the system is nominally rated 240/120 volt, three (3) phase, four (4) wire in which the midpoint of one (1) phase is used as a circuit conductor; or

(d) If a service conductor is uninsulated.

(v) AC systems of 50 volts to 1000 volts are not required to be grounded if the system is separately derived and is supplied by a transformer that has a primary voltage rating less than 1000 volts, provided all of the following conditions are met:

(a) The system is used exclusively for control circuits;

(b) The conditions of maintenance and supervision assure that only qualified persons will service the installation;

(c) Continuity of control power is required; and

(d) Ground detectors are installed on the control system.

b. Where paragraph (i) of this section requires grounding of wiring systems whose power is derived from generator, transformer, or converter windings and has no direct electrical connection, including a solidly connected grounded circuit conductor, to supply conductors originating in another system, paragraph (v) of this section will also apply.

c. Portable and vehicle-mounted generators:

(i) Under the following conditions, the frame of a portable generator need not be grounded and may serve as the grounding electrode for a system supplied by the generator:

(a) The generator supplies only equipment mounted on the generator and/or cord-and plug-connected equipment through receptacles mounted on the vehicle or on the generator;

(b) The non-current-carrying metal parts of equipment and the equipment grounding conductor terminals of the receptacles are bonded to the generator frame:

(ii) Under the following conditions the frame of a vehicle may serve as the grounding electrode for a system supplied by a generator located on the vehicle:

(a) The frame of the generator is bonded to the vehicle frame;

(b) The generator supplies only equipment located on the vehicle and/or cord-and plug-connected equipment through receptacles mounted on the vehicle or on the generator;

(c) The non-current-carrying metal parts of equipment and the equipment grounding conductor terminals of the receptacles are bonded to the generator frame; and

(d) The system complies with all other provisions of this section.

(iii) A neutral conductor will be bonded to the generator frame if the generator is a component of a separately derived system. No other conductor need be bonded to the generator frame.

d. For AC premises wiring systems the identified conductor will be grounded.

e. Grounding connections:

(i) For a grounded system, a grounding electrode conductor will be used to connect both the equipment grounding conductor and the grounded circuit conductor to the grounding electrode. Both the equipment grounding conductor and the grounding electrode conductor will be connected to the grounded circuit conductor on the supply side of the service disconnecting means, or on the supply side of the system disconnecting means or over current devices if the system is separately derived; and

(ii) For an ungrounded service-supplied system, the equipment grounding conductor will be connected to the grounding electrode conductor at the service equipment. For an ungrounded separately derived system, the equipment grounding conductor will be connected to the grounding electrode conductor at, or ahead of the system disconnecting means or over current devices.

f. The path to ground from circuits, equipment, and enclosures will be permanent and continuous.

g. Supports, enclosures, and equipment to be grounded:

(i) Supports, enclosures for conductors. Metal cable trays, metal raceways, and metal enclosures for conductors will be grounded, except that:

(a) Metal enclosures such as sleeves that are used to protect cable assemblies from physical damage need not be grounded; and

(b) Metal enclosures for conductors added to existing installations of open wire, knob-and-tube wiring, and nonmetallic-sheathed cable need not be grounded if all of the following conditions are met:

(1) Runs are less than 25 feet;

(2) Enclosures are free from probable contact with ground, grounded metal, metal laths, or other conductive materials; and

(3) Enclosures are guarded against employee contact.

(ii) Metal enclosures for service equipment will be grounded;

(iii) Exposed non-current-carrying metal parts of fixed equipment which may become energized will be grounded under any of the conditions described in 29CFR1926.304;

(iv) Equipment connected by cord and plug. Under any of the conditions described in paragraphs (I) through (iii) below, exposed non-current-carrying metal parts of cord- and plug-connected equipment which may become energized will be grounded;

(v) If in a hazardous (classified) location (see 29CFR1926.407):

(a) If operated at over 150 volts to ground, except for guarded motors and metal frames of electrically heated appliances if the appliance frames are permanently and effectively insulated from ground; and

(b) If the equipment is one of the types listed in paragraphs one (1) through five (5) of this section. However, even though the equipment may be one of these types, it need not be grounded if it is exempted by paragraph six (6) below:

(1) Hand held motor-operated tools;

(2) Cord-and plug-connected equipment used in damp or wet locations or by employees standing on the ground or on metal floors or working inside of metal tanks or boilers;

(3) Portable and mobile X-ray and associated equipment;

(4) Tools likely to be used in wet and/or conductive locations;

(5) Portable hand lamps; and

(6) Listed or labeled portable tools and appliances protected by a system of double insulation, or its equivalent, need not be grounded. If such a system is employed, the equipment will be distinctively marked to indicate that the tool or appliance utilizes a system of double insulation.

5 Training

NON-QUALIFIED PERSONNEL

Those employees not specifically trained and designated as "qualified" are considered non-qualified but must be trained in the awareness and safety provisions contained in this section.

QUALIFIED PERSONNEL

Qualified employees must receive training detailing hazards of working in Limited Approach Boundary areas, how to identify, inspect and use insulating PPE and tools, and arc flash and shock protections. To be qualified and employee must be both trained and designated by OSC. Qualification training and designation shall be repeated at intervals not to exceed 3 years.

ALL PERSONNEL

b. Any employee found not complying with safe work procedures and this program must undergo re-training before working in electrical hazards areas.
c. Copies of training and designation of qualified employee's certification will be kept for the duration of employment.

6 Program Review

This program and its field implementation shall be reviewed as part of the company's required performance audit. Each project, where this program is applicable, will be assessed for conformance as part of the routine safety audit but shall not be less than annually. Deficiencies in application of the electrical safety program shall be corrected immediately.

ATTACHMENT 22 – FALL PROTECTION PROGRAM

INTRODUCTION & PURPOSE

To prevent falls when working from elevated surfaces. This document is primarily intended to provide fall protection methods for protecting and informing (training) all employees whose job duties would expose them to fall hazards. All activities where a fall hazard exists appropriate (company approved) Fall Protection Systems shall be utilized to prevent injury. It is the company's policy that 100% tie-off shall be used whenever feasible. This program shall be reviewed and updated as a minimum annually or as conditions warrant (equipment changes, regulatory changes and recognized improvement/best practices) by the Corporate Director, HS&E. Likes fall protecting is required for all employees whose work could expose them to a potential fall. Fall protection training shall be updated as a minimum annually or sooner as situations warrant (equipment changes, regulatory changes, audit/inspection recommendations and recognized improvement/best practices).

REGULATORY AUTHORITY FOR IMPLEMENTATION OF FALL PROTECTION

The Occupational Safety and Health Act under 29 CFR, Subpart M establishes requirements relating to Fall Protection. In response to the regulatory mandate, the company has developed and will maintain this Fall Protection program to provide proper and safe procedures for all applicable employees.

RESPONSIBILITY - (Managers Commitment)

Managers or their designee shall instruct all appropriate employees in the safety significance of the Fall Protection Program and/or procedures. In addition, consideration shall be given to the critical importance of these procedures by ensuring that the applicable provisions of the Fall Protection Program are known, understood, and strictly adhered to by all employees. Strict enforcement of this program is required as a condition of employment. Any variations from these set procedures shall be considered a work rule violation and because of the serious nature of this program, disciplinary action will be taken in accordance with the disciplinary guidelines contained in these procedures.

DEFINITIONS APPLICABLE TO THIS SECTION

Anchorage - A secure point of attachment for lifelines, lanyards or deceleration devices.

Body Belt (NOTE - Safety Belt for Positioning & Restraint Only, Not for Fall Arrest Protection) - A strap with means both for securing it about the waist and for attaching it to a restraining device.

Body Harness - Straps which may be secured about the employee in a manner that will distribute the fall arrest forces over a least the thighs, pelvis, waist, chest and shoulders with means for attaching it to other components of a personal fall arrest system.

Buckle - Any device for holding the body belt or body harness closed around the employee's body.

Connector - A device which is used to couple (connect) parts of the personal fall arrest system and positioning device system and positioning device systems together. It may be an independent component of the system, such as a carabiner, or it may be an integral component of part of the system, (such as a buckle or dee-ring sewn into a body belt or body harness, or a snap-hook spliced or sewn to a lanyard or self-retracting lanyard).

Controlled Access Zone (CAZ) - An area in which certain work (e.g. overhand bricklaying) may take place without the use of guardrail systems, personal fall arrest systems, or safety net systems and access to the zone is controlled.

Dangerous Equipment - Equipment (such as pickling or galvanizing tanks, degreasing units, filtering , pumping, cleaning machinery, electrical equipment, and other units) which, as a result of form or function, may be hazardous to employees who fall onto or into such equipment.

Deceleration Device - Any mechanism, such as a rope grab, rip-stitch lanyard, specially-woven lanyard, tearing or deforming lanyards, automatic self-retracting lifelines/lanyards, etc., which serves to dissipate a substantial amount of energy during a fall arrest, or otherwise limit the energy imposed on an employee during fall arrest.

Deceleration Distance - The additional vertical distance a falling employee travels, excluding lifeline elongation and free fall distance, before stopping, from the point at which the deceleration device begins to operate. It is measured as the distance between the location of an employee's body belt or body harness attachment point at the moment of activation (at the onset of fall arrest forces) of the deceleration device during a fall, and the location of that attachment point after the employee comes to a full stop.

Equivalent - Alternative designs, materials, or methods to protect against a hazard which the employer can demonstrate will provide an equal or greater degree of safety for employees than the methods, materials or designs specified in the standard.

Failure - Load refusal, breakage, or separation of component parts. Load refusal is the point where the ultimate strength is exceeded.

Free fall - The act of falling before personal fall arrest system begins to apply force to arrest the fall.

Free Fall Distance - The vertical displacement of the fall arrest attachment point on the employee's body belt or body harness between onset of the fall and just before the system begins to apply force to arrest the fall. This distance excludes deceleration distance, and lifeline/lanyard elongation, but includes any deceleration device slide distance or self-retracting lifeline/lanyard extension before they operate and fall arrest forces occur.

Guardrail System - A barrier erected to prevent employees from falling to lower levels.

Hole - A gap or void 2 inches (5.1 cm) or more in its least dimension, in a floor, roof, or other walking/working surface.

Infeasible - It is impossible to perform the construction work using a conventional fall protection system (i.e. guardrail system, safety net system, or personal arrest system) or that it is technologically impossible to use any one of these systems to provide fall protection.

Lanyard - A flexible line of rope, wire rope, or strap which generally has a connector at each end for connecting the body belt or body harness to a deceleration device, lifeline, or anchorage.

Leading Edge - The edge of a floor, roof, or formwork for a floor or other walking/working surface (such as the deck) which changes location as additional floor, roof, decking, or formwork sections are placed, formed, or constructed. A leading edge is considered to be an **"unprotected side and edge"** during periods when it is not actively and continuously under constructed.

Lifeline - A component consisting of a flexible line for connection to an anchorage at one end to hang vertically (vertical lifeline), or for connection to anchorages at both ends to stretch horizontally (horizontal lifeline), and which serves as a means for connecting other components of a personal fall arrest systems to the anchorage.

Low-slope Roof - A roof having a slope less than or equal to 4 in 12 (vertical to horizontal).

Lower Levels - Those areas or surfaces to which an employee can fall. Such areas or surfaces include, but are not limited to, ground levels, floors, platforms, ramps, runways, excavations, pits, tanks, material, water, equipment, structures, or portions thereof.

Mechanical Equipment - All motor or human propelled wheeled equipment used for roofing work, except wheelbarrows and mopcarts.

Opening - A gap or void 30 inches (76 cm) or more high and 18 inches (48 cm) or more wide, in a wall or partition, through which employees can fall to a lower level.

Overhand bricklaying and related work (piece wall structures, i.e. retaining walls, sand bag walls, etc.) - The process of laying bricks and masonry units such that the surface of the wall to be jointed is on the opposite side of the wall from the mason, requiring the mason to lean over the wall to complete the work. Related work includes mason tending and electrical installation, incorporated into the brick wall during the overhand bricklaying process.

Personal Fall Arrest System (PFAS) - System used to arrest an employee in a fall from a working level. It consists of an anchorage, connectors, a body belt or body harness and may include a lanyard, deceleration device, lifeline, or suitable combinations. NOTE - use of a body belt for fall arrest is prohibited.

Personal Fall Restraint System – System used to eliminate employee travel to a free fall situation. Permits no free fall by tie off utilizing harness from PFAS and fixed restraining lanyard/line or retractable lanyard that limits travel of employee to fall edge.

Positioning Device System - A body belt or body harness system rigged to allow an employee to be supported on an elevated vertical surface, such as a wall, and work with both hands free while leaning.

Rope Grab - A deceleration device which travels on a lifeline and automatically, by friction, engages the lifeline and locks so as to arrest the fall of an employee. A rope grab usually employs the principle of inertial locking, cam/level locking, or both.

Roof - The exterior surface on the top of a building. This does not include floors or form work which, because a building has not been completed, temporarily become the top surface of a building.

Roof Work - The hoisting, storage, application, and removal of roofing materials and equipment, including related insulation, sheet metal, and vapor barrier work, but not including the construction of the roof deck.

Self-retracting Lifeline / lanyard - A deceleration device containing a drum-wound line which can be slowly extracted from, or retracted onto, the drum under slight tension during normal employee movement, and which, after onset of a fall, automatically locks the drum and arrests the fall.

Snap-hook - A connector comprised of a hook-shaped member with a normally closed keeper, or similar arrangement, which may be opened to permit the hook to receive an object and, when released, automatically closes to retain the object.

Snap-hooks are generally one of two types:

The locking type with a self-closing, self-locking keeper which remains closed and locked until unlocked and pressed open for connection or disconnection; or

The non-locking type with a self-closing keeper which remains closed until pressed open for connection or disconnection. NOTE THIS TYPE IS PROHIBITED FROM USE AND SHALL BE IMMEDIATELY DESTROYED AND DISCARDED. the use of a non-locking snap-hook as part of personal fall arrest systems and positioning device systems is prohibited.

Steep Roof: A roof having a slope greater than 4 in 12 (vertical to horizontal.)

Toe board - A low protective barrier that will prevent the fall of materials and equipment to lower levels and provide protection from falls for personnel.

Unprotected Sides and Edges - Any side or edge (except at entrances to points of access) of a walking/working surface, e.g., floor, roof, ramp, or runway where there is no wall or guardrail system at least 39 inches (1.0 m) high.

Walking/Working Surface - Any surface, whether horizontal or vertical on which an employee walks or works, including, but not limited to, floors, roofs, ramps, bridges, runways, form work and concrete reinforcing steel but not including ladders, vehicles, or trailers, on which employees must be located in order to perform their job duties.

Warning Line System - A barrier erected on a roof to warn employees that they are approaching an unprotected roof side or edge, and which designates an area in which roofing work may take place without the use of guardrail, body belt, or safety net systems to protect employees in the area.

Work Area - That portion of a walking/working surface where job duties are being performed.

GENERAL REQUIREMENTS

It shall be determined if the walking/working surfaces on which employees are to work, have the strength and structural integrity to support employee's safety. Supervisor/competent person shall have the responsibility of continually monitoring this to ensure employee's safety.

No employee shall be permitted on a walking/working surface with an unprotected side or edge which is six feet (1.8 m) or more above a lower level without protection from falling by the use of guardrails, safety nets, or personal fall arrest systems. Examples include but are not limited to; high burning, aerial platform work, vessel/tank inspection, purging and cleaning, barrier/containment wall work, elevated earth structure with slopes or any elevated work which has fall potential.

The criteria for these systems are described within this document under the section titled, **"Standardization Requirements for Fall Protection."**

In the event that this work place situation should arise, employees shall be required to inform their immediate supervisor at once.

No employee shall be permitted to construct a leading edge six feet (1.8 m) or more above lower levels without being protected by guardrails, safety nets, or personal fall arrest systems.

The criteria for these systems are described within this document under the section titled, **"Standardization Requirements for Fall Protection."**

In the event that this work place situation should arise, employees are required to inform their immediate supervisor at once.

No employee shall be permitted on a walking/working surface where leading edges are under construction who is not engaged in the leading lead work six feet (1.8 m) or more above the lower level without being protected by guardrails, safety nets, or personal fall arrest systems.

The criteria for these systems are described within this document under the section titled, **"Standardization Requirements for Fall Protection."**

In the event that this work place situation should arise, employees are required to inform their immediate supervisor at once.

No employee performing overhand brick laying includes any type of piece by piece (sandbags, blocks, etc) wall building (i.e. retaining/protective walls) and related work 6 feet (1.8 m) or more above lower levels, without being protected by guardrail systems, safety net systems, personal fall arrest systems or in a controlled access zone. No employee shall be permitted to reach more than ten inches (25 cm) below the lower level of the walking/working surface on which they are working without being

protected from falling by a guardrail, safety net, or personal fall arrest systems. Note: Bricklaying operations performed on scaffolds are regulated by Subpart L – Scaffolds of this part.

The criteria for these systems are described within this document under the section titled, **"Standardization Requirements for Fall Protection."**

In the event that this work place situation should arise, employees are required to inform their immediate supervisor at once.

No employee shall be permitted on, at, or near wall openings (including those with chutes attached) where the outside bottom edge of the wall opening is six feet (1.8 m) or more above lower levels and the inside bottom edge of the wall opening is less than thirty-nine inches (1.0 m) above the walking/working surface without protection from falling by the use of guardrails, safety nets, or personal fall arrest systems.

The criteria for these systems are described within this document under the section titled, **"Standardization Requirements for Fall Protection."**

In the event that this work place situation should arise, employees are required to inform their immediate supervisor at once.

No employee shall be permitted in a hoist area where the walking/working surface is six feet (1.8 m) or more above the lower level without being protected by the use of guardrails, safety nets, or personal arrest system. If guardrail systems, chain, gate or guardrails are in place and any portion thereof are removed to facilitate the hoisting operation and the employee must lean through the access opening or out over the edge of the access opening, that employee shall be protected from falling hazards by a personal fall arrest systems.

The criteria for these systems are described within this document under the section titled, **"Standardization Requirements for Fall Protection."**

In the event that this work place situation should arise, employees are required to inform their immediate supervisor at once.

No employee shall be permitted on a walking/working surface where there is a danger of falling through holes, (including skylights), more than six feet (1.8 m) above lower levels without being protected by personal fall arrest systems, covers, or guardrails systems erected around such holes.

The criteria for these systems are described within this document under the section titled, **"Standardization Requirements for Fall Protection."**

In the event that this work place situation should arise, employees are required to inform their immediate supervisor at once.

No employee shall be permitted on a walking/working surface where there is a tripping in or stepping into or through and/or objects falling through holes, (including skylights), without adequate covers, guardrails, safety nets, or personal fall arrest systems in place.

The criteria for these systems are described within this document under the section titled, **"Standardization Requirements for Fall Protection."**

In the event that this work place situation should arise, employees are required to inform their immediate supervisor at once.

In the event a hazard from falling objects would arise, **all exposed employees** will be required to wear a hard hat.

In the event that this work place situation should arise, employees are required to inform their immediate supervisor at once.

The following measures shall also be implemented:

Erect toe boards, screens, or guardrail systems.

Erect a canopy structure.

Barricade the area and prohibit employee access.

No employee shall be permitted on a ramp, runway, or other walkway where the surface is six feet (1.8 m) above the lower level without protection from a guardrail systems, safety nets, or personal fall arrest systems.

The criteria for these systems are described within this document under the section titled, **"Standardization Requirements for Fall Protection."**

In the event that this work place situation should arise, employees are required to inform their immediate supervisor at once.

SPECIAL CONDTIONS AND APPLICATIONS

No employee shall be permitted at the edge of any retaining wall, dyke, dam, containment system, vessel or other similar structures where the next lowest level is greater than 6 feet or less in cases where a fall could result in falling into hazards (drowning & chemical hazards, process hazards) or on an something that could cause injury or death (impalement, hazardous objects, etc).

The criteria for these systems are described within this document under the section titled, **"Standardization Requirements for Fall Protection."**

No employee shall be permitted at the edge of an excavation six feet (1.8 m) or more in depth where there is plant growth or other visual barrier without being protected from falling by guardrail systems, fences, or other barricades.

The criteria for these systems are described within this document under the section titled, **"Standardization Requirements for Fall Protection."**

No employee shall be permitted at the edge of a well, pit, shaft and/or similar excavation six feet (1.8 m) or more in depth without protection from falling by guardrail systems, fences, barricades, or covers.

The criteria for these systems are described within this document under the section titled, **"Standardization Requirements for Fall Protection."**

In the event that this work place situation should arise, employees are required to inform their immediate supervisor at once.

No employee shall be permitted on the face of form work or reinforcing steel without being protected from falling six feet (1.8 m) or more to lower levels by personal fall arrest systems, safety net systems, or positioning device system.

The criteria for these systems are described within this document under the section titled, **"Standardization Requirements for Fall Protection."**

In the event that this work place situation should arise, employees are required to inform their immediate supervisor at once.

In the event that this work place situation should arise, employees are required to inform their immediate supervisor at once.

No employee shall be permitted to work above dangerous equipment without being protected from falling into or onto the dangerous equipment by equipment guards, guardrails, safety nets, or personal fall arrest systems.

The criteria for these systems are described within this document under the section titled, **"Standardization Requirements for Fall Protection."**

In the event that this work place situation should arise, employees are required to inform their immediate supervisor at once.

No employee shall be permitted to construct, including any related operation of precast concrete members, (including but not limited to the erection of wall panels, columns, beams, floors, and roof tees) without being protected from falling by guardrails, safety nets, or personal fall arrest systems.

The criteria for these systems are described within this document under the section titled, **"Standardization Requirements for Fall Protection."**

In the event that this work place situation should arise, employees are required to inform their immediate supervisor at once.

WORK PERFORMED ON LOW SLOPED ROOFS

No employee shall be permitted to become engaged in activities on low sloped roofs without unprotected sides and edges six feet (1.8 m) or more above lower level without being protected from falling by guardrail, safety net, personal fall arrest system, or a combination of:

Warning line system and guardrail system,

Warning line system and safety net system, or

Warning line system and personal fall arrest system, or

Irregular, Non-Rectangular Shaped Roofs

WORK PERFORMED ON STEEP ROOFS

No employee shall be permitted to work on a steep roof with unprotected sides and edges six feet (1.8 m) or more above lower levels without being protected from falling by guardrail systems with toe boards, safety net systems, or personal fall arrest systems.

STANDARDIZATION REQUIREMENTS FOR FALL PROTECTION SYSTEMS, CRITERIA AND PRACTICES

There may be situations where a fall hazard may be unique or **"one of a kind."** In this situation, the supervisor (competent person) is ultimately in the best position based upon his/her knowledge of the construction and/or configuration of the hazard, to judge or determine if any additional/alternative protection or protective measures need to be taken.

In the event that this work place situation should arise, employees are required to inform their immediate supervisor at once.

A Fall Protection Plan shall be implemented as outlined within this document under the section titled, **"Alternative Measures."**

All other Fall Protection Systems shall meet the following criteria, and shall be installed prior to the employee beginning work that necessitates the Fall Protection.

GUARDRAIL SYSTEMS

To ensure the integrity of all guardrail systems for use as Fall Protection, the construction and configuration shall meet the following minimum criteria set forth below:

Top edge of top rails, or equivalent guardrail system members, shall be 43 inches (1.1 m) plus or minus 3 inches (8 cm) above the walking/working level. When conditions warrant, the height of the top edge may exceed the 45-inch height, provided the guardrail system meet all other criteria outlined by this section.

NOTE: When employees are using stilts, the top edge height of the top rail, or equivalent member, shall be increased an amount equal to the height of the stilts.

Midrails, screens, mesh, intermediate vertical members, or equivalent intermediate structural members shall be installed between the tip edge of the guardrail system and the walking/working surface when there is no wall or parapet wall at least 21 inches (53 cm) high.

Midrails, when used, shall be installed at a height midway between the top edge of the guardrail system and the walking/working level.

Screens and mesh, when used, shall extend from the top rail to the walking/working level and along the entire opening between top rail supports.

Intermediate members (such as balusters), when used between posts, shall be not more than 19 inches (48 cm) apart.

Other structural members (such as additional midrails and architectural panels) shall be installed such that there are no openings in the guardrail system that are more than 19 inches wide.

Guardrail systems shall be capable of withstanding, without failure, a force of at least 200 pounds applied within 2 inches of the top edge, in any outward or downward direction, at any point along the top edge.

When the 200 pound load is applied in a downward direction, the top edge of the guardrail shall not deflect to a height less than 39 inches (1.0 m) above the walking/working level.

Midrails, screens, mesh, intermediate vertical members, solid panels, and equivalent structural members shall be capable of withstanding, without failure, a force of at least 150 pounds applied in any downward or outward direction at any point along the midrail or other member.

Guardrail systems shall be so surfaced as to prevent injury form punctures or lacerations, and to prevent snagging of clothing.

The ends of all top rails and midrails shall not overhang the terminal posts except where such overhang does not constitute a projection hazard.

Steel banding and plastic banding shall not be used as top rails or midrails.

Top rails and midrails shall be at least one-quarter inch nominal diameter or thickness to prevent cuts and lacerations. If wire rope is used for top rails, it shall be flagged at not more that 6-foot intervals with high-visibility material.

When guardrail systems are used at hoisting areas, a chain or removable guardrail section shall be placed across the opening between guardrail sections when hoisting operations are not taking place.

When guardrail systems are used at holes, they shall be erected on all unprotected sides or edges of the hole.

When guardrail systems are used around holes used for the passage of materials, the hole shall have not more than two sides provided with removal guardrail sections to allow the passage of materials. When the hole is not in use, it shall be closed over with a cover, or a guardrail system shall be provided along all unprotected sides or edges.

When guardrail systems are used around which are used as points of access (such as ladderways), they shall be provided with a gate, or be so offset that a person cannot walk directly into the hole.

Guradrail systems used on ramps and runways shall be erected along each unprotected side or edge.

Manila, plastic or synthetic rope being used for top rails or midrails shall be inspected as frequently as necessary to ensure that it continues to meet the strength requirements.

Guardrail systems when used as falling object protection, shall have all openings small enough to prevent passage of potentially falling objects.

TOEBOARDS

In the event that employees need additional protection from falling objects toeboards shall be installed. To ensure the integrity of all toeboards, they shall be constructed to meet the following minimum criteria set forth below:

Toeboards, when used as falling object protection, shall be erected along the edge of the overhead walking/working surfaces for a distance sufficient to protect employees below.

Toeboards shall be capable of withstanding without failure, a force of at least 50 pounds applied in any downward or outward direction at any point along the toeboard.

Toeboards shall be a minimum of 3 ½ inches (9 cm) in vertical height from their top edge to the level of the walking/working surface. They shall be solid or have openings not over 1 inch (2.5 cm) in greater dimension. They shall have not more than ¼ inch (0.6 cm) clearance above the walking/working surface.

Where tools, equipment, or materials are piled higher than the top edge of a toeboard, paneling or screening shall be erected from the walking/working surface or toeboard to the top of a guardrail system's top rail or midrail, for a distance sufficient to protect employees below.

COVERS

In the event that employees need additional protection from falling through holes, covers shall be installed. To ensure the integrity of all covers, they shall meet the following minimum criteria set forth below:

Covers located in roadways and vehicular aisles shall be capable of supporting, without failure, at least twice the maximum axle load of the largest vehicle expected to cross over the cover.

All covers shall be capable of supporting, without failure, at least twice the weight of employees, equipment, and materials that may be imposed on the cover at any one time.

All covers shall be secured when installed so as to prevent accidental displacement by the wind, equipment, or employees.

All covers shall be color coded or they shall be marked with the word **"HOLE"** or **"COVER"** to provide warning of the hazard.

Note: This provision does not apply to cast iron manhole covers or steel grates used on streets or roadways.

SAFETY NETS

To ensure the integrity of any safety net system used as fall protection, safety nets shall be inspected at least once a week for wear, damage, and other deterioration. In addition, they shall be drop tested at the jobsite after initial installation and before being used, or at any time the safety net system is relocated and/or repaired. If the safety net system is left in one place it shall be tested at six month intervals. Defective nets shall not be used.

The most recent certification of inspection and drop test for each net and net installation shall be kept up to date and available at each jobsite.

Please see the following documents:

Safety nets shall be installed as close as practicable under the walking/working surfaces on which employees are working, but in no case more than 30 feet (9.1 m) below such level. The potential fall area from the walking/working surface to the net shall be unobstructed.

Safety nets shall extend outward from the outermost projection of the work surface as follows:

Vertical distance from working level to horizontal plane of net	Minimum required horizontal distance of outer edge of net from the edge of the working surface
Up to 5 feet	8 feet.
More than 5 feet up to 10 feet	10 feet.
More than 10 feet	13 feet.

Safety nets shall be installed with sufficient clearance under them to prevent contact with the surface or structures below when subjected to an impact force equal to the drop test.

Safety nets and their installations shall be capable of absorbing an impact force of a drop test consisting of a 400 pound bag of sand 30 inches in diameter from the highest walking/working surface at which workers exposed, but not less than 42 inches above the level **"before being used as a fall protection system"**, whenever relocated, after major repair, and at 6 month intervals if left in one place.

Items that have fallen into safety nets including – but not restricted to, materials, scrape, equipment, and tools – must be removed as soon as possible and at least before the next work shift.

SAFETY NET WEEKLY INSPECTION

Date: _____ Time: _____

Competent person performing inspection: _____ (Signature)

Manufacturer of Safety Net/Model/Serial Number: _____

Has safety net been modified and/or repaired? ☐Yes ☐No If Yes, When: _____

SAFETY NET DROP TEST Date: _____ Time: _____

Competent person performing test: _____ (Signature)

Manufacturer of Safety Net: _____

Has this net been modified and/or repaired? ☐Yes ☐No

If Yes, When: _____

Environmental conditions at time of test: _____

Vertical distance from walking/working level to horizontal plan of safety net: _____ feet.

Drop test medium _____ 400 pound bag of sand 30 ± 2 inches in diameter

Vertical distance from the surface to the horizontal plan of the Safety Net that the test medium was dripped: _____ feet

Remarks following test: ☐Pass ☐Fail Repairs or modifications made following the drop test:

_____

<u>If for any reason all or part of the safety net did not meet or pass the drop test, no employee shall be permitted on the walking/working surface until it is retested.</u>

PERSONAL FALL ARREST SYSTEMS

Whenever possible fall restraint/prevention shall be used before fall arrest. All equipment used for fall restraint and/or fall arrest shall be inspected prior to each use following the guidelines provided herein.

To ensure the integrity of any Personal Fall Arrest Systems, the Personal Fall Arrest Systems and its use shall comply with the following provisions set forth below.

Connectors shall be dropped forged, pressed or formed steel, or made of equivalent materials.

Connectors shall have a corrosion-resistant finish, and all surfaces and edges shall be smooth to prevent damage to interfacing parts of the system.

Dee-rings and snap-hooks shall have a minimum tensile strength of 5,000 pounds.

Dee-rings and snap-hooks shall be proof-tested to a minimum tensile load of 3,600 pound without cracking, breaking, or taking permanent deformation.

Snap-hooks shall be sized to be compatible with the member to which they are connected, to prevent unintentional disengagement of the snaphook by depression of the snap-hook keeper by the connected member, or shall be a locking type snaphook designed and used to prevent disengagement of the snap-hook by the contact of the snaphook keeper by the connected member.

On suspended scaffolds or similar work platforms which horizontal lifelines which may become vertical lifelines, the devices used to connect to a horizontal lifeline shall be capable of locking in both directions on the lifeline.

Horizontal lifelines shall be designed, installed, and used, under the supervision of a qualified person, as part of a complete personal fall arrest system, which maintains a safety factor of at least two.

Lanyards and vertical lifelines shall have a minimum breaking strength of 5,000 pounds.

Lifelines shall be protected against being cut or abraded.

Self-retracting lifelines and lanyards which automatically limit free fall distance to 2 feet (0.61 m) or less shall be capable of sustaining a minimum tensile load of 3,000 pounds applied to the device with the lifeline or lanyard in the fully extended position.

Self-retracting lifelines and lanyards which do not limit free fall distance to 2 feet (0.61 m) or less, rip-stitch lanyards, tearing and deforming lanyards shall be capable of sustaining a minimum tensile load of 5,000 pounds applied to the device with the lifeline or lanyard in the fully extended position.

Ropes and straps (webbing) used in lanyards, lifelines, and strength components of body harnesses shall be made from synthetic fibers.

Anchorages used for attachment of personal fall arrest equipment shall be independent of any anchorage being used to support or suspend platforms and capable of supporting at least 5,000 pounds per employee attached, or shall be designed, installed, and used as follows:

As part of a complete personal fall arrest system which maintains a safety factor of at least two; and

Under the supervision of a qualified person.

Personal fall arrest systems, when stopping a fall, shall:

Limit maximum arresting force on an employee to 900 pounds when used with a body belt;

Limit maximum arresting force on an employee to 1,800 pounds when used with a body harness;

Be rigged such that an employee can neither free fall more than 6 feet (1.8 m), nor contact any lower level;

Bring an employee to a complete stop and limit maximum deceleration distance an employee travels to 3.5 feet (1.07 m); and,

Have sufficient strength to withstand twice the potential impact energy of an employee free falling a distance of 6 feet (2.8 m), or the free fall distance permitted by the system, whichever is less.

Note: - If the system is used by an employee having a combined tool and body weight of 310 pounds (140 kg) or more, then the system shall be modified to provide proper protection for such heavier weights.

The attachment point of the body harness shall be located in the center of the wearer's back near shoulder level, or above the wearer's head.

Body harnesses, and components shall be used only for employee protection (as part of a personal fall arrest system or positioning device system) and not to hoist materials.

Personal fall arrest systems and components subjected to impact loading shall be immediately removed from service and shall not be used again for employee protection until inspected and determined by a competent person to be undamaged and suitable for reuse.

Provisions for prompt rescue of employees in the event of a fall or shall assure that employees are able to rescue themselves.

All employees shall be required to inspect prior to use of personal fall arrest systems for wear, damage and other deterioration, and defective components shall be removed from service.

Personal fall arrest systems shall not be attached to guardrail systems, nor shall they be attached to hoists, except as specified in this policy.

When a personal fall arrest system is used at hoist areas, it shall be rigged to allow the movement of the employee only as far as the edge of the walking/working surface.

POSITIONING DEVICE SYSTEMS

To ensure the integrity of any positioning device system, the positioning device system, and its use shall comply with the following minimum provisions set forth below.

Positioning devices shall be rigged such that an employee cannot free fall more than 2 feet (.9 m).

Positioning devices shall be secured to an anchorage capable of supporting at least twice the potential impact load of an employee's fall or 3,000 pounds, whichever is greater.

Connectors shall be drop forged, pressed or formed steel, or made of equivalent materials.

Connectors shall have a corrosion-resistant finish, and all surfaces and edges shall be smooth to prevent damage to interfacing parts of this system.

Connecting assemblies shall have a minimum tensile strength of 5,000 pounds.

Dee-rings and snap-hooks shall be proof-tested to a minimum tensile load of 3,600 pounds without cracking, breaking, or taking permanent deformation.

Snap-hooks shall be sized to be compatible with the member to which they are connected to prevent unintentional disengagement of the snap-hook by depression of the snap-hook keeper by the connected member, or shall be a locking type snap-hook designed and used to prevent disengagement of the snap-hook by the contact of the snap-hook keeper by the connected member.

All employees shall be required to inspect prior to use any positioning device system for wear, damage, and other deterioration, and defective component shall be removed from service.

Harnesses and components shall be used only for employee protection (as part of a personal fall arrest system or positioning device system) and not to hoist materials.

WARNING LINE SYSTEMS

Warning lines may be used only on low-sloped roofs when doing roof and in conjunction with other acceptable fall protection. To ensure the integrity of any warning line system, the warning line system, and its use shall be constructed to meet the following minimum criteria set forth below.

The warning line shall be erected around all sides of the roof work area.

When mechanical equipment is not being used, the warning line shall be erected not less than 6 feet (1.8 m) from the roof edge.

When mechanical equipment is being used, the warning line shall be erected not less than 6 feet (1.8 m) from the roof edge which is parallel to the direction of mechanical equipment operation, and not less than 10 feet (3.1 m) from the roof edge which is perpendicular to the direction of mechanical equipment operation.

Points of access, materials handling areas, storage areas, and hoisting areas shall be connected to the work area by an access path formed by two warning lines.

When the path to a point of access is not in use, a rope, wire, chain, or other barricade, equivalent in strength and height to the warning line, shall be placed across the path at the point where the path intersects the warning line erected around the work area, or the path shall be offset such that a person cannot walk directly into the work area.

Warning lines shall consist of ropes, wires, or chains, and supporting stanchions erected as follows:

The rope, wire, or chain shall be flagged at not more than 6 foot (1.8 m) intervals with high-visibility material;

The rope, wire, or chain shall be rigged and supported in such a way that its lowest point (including sag) is no less than 34 inches (.9 m) from the walking/working surface and its highest point is no more than 39 inches (.9 m) from the walking/working surface;

After being erected, with the rope, wire, or chain attached, stanchions shall be capable of resisting, without tipping over, a force of at least 16 pounds applied horizontally against the stanchion, 30 inches (.8 m) above the walking/working surface, perpendicular to the warning line, and in the direction of the floor, roof, or platform edge;

The rope, wire, or chain shall have a minimum tensile strength of 500 pounds and after being attached to the stanchions, shall be capable of supporting, without breaking, the loads applied to the stanchions and;

The line shall be attached at each stanchion in such a way that pulling on one section of the line between stanchions will not result in slack being taken up in adjacent sections before the stanchion tips over.

No employee shall be allowed in the area between a roof edge and a warning line unless the employee is performing roofing work in that area.

Mechanical equipment on roofs shall be used or stored only in areas where employees are protected by a warning line system, guardrail system, or personal fall arrest system.

Warning lines meeting the above criteria may be used on other than roofs when erected at least 15 feet from an unprotected edge (i.e., floors below roof level).

CONTROLLED ACCESS ZONES

To ensure the integrity of all controlled access zones used to control access to areas where leading edge and other operations are taking place, the controlled access zone shall conform to the following minimum provisions.

The controlled access zone shall be defined by a control line or by any other means that restricts access.

When control lines are used, they shall be erected not less than 6 feet (1.8 m), nor more than 25 feet (7.7 m) from the unprotected or leading edge; except when erecting precast concrete members.

The control line shall extend along the entire length of the unprotected or leading edge and shall be approximately parallel to the unprotected or leading edge.

The controlled line shall be connected on each side to a guardrail system or wall.

Control lines shall consist of ropes, wires, tapes, or equivalent materials, and supporting stanchions as follows:

Each line shall be flagged or otherwise clearly marked at not more than 6-foot (1.8 m) intervals with high-visibility material.

Each line shall be rigged and supported in such a way that its lowest point (including sag) is not less than 39 inches (1 m) from the walking/working surface and its highest point in not more than 45 inches (1.3 m), (when overhand bricklaying operations are being performed) from the walking/working surface.

On floors and roofs where guardrail systems are not in place prior to the beginning of work, controlled access zones shall be enlarged, as necessary, to enclose all points of access, material handling areas, and storage areas.

On floors and roofs where guardrail systems are in place, but need to be removed to allow leading edge work to take place, only that portion of the guardrail necessary to accomplish that day's work shall be removed and PFAS or PFRS shall be utilized where fall exposure may exist.

EQUIPMENT INSPECTIONS

All fall protection equipment shall be expected at least annually by a competent person and prior to each use. A record of each inspection shall be made and kept in the job trailer for verification and audit purposes.

Inspections will be carried out as provided in the following guide which shall be available with the equipment in each job trailer.

INSPECT PRIOR TO USE – EVERY ITEM MUST HAVE A SERVICE TAG/LABEL

Harness

- Must be inspected before every use by user and once per year by competent person
- Inspect for damage including wear, tear, cuts, corrosion, and deterioration. Throw out if used in a fall
- Guardian & French Creek harness must be discarded if older than 5 years after put in service
- Never write on harness webbing. Fibers are damaged by ink solvents. Discard if written on
- If used for fall arrest make sure harness fits properly and has trauma straps

Tether/lanyard

- No knots
- No damage including cuts, abrasion, "powdered" webbing, discoloration, or deterioration
- Connectors must be locking type and must freely operate. Check for cracks, deformation, pitting, burrs, lose parts. Make sure the connector matches the use

For shock absorber lanyards check for previous fall exposure and remove from service if so

SLR

Make sure label is legible and proper SLR is used. Never use an SLR for fall restraint and always use an SLR-LE for leading edge work

Pull lifeline sharply to make sure brake engages

Play out full length of lifeline and check for damage. Discard if damaged, corroded, etc.

Check connectors for damage and discard if damaged

Make sure the visual indicator has not been engaged. Discard if it has been

USE FALL RESTRAINT WHENEVER POSSIBLE BEFORE FALL ARREST

ATTACHMENT 23 – JOURNEY MANAGEMENT PROGRAM

PURPOSE

The purpose of the OSC Journey Management Plan (JMP) is to set expectations for the safe operation of motor vehicles used in the transport of employees to and from the job site. As such this document defines practices which will minimize risk and prevent losses associated with travel-related incidents including injuries to drivers, passengers and pedestrians, damage to vehicles and damage to third party property. By communicating potential safety risks before mobilizing to a site, visitors will be able to prepare for and avoid potential hazards. The Journey Management Plan shall be reviewed by all affected employees prior to travel.

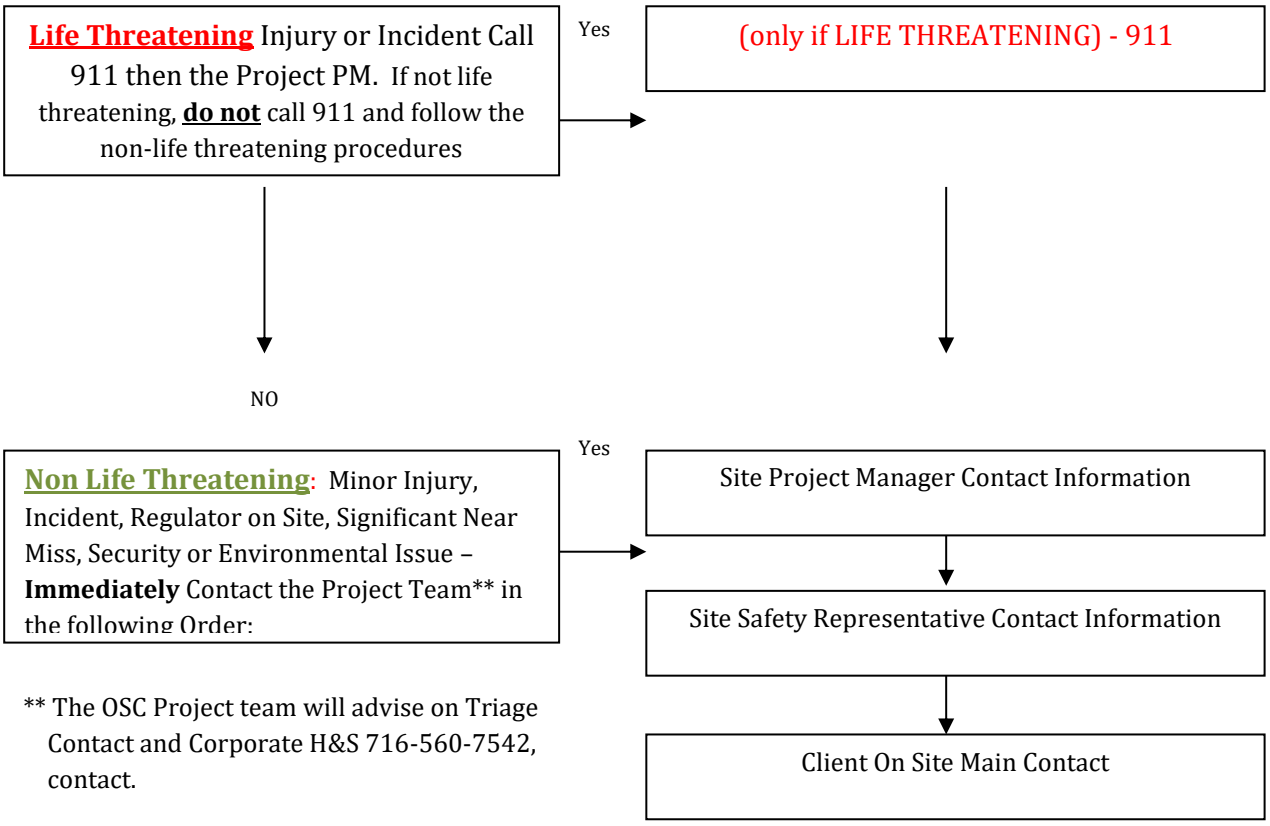
ADDRESSES AND TELEPHONE NUMBERS

LOCATION	**PHYSICAL ADDRESS**	**TELEPHONE NUMBERS**
Origin	City and State	Project Contact Phone Number
(Insert) Project Name	(Insert) Physical Address	**(Insert) Name of Primary Contact** **Phone Number** **Office Location Address**

RESPONSIBILITIES

1. Reporting

The Project Manager or designee is responsible for ensuring that employees and subcontracted employees traveling to the work site are provided a copy of this JMP, driving directions, and safety rules for review and assistance in planning their trip to the site. If there are any issues, concerns, unsafe acts or conditions, incidents, near misses, regulatory questions, please contact use the following reporting tree:



** The OSC Project team will advise on Triage Contact and Corporate H&S 716-560-7542, contact.

JOURNEY PLAN

Driving Directions, Map and Meeting Point at Project

(INSERT HERE) **N**

GENERAL HAZARDS

- Drivers first time to the site and unfamiliar with the area.
- Chemical, electrical, and biological (ticks, snakes) risks at the site
- Traveling between 2-6am when you have the lowest body temperature, maximum sleepiness, poorest performance (mental and physical)
- Travel between 3-5 pm when you have high sleepiness and it is hard to stay vigilant.
- vehicular travel on freeways, city streets and rural roads
- vehicular travel on gravel/dirt roads,
- backing of vehicles
- changing weather conditions
- construction / work zones
- secure goods/cargo being transported and only carry
- long work day/travel can raise the risk of a crash due to fatigue to an unacceptable level
- windy rural roads

Sample Journey Plan

Journey Management Plan	**Destination: Bayer Crop Science, Institute West Virginia**	
☐ OSC Employees ☒ and/or Sub-contractor Employees	Convoy?: ☒ Yes ☐ No - Leader: Justin Romanow Meeting/rest points: Power Plant Gate	Has an Emergency Response Plan been prepared? ☒ Yes ☐ No Who is responsible for emergency response to this journey? OSC
Pre-trip planning meeting held? ☒ Yes Date 5/31/12 ☐ No	Security / Escort Requirements? ☒ Yes ☐ No - If Yes, explain: Escort needed on Site by CH2MHill	**Origin to Arrival Distance:** ~250 miles **Driving job/tasks:** Drive to the facility fo visit.
Driver: Don Wall Company: OSC Phone: 443-463-5527 **Alternate Driver:** No	**Journey Manager:** Bill Fleck Company: OSC Phone: 716-560-7542	**Emergency Contact:** Jim Bentley Company: OSC Phone: 443-271-5433
Insurance details/contacts–all vehicles? ☒ Yes ☐ No **Is the driving license valid for the vehicle driver / country?** ☒ Yes ☐	**Preventative Maintenance Check Completed Each Day** ☒ Yes ☐ No **Vehicle Suitable for the Trip/Road Conditions?** ☒ Yes ☐ No Any item identified as needing attention must be noted on the inspection form and brought to the supervisor's attention immediately.	
Is the another way to achieve trip's Objective (Transportation Co. etc?) ☐ Yes ☒ No	**Is this trip necessary?** ☒ Yes, for Site Visit ☐ No	**Is defensive Driver Training for the Driver(s) valid?** ☒ Yes ☐ No
Does this journey require night driving? ☐ Yes ☒ No (if yes describe controls to minimize risk)	**Phone Service** (Satellite phone, etc.?): Verizon works at the site, T-Mobile has limited to no service.	Is each vehicle equipped with all conducted for all vehicles? ☒ Yes ☐ No
Vehicle(s): Personal Type Suitable for Site: ☒ Yes ☐ No	**Passengers**: None	**Job Safety Analysis Complete?** Yes
Trailer?: ☐ Yes ☒ No	Park so first movement is forward? ☒ Yes ☐ No	Informed to us Spotters onsite? ☒ Yes ☐ No
Weather: Temperature: 70º & partly cloudy Dry? ☒ Windy? ☐ Rain? ☐ Snow? ☐ Fog? ☒ Dust? ☒	**Road Conditions** Sealed? ☒ Yes ☐ No Pot-holed/rough? ☒ Yes ☐ No Mixed (<50% sealed)? ☒ Yes ☐ No	Hours on duty: 2 hrs Planned journey travel: 7.5 hrs Total hours on duty*: **9.5 hrs** (* Must be less than 14 hrs)

Route Destination / / Rest Areas	Arrival Time	Departure Time	Rest Break?	Is Contact Required?	Known hazards / weather / road conditions to destination / rest area
Departure: 6/4/12 Rising Sun, Maryland		06:00		No, unless delay	Morning sun glare.
Break: 6/4/12 I-76W mile post 202.5, Service Plaza Blue Mountain	08:00	08:15	15 minutes	Yes, A. Long	Windy/gravel roads near the site.
Arrival: 6/4/12 Homer City Power Plant Guard Booth to meet OSC / Escort to the Site	11:00	13:00?	No	Yes, A. Long	Road is gravel/pot holes – drive cautiously. Multiple hazards at the Site, must be escorted onto site by OSC and oriented upon arrival.
Institute, WV	15:30	?			

Did the trip go as planned, if not, why (Use Reverse for Additional Space)**?**

All vehicle accidents and other associated events shall be reported immediately to OSC project management according to the reporting structure and the employee's supervisor. Failure to report an accident will be subject to standard progressive discipline. A written report shall be filed within 24 hrs of the incident.

PPE Needed at the Site: Standard Level D PPE, Long Sleeves and Long Plant, Wear bug spray with Deet, Hard Hat, Safe (6" support), Traffic Safety Vest, Safety Glasses.

Driver Signature: (unless driver is also the Journey Manager):

Driving Life Saving Rules

1. No alcohol or drugs while working or driving - *Using alcohol, illegal drugs and misusing legal drugs or other substances will reduce your ability to do your job safely.*
    a. Always inform your Supervisor or the Person in Charge if you are taking medicine that may have an effect on your performance
    b. If in doubt, always check with your Supervisor or the Person in Charge who may seek medical advice
    c. Not use, keep, sell or distribute illegal drugs
    d. Intervene if you see a case of alcohol or drugs abuse
2. While driving, be proactive, be defensive, drive to survive, do not use your phone & do not exceed speed limits
    a. Speeding or using your phone while driving increases the risk of losing control of your vehicle.
    b. If you are a Driver you should:
        i. Not use a mobile phone or pager, send or read a text message, or use a hands-free mobile phone device
        ii. Stay at or below the maximum allowable speed for the road you are driving on as indicated by road signs or Journey Management instructions
        iii. Drive during daylight hours whenever possible. Avoid driving in adverse weather conditions.
        iv. Stay alert! Do not drive if you are sleepy. Take rest breaks if necessary.
        v. Adjust your speed to the prevailing conditions
        vi. Drive defensively, observe a safe following distance (3 second plus rule), scan the road ahead and use “the what if strategy” for anticipating hazards (have a plan B action to avoid the “what if” happens.
    c. If you are a Passenger you should:
        i. Intervene if a Driver is using a phone in a moving vehicle
        ii. Intervene if a Driver is exceeding the maximum allowable speed
3. Wear your seatbelt: *A seatbelt protects you from injury in the event of an incident while driving and keeps you safe.*
    a. *Includes, for example, safety belts in (rental) cars, taxis, (mini) buses, trucks, cranes, or forklift trucks, and involves persons in moving vehicles when engaged on Client business.*
    b. *Exceptions include vehicles where only lap seatbelts are available or in public transport where seat belts are not available.*
    c. You (Drivers and Passengers) should:

i. Always use a 3-point seatbelt *(please note exceptions above)*
ii. Check that your seatbelt works properly
iii. Keep your seatbelt properly fastened while in a moving vehicle
iv. Check that everyone in the vehicle is wearing a seatbelt properly before starting to drive
v. Intervene when your fellow passengers are not wearing seatbelts properly

4. Follow prescribed Journey Management Plan: *A Journey Management Plan is a plan for you as a Driver that will help you to travel and arrive safely.*
    a. If you are a Driver you should:
        i. Confirm if a Journey Management Plan is required before starting the journey. Consider alternate modes of travel other than driving (Plane, Train, Bus). Likewise consider if meeting can be done without any travel, i.e. conference call over the phone.
        ii. Discuss the Journey Management Plan with the authorised person
        iii. Understand the Journey Management Plan before starting the journey
        iv. Comply with the duty, driving and rest hours specified in the Journey Management Plan
        v. Follow the route specified in the Journey Management Plan
        vi. Always tell the authorised person immediately if changes occur
    b. If you are the Supervisor or Person in Charge you should routinely:
        i. Check that the Journey Management Plan is in place and being followed
        ii. Check that the Driver understands and complies with the Journey Management Plan
5. Inspect your vehicle prior to driving
    a. Exterior Physical Walk Around Inspection Key Items: Tires, lights (front, rear & running (if any)), windshield/glass, belts, wires, overall vehicle physical condition, signs of leaks, underbody & exhaust, hitches, trailer and lights (if applicable).
    b. Operational controls, signals and safety devices; steering, lights, signals, emergency signal, horn, brakes, defroster, ignition, radio, safety belts, driver seat and mirror adjustment.
    c. Required Documentation – license, inspection, registration and insurance current.
    d. Road Safety Kit containing Jumper Cables, First Aid Kit, Blanket, Flashlight and Emergency Light Flasher, Road Flares and or reflective traffic triangles.
    e. Cell phone in good working order with car charging cable.

ATTACHMENT 24 – EXCAVATION SAFETY PROGRAM

EXCAVATION SAFETY PROGRAM:

Purpose:

This Excavation Safety Program has been developed to protect employees from safety hazards that may be encountered during work in trenches and excavations. This program is intended to assure that:

- Employees who perform work in excavations are aware of their responsibilities and know how to perform the work safely.
- *OSC* has appointed one or more individuals within the company to assure compliance with the requirements of this program.
- The responsibilities of each Site Health and Safety Officer (SHSO), and workers, are clearly detailed.
- All persons involved in excavation and trenching work have received appropriate training in the safe work practices that must be followed when performing this type of work.

Definitions:

1. **Accepted Engineering Practices** are those requirements, which are compatible with standards of practice required by a registered professional engineer.
2. **Aluminum Hydraulic Shoring** is a pre-engineered shoring system comprised aluminum hydraulic cylinders (cross braces) used in conjunction with vertical rails (uprights) or horizontal rails (whalers). The system is designed specifically to support the sidewalls of an excavation and prevent cave-ins.
3. **ANSI"** means American National Standards Institute
4. **Approved"** means sanctioned, endorsed, accredited, certified, or accepted as satisfactory by a duly constituted and nationally recognized authority or agency including OSC, its clients or client representatives as specified.
5. **Authorized person"** means a person approved or assigned by the employer to perform a specific type of duty or duties or to be at a specific location or locations at the jobsite.
6. **Bell-Bottom Pier Hole** is a type of shaft or footing excavation, the bottom is made larger than the cross section above to form a belled shape.

7. **Benching** is a method of protecting employees from cave-ins by excavating the sides to form one or a series of horizontal levels or steps, usually with vertical or near-vertical surfaces between the levels.
8. **Cave-in** means the separation of a mass of soil or rock material from the side of an excavation or the loss of soil from under a trench shield or support system, and its sudden movement into the excavation by falling or sliding in a quantity that may be sufficient to entrap, bury, or injure and immobilize a person.
9. **Competent Person** is one who is capable of identifying existing and predictable hazards in the surroundings or working conditions, which are unsanitary, hazardous, or dangerous to employees. A competent person has the ability and authority to take prompt corrective measures to eliminate the previously mentioned conditions.
10. **Confined space** for the purpose of the excavation standard is defined as one having: (refer to Section 6 for more specific information)
    a) Limited access and egress.
    b) Ventilation, which could produce or contain a hazardous atmosphere.
    c) Is not designed for continuous human occupancy.
    d) Is deeper than four (4) feet.
11. **Cross Braces** are the horizontal members of a shoring system installed perpendicular to the sides of the excavation, the ends of which bear against either uprights or Wales.
12. **"Defect"** means any characteristic or condition which tends to weaken or reduce the strength of the tool, object, or structure of which it is a part.
13. **"Designated person"** means "authorized person" as defined in paragraph
14. **Faces or Sides** are the vertical or inclined earth surfaces formed as a result of the excavation.
15. **Failure** is the breakage, displacement, or permanent deformation of a structural member or connection that would reduce its structural integrity and its support capabilities.
16. **Hazardous atmosphere** is an atmosphere that may be harmful, cause death, illness, or injury by being explosive, poisonous, flammable, corrosive, oxidizing, irritating, or toxic.
17. **Kick out** is the accidental release or failure of a cross brace.
18. **Lockout-Tagout (LOTO)** or **lock and tag** is a safety procedure which is used in industry and research settings to ensure that dangerous machines are properly shut off and not started up again prior to the completion of maintenance or servicing work. It requires that hazardous power sources be "isolated and rendered inoperative" before any repair procedure is started. "Lock and tag" works in conjunction with a *lock* usually locking the device or

the power source with the hasp, and placing it in such a position that no hazardous power sources can be turned on. The procedure requires that a *tag* be affixed to the locked device indicating that it should not be turned on.

19. **NIOSH –** National Institute of Occupational Safety and Health. Institute which develops safety standards and specifications which the Occupational Safety and Health Act (OSHA) frequently reference.
20. **Protective system** is a method of protecting employees from hazards as specified such as cave-ins, materials that could roll or fall into the excavation or excavation face, collapse of adjacent structures. They include support systems, sloping and benching systems, shield systems, and other systems, which provide the necessary protection.
21. **Ramp** means an inclined walking or working surface used to gain access to one point from another and is constructed from earth or structural materials like wood or steel.
22. **Registered Professional Engineer** is a professional engineer registered in the state where the work is to be performed.
23. **Sheeting** is the member of a shoring system that retains the earth in position and is supported by other members of the shoring system.
24. **Shield (Trench Box, Trench Shield)** is a structure that is able to withstand the forces of a cave-in. Shields can be permanent structures that can be designed to be portable and moved along as the work progresses, pre-manufactured, or job-built in accordance with 1926.652 (c)(3).
25. **Shoring (Shoring System)** is a structure such as a metal hydraulic, mechanical, or timber shoring system that supports the sides of an excavation and is designed to prevent cave-ins.
26. **Sloping (Sloping System)** excavation to form sides of an excavation that are inclined away from the excavation. The angle of incline required to prevent a cave-in varies with differences in factors such as the soil type, environmental conditions of exposure, and application of surcharge loads.
27. **Stable Rock** is a solid mineral material that can be excavated with vertical sides and will remain intact while exposed. (See the standard for methods of converting unstable rock to stable rock.)
28. **Structural Ramp** is a ramp made of steel or wood and usually used for vehicle access. Soil or rock ramps are not considered structural.
29. **Support System** is a structure such as underpinning, bracing or shoring which provides support to an adjacent structure, underground installation, or the sides of an excavation.
30. **Tabulated Data** are tables and charts approved by a registered professional engineer and used to design and construct a protective system.

31. **Trenches** are a narrow excavation, in relation to length, made below the surface of the ground. Generally, the depth is greater than the width, but the width of a trench measured at the bottom is not greater than 15 feet. If forms or other structures are installed or constructed in an excavation and reduce the dimension from the structure to the side to 15 feet or less the excavation is considered a trench.
32. **Uprights** are vertical members of a trench shoring system placed in contact with the earth and usually positioned so that individual members do not come in contact with each other. Uprights in contact with each other are sheeting.
33. **Wales** are horizontal members of a shoring system placed parallel to the excavation face whose sides bear against the vertical members of the shoring system or earth.

ASSIGNMENT OF RESPONSIBILITY (Also See Section for "4 - TRAINING PROGRAM")

In administering the Excavation Safety Program, *OSC* will:

- Monitor the overall effectiveness of the program.
- Provide atmospheric testing and equipment selection as needed.
- Provide personal protective equipment as needed.
- Provide protective systems as needed.
- Provide training to affected employees and supervisors.
- Provide technical assistance as needed.
- Preview and update the program on at least an annual basis, or as needed.

Program Manager
The acts as the competent person for *OSC* in reference to this project plan/ program, and must assure that:

- The procedures described in this program are followed.
- Employees entering excavations or trenches are properly trained and equipped to perform their duties safely.
- All required inspections, tests, and recordkeeping functions have been performed.

Employees
All employees, including contractor personnel, who work in or around excavations, must comply with the requirements of this program. Employees are responsible for reporting hazardous practices or situations to *OSC* management, as well as, reporting incidents that cause injury to themselves or other employees to the SHSO.

TRAINING

Training Schedule

- All personnel involved in trenching or excavation work shall be trained in the requirements of this program by the SHSO, with assistance from the appropriate supervisors.
- Training shall be performed before employees are assigned duties in excavations.
- Retraining will be performed when work site inspections indicate that an employee does not have the necessary knowledge or skills to safely work in or around excavations, or when changes to this program are made.
- Training records will be maintained by the Corporate Health, Safety and Environmental Director (DIRECTOR, HS&E) with copies kept in the project files, and shall include:
    - date of the training program;
    - name(s) of the instructor(s) who conducted the training;
    - a copy of the written material presented; and
    - name(s) of the employee(s) who received the training

Training Components

The training provided to all personnel who perform work in excavations shall include:

- The work practices that must be followed during excavating or working in excavations.
- The use of personal protective equipment that will typically be required during work in excavations, including but not limited to safety shoes, hardhats and, if required, fall protection devices.
- Procedures to be followed if a hazardous atmosphere exists, or could reasonably be expected to develop, during work in an excavation.
- The OSHA Excavation Standard, 29 CFR 1926, Subpart P.
- Emergency and non-entry rescue methods and the procedure for calling rescue services.
- *OSC* policy on reporting incidents that cause injury to employees.

Training and Duties of Program Manager

The Program Manager (DIRECTOR, HS&E) and SHSO shall receive the training detailed in this program as well as training on the requirements detailed in the OSHA Excavation Standard. The Program Manager or SHSO shall:

- Coordinate, actively participate in, and document the training of all employees affected by this program.
- Ensure on a daily basis, or more often as detailed in this program, that worksite conditions are safe for employees to work in excavations.
- Determine the means of protection that will be used for each excavation project.
- Ensure, if required, that the design of a protective system has been completed and approved by a registered professional engineer before work begins in an excavation.
- Make available a copy of this program and the OSHA Excavation Standard to any employee who requests it.

EXCAVATION REQUIREMENTS

Utilities and Pre-Work Site Inspection

- Prior to excavation, the site shall be thoroughly inspected by the *Site Superintendent, Project Manager and/or SHSO* to determine if special safety measures must be taken.

Surface Encumbrances

- All equipment, materials, supplies, permanent installations (i.e., buildings or roadways), trees, brush, boulders, and other objects at the surface that could present a hazard to employees working in the excavation shall be removed or supported as necessary to protect employees and reduce "surcharge loading" on the Excavation/Trench edge[s].

Underground Installations

- The location of sewer, telephone, fuel, electric, water, or any other underground installations or wires that may be encountered during excavation work shall be determined and marked prior to opening an excavation. Arrangements shall be made as necessary by the *Site Superintendent and/or SHSO* with the appropriate utility entity for the location, protection, removal, shutdown, or relocation of underground installations.
- If the utility company does not respond within 24 hours and it is not possible to establish the exact location of these installations, the work may proceed with caution if detection equipment or other safe and acceptable means are used to locate the utility. **[Hand digging may be required].*
- Excavation shall be done in a manner that does not endanger the underground installations or the employees engaged in the work. Utilities left in place shall be protected by barricades, shoring, suspension, or other means as necessary to protect employees.

Protection of the Public
Barricades, walkways, lighting and posting shall be provided as necessary for the protection of the public prior to the start of excavation operations.

- Guardrails, fences, or barricades shall be provided on excavations adjacent to walkways, driveways, and other pedestrian or vehicle thoroughfares. Warning lights or other illumination shall be maintained as necessary for the safety of the public and employees from sunset to sunrise.
- Wells, holes, pits, shafts, and all similar hazardous excavations shall be effectively barricaded or covered and posted as necessary to prevent unauthorized access. All temporary excavations of this type shall be backfilled as soon as possible.

- Walkways or bridges protected by standard guardrails shall be provided where employees and the general public are permitted to cross over excavations that are 6 feet or more in depth. Where workers in the excavation may pass under these walkways or bridges, a standard guardrail and toeboard shall be used to prevent the hazard of falling objects. Information on the requirements for guardrails and toeboards may be obtained by contacting the *SHSO*.

Protection of Employees
Stairs, ladders, or ramps shall be provided at excavation sites where employees are required to enter trench excavations over four (4) feet deep. The maximum distance of lateral travel (along the length of the trench) from the point of work necessary to reach the means of egress shall not exceed 25 feet in either lateral direction.

(ie: If a Trench is 200 feet long and work is being done at the 100 foot or center location, a ladder is needed on both sides of the work area at a distance of 25 feet).

- Structural Ramps (used only on specific projects)
  - Structural ramps used solely by employees as a means of access or egress from excavations shall be designed by a competent person. Structural ramps used for access or egress of equipment shall be designed by a person qualified in structural design, and shall be constructed in accordance with the design.
  - Ramps and runways constructed of two or more structural members shall have the structural members connected together to prevent movement or displacement.

- Structural members used for ramps and runways shall be of uniform thickness.
- Cleats or other appropriate means used to connect runway structural members shall be attached to the bottom of the runway or shall be attached in a manner to prevent tripping.
- Structural ramps used in place of steps shall be provided with cleats or other surface treatments on the top surface to prevent slipping.

- Ladders

- When portable ladders are used, the ladder side rails shall extend a minimum of three (3) feet above the upper surface of the excavation.

- Ladders shall have nonconductive side rails if work will be performed near exposed energized equipment or systems.

- Two or more ladders, or a double-cleated ladder, will be provided where 25 or more employees will be conducting work in an excavation where ladders serve as the primary means of egress, or where ladders serve two-way traffic.

- Ladders will be inspected prior to use for signs of damage or defects. Damaged ladders will be removed from service and marked with “Do Not Use” until repaired or destroyed.

- Ladders shall be used only on stable and level surfaces unless secured from movement. Ladders placed in any location where they can be displaced by workplace activities or traffic shall be secured, or barricades shall be used to keep these activities away from the ladders.

- Non self-supporting ladders [extension ladders] shall be positioned so that the foot of the ladder is one-quarter of the working length away from the support.

- Employees are not permitted to carry any object or load while on a ladder that could cause them to lose their balance and fall.

Exposure to Vehicular Traffic

Employees exposed to vehicular traffic shall be provided with, and shall wear; warning vests or other suitable garments marked with or made of reflective or high-visibility material. Warning vests worn by flagmen shall be Lime Green, and shall be reflective material if worn during night work. Emergency lighting, such as spotlights or portable lights, shall be provided as needed to perform work safely.

Exposure to Falling Loads

No employee is permitted underneath loads being handled by lifting or digging equipment. Employees are required to stand away from any vehicle being loaded or unloaded to avoid being struck by any spillage or falling materials. Operators may remain in the cabs of vehicles being loaded or unloaded when the vehicles provide adequate protection for the operator during loading and unloading operations.

Warning System for Mobile Equipment

A warning system shall be used when mobile equipment is operated adjacent to the edge of an excavation if the operator does not have a clear and direct view of the edge of the excavation. The warning system shall consist of barricades, hand or mechanical signals, or stop logs. If possible, the grade should be away from the excavation.

Hazardous Atmospheres

The *SHSO* will test the atmosphere in excavations over four (4) feet deep if a hazardous atmosphere exists or could reasonably be expected to exist. A hazardous atmosphere could be expected, for example, in excavations in landfill areas, areas where hazardous substances are stored nearby, or near areas containing gas pipelines.

- Adequate precautions shall be taken to prevent employee exposure to atmospheres containing less than 19.5 percent oxygen and other hazardous atmospheres. These precautions include providing proper respiratory protection or forced ventilation of the workspace.

- Forced ventilation or other effective means shall be used to prevent employee exposure to an atmosphere containing a flammable gas in excess of ten (10) percent of the lower flammability limit of the gas.

- When controls are used that are intended to reduce the level of atmospheric contaminants to acceptable levels, continuous air monitoring will be performed by the SHSO or their designee. The device used for atmospheric monitoring shall be equipped with an audible and visual alarm.

- Atmospheric testing will be performed using a properly calibrated direct reading gas monitor. Direct reading gas detector tubes, Quad meter or other acceptable means may also be used to test potentially toxic atmospheres.

- Each atmospheric testing instrument shall be calibrated by the *SHSO* on a schedule and in the manner recommended by the manufacturer. In addition:
    - Any atmospheric testing instrument that has not been used within 30 days shall be recalibrated prior to use.
    - Each atmospheric testing instrument shall be calibrated at least every six (6) months.

Each atmospheric testing instrument will be field checked immediately prior to use to ensure that it is operating properly.

Personal Protective Equipment

- All employees working in trenches or excavations shall wear approved hardhats and steel-toed shoes or boots.

- Employees exposed to flying fragments, dust or other materials produced by drilling, sawing, sanding, grinding, and similar operations shall wear approved safety glasses with side shields.

- Employees performing welding, cutting, or brazing operations, or are exposed to the hazards produced by these tasks, shall wear approved spectacles or a welding face shield or helmet, as determined by the *SHSO*.

- Employees entering bell-bottom pier holes or other similar deep and confined footing excavations shall wear a harness with a lifeline securely attached to it. The lifeline shall be separate from any line used to handle materials and shall be individually attended at all times while the employee wearing the lifeline is in the excavation.

- Employees shall wear, as determined by the SHSO, approved gloves or other suitable hand protection as required by the work and/or potential exposure.

- Employees using, or working in, the immediate vicinity of hammer drills, pile/sheeting drivers, masonry saws, jackhammers, or similar high-noise producing equipment shall wear suitable hearing protection, as determined by *the SHSO and outlined in the Site HASP*.

- Each employee working at the edge of an excavation six (6) feet or more deep shall be protected from falling. Appropriate Fall Protection may include guardrail systems, fences, barricades, covers, or a tie-back system meeting OSHA requirements, as determined by the *SHSO*.

- Emergency rescue equipment, such as a breathing apparatus, a safety harness and line and a basket stretcher, shall be readily available where hazardous atmospheric conditions may exist or develop during work in an excavation. This equipment shall be attended when in use. Only personnel who have received approved training and have appropriate equipment shall attempt retrieval that would require entry into a hazardous atmosphere. If entry into a known hazardous atmosphere must be performed, then the *SHSO* shall be given advance notice so that the hazards can be evaluated and rescue personnel placed on standby if necessary.

Walkways and Guardrails

Walkways shall be provided where employees or equipment are permitted to cross over excavations. Guardrails shall be provided, to provide protection from falling hazards, where walkways, accessible only to on-site project personnel, are six (6) feet or more above lower levels.

Protection from Water Accumulation Hazards

- Employees are not permitted to work in excavations that contain or are accumulating water unless precautions have been taken to protect them from the hazards posed by water accumulation. Precautions may include special support or shield systems [Trench Boxes] to protect from cave-ins, water removal to control the level of accumulating water, or use of safety harnesses and lifelines.

- If water is controlled or prevented from accumulating by the use of water removal equipment, the water removal equipment and operation shall be monitored by a person trained in the use of that equipment.

- If excavation work interrupts the natural drainage of surface water (such as streams), then diversion ditches, dikes, or other suitable means shall be used to prevent surface water from entering the excavation. Precautions shall also be taken to provide adequate drainage of the area adjacent to the excavation. Excavations subject to runoff from heavy rains or freeze-thaw cycles shall be re-inspected by the *SHSO* after each rain incident to determine if additional precautions, such as special support or shield systems to protect from cave-ins, water removal to control the level of accumulating water, or use of safety harnesses and lifelines, should be used. *LOGS OF EVERY INSPECTION MUST BE KEPT

- The *SHSO* shall inform affected workers of the precautions or procedures that are to be followed if water accumulates or is accumulating in an excavation.

Stability of Adjacent Structures

*The SHSO, Project Engineer, Superintendent or Project Manager*_will determine if the excavation work could affect the stability of adjoining buildings, walls, sidewalks, or other structures.

- Support systems (such as shoring, bracing, or underpinning) shall be used to assure the stability of structures and the protection of employees where excavation operations could affect the stability of adjoining buildings, walls, or other structures.

- Excavation below the level of the base or footing of any foundation or retaining wall that could be reasonably expected to pose a hazard to employees shall not be permitted, except when:
    - a support system, such as underpinning, is provided to ensure the safety of employees and the stability of the structure;
    - the excavation is in stable rock;
    - a registered professional engineer has approved the determination that the structure is sufficiently removed from the excavation so as to be unaffected by the excavation activity; or
    - a registered professional engineer has approved the determination that such excavation work will not pose a hazard to employees.
- Sidewalks, pavements, and appurtenant structures shall not be undermined unless a support system or other method of protection is provided to protect employees from the possible collapse of such structures.

- Where review or approval of a support system by a registered professional engineer is required, the *SHSO* shall secure this review and approval in writing before the work begins.

Protection from Falling Objects and Loose Rocks or Soil

- Adequate protection shall be provided to protect employees from loose rock or soil that could pose a hazard by falling or rolling from an excavation face. Such protection shall consist of:
  - scaling to remove loose material;
  - installation of protective barricades, such as wire mesh or timber, at appropriate intervals on the face of the slope to stop and contain falling material; or
  - benching sufficient to contain falling material.

- Excavation personnel shall not be permitted to work above one another where the danger of falling rock or earth exists.
- Employees shall be protected from excavated materials, equipment, or other materials that could pose a hazard by falling or rolling into excavations.
- Protection shall be provided by keeping such materials or equipment at least two (2) feet from the edge of excavations, by use of restraining devices that are sufficient to prevent materials or equipment from falling or rolling into excavations, or by a combination of both if necessary.
- Materials and equipment may, as determined by the *SHSO*, need to be stored further than two (2) feet from the edge of the excavation if a hazardous "Surcharge" loading condition is created on the face of the excavation.
- Materials piled, grouped, or stacked near the edge of an excavation must be stable and self-supporting and not produce excessive surcharge loading.

Inspection by Program Manager

The Corporate Director, HS&E (Program Manager) or the SHSO shall conduct daily inspections of excavations, adjacent areas, and protective systems for evidence of a situation that could result in possible cave-ins, failure of protective systems, hazardous atmospheres, or other hazardous conditions. An inspection shall be conducted by the *SHSO* prior to the start of work and as needed throughout the shift. Inspections shall also be made after every rainstorm or other hazard-increasing occurrence. These inspections are only required when the trench will be, or is, occupied by employees and a Log of EVERY inspection must be kept.

Where the *SHSO* finds evidence of a situation that could result in a possible cave-in, failure of protective systems, hazardous atmosphere, or other hazardous conditions, exposed employees shall be removed from the hazardous area until precautions have been taken to assure their safety.

The *SHSO* shall maintain a written log of all inspections conducted. This log shall include the date, work site location, results of the inspection, and a summary of any action taken to correct existing hazards.

PROTECTIVE SYSTEM REQUIREMENTS

Protection of Employees

Employees in an excavation shall be protected from cave-ins by using either an adequate sloping and benching system or an adequate support or protective system (ie: Trench Boxes or Shoring). The only exceptions are:

- excavations made entirely in stable rock; or
- excavations less than five (5) feet in depth where examination of the ground by the *SHSO* provides no indication of a potential cave-in.

Protective systems shall be capable of resisting all external loads that could reasonably be expected to be applied to the system.

Design of Sloping and Benching Systems

The slope and configuration of sloping or benching systems shall be selected and constructed by the *SHSO* or other Competent Person in accordance with the following options:

- Allowable configurations and slopes
  - Excavations shall be sloped at an angle no steeper than one and one-half (1 ½) horizontal to one (1) vertical (34 degrees measured from the horizontal) which is Type C soil, unless one of the options listed below is used.
  - Slopes shall be properly excavated depending on soil type as shown in 29 CFR 1926, Subpart P, Appendix B.

- Determination of slopes and configurations using 29 CFR 1926, Subpart P, Appendices A and B
- The maximum allowable slopes and allowable configurations for sloping and benching systems shall meet the requirements set forth in these appendices.
- Designs using other tabulated data
  The design of sloping or benching systems may be selected from, and shall be constructed in accordance with, other tabulated data, such as tables and charts. The tabulated data used must be in written form and include the following:

    - Identification of the factors that affect the selection of a sloping or benching system.
    - Identification of the limits of the use of the data, including the maximum height and angle of the slopes determined to be safe.
    - Other information needed by the user to make correct selection of a protective system.
    - At least one copy of the tabulated data that identifies the registered professional engineer who approved the data shall be maintained at the jobsite during construction of the protective system. After that time, the data may be stored off the jobsite, and shall be maintained by the *SHSO or DIRECTOR, HS&E*.

Design by a registered professional engineer
Sloping or benching systems designed in a manner other than those described in the preceding three options shall be approved by a registered professional engineer.

- Designs shall be in written form and shall include at least the following information:
    - the maximum height and angle of the slopes that were determined to be safe for a particular project; and
    - the identity of the registered professional engineers who approved the design.
    - At least one copy of the design shall be maintained at the jobsite while the slope is being constructed. After that time, the design may be stored off the jobsite, and shall be maintained by the *SHSO or DIRECTOR, HS&E*.

Design of Support, Shield, and Other Protective Systems
The design of support systems, shield systems, and other protective systems shall be selected and constructed by *the SHSO, Registered Engineer, Project Superintendent or other Competent Person* in accordance with the following requirements:

Designs using 29 CFR 1926, Subpart P, Appendices A, C and D

- Timber shoring in trenches shall be designed in accordance with the requirements of the OSHA guidelines.

- *Any Excavation 20 feet or more in depth requires a Registered Engineers design and/or approval regardless of the system selected for use*

Aluminum hydraulic shoring shall be designed in accordance with the manufacturer's tabulated data or the requirements of the OSHA guidelines.

Designs using manufacturer's tabulated data

- Support systems, shield systems, and other protective systems designed from manufacturer's tabulated data shall be constructed and used in accordance with all specifications, recommendations, and limitations issued or made by the manufacturer.

- Deviation from the specifications, recommendations, and limitations issued or made by the manufacturer shall be allowed only after the manufacturer issues specific written approval.

- Manufacturer's specifications, recommendations, and limitations, as well as the manufacturer's written approval to deviate from the specifications, recommendations, and limitations, shall be kept in written form at the jobsite during construction of the protective system(s). After that time, the information may be stored off the jobsite, and shall be maintained by the *DIRECTOR, HS&E or SHSO*.

Designs using other tabulated data
Designs of support systems, shield systems, and other protective systems shall be selected from and constructed in accordance with tabulated data, such as tables and charts.

The tabulated data shall be in written form and shall include all of the following:

- identification of the factors that affect the selection of a protective system drawn from such data;
- identification of the limits of the use of such data; and
- information needed by the user to make a correct selection of a protective system from the data.

At least one written copy of the tabulated data, which identifies the registered professional engineer who approved the data, shall be maintained at the jobsite during construction of the protective system. After that time, the data may be stored off the jobsite, and shall be maintained by the *DIRECTOR, HS&E or SHSO*.

Design by a registered professional engineer
Support systems, shield systems, and other protective systems designed in a manner other than the preceding three options shall be approved by a registered professional engineer.

Designs shall be in written form and shall include:

- a plan indicating the sizes, types, and configurations of the materials to be used in the protective system; and
- the identity of the registered professional engineer who approved the design.

At least one copy of the design shall be maintained at the jobsite during construction of the protective system. After that time, the design may be stored off the jobsite, and shall be maintained by the *DIRECTOR, HS&E or SHSO*.

Materials and Equipment

- Materials and equipment used for protective systems shall be free from damage or defects that might affect their proper function.
- Manufactured materials and equipment used for protective systems shall be used and maintained in accordance with the recommendations of the manufacturer, and in a manner that will prevent employee exposure to hazards.
- When materials or equipment used for protective systems are damaged, the *SHSO or Superintendent* shall ensure that these systems are examined by a competent person to evaluate suitability for continued use. If the competent person cannot assure that the material or equipment is able to support the intended loads or is otherwise suitable for safe use, then such material or equipment shall be removed from service. The material or equipment shall then be evaluated and approved by a registered professional engineer before being returned to service.

Installation and Removal of Supports

General

- Members of support systems shall be securely connected together to prevent sliding, falling, kick-outs, or other potential hazards.
- Support systems shall be installed and removed in a manner that protects employees from cave-ins, structural collapses, or from being struck by members of the support systems.
- Individual members of the support systems shall not be subjected to loads exceeding those that they were designed to support.
- Before temporary removal of individual support members begins, additional precautions shall be taken as directed by the *SHSO, Superintendent or Engineer* to ensure the safety of employees (i.e., the installation of other structural members to carry the loads imposed on the support system).
- Removal of support systems shall begin at, and progress from, the bottom of the excavation. Members shall be released slowly. If there is any indication of possible failure of the remaining members of the structure or possible cave-in of the sides of the excavation, the work shall be halted until it can be examined by the *SHSO, Superintendent, Engineer or other Competent Person*.

- Backfilling shall progress in conjunction with the removal of support systems from excavations.

Additional Requirements

- Excavation of material to a level no greater than two (2) feet below the bottom of the members of a support system is allowed, but only if the system is designed to resist the forces calculated for the full depth of the trench. There shall be no indications of a possible loss of soil from behind or below the bottom of the support system while the trench is open.

- Installation of a support system shall be closely coordinated with the excavation of trenches.

Sloping and Benching Systems

Employees are not permitted to work above other employees in the faces of sloped or benched systems, except when employees at lower levels are protected from the hazards of falling, rolling, or sliding material or equipment.

Shield Systems

General

- Shield systems shall not be subjected to loads that are greater than those they are designed to withstand.
- Shields shall be installed in a manner that will restrict lateral or other hazardous movement of the shield and could occur during cave-in or unexpected soil movement.
- Employees shall be protected from the hazard of cave-ins when entering or exiting the areas protected by shields. **THEY MUST ENTER BY MEANS OF A LADDER THAT IS PLACED INSIDE THE TRENCH BOX(ES)*
- Employees are not permitted in trenches when shields are being installed, removed, or moved vertically.

Additional Requirements

- Excavation of material to a level no greater than two (2) feet below the bottom of the shield system is allowed, but only if the system is designed to resist the forces calculated for the full depth of the trench.

- There shall be no indications of a possible loss of soil from behind or below the bottom of the shield system while the trench is open.

ACCIDENT INVESTIGATIONS

All incidents that result in injury to workers, as well as near misses, regardless of their nature, shall be reported and investigated. Investigations shall be conducted by the *SHSO* as soon after an incident as possible to identify the cause and means of prevention to eliminate the risk of reoccurrence.

In the event of such an incident, the Excavation Safety Program shall be reevaluated by the *SHSO* to determine if additional practices, procedures, or training are necessary to prevent similar future incidents.

CHANGES TO PROGRAM

Any changes to the Excavation Safety Program shall be approved by *DIRECTOR, HS&E, Project Manager or Engineer,* and shall be reviewed by a qualified person as the job progresses to determine additional practices, procedures, or training needs necessary to prevent injuries. Affected employees shall be notified of procedure changes, and trained if necessary. A copy of this program shall be maintained at the jobsite by the *SHSO*.

ATTACHMENT 25 - FIRE PROTECTION PROGRAM

Fire Prevention Program Purpose:

To assure all OSC operations are safe from fire incidences that could cause injury or property damage and all locations are properly prepared in a fire emergency. This program shall be reviewed and updated annually or sooner as warranted by audit/inspection recommendations, incident investigation, regulation and equipment change or other improvement measure recommendations.

PERSONNEL RESPONSIBILITIES (Also See Manual Sections 2.0 – 2.6 "RESPONSIBILITIES")

- Director, HS&E - The Director, HS&E is responsible for assuring this program is reviewed and updated as necessary (product changes and updates, regulatory updates, program performance improvements). The program shall be as a minimum reviewed and updated annually.

- Managers and Supervisors - Managers and Supervisors are responsible for assuring their projects/operations and employees are in compliance with the requirements of this program (training, application, practice and procedures).

- Employees – Employees are responsible for following all policies and procedures as required by this program as well as report any perceived program deficiencies (violations and errors) or improvement measures to their supervisor). NOTE – All employees have the authority and responsibility to stop work for safety concerns. "If you see it, you own it".

- Subcontractors – All subcontractors are responsible for following all policies and procedures as required by this program as well as report any perceived program deficiencies (violations and errors) or improvement measures to their superior). NOTE – All employees have the authority and responsibility to stop work for safety concerns. "If you see it, you own it".

Definitions:

1. *Closed container* means a container so sealed by means of a lid or other device that neither liquid nor vapor will escape from it at ordinary temperatures.
2. *Combustion* means any chemical process that involves oxidation sufficient to produce light or heat.
3. *Fire resistance* means so resistant to fire that, for specified time and under conditions of a standard heat intensity, it will not fail structurally and will not permit the side away from the fire to become hotter than a specified temperature. For purposes of this part, fire resistance shall be determined by the Standard Methods of Fire Tests of Building Construction and Materials, NFPA (National Fire Protection Association) 251-1969.
4. *Flammable* means capable of being easily ignited, burning intensely, or having a rapid rate of flame spread.
5. *Flammable liquid* means any liquid having a vapor pressure not exceeding 40 pounds per square inch (absolute) at 100 °F (37.8 °C) and having a flashpoint at or below 199.4 °F (93 °C). Flammable liquids are divided into four categories as follows:
6. Category 1 shall include liquids having flashpoints below 73.4 °F (23 °C) and having a boiling point at or below 95 °F (35 °C).
7. Category 2 shall include liquids having flashpoints below 73.4 °F (23 °C) and having a boiling point above 95 °F (35 °C).
8. Category 3 shall include liquids having flashpoints at or above 73.4 °F (23 °C) and at or below 140 °F (60 °C).
9. Category 4 shall include liquids having flashpoints above 140 °F (60 °C) and at or below 199.4 °F (93 °C).
10. *Flash point* of the liquid means the temperature at which it gives off vapor sufficient to form an ignitable mixture with the air near the surface of the liquid or within the vessel used as determined by appropriate test procedure and apparatus as specified below.
11. *Liquefied petroleum gases*, *LPG* and *LP Gas* mean and include any material which is composed predominantly of any of the following hydrocarbons, or mixtures of them, such as propane, propylene, butane (normal butane or iso-butane), and butylenes.
12. *Portable tank* means a closed container having a liquid capacity more than 60 U.S. gallons, and not intended for fixed installation.
13. *Safety can* means an approved closed container, of not more than 5 gallons capacity, having a flash-arresting screen, spring-closing lid and spout cover and so designed that it will safely relieve internal pressure when subjected to fire exposure.
14. *Vapor pressure* means the pressure, measured in pounds per square inch (absolute), exerted by a volatile liquid as determined by the "Standard Method of Test for Vapor Pressure of Petroleum Products (Reid Method).

Fire Prevention - Housekeeping

- Regular inspections of project sites shall be conducted at a minimum weekly to for fire prevention; proper storage of flammables, combustibles, ignition sources elimination and control (see also Welding and Cutting Section, Hot Work Permits and)
- Good housekeeping must be maintained at all work areas and vehicles.
- Combustible materials, such as oil soaked rags, wastes and shaving must be kept in metal containers with self-closing lids or in an area far removed from any other flammable materials. All containers should be emptied as soon as possible.
- Paper and other combustible material shall not be allowed to accumulate. Weeds and other vegetation shall not be permitted to grown in or around equipment storage areas.
- Flammable liquids such as gas, kerosene, benzene, naphtha, paints, lacquer thinner, or solvents may not be used for cleaning purposes unless approved methods are employed for their safe use.
- All solvents and flammable liquids must be kept in UL listed-type, properly labeled, safety cans (self closing lid and equipped with flash arrestor).
- When pouring or pumping gasoline or other flammable fuels/solvents from one container to another, metallic contact shall be maintained between the receiving and pouring containers at all times, or bond with a bonding wire connected to each. When refueling, engines must be cut off.
- Employees shall not smoke in close proximity to flammable liquids, gases or explosives, either on property occupied by the Company or elsewhere. Smoking must be designated areas only.
- No smoking is allowed in areas designated as no smoking areas. All lighters and matches should be left in the truck to avoid the unconscious accidental usage while in a hazardous atmosphere. Smoking is designated "no-smoking" areas is subject to disciplinary action.
- No more than 25 gallons (five 5 gallon cans) can be stored at a site in anyone single area outside of a UL approved flammable storage cabinet. Flammable storage cabinets shall be properly located (away from ignition and heat, and protected from damage) installed, vented and kept secure per the MFG's, NFPA and OSHA requirements.
- Bulk storage of combustible and flammable liquids in excess of 100 gallons shall require a site specific bulk storage protection plan be developed by a qualified person. The plan shall meet the OSHA and NFPA requirements for bulk storage and use. Bulk storage plans shall detail, frequency of inspections

(prior to use weekly at close of week), documentation requirements, design specifications and placement of tanks (double wall or spill containment/weather containment, grounding and fill alarm, security lockable, etc), location, traffic protection (barricades), use and tank, maintenance, filling, refueling procedures, fire protection (minimum clearly visible/accessible 20lb ABC dry chemical fire extinguisher not less than 25 feet away not more than 75 feet away from storage tank) and hazard warning sign requirements.

Fire Protection - Extinguishers

Properly selected and maintained firefighting equipment is an essential part of fire prevention. Extinguishers must be located at easily accessible places and each employee must know how to inspect and properly operate each extinguisher. Training shall be completed at the time of hire, at the beginning of each project and thereafter at least. As a minimum at least one 10 lb ABC dry chemical fire extinguisher shall be available within 75 ft of any work area (line of sight) to assure adequate coverage (one 10 lb ABC extinguisher for every 3000 square feet). Extinguishers must be regularly inspected monthly or sooner as warranted by requirements; physical inspection, no visible signs of damage, pin is in trigger keeper to prevent accidental discharge, extinguisher 180 degree rotation is performed for dry chemical extinguishers to assure dry suppressant is loose. In sections shall be documented on the extinguishers attached inspection tag. All portable dry chemical extinguishers shall at a minimum be tested annually and serviced per the MFG's, NFPA and OSHA guidelines; pressure tested, refilled and weighed, with documented inspection affixed to each extinguisher.

ATTACHMENT 26 – POWERED INDUSTRIAL FORK TRUCK PROGRAM

Powered Industrial Trucks (Forklifts)

PROGRAM PURPOSE:
To assure Industrial Fork Truck use is performed safely without incident and in compliance with Federal OSHA regulations under the applicable 1926 construction and 1910 general industry standard. This program shall be reviewed annually for effectiveness and compliance or sooner as warranted by change in conditions (regulatory change, equipment change, inspection/audit recommendations, incident investigation findings or other realized improvement measures).

RESPONSIBILITIES (Also See Manual Sections 2.0 – 2.6 "RESPONSIBILITIES")

- Director, HS&E - The Director, HS&E is responsible for assuring this program is reviewed and updated as necessary (product changes and updates, regulatory updates, program performance improvements). The program shall be as a minimum reviewed and updated annually.

- Managers and Supervisors - Managers and Supervisors are responsible for assuring their projects/operations and employees are in compliance with the requirements of this program (training, application, practice and procedures).

- Employees – Employees are responsible for following all policies and procedures as required by this program as well as report any perceived program deficiencies (violations and errors) or improvement measures to their supervisor). NOTE – All employees have the authority and responsibility to stop work for safety concerns. "If you see it, you own it".

- Subcontractors – All subcontractors are responsible for following all policies and procedures as required by this program as well as report any perceived program deficiencies (violations and errors) or improvement measures to their superior). NOTE – All employees have the authority and responsibility to stop work for safety concerns. "If you see it, you own it".

Training of all authorized employees shall be conducted by an authorized OSC instructor at the time of hire and there after an operator performance review shall be required for each authorized operator. Frequency of operator review may be sooner if warranted by change in conditions. Operators who fail the review shall be required to retake and successfully complete another Forklift training class for the type of lift(s) they are operating. Operator license shall be issued for each successfully trained authorized operator, noting date of issue, name of operator, name of instructor and type of equipment authorized to operate. Training records shall be maintained at the local project field office and corporate office for review.

PROCEDURES:

For the protection of all persons involved with *OSC* projects, the following rules apply for use of powered industrial trucks or forklifts:

- Only authorized persons shall be permitted in the cab or on the equipment. Only those designated persons who are trained and qualified shall operate a powered industrial truck. Unauthorized employees shall be advised of this policy rule in their required safety training.
- Industrial trucks shall be examined daily before being placed in service. Operator manual available and current with lift. The vehicle shall not be placed in service if any condition is found that would adversely affect safety. Documented lift inspections - All fork trucks shall be inspected daily prior use by the authorized operator per the MFG lift specifications. Defective equipment shall be tagged out not to use at the control and locked out (key removed and secured).
- Only trained and authorized employees are permitted to perform refueling and charging of forklifts. All refueling and charging shall be performed in a designated area that is designed for safe refueling and charging per the MFG specifications as it applies to the particular each specific lift. Smoking is prohibited in refueling and charging areas.
- ANSI approved eyewash station shall be readily available in the immediate lift charging area.
- A minimum 20 lb ABC dry chemical fire extinguisher shall be readily available and maintained at refueling and charging stations (within 75 feet not less than 25 feet).
- No additional unauthorized passengers are permitted to ride on the lift truck other than the authorized operator.
- Lift operators shall wear seat belts as equipped and required by MFG during lift operation.
- Cell phone use is prohibited when operating fork trucks.
- Wheels of trailer shall choked and trailer breaks locked when loading and unloading trucks.
- Dock levelers shall be inspected and secured prior to loading and unloading trailers.
- Floor and ground loading shall be assessed for proper capacity and lift use by the site competent person prior to authorizing lift use. Load rating for floors shall be posted.
- Industrial trucks shall not be altered unless approved by the truck manufacturer.

- All fork trucks shall be equipped as a minimum with 1 fully charged 5 lb ABC dry chemical extinguisher.
- Load limits, as specified by the manufacturer, shall not be exceeded under any circumstances.
- Operating and maintenance procedures, as specified by the manufacturer, shall be followed.
- Any power-operated industrial truck not in safe operating condition shall be removed from service. Authorized personnel shall make all repairs.
- No load shall be lifted until its weight has been determined.
- Free rigging (unsecured, non-locking connections) to the forks for hoisting is prohibited. Only approved pre-engineered hoisting attachments with positive locking connections that are per the MFG specifications can be used with forklifts for hoisting. All rigging shall be performed by a competent rigger.
- Operation of fork trucks in hazardous atmospheres is prohibited.
- Only stable or safely arranged loads shall be handled. Caution shall be exercised when handling off-center loads that cannot be centered.
- Trucks shall not be driven up to anyone standing in front of any fixed object.
- No person shall be allowed to stand or pass under the elevated portion of any truck, whether loaded or empty.
- When a truck is left unattended, out of view or is located more than 25 feet away, the load engaging means shall be fully lowered to ground/floor level, controls shall be neutralized, power shut off and brakes set. Wheels shall be blocked if on an incline.
- The truck operator shall be required to look in the direction of, and keep a clear view of, the path of travel.
- When ascending or descending grades in excess of ten degrees, loaded trucks shall be driven slowly with the load upgrade.
- No truck shall be operated with a leak in the fuel system until the leak has been corrected.

- Truck operators shall exercise extreme caution when in close proximity to energized lines or equipment. The operator shall maintain minimum 15 feet of clearance from the energized source.
- Carbon fuel powered lifts shall be operated in a well ventilated area. Air monitoring for CO to assure levels are within acceptable levels shall be conducted (0 – 35 PPM).
- An activity hazard analysis (AHA) identifying the hazards and protective measures for site specific lift use shall be developed for operators and ground personnel for every definable feature of work involving forklift use. AHA shall be reviewed prior to starting task with all authorized and affected employees. Copy of signed training review by instructor and participants shall be kept on file in the project field office and at the home corporate office in Buffalo.

ATTACHMENT 27 – HYDROGEN SULFIDE (H2S) AWARENESS

Hydrogen Sulfide (H2S) Awareness

I. Program Purpose:

The purpose of this program is to ensure workers are aware of the potential hazards that exist with Hydrogen Sulfide gas; when and where typical exposure can occur (recognition, testing/air monitoring), proper protective measures (PPE, Work Procedures & Monitoring) and First Aid (recognition, signs, symptoms, exposure limits and First Aid). In every case no work shall be performed when H2S is detected in any concentration until sufficient engineering controls are in place to assure levels are at zero.

Hydrogen sulfide presents a potential hazard to workers at projects sites where the hazard can exist. It usually occurs as an unwanted by-product and can result in worker exposure in many different instances. To ensure protection against exposure to hydrogen sulfide workers must be aware of its properties, how it affects the body and what to do in emergency situations. The Safety and Health Manager shall ensure that all personnel who will be working at the job site will be properly trained in Hydrogen sulfide awareness and contingency procedures.

II. Scope and Responsibilities:

This Program is applicable to all projects and operations that are being conducted in work areas which are known or could reasonably be expected to contain H_2S or could produce SO_2, in such concentrations that upon release could constitute a hazard to human life. The requirements and minimum standards of this program do not apply when operating in work areas where H_2S is presently known not to be present or cannot reasonably be expected to be present in concentrations of 100 parts per million (ppm) or more in the gas stream. Strict adherence to the Company's Confined Space Entry Program shall be observed when employees will be working inside tanks, vessels or in other situations that fall into the Confined Space Entry Program. Employees shall be trained per the requirements of CFR 1910.146(g).

The Corporate Safety Director is responsible for reviewing and updating this program as a minimum annually to ensure compliance and effectiveness. All company personnel required to follow the program guidelines as given and shall be trained in H2S awareness at the initial time of hire, whenever the program or procedures are amended and at least annually thereafter.

III. Hydrogen Sulfide:

Hydrogen sulfide exposures usually occur during the drilling for or production of natural gas, crude oil and petroleum products. Hydrogen sulfide is also produced by the putrefication of organic matter which may accumulate in sewers, manholes, sewage treatment plants or storage pits where decay for organic matter can occur (confined spaces, landfills, holding tanks, water wells & refineries). Well drillers and tunnel workers, as well as miners, may be exposed when underground pockets of hydrogen sulfide are encountered. Hydrogen sulfide may be used in the manufacture of inorganic sulfides, sulfuric acid and mercaptans.

IV. Characteristics:

Hydrogen sulfide (H_2S) is a colorless gas with a powerful nauseating smell of rotten eggs. The odor is a poor warning property because hydrogen sulfide exposure quickly deadens the sense of smell. The gas is heavier than air and may collect in low areas such as sewers, pits, tunnels or gullies. High airborne levels of hydrogen sulfide (between 4.3 and 46.0 percent of gas by volume in the air) may catch fire if there is a source of ignition. If the gas is burned, toxic products such as sulfur dioxide will be formed. Hydrogen sulfide is incompatible with oxidizing agents, such as nitric acid and chlorine trifluoride, and may react violently or ignite spontaneously.

V. Health Effects on the Body:

Hydrogen sulfide is extremely toxic. It may cause death instantaneously in high airborne concentrations. Low levels may be extremely irritating to the lungs, nose, throat and eyes.

Hydrogen sulfide can be detected by smell at levels as low as 0.13 parts hydrogen sulfide per million parts air (ppm). Odor cannot be used as a warning because the gas can deaden the sense of smell within 2 to 15 minutes in exposures of approximately 100 ppm. A single breath of hydrogen sulfide at about 1000 ppm may paralyze the respiratory system and result in coma and death. Convulsions may also occur. Prolonged exposure at about 250 ppm hydrogen sulfide may cause the lung tissue to swell and fill up with water (pulmonary edema).

This effect may occur after the exposed worker recovers from the irritant effects of the gas. Exposures of 20 to 50 ppm hydrogen sulfide for one hour may cause inflammation

of the cornea and the delicate lining of the eye and eyelid (a condition called keratoconjunctivitis). Exposures for long periods at 50 ppm may cause severe irritation of the nose, throat and lungs. Workers exposed to lower concentrations of hydrogen sulfide may develop headaches, eye disorders and chronic bronchitis.

H_2S is classed as a ***chemical asphyxiate***, similar to carbon monoxide and cyanide gases. It inhibits cellular respiration and uptake of oxygen, causing biochemical suffocation. Typical exposure symptoms include:

L O W	0 - 10 ppm	Irritation of the eyes, nose and throat
M O D	10 - 50 ppm	Headache Dizziness Nausea and vomiting Coughing and breathing difficulty
H I G H	50 - 200 ppm	Severe respiratory tract irritation Eye irritation / acute conjunctivitis Shock Convulsions Coma Death in severe cases
Special PPE	Potential Exposures Greater than 0 ppm	Respiratory protection Full Face Supplied Air or SCBA Medical Clearance and Training for Level B Respiratory Protection

VI. Procedures:

No work shall be performed in H2S environments. Initial hazard assessment shall be conducted by the designated competent person (Supervisor) to ensure work area is free of H2S and LEL prior to entering work space. All work shall be performed as supervised by the competent person. Air monitoring shall be conducted initially at the entry and ground level of the work area for H2S, LEL, CO, and O2. Air monitoring shall be conducted by a trained air technician; monitor calibrated per the MFG specifications daily prior to use. Air shall be samples utilizing external probe, hose and pump so physical entry into the space is not required. Duration of air monitoring shall be a minimum of 30 minutes or greater (time required to adequately test complete work area.

Air monitoring results shall be documented initially and every 15 minutes thereafter (See HASP Confined Space Procedures). Acceptable measurements for H2S and LEL is 0, CO < 35 PPM, and O2 between 19.5% - 23%.

Until negative exposure has been verified all special precautions shall be taken in and near work area to eliminate any potential ignition source that could cause a fire; sparks, extreme heat, flame in work area.

If air monitoring results are acceptable physical entry may proceed and work may begin. Air monitoring shall be conducted continuously while space is occupied. Work stops and space is evacuated with unacceptable readings. If readings are not acceptable engineering controls shall be established to remove air contaminants and pump in fresh clean air; add local exhaust and remove containments.

ATTACHMENT 28 – FATIGUE MANAGEMENT PROGRAM

FATIGUE MANAGEMENT PROGRAM

INTRODUCTION AND PURPOSE:

Fatigue has been identified as a contributory factor in many work accidents. The following aims to give some information about the risks associated with fatigue and some guidance on how to avoid, manage and control fatigue so that workers are less likely to be harmed by the effects. All employees shall receive training concerning fatigue management, initially at the time of hire and thereafter as a minimum annually. Likewise this program shall be reviewed at least annually by Corporate Safety for effectiveness.

FATIGUE FACTORS:

- Duration of shifts, time off between shifts and changes to shift patterns.
- Ability to sleep on rest days, the quality of sleep, and sleeping disorders.
- Commuting time to/from workplace. Effects (sleepiness) of melatonin release with darkness, driving and working at night.
- Workload & responsibilities, different mental and/or physical task demands, role and main activities performed throughout a shift.
- Impact of second jobs and personal activities.
- Scheduling and quality of rest breaks during a shift.
- Cold starts and inadequate recovery times.
- Attitudes to work/motivation and dealing with stress in life.
- The working environment encourages fatigue rather than alertness (warm, dark, comfortable, silent).

PREVENTION – WORKER RESPONSIBILITIES.

- Always take scheduled breaks for water, rest and food. Minimum one 15 minute break every 3 hours, minimum one half hour break after 6 hours (rest/water/meal, i.e. lunch). Actual shift/work day should not exceed 14 hours which includes breaks. Likewise, a mandatory full day break (24 hours no work/day off) after 5 full 12 hour shifts or 60 hours. Note, in some cases additional and more frequent breaks should be taken depending on task including job rotation (heavy physical requirements i.e. jack hammering, moderate to heavy repetitive lifting (25 – 50 lbs) and working conditions (extreme heat and cold environments, noisy environments >85 db, environments requiring respirator use, repetitive motions, awkward positions)).
- Get 8 hours sleep before starting work and try to sleep at the same time each day.
- Find a healthy balance between work and personal life.
- Always seek medical advice about sleep disorders.

- All employees shall receive initial fatigue management training at the time of hire and annually thereafter or sooner as warranted by program updates, employ requests, inspection, audit or incident recommendations.
- Avoid chronic use of over the counter or prescription medication that may impair a worker from working safely.
- Employees are responsible for notifying their supervisor if they are fatigued to the point of not being able to perform their duties safely.
- All employees have the authority to stop work whenever safety is a concern which includes fatigue which can impair a workers ability to work safely. If fatigue is a concern report it to your supervisor so appropriate action can be taken to correct the issue.

RESPONSIBILITIES OF MANAGERS AND SUPERVISORS.

- Ensure the availability of adequate rest breaks and time off between shifts.
- Rotate jobs to avoid repetition and maintain awareness. Maintain Staff work balance to help control worker fatigue.
- Analysis of work task routinely to control fatigue. Engineering controls and work schedules to prevent fatigue, job variation, including rotation, frequent breaks.
- Monitor workers for signs of fatigue (lethargic behavior, diminished physical abilities, sleepiness). Relieve workers of duties to get adequate rest when signs of fatigue are exhibited or reported by employees.
- Assure all employees are properly trained (initially at time of hire and at a minimum annually thereafter) in fatigue management; hazard recognition, signs, symptoms and protective and control measures.
- The hazards of fatigue and proper fatigue management are included with every Activity Hazard Analysis; analysis of work task to control fatigue, use of ergonomic friendly equipment and tools to reduce stressors which contribute to fatigue.

CONCLUSION

Fatigue is the condition of being physically or mentally tired or exhausted.

When you're fatigued your attention to detail and hazard awareness is compromised which could cause **you to make errors in judgment or affect your reaction time to a hazard**. Your mind or eyes can be off the task and you can make a critical error or have a near-miss incident. If you recognize the effects of fatigue in yourself, or others, stop what you are doing and raise your concerns with your immediate supervisor.

All employees have a duty to take reasonable care of their own health and safety and that of other people, who may be affected by their activities at work.

ATTACHMENT 29 – HEXAVALENT CHROMIUM PROGRAM

INTRODUCTION

Hexavalent Chromium (CrVI)) is a heavy metal component of stainless steel. Stainless steel is widely used in industrial processes because of its resistance to corrosion.

The fume from welding processes may contain compounds of chromium, including hexavalent chromium, and of nickel. The composition of the base metals, the welding materials used, and the welding processes affect the specific compounds and concentrations found in the welding fume.

The major concern in the industry is the potential for overexposure from fumes created by welding or plasma cutting on stainless steel pipe and ducts, dust from grinding on stainless steel and from skin exposure. In most applications, engineering controls such as using localized exhaust ventilation and good welding work practices will mitigate the chances of overexposure. Respiratory protection will be required when adequate ventilation is not achievable.

POLICY

It shall be the policy of OSC to implement the various requirements of the Chromium Exposure Regulation as required by the U.S. Department of Labor, Occupational Safety and Health Administration § 1910.1026.

The OSC Chromium Exposure Plan applies to all construction work where an employee may be occupationally exposed to chromium. All work related to construction, alteration or repair is included. Under this plan, construction is to include, but not limited to the following: Fumes and emissions from welding processes including pre and finish activities (grinding, filing and sanding).

All potentially affected employees shall receive training at the time of hire and thereafter prior to the start of each job where ever exposure may occur or when program changes warrant but as a minimum refresher training shall be at least annually. Training and PPE shall be provided by the company at no expense to the employee as previously defined by the companies training policy. Likewise employees who are exposed to levels above PEL in any 30 day work period per year or have the potential to be exposed for the same period each year shall be subject to the medical surveillance program which shall require initial medical exam and blood screening prior to the start of work, every three months for the job with exposure and at the end of the job to assure protective measures; engineering and administrative controls (regulated work area), PPE and hygiene facilities;(decontamination trailer for changing clothes and washing up) are effective in preventing exposure (see section 3 medical surveillance plan).

HEALTH EFFECTS OF OVER-EXPOSURE TO FUMES CONTAINING CHROMIUM AND NICKEL

Depending upon the level of exposure, Hexavalent Chromium can irritate the nose, throat and lungs, leading to nasal ulcers, lung cancer, and can cause skin rashes, skin ulcers and permanent eye damage.

Stainless Steel contains nickel and chromium. Nickel can cause asthma. Nickel and Chromium can cause cancer. Chromium cancer may not show up for 10 to 40 years.

Similar to the effects produced by fumes from other metals.

Can cause symptoms such as runny nose, sneezing, coughing, sores in nose and on skin, nausea, headaches, dizziness, and respiratory irritation.

Some persons may develop sensitivity to chromium or nickel which can result in dermatitis or skin rash. Prolonged skin contact can result in dermatitis and skin ulcers. Some workers develop an allergic sensitization to chromium. In sensitized workers, contact with even small amounts can cause a serious skin rash. Kidney damage has been linked to high dermal exposures.

Chromium can irritate the nose, throat, and lungs. Repeated or prolonged exposure can damage the mucous membranes of the nasal passages and result in ulcers. In severe cases, exposure causes perforation of the septum (the wall separating the nasal passages).

Direct eye contact with chromic acid or chromate dusts can cause permanent eye damage.

EXPOSURE LIMITS

The U.S. Department of Labor establishes maximum limits of exposure to chromium for all workers covered, including a Permissible Exposure Limit and Action Level. The Permissible Exposure Limit, or PEL sets the maximum exposure limit for workers to chromium. The exposure limits for Hexavalent Chromium are as follows:

.5 micrograms per cubic meter (µg/m3) of air – When airborne concentrations are at or below this level, the standard is not applicable.

2.5 micrograms per cubic meter (µg/m3) of air – When airborne concentrations are at or above 2.5 micrograms per cubic meter (µg/m3) of air (this is the Action Level), but under 5 micrograms per cubic meter (µg/m3) of air, employers are required to implement certain measures to protect workers from over exposure.

5 micrograms per cubic meter (µg/m3) of air – Airborne concentrations above this level require compliance with more comprehensive requirements of the standard.

EXPOSURE ASSESSMENT

Whenever Hexavalent Chromium exposure is possible an initial exposure assessment shall be conducted. Exposure assessment shall be conducted on all tasks where exposure is possible (grinding, torching, welding). Exposure assessment shall be conducted for each task for at least 1 full 8 hour shift. Task that are most likely to cause the highest exposures shall be selected for sampling. Sampling shall be performed utilizing portable pumps equipped with cassettes setup for air monitoring Hexavalent Chromium (Personal pump attached to worker with hose and cassette in breathing zone). During the initial exposure assessment period all workers who have potential exposure shall as a minimum be required to wear respiratory protection with a protection factor of 1000 or more. This requirement shall not end until the assessment is complete and monitoring results warrant a down grade in PPE. Exposure assessment results shall be posted immediately upon receipt from lab and reviewed with all affected employees. Periodic air monitoring shall continue to assure conditions have not changed. Change in methods, environmental/physical conditions, work period or employee concern are all reasons for conducting additional monitoring. Note: unless negative exposure is established personal air monitoring shall be conducted at least daily per shift.

ACTION LEVEL

Action Level is the level at which OSC will begin compliance activities. The Action level, regardless of respirator use, for chromium in this program is an airborne concentration of 50 micrograms per cubic meter as calculated as an 8-hour Time Weighted Average (TWA).

COMPLIANCE PROGRAM

Prior to each job where employee exposure exceeds the PEL, OSC will establish a program to reduce employee exposure to the PEL or below. The compliance program will provide the following:

- A description of each activity in which chromium is emitted.
- Specific plans to achieve compliance and engineering plans where engineering controls are required.
- Information on the technology considered meeting the PEL.
- Air monitoring data that document the source of chromium emissions.

- A work practice program including regulations for the use of protective work clothing, equipment, good housekeeping and hygiene guidelines.
- An employee should report to their foreman and OSC Safety Director if they feel:
    - They have been exposed to at or above safe levels
    - Experience symptoms of exposure
    - Are exposed to an emergency situation to an uncontrolled release

ENGINEERING CONTROLS

- Ventilation such as local exhaust systems that capture airborne Cr(VI) near its source and remove it from the workplace
- Local exhaust or shop fans to extract fumes from work areas
- Dust collection systems with HEPA filters
- Substitute less toxic material or a process that results in lower exposures for a process that causes higher exposures
- Isolation such as placing a barrier between employees and source of exposure

SAFE WORK PRACTIES CONTROLS

Safe work practices require maintenance of separate hygiene facilities (change rooms, showers, hand wash facilities and lunch areas), and require proper housekeeping practices.

HOW TO PROTECT AGAINST OVER-EXPOSURE

- Use enough ventilation or exhaust at the arc or both to keep fumes and gases from your breathing zone and general area.
- Use localized exhaust ventilation to remove fumes and gases at their source in still air. Keep the exhaust trunk / hood as close to the fume source as possible in order to keep fumes and gases from your breathing zone.
- Use air blowers to draw fumes away from you and your immediate work area.
- If ventilation is questionable, use air sampling to determine the need for corrective measures.

- OSHA says you must remove all paint and solvents before welding or torch cutting. Follow written instructions. Make sure all residues are removed.
- Use the safest welding method for the job. Stick welding makes much less fume than flux core welding. Tig welding reduces Cr(VI) emissions by 90%.
- Use welding rods that produce a low fume. 90% of the fume can come from the rod. Larger diameter rods produce much higher emissions than electrodes of smaller diameter. Welding guns that extract fumes can capture 95% of the fume.
- In a confined space, follow all the OSHA confined space rules – like air monitoring, not storing torches in the space, and ventilation.
- Do not breathe fumes and gases. Keep your head out of the smoke plume.
- Use proper Protective Protection Equipment.
- Position your welding hood so that fumes will not rise up under it and into your breathing zone.
- If the ventilation is not adequate, such as confined spaces, respiratory protection is required.
- When respiratory protection is required (> PEL and initial exposure assessments), be sure that you have the required training and proper respirator before starting work.
- Implement good housekeeping procedures. Keep area as free as practicable of accumulations of chromium dust and buildup.
- Vacuums with HEPA filters should be used to keep dust emissions at a minimum.
- Do not blow dust from clothing with air hose. Doing so can embed the dust particles into your skin and eyes and expose others to airborne particles.
- Wash hands and face at the end of every shift and before eating, drinking, smoking, chewing gum, applying cosmetics or using the bathroom.
- Never eat or drink in areas where Hexavalent Chromium may come in contact with your food, skin or eyes.
- Keep exposure as low as possible.

PROTECTIVE CLOTHING AND EQUIPMENT

OSC will provide and ensure the proper use of personal protective equipment where employees are exposed to chromium above the PEL.

- Wear long-sleeved shirt, welding jacket or welding sleeves
- Wear long pants
- Tyvek suits if necessary
- Wear welding gloves
- Wear safety glasses or goggles
- Wear a face shield over eye protection when grinding
- Wear a welding helmet over eye protection when welding
- Wear appropriate respirator when needed

RESPIRATORS

When engineering and administrative controls do not reduce hazards below the OSHA's permissible exposure level (PEL), employees must wear respirators. OSC will provide respiratory protection for the employee, and must ensure that the respirator is used when:

- Employee exposure to chromium exceeds the PEL.
- The employee requests a respirator.
- Employees must be medically evaluated and respirator fit tested before being issued and wearing a respirator.

RECORD KEEPING

OSC will establish and maintain an accurate record of all monitoring and other data used to conduct employee exposure assessments. Effective management of worker safety and health protection is a decisive factor in reducing the extent and severity or work related injuries and illnesses and their related costs. OSC is committed to this process.

TRAINING

OSC has established a training program to educate our employees of this hazard. This topic is also included in the OSC Employee initial hire orientation, at the beginning of every project where exposure is a concern or as a minimum annually.

ATTACHMENT 30 – SILICA PROTECTION

SILICA PROTECTION

Crystalline silica is a common mineral found in sand, concrete, brick, block, stone and mortar. It is not always present and not in the same concentration. The most hazard is presented when it is in respirable form.

Respirable crystalline silica – very small particles typically at least 100 times smaller than ordinary sand found on beaches or playgrounds – is generated by high-energy operations like cutting, sawing, grinding, drilling and crushing stone, rock, concrete, brick, block and mortar, or when abrasive blasting with sand.

Potential health impacts of breathing in silica dust include;

Lung cancer;
COPD;
Kidney disease;
Silicosis; and
Immune system effects

OSHA has two (2) limits associated with managing risk from silica exposure on the job. The permissible exposure limit (PEL) and the action level (AI). The PEL is the maximum allowable exposure that isn't expected to result in an increase of harmful impacts. The AI is the concentration at which exposure controls and other requirements must be implemented. The concentrations are;

- PEL: 50 micrograms per cubic meter of air (50 ug/m^3) as an 8-hour time weighted average (TWA)

- AI: airborne concentration of 25 ug/m^3 as an 8-hour TWA

The primary means of controlling silica exposure is by controlling dust released from activities known to generate respirable silica dust. The controls to be used are in turn dependent on the work practice generating the dust, the location of the work (inside or outside), and the duration of the task. When work controls are insufficient for keeping exposures below the PEL, respiratory protection, in the form of an air-purifying respirator (APR) will be required.

The control methods for tasks commonly performed by OSC are described below and are based on OSHA requirements. Actual implementation of the company silica program will be detailed in each case via the task AHA/JSA. Furthermore, employees with the potential for silica exposure must be enrolled in the OSC medical surveillance program for silica work and the respirator program if exposure above the AI are anticipated.

Equipment/ Task	Control Methods	Required Respirator/APF	
		< 4 hrs./shift	>4 hrs./shift
Handheld power saw (any blade dia)	Use saw equipped with integrated water system that continuously feeds water to blade. Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions. • When used outdoors • When used indoors/enclosed	None APF 10	APF 10 APF 10

Equipment/ Task	Control Methods	Required Respirator/APF	
		< 4 hrs./shift	>4 hrs./shift
Walk-behind saws	Use saw equipped with integrated water system that continuously feeds water to blade. Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions. • When used outdoors • When used indoors/enclosed	None APF 10	None APF 10

Equipment/Task	Engineering and Work Practice Control Methods	Required Respiratory Protection and Minimum Assigned Protection Factor (APF)	
		≤ 4 hours/shift	> 4 hours/shift
(xvii) Heavy equipment and utility vehicles used to abrade or fracture silica-containing materials (e.g., hoe-ramming, rock ripping) or used during demolition activities involving silica-containing materials	Operate equipment from within an enclosed cab.	None	None
	When employees outside of the cab are engaged in the task, apply water and/or dust suppressants as necessary to minimize dust emissions.	None	None

Equipment/Task	Engineering and Work Practice Control Methods	Required Respiratory Protection and Minimum Assigned Protection Factor (APF)	
		≤ 4 hours/shift	> 4 hours/shift
(xvi) Crushing machines	Use equipment designed to deliver water spray or mist for dust suppression at crusher and other points where dust is generated (e.g., hoppers, conveyers, sieves/sizing or vibrating components, and discharge points). Operate and maintain machine in accordance with manufacturer's instructions to minimize dust emissions. Use a ventilated booth that provides fresh, climate-controlled air to the operator, or a remote control station.	None	None

ATTACHMENT 31 – (STANDARD PROGRAM DEFINITIONS)

DEFINITIONS:

- **Accepted Engineering Practices** are those requirements, which are compatible with standards of practice required by a registered professional engineer.
- **Aluminum Hydraulic Shoring** is a pre-engineered shoring system comprised aluminum hydraulic cylinders (cross braces) used in conjunction with vertical rails (uprights) or horizontal rails (whalers). The system is designed specifically to support the sidewalls of an excavation and prevent cave-ins.
- **Anchorage** means a secure point of attachment for lifelines, lanyards or deceleration devices.
- **ANSI** - means American National Standards Institute
- **Approved** means sanctioned, endorsed, accredited, certified, or accepted as satisfactory by a duly constituted and nationally recognized authority or agency including OSC, its clients or client representatives as specified.
- **Authorized person** means a person approved or assigned by the employer to perform a specific type of duty or duties or to be at a specific location or locations at the jobsite.
- **Attendant** – Authorized and trained confined space employee assigned by the confined space supervisor who is responsible to stay top side, at confined space entry point and monitor entrant status as well as confined space conditions (See Attendant Responsibilities).
- **Bell-Bottom Pier Hole** is a type of shaft or footing excavation, the bottom is made larger than the cross section above to form a belled shape.
- **Benching** is a method of protecting employees from cave-ins by excavating the sides to form one or a series of horizontal levels or steps, usually with vertical or near-vertical surfaces between the levels.
- ***Body belt*** *(safety belt)* means a strap with means both for securing it about the waist and for attaching it to a lanyard, lifeline, or deceleration device.
- **Body harness** means straps which may be secured about the employee in a manner that will distribute the fall arrest forces over at least the thighs, pelvis, waist, chest and shoulders with means for attaching it to other components of a personal fall arrest system.
- ***Buckle*** means any device for holding the body belt or body harness closed around the employee.
- **Cave-in** means the separation of a mass of soil or rock material from the side of an excavation or the loss of soil from under a trench shield or support system, and its sudden movement into the excavation by falling or sliding in a quantity that may be sufficient to entrap, bury, or injure and immobilize a person.
- **Confined space** IS ANY SPACE having the following characteristics:
    - The space is large enough that it can be bodily entered;
    - The space has restricted means of entry and exit; and
    - The space is not designed for continuous human occupancy;
    - NOTE – SEE ALSO DEFINITION FOR PERMIT REQUIRED CONFINED SPACE.

- **Entrant** – Employee who is authorized and trained to enter and perform designated confined space work.
- **Entry Supervisor** – competent authorized person responsible for supervision of confined space work (See Also Supervisor Responsibilities and Training).
- **Competent Person** is one who is capable of identifying existing and predictable hazards in the surroundings or working conditions, which are unsanitary, hazardous, or dangerous to employees. A competent person has the ability and authority to take prompt corrective measures to eliminate the previously mentioned conditions.
- **Connector** means a device which is used to couple (connect) parts of the personal fall arrest system and positioning device systems together. It may be an independent component of the system, such as a carabiner, or it may be an integral component of part of the system (such as a buckle or dee-ring sewn into a body belt or body harness, or a snap-hook spliced or sewn to a lanyard.
- **Controlled** *access zone (CAZ)* means an area in which certain work (e.g., overhand bricklaying, decontaminating, abating, and other task specific work) may take place without the use of guardrail systems, personal fall arrest systems, or safety net systems and access to the zone is controlled for safety.
- **Cross Braces** are the horizontal members of a shoring system installed perpendicular to the sides of the excavation, the ends of which bear against either uprights or Wales.
- **Dangerous** *equipment* means equipment (such as pickling or galvanizing tanks, degreasing units, machinery, electrical equipment, and other units) which, as a result of form or function, may be hazardous if employee falls onto.
- **Deceleration device** means any mechanism, such as a rope grab, rip-stitch lanyard, specially-woven lanyard, tearing or deforming lanyards, automatic self-retracting lifelines/lanyards, etc., which serves to dissipate energy from a fall from the wearer.
- **Deceleration distance** means the additional vertical distance a falling employee travels, excluding lifeline elongation and free fall distance, before stopping, from the point at which the deceleration device begins to operate. It is measured as the distance between the location of an employee's body belt or body harness attachment point at the moment of activation (at the onset of fall arrest forces) of the deceleration device during a fall, and the location of that attachment point after the employee comes to a full stop.
- **"Defect"** means any characteristic or condition which tends to weaken or reduce the strength of the tool, object, or structure of which it is a part.
- **"Designated person"** means "authorized person" as defined in use.
- **Employee** means a worker who may be exposed to hazardous chemicals under normal operating conditions or in foreseeable emergencies.

- **Equivalent** means alternative designs, materials, or methods to protect against a hazard which the employer can demonstrate will provide an equal or greater degree of safety for employees than the methods, materials or designs specified in the standard.

- **Faces or Sides** are the vertical or inclined earth surfaces formed as a result of the excavation.
- **Failure** is the breakage, displacement, or permanent deformation of a structural member or connection that would reduce its structural integrity and its support and protective capabilities.
- **Fire resistance** means so resistant to fire that, for specified time and under conditions of a standard heat intensity, it will not fail structurally and will not permit the side away from the fire to become hotter than a specified temperature. For purposes of this part, fire resistance shall be determined by the Standard Methods of Fire Tests of Building Construction and Materials, NFPA (National Fire Protection Association) 251-1969.
- **Flammable** means capable of being easily ignited, burning intensely, or having a rapid rate of flame spread.
- **Flammable liquid** means any liquid having a vapor pressure not exceeding 40 pounds per square inch (absolute) at 100 °F (37.8 °C) and having a flashpoint at or below 199.4 °F (93 °C). Flammable liquids are divided into four categories as follows:
    - Category 1 shall include liquids having flashpoints below 73.4 °F (23 °C) and having a boiling point at or below 95 °F (35 °C).
    - Category 2 shall include liquids having flashpoints below 73.4 °F (23 °C) and having a boiling point above 95 °F (35 °C).
    - Category 3 shall include liquids having flashpoints at or above 73.4 °F (23 °C) and at or below 140 °F (60 °C).
    - Category 4 shall include liquids having flashpoints above 140 °F (60 °C) and at or below 199.4 °F (93 °C).
- **Flash point** of the liquid means the temperature at which it gives off vapor sufficient to form an ignitable mixture with the air near the surface of the liquid or within the vessel used as determined by appropriate test procedure and apparatus as specified below.
- **Free Fall** – the act of falling before a personal fall arrest system begins to apply force to arrest the fall.
- **Free Fall Distance** – mean the vertical displacement of the fall arrest attachment point on the employee's body belt or body harness between onset of the fall and just before the system begins to apply force to arrest the fall. This distance excludes deceleration distance and lifeline/lanyard elongation but includes any deceleration device slide distance or self-retracting lifeline/lanyard extension before they operate and fall arrest forces occur.
- **Free Rigging** – unsecured rigging, not positive attached with locking connections.
- **Guardrail system** means a barrier erected to prevent employees from falling.
- **Hazardous atmosphere** is an atmosphere that may be harmful, cause death, illness, or injury by being explosive, poisonous, flammable, corrosive, oxidizing, irritating, or toxic.
- **Hole –** in reference to fall protection mean a gap or void 2 inches or more in its leas dimension in a floor, roof, or other walking working surface.
- **Infeasible** - means that it is impossible to perform.
- **Kick out** is the accidental release or failure of a cross brace.

- **Lockout-tagout (LOTO)** or **lock and tag** is a safety procedure which is used in industry and research settings to ensure that dangerous machines are properly shut off and not started up again prior to the completion of maintenance or servicing work. It requires that hazardous power sources be "isolated and rendered inoperative" before any repair procedure is started. "Lock and tag" works in conjunction with a *lock* usually locking the device or the power source with the hasp, and placing it in such a position that no hazardous power sources can be turned on. The procedure requires that a *tag* be affixed to the locked device indicating that it should not be turned on.
- **Leading edge** - means the edge of a floor, roof, or formwork for a floor or other walking/working surface (such as the deck) which changes location as additional floor, roof, decking, or formwork sections are placed, formed, or constructed. A leading edge is considered to be an "unprotected side and edge" during periods when it is not actively and continuously under construction.
- **Lifeline** - means a component consisting of a flexible line for connection to an anchorage at one end to hang vertically (vertical lifeline), or for connection to anchorages at both ends to stretch horizontally (horizontal lifeline), and which serves as a means for connecting other components.
- **Liquefied petroleum gases**, *LPG* and *LP Gas* mean and include any material which is composed predominantly of any of the following hydrocarbons, or mixtures of them, such as propane, propylene, butane (normal butane or iso-butane), and butylenes.
- **Low-slope roof** means a roof having a slope less than or equal to 4 in 12 (vertical to horizontal).
- **(MATERIAL) SAFETY DATA SHEET (MSDS) OR SAFETY DATA SHEET (SDS)** - A (Material) Safety Data Sheet or Safety Data Sheet is a document from the material manufacturer that provides specific identification information, ingredients and hazards, physical data, fire and explosion information, reactivity data, health hazard information, spill risk and disposal procedures, special protection information, and special precautions.
- **NIOSH** – National Institute of Occupational Safety and Health. Institute which develops safety standards and specifications which the Occupational Safety and Health Act (OSHA) frequently reference.
- **Opening** means a gap or void 30 inches (76 cm) or more high and 18 inches (48 cm) or more wide, in a wall or partition, through which employees can fall to a lower level.
- **Overhand bricklaying and related work** means the process of laying bricks and masonry units such that the surface of the wall to be jointed is on the opposite side of the wall from the mason, requiring the mason to lean over the wall to complete the work. Related work includes mason tending and electrical installation incorporated into the overhand bricklaying process.

- **Permit Required Confined Space** – is a confined space as previously defined that also may have a potential life threatening hazard;
    - The space contains, or has the potential to contain, a hazardous atmosphere, defined as oxygen below 19.5% or above 23.5%, combustible vapors above 10% LEL, or high toxic concentrations which may cause death, incapacitation, or an impaired ability to self-rescue;
    - The space contains a material that may engulf an entrant;
    - The space has an internal configuration that may trap or asphyxiate entrants; and/or
    - The space contains any other serious health and life threatening safety hazard.
- **Protective system** is a method of protecting employees from hazards as specificed such as cave-ins, materials that could roll or fall into the excavation or excavation face, collapse of adjacent structures. They include support systems, sloping and benching systems, shield systems, and other systems, which provide necessary protection.
- **Personal fall arrest system (PFAS)** means a system used to arrest an employee in a fall from a working level. It consists of an anchorage, connectors, full body harness and may include a lanyard, deceleration device, lifeline, or suitable combinations of these.
- **Personal fall restraint system (PFRS)** means a system used to prevent an employee from fall where there is a free fall. It consists of an anchorage, connectors, a body belt or body harness and may include a lanyard, deceleration device, lifeline, or suitable combinations of these.
- **Portable tank** means a closed container having a liquid capacity more than 60 U.S. gallons, and not intended for fixed installation.
- **Positioning device system** means a body belt or body harness system rigged to allow an employee to be supported on an elevated vertical surface, such as a wall, and work with both hands free while leaning.
- **Qualified Person** – person by means of recognized specialized education (license, degree, certification – ie "Professional Engineer, Licensed Electrician"), training and experience which demonstrates expertise for a specific field.
- **Ramp** means an inclined walking or working surface used to gain access to one point from another and is constructed from earth or structural materials like wood or steel.
- **Registered Professional Engineer** is a professional engineer registered in the state where the work is to be performed.
- ***Rope grab*** means a deceleration device which travels on a lifeline and automatically, by friction, engages the lifeline and locks so as to arrest the fall of an employee. A rope grab usually employs the principle of inertial locking, cam/level locking, or both.
- **Rigging** – equipment (slings, hooks, shackles, chains, wire rope, pins, spreader bars, hoisting nets and bags, etc.) used to secure items for hoisting and lifting equipment (crane, forklift, earth moving equipment slings).
- **Safety can** means an approved closed container, of not more than 5 gallons capacity, having a flash-arresting screen, spring-closing lid and spout cover and so designed that it will safely relieve internal pressure when subjected to fire exposure.

- **Safety Committee -** Committees composed of the field employees,, superintendents and field safety representatives (Includes Subcontractor as well as OSC representatives). The purpose of the safety committee is to provide an open forum where safety issues and concerns can be openly addressed; recent incidents, near misses, corrective actions as well as opportunities for site and program improvement.
- **Safety-monitoring system** means a safety system in which a competent person is responsible for recognizing and warning employees of fall hazards.
- **Self-retracting lifeline/lanyard** means a deceleration device containing a drum-wound line which can be slowly extracted from, or retracted onto, the drum under slight tension during normal employee movement, and which, after onset of a fall, automatically locks the drum and arrests the fall.
- **Sheeting** when used in reference to excavation protective systems is the member of a shoring system that retains the earth in position and is supported by other members of the shoring system.
- **Shield (Trench Box, Trench Shield)** is a structure that is able to withstand the forces of a cave-in. Shields can be permanent structures that can be designed to be portable and moved along as the work progresses, pre-manufactured, or job-built in accordance with 1926.652 (c)(3).
- **Shoring (Shoring System)** is a structure such as a metal hydraulic, mechanical, or timber shoring system that supports the sides of an excavation and is designed to prevent cave-ins.
- **Sloping (Sloping System)** excavation to form sides of an excavation that are inclined away from the excavation. The angle of incline required to prevent a cave-in varies with differences in factors such as the soil type, environmental conditions of exposure, and application of surcharge loads.
- **Snaphook** means a connector comprised of a hook-shaped member with a normally closed keeper, or similar arrangement, which may be opened to permit the hook to receive an object and, when released, automatically closes to retain the object. Snaphooks are generally one of two types:
- **Stable Rock** is a solid mineral material that can be excavated with vertical sides and will remain intact while exposed. (See the standard for methods of converting unstable rock to stable rock.)
- **Structural Ramp** is a ramp made of steel or wood and usually used for vehicle access. Soil or rock ramps are not considered structural.
- **Support System** is a structure such as underpinning, bracing or shoring which provides support to an adjacent structure, underground installation, or the sides of an excavation.
- **Tabulated Data** are tables and charts approved by a registered professional engineer and used to design and construct a protective system.
- **Trenches** are a narrow excavation, in relation to length, made below the surface of the ground. Generally, the depth is greater than the width, but the width of a trench measured at the bottom is not greater than 15 feet. If forms or other structures are installed or constructed in an excavation and reduce the dimension from the structure to the side to 15 feet or less the excavation is considered a trench.

- **Uprights** are vertical members of a trench shoring system placed in contact with the earth and usually positioned so that individual members do not come in contact with each other. Uprights in contact with each other are sheeting.
- **Vapor pressure** means the pressure, measured in pounds per square inch (absolute), exerted by a volatile liquid as determined by the "Standard Method of Test for Vapor Pressure of Petroleum Products (Reid Method).
- **Wales** are horizontal members of a shoring system placed parallel to the excavation face whose sides bear against the vertical members of the shoring system or earth.

ATTACHMENT 32 – SELECT HSE FORMS

Appendix H – Community Air Monitoring Plan

COMMUNITY AIR MONITORING PROGRAM (CAMP)

A Community Air Monitoring Program (CAMP) requires real-time monitoring for volatile organic compounds (VOCs) and particulates (i.e., dust) at the upwind and downwind perimeter of each designated work area when certain activities are in progress at contaminated sites. The program 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 and on-site workers not directly involved with work activities) from potential airborne contaminant releases as a direct result of investigative and remedial work activities. A NYSDOH generic CAMP obtained from NYSDEC DER-10 is presented in Appendix 1A that will be followed and adhered to for work activities that could release potential contaminants from an impacted area. A program for suppressing fugitive dust and particulate matter monitoring will also be conducted in accordance NYSDEC DER-10 titled Appendix 1B Fugitive Dust and Particulate Monitoring, which is also provided in Attachment 1. The fugitive dust suppression and particulate monitoring program will be employed at the site during building demolition, site investigations/remediation and other intrusive activities which warrant its use.

Both the CAMP and the fugitive dust and particulate monitoring program will be administered by the environmental engineer/consultant. Monitoring results of the CAMP will be reported to the New York State Department of Health daily for review. NYSDEC and NYSDOH are to be provided CAMP data on a daily basis when collected. When sample excursions occur, identify the reason for the excursions and measures to address the excursions.

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.

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Appendix 1B
Fugitive Dust and Particulate Monitoring

A program for suppressing fugitive dust and particulate matter monitoring at hazardous waste sites is a responsibility on the remedial party performing the work. These procedures must be incorporated into appropriate intrusive work plans. The following fugitive dust suppression and particulate monitoring program should be employed at sites during construction and other intrusive activities which warrant its use:

1. Reasonable fugitive dust suppression techniques must be employed during all site activities which may generate fugitive dust.

2. Particulate monitoring must be employed during the handling of waste or contaminated soil or when activities on site may generate fugitive dust from exposed waste or contaminated soil. Remedial activities may also include the excavation, grading, or placement of clean fill. These control measures should not be considered necessary for these activities.

3. Particulate monitoring must be performed using real-time particulate monitors and shall monitor particulate matter less than ten microns (PM10) with the following minimum performance standards:

(a) Objects to be measured: Dust, mists or aerosols;
(b) Measurement Ranges: 0.001 to 400 mg/m3 (1 to 400,000 :ug/m3);
(c) Precision (2-sigma) at constant temperature: +/- 10 :g/m3 for one second averaging; and +/- 1.5 g/m3 for sixty second averaging;
(d) Accuracy: +/- 5% of reading +/- precision (Referred to gravimetric calibration with SAE fine test dust (mmd= 2 to 3 :m, g= 2.5, as aerosolized);
(e) Resolution: 0.1% of reading or 1g/m3, whichever is larger;
(f) Particle Size Range of Maximum Response: 0.1-10;
(g) Total Number of Data Points in Memory: 10,000;
(h) Logged Data: Each data point with average concentration, time/date and data point number
(i) Run Summary: overall average, maximum concentrations, time/date of maximum, total number of logged points, start time/date, total elapsed time (run duration), STEL concentration and time/date occurrence, averaging (logging) period, calibration factor, and tag number;
(j) Alarm Averaging Time (user selectable): real-time (1-60 seconds) or STEL (15 minutes), alarms required;
(k) Operating Time: 48 hours (fully charged NiCd battery); continuously with charger;
(l) Operating Temperature: -10 to 50^{o} C (14 to 122^{o} F);
(m) Particulate levels will be monitored upwind and immediately downwind at the working site and integrated over a period not to exceed 15 minutes.

4. In order to ensure the validity of the fugitive dust measurements performed, there must be appropriate Quality Assurance/Quality Control (QA/QC). It is the responsibility of the remedial party to adequately supplement QA/QC Plans to include the following critical features: periodic instrument calibration, operator training, daily instrument performance (span) checks, and a record keeping plan.

5. The action level will be established at 150 ug/m3 (15 minutes average). While conservative,

this short-term interval will provide a real-time assessment of on-site air quality to assure both health and safety. If particulate levels are detected in excess of 150 ug/m3, the upwind background level must be confirmed immediately. If the working site particulate measurement is greater than 100 ug/m3 above the background level, additional dust suppression techniques must be implemented to reduce the generation of fugitive dust and corrective action taken to protect site personnel and reduce the potential for contaminant migration. Corrective measures may include increasing the level of personal protection for on-site personnel and implementing additional dust suppression techniques (see paragraph 7). Should the action level of 150 ug/m3 continue to be exceeded work must stop and DER must be notified as provided in the site design or remedial work plan. The notification shall include a description of the control measures implemented to prevent further exceedances.

6. It must be recognized that the generation of dust from waste or contaminated soil that migrates off-site, has the potential for transporting contaminants off-site. There may be situations when dust is being generated and leaving the site and the monitoring equipment does not measure PM10 at or above the action level. Since this situation has the potential to allow for the migration of contaminants off-site, it is unacceptable. While it is not practical to quantify total suspended particulates on a real-time basis, it is appropriate to rely on visual observation. If dust is observed leaving the working site, additional dust suppression techniques must be employed. Activities that have a high dusting potential--such as solidification and treatment involving materials like kiln dust and lime--will require the need for special measures to be considered.

7. The following techniques have been shown to be effective for the controlling of the generation and migration of dust during construction activities:

(a) Applying water on haul roads;
(b) Wetting equipment and excavation faces;
(c) Spraying water on buckets during excavation and dumping;
(d) Hauling materials in properly tarped or watertight containers;
(e) Restricting vehicle speeds to 10 mph;
(f) Covering excavated areas and material after excavation activity ceases; and
(g) Reducing the excavation size and/or number of excavations.

Experience has shown that the chance of exceeding the 150ug/m3 action level is remote when the above-mentioned techniques are used. When techniques involving water application are used, care must be taken not to use excess water, which can result in unacceptably wet conditions. Using atomizing sprays will prevent overly wet conditions, conserve water, and provide an effective means of suppressing the fugitive dust.

8. The evaluation of weather conditions is necessary for proper fugitive dust control. When extreme wind conditions make dust control ineffective, as a last resort remedial actions may need to be suspended. There may be situations that require fugitive dust suppression and particulate monitoring requirements with action levels more stringent than those provided above. Under some circumstances, the contaminant concentration and/or toxicity may require additional monitoring to protect site personnel and the public. Additional integrated sampling and chemical analysis of the dust may also be in order. This must be evaluated when a health and safety plan is developed and when appropriate suppression and monitoring requirements are established for protection of health and the environment.