

INTERIM REMEDIAL MEASURES WORK PLAN

**Oak Mitsui
Site # 442052
80 First Street
Hoosick Falls, New York**

CHA Project Number: 31861

Prepared for:

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80 First St
Hoosick Falls, New York*

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November 2017

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CERTIFICATION

I, Scott M. Smith, certify that I am currently a NYS registered professional engineer and that this Interim Remedial Action Work Plan was prepared in accordance with all applicable statutes and regulations and in substantial conformance with the DER Technical Guidance for Site Investigation and Remediation (DER-10).

I certify that all information and statements in this certification form are true. I understand that a false statement made herein is punishable as a Class "A" misdemeanor, pursuant to Section 210.45 of the Penal Law. I, the undersigned, of CHA Consulting, Inc. have been designated by the Site owner to sign this certification for the Site.

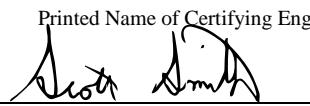
For CHA Consulting, Inc.:

(Professional Seal)



Scott M. Smith, P.E.

Printed Name of Certifying Engineer

A handwritten signature of "Scott M. Smith" in black ink.

Signature of Certifying Engineer

November 2, 2017

Date of Certification

083885

NYS Professional Engineer Registration Number

CHA Consulting, Inc.

Company

Associate Vice President

Title

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TABLE OF CONTENTS

1.0	Introduction	1
1.1	Site Background.....	1
1.1.1	Site Description.....	1
1.1.2	Site History	1
1.1.3	Proposed Site Re-Use	3
1.1.4	Site Geology/Hydrogeology	3
1.1.5	Local Hydrogeology and Groundwater Flow	3
2.0	Nature and Extent of Contamination	5
2.1	Soil	5
2.2	Groundwater	5
3.0	Remedial Action	7
3.1	Proposed Remedy Description.....	7
3.2	Remedial Action Objectives	7
3.3	Remedial Action Approach.....	7
3.4	Summary of Major Work Tasks Addressed by This Plan	8
3.4.1	Site Controls.....	8
3.4.1.1	Erosion & Sediment Controls	8
3.4.1.2	Site Access & Work Zones	8
3.4.1.3	Truck Routing.....	10
3.4.2	Soil Excavation	10
3.4.3	Confirmation Sampling.....	12
3.4.4	Site Characterization Sampling.....	12
3.4.5	Material Transport Off-Site	13
3.4.6	Material Disposal Off-Site.....	13
3.4.7	Wastewater Management.....	15
3.4.8	Imported Material	16
3.5	Remedial Action Project Plans	18
3.5.1	Field Sampling Plan	18
3.5.2	Quality Assurance Project Plan	18
3.5.3	Health & Safety Plan	19
3.5.4	Community Air Monitoring Plan	20
4.0	Schedule	21
5.0	Construction Completion Report	23

TABLES

- Table 1: Excavation Dimensions
- Table 2: Sampling Rationale
- Table 3: Analytical Methods/Quality Assurance Summary
- Table 4: Imported Soil Requirements
- Table 5: Project Schedule

FIGURES

- Figure 1: Site Location Map
- Figure 2: Site Plan
- Figure 3: Phase I and Phase II Results Map
- Figure 4: Excavation Locations

APPENDICES

- Appendix A: Field Sampling Plan
- Appendix B: Quality Assurance Project Plan
- Appendix C: Health and Safety Plan
- Appendix D: Community Air Monitoring Plan

LIST OF ACRONYMS & ABBREVIATIONS

AOC	Area of Concern
bgs	Below the Ground Surface
C&D	Construction & Demolition
CAMP	Community Air Monitoring Program
CCR	Construction Completion Report
CHA	CHA Consulting, Inc.
CY	Cubic Yards
DER	Division of Environmental Remediation
DRO	Diesel Range Organics
ELAP	Environmental Laboratory Accreditation Program
ERM	Environmental Resource Management
FER	Final Engineering Report
FSP	Field Sampling Plan
GRO	Gasoline Range Organics
HASP	Health and Safety Plan
IC/EC	Institutional & Engineering Controls
IRM	Interim Remedial Measure
IRMWP	Interim Remedial Measure Work Plan
LNAPL	Light Non-Aqueous Phase Liquids
MMS	Mitsui Mining & Smelting Co. LTD
MS/MSD	Matrix Spike/Matrix Spike Duplicate
NYCRR	New York Code, Rules and Regulations
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
OMI	Oak Mitsui Industries
OMT	Oak Mitsui Technologies, LLC
OSHA	Occupational Safety and Health Administration
PCBs	Polychlorinated Biphenyls
PFA	Per/Poly-fluoroalkyl Substances
POTW	Publicly Owned Treatment Works
PPE	Personal Protective Equipment
QA	Quality Assurance
QAPP	Quality Assurance Project Plan
QC	Quality Control
RAO	Remedial Action Objectives
RCRA	Resource Conservation and Recovery Act
SCO	Soil Cleanup Objective
SMP	Site Management Plan
SVOC	Semi-Volatile Organic Compound
TAL	Target Analyte List
TCL	Target Compound List
TCLP	Toxicity Characteristic Leaching Procedure
TOGS	Technical & Operational Guidance Series

TPH	Total Petroleum Hydrocarbons
USDOT	United States Department of Transportation
USEPA	United States Environmental Protection Agency
UST	Underground Storage Tank
VOC	Volatile Organic Compound

1.0 INTRODUCTION

Oak Mitsui, known as “the Respondent”, entered into an Order on Consent on September 8, 2017 with the New York State Department of Environmental Conservation (NYSDEC) for the Oak Mitsui Facility (Property or Site), located at 80 First Street in Hoosick Falls, New York. The Site has been assigned Site No. 442052 and classified as a “P-Site” (sites that have the potential to be listed on the Registry of Inactive Hazardous Waste Disposal Sites) within the NYSDEC State Superfund Program. The primary goals of the Order are to appropriately characterize the contamination at the Site and implement any necessary remedial work related to on-site contamination, including any necessary Interim Remedial Measures (IRMs).

CHA Consulting, Inc. (CHA) has been retained by Oak Mitsui to prepare an IRM Work Plan (IRMWP) to define the implementation and construction provisions for the proposed remedy. This IRM Work Plan describes the remedial action and technology to complete the remedy and is consistent with the guidance provided in Section 5.3 of the NYSDEC’s “DER-10 Technical Guidance for Site Investigation and Remediation” (May 2010). The Respondent is proposing to remediate soils to the Industrial Use Soil Cleanup Objectives (SCOs).

1.1 SITE BACKGROUND

1.1.1 Site Description

The subject property consists of approximately 7.5 acres and is located in the Village of Hoosick Falls within Rensselaer County. The Site is situated on the southern bank of the Hoosick River and is bound to the east by the Pan Am Railroad line and to the south by residences. The Site is comprised of three (3) parcels, Tax Map Nos. 27.14-7-2, 27.14-7-3 and 27.14-8-19. According to the current Zoning Map on file with the Village of Hoosick Falls (Barton and Loguidice, D.P.C. January 2015 Draft Existing Zoning Map of the Village of Hoosick Falls), parcel 27.14-7-2 is mainly zoned Industrial except for the parking lot across First St. which is zoned Commercial-Industrial; and parcels 27.14-7-3 and 27.14-8-19 are zoned Residential. The former Oak Mitsui on-site operations included the production of copper foil; however, between 2014 and 2015 operations at the Oak Mitsui facility ceased and in the summer of 2017 the on-site buildings were demolished. The former building foundations have been left in place and the Site is surrounded by a chain link fence for security. The Site is currently vacant and undeveloped. A site location map is provided as Figure 1 and a property boundaries map is provided as Figure 2.

1.1.2 Site History

Oak Mitsui History

Oak Mitsui was formed in 1976 by Oak Industries, Inc., Mitsui Mining & Smelting Co., LTD (MMS) and The Anaconda Company. At that time, Oak Industries owned ~68.6%, MMS ~19.1% and Anaconda ~12.3% of Oak Mitsui Industries (OMI). In 1978, Anaconda sold its share of OMI to MMS. At that time Oak Industries owned ~68.6%; and MMS ~31.4% of OMI. In 1986, AlliedSignal Inc. purchased the Oak Industries share of Oak-Mitsui and MMS exercised its option to increase its ownership to 49.9%. Ownership of OMI at that time became AlliedSignal 50.1%

& MMS 49.9%. In 2000, MMS purchased AlliedSignal's (then Honeywell) entire share of Oak-Mitsui. MMS then owned 100% of Oak-Mitsui.

Site Transfer History

Oak Mitsui is a New York corporation, incorporated in 1976. Oak Mitsui acquired the 80 First Street site by Deed from Oak Materials Group, Inc. dated March 17, 1976 and recorded on March 22, 1976 at Volume 1279, page 195 (Tax parcel 27.14-7-2). In addition, by Deed dated June 5, 1981, OMI added to their original 1976 land purchase by acquiring an adjacent parcel from Texaco, Inc. (Tax parcel 27.14-7-3). Later in 1986, OMI acquired another adjoining property, this time from the Boston & Maine Corporation (Tax parcel 27.14-8-19). Together, these 3 parcels comprise the existing 80 First Street site.

Site Use History

According to Sanborn Fire Insurance maps, the subject Site was historically utilized for industrial purposes dating back to the late 1800's. Previous operations included a foundry, a machine shop, a paper mill machine manufacturing facility, and a coal gas manufacturing facility. Oak Mitsui has occupied the Site since 1976 and the primary business of Oak Mitsui has been the manufacturing of electrodeposited copper foil. All copper foil manufacturing operations in Hoosick Falls occurred at the 80 First Street location.

From 1977 to 2001, the Site was used for high volume manufacturing of copper foil and administrative offices. From mid-2001 to 2015, the Site was used for administrative offices and other activities as follows:

- From 2005 to 2010, the Site was used for pilot scale (research and development) copper foil electroplating. This process utilized some of the copper foil manufacturing equipment still at the Site from the high-volume manufacturing period.
- From 2003 to 2015, an OMI subsidiary, Oak Mitsui Technologies LLC (OMT) produced FaradFlex products at the 80 First Street site. FaradFlex is produced by using heat & pressure to bond 2 pieces of adhesive coated copper foil to either side an insulating film. The adhesive coated copper foil was purchased from suppliers in Japan & Malaysia. The insulating film was also purchased from overseas suppliers. A large heated hydraulic press was installed along with other sheeting & collating equipment to manufacture this product.
- In 2015, the FaradFlex manufacturing operations were moved to Malaysia. Remaining administration staffs were moved to leased office space at 8 John Street, Hoosick Falls. Oak Mitsui ceased plant operations and has since been in the process of decommissioning and eventually demolishing the Hoosick Falls facility.

1.1.3 Proposed Site Re-Use

There are currently no plans to redevelop the property. Oak Mitsui plans to investigate and remediate (i.e. IRMs, cap/cover system) the Site under the Order on Consent, install security measures (i.e. fencing) and maintain ownership of the Site indefinitely.

1.1.4 Site Geology/Hydrogeology

According to recent areas studies as well as a 2016 on-site investigation, shallow groundwater is found in poorly sorted silt, sand, gravel and fill materials at an average depth of 12 feet below grade. A thick layer of less permeable glacial deposits (silt-rich clay) is situated between shallow groundwater and a deeper overburden aquifer, which consists of sand and gravel. Bedrock was not encountered during the previous on-site investigation; however, based on area studies completed by Environmental Resource Management (ERM), the depth to bedrock is variable and was encountered at a maximum depth of approximately 110 feet below ground surface.

1.1.5 Local Hydrogeology and Groundwater Flow

Groundwater generally occurs within the subsurface at average depths of approximately 9 feet to 16 feet below the ground surface (bgs) across the Site. Based on 2017 quarterly sampling events conducted by CHA, the groundwater generally flows in a northerly direction towards the Hoosic River. The water level variations throughout the year are most likely seasonal and do not indicate a change in the groundwater flow direction, which is continually to the north.

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2.0 NATURE AND EXTENT OF CONTAMINATION

CHA completed a Phase 1 and Phase 2 Limited Subsurface Environmental Investigation at the Site in 2016. The investigation objective was to evaluate groundwater conditions and subsurface conditions in the sub-slab soils beneath areas of former operations, general chemical storage, hazardous waste storage and certain building features (i.e. trenches, sumps). The investigation was completed to assist in determining the future use of the Site and the possible need for remediation during or after building demolition. Samples were analyzed for a variety of parameters including metals, volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), and polychlorinated biphenyls (PCBs). The sample results and findings are discussed below.

2.1 SOIL

The results of the Phase 1 and Phase 2 investigations, suggest that metal contamination exists in the shallow soils (0-8 feet bgs) located beneath the on-site building and areas surrounding the building. The metal concentrations are most likely due to on-site operations and historical industrial uses dating back to the late 1800s. In addition, low level of SVOCs were also detected in the shallow soils in limited areas of the Site. The SVOC concentrations are most likely attributed to the historic fill that was observed in the subsurface during this investigation.

Based on the results of the Phase 1 and Phase 2 investigations, the areas of highest metal concentrations (exceeding Industrial SCOs) within the subsurface soils include the areas of Treater 2 & 3, Treater 4 & 5, Drum Deck Area, Dissolving Area (Filter Side), QA Lab Area, 11-20 Spent Tank Area, Waste Water Treatment Area and MW-2 Area (Figure 3). It should be noted that the detected metal concentrations decreased with depth, except in a few locations.

2.2 GROUNDWATER

Four groundwater wells were installed across the Site as part of the Phase 2 investigation. The wells were sampled as part of the 2016 investigation and again quarterly in 2017. The groundwater samples collected from MW-1 through MW-4 were analyzed for arsenic, chromium, copper, lead, zinc, mercury (both unfiltered and filtered) and pH. The analytical results from each monitoring event indicate that the metal compounds within the groundwater were either non-detect or below the NYSDEC Technical & Operational Guidance Series (TOGS) 1.1.1 values. The pH levels for the groundwater samples ranged from 6.7 to 7.3. This indicates the metal compounds detected within the shallow soils have not affected the quality of the on-site groundwater.

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3.0 REMEDIAL ACTION

This section summarizes Remedial Action Objectives (RAOs) established for the Site, the selected interim remedial measure (IRM), and the remedial approach to achieve the IRM objectives.

3.1 PROPOSED REMEDY DESCRIPTION

Under the proposed IRM, the major work task includes the excavation of soil in exceedance of the Industrial Soil Cleanup Objectives (SCOs) set forth in Title 6 of New York Codes, Rules and Regulations (NYCRR) Part 375, in twelve (12) areas of concern (AOCs) (Figure 4). These areas will be excavated to various depths bgs based on results of the previous investigations. The goal to remediate to Industrial SCOS is based on the future use of the Site (remain undeveloped), the zoning classification of the Site (Industrial) and that on-site groundwater samples results indicate the metal concentrations within the soil have not affected the quality of the groundwater.

3.2 REMEDIAL ACTION OBJECTIVES

The goal of this interim measure is to remove soils from those areas of the Site where metals have been found at concentrations exceeding applicable Industrial SCOs. Soil removals are targeted at the following twelve (12) AOCs (see Figures 3 and 4):

- AOC-1 & AOC-2: the vicinity of Treaters 4 and 5
- AOC-3 & AOC-4: Treaters 2 and 3
- AOC-5: the Drum Deck
- AOC-6: the Storage Area near the Old Boiler Room
- AOC-7: the 11-20 Spent Tank Area
- AOC-8: the Dissolving Area near the Filtration System
- AOC-9: the QC Lab
- AOC-10 & AOC-11: the Waste Water Treatment Areas
- AOC-12: MW-2 .

3.3 REMEDIAL ACTION APPROACH

The factors considered during the selection of the Site remedy are those listed in Title 6 of NYCRR, Part 375-1.8. The following are the components of the selected remedy:

- Contaminated soils from twelve (12) AOCs will be excavated across the Site to various depth ranging from three to 12 feet bgs.
- Contaminated soil generated during Site excavation activities will be disposed of off-site

(at a properly permitted facility).

- After contaminated soil is excavated, a combination of clean imported fill material and the materials from former buildings and foundations will be used as backfill in accordance with Section 5.4(e) of NYSDEC DER-10: Technical Guidance for Site Investigation and Remediation.
- After these activities are complete, a construction completion report (CCR), in accordance with NYSDEC DER-10 will be prepared.

It should be noted that additional site characterization, investigation and/or remediation, as well as the preparation of associated reports, will most likely be required in addition to the completion of the IRMs described in this Work Plan.

3.4 SUMMARY OF MAJOR WORK TASKS ADDRESSED BY THIS PLAN

The major work task addressed by this IRMWP includes the removal of soil in exceedance of DER-10 Industrial SCOs from twelve (12) AOCs. The work tasks are described further in the following subsections.

3.4.1 Site Controls

The site controls implemented at the Site will minimize the potential for detrimental impacts to the environment and human health associated with the proposed excavations and handling of impacted soils. All appropriate site controls will be in place prior to conducting any intrusive activities at the Site.

3.4.1.1 Erosion & Sediment Controls

The area of disturbance will be maintained to less than one (1) acre at all times during the IRMs. Therefore, only temporary erosion control measures and best management practices will be utilized during the IRM. These control measures will include the installation of silt fence around the perimeter of the work zone and the installation of silt fence or hay bales around any catch basins in and around the work zone.

3.4.1.2 Site Access & Work Zones

Appropriate work zones, as detailed below, will be established prior to commencing intrusive remedial activities at the Site. Access to the property is currently secured by a chain-link fence. To control access during the remedial activities at the Site, a 4-foot tall temporary construction fence will be placed around the perimeter of the active excavation area(s). Fencing will be erected and maintained as necessary by the Contractor to control access to the portions of the Site where soils with potential contamination are exposed. Additional construction fencing will be used as

needed to delineate work zones within the Site boundaries. Work zones, if appropriate, will be clearly marked and reviewed prior to the start of each work day.

Exclusion Zone

An exclusion zone will be established around each of the proposed excavation areas. Orange construction fencing or other similar barricades, along with appropriate signage, will be installed around the perimeter of the excavations to keep unauthorized personnel away from intrusive activities. If necessary, temporary soil containment pads will be constructed within the exclusion zone to stage materials awaiting characterization and/or off-site disposal.

Contamination Reduction Zone

A Contamination Reduction Zone will be established adjacent to the Exclusion Zone to facilitate the decontamination of the personnel and equipment that come into contact with impacted soils. Personnel working inside the exclusion zone will decontaminate or dispose all soiled clothing in the contamination reduction zone each time the exclusion zone is exited. Appropriate equipment, supplies, and personal protective equipment (PPE) will be made available in the contamination reduction zone to facilitate the protection and decontamination of personnel working in the exclusion zone.

All equipment will be decontaminated at the conclusion of the excavation activities and prior to demobilizing equipment from the project site. If appropriate precautions are taken throughout the excavation process, the only equipment requiring decontamination should be limited to the bucket and tracks on the excavator (and a small portion of the boom/stick), the inside of dump boxes on the trucks used for hauling the soils, and small hand tools. Examples of such precautions include, but are not limited to:

- Efforts will be made to advance the excavation face towards the excavator such that the tracks on the machine do not track impacted soils across the Site.
- Where possible, all trucks will be loaded adjacent to the excavation. Care will be taken to ensure that impacted soil is not spilled on the sides of the trucks as they are loaded and that the trucks do not drive through contaminated soils. If wet soils are encountered, dry soils will be placed near the rear tailgate of the truck and wetter soils will be placed near the front of the truck. If the soils are saturated, liners will need to be installed in the dump box or the soils will be stabilized prior to loading to avoid drippage out of the truck during the hauling process. All trucks will be covered with canvas or tarpaulins (netting will not be permitted) to minimize the potential for dust and material to fall off the truck during transport.
- Efforts will be made to minimize the amount of equipment and machinery that comes in contact with the impacted soils.

All non-disposable personnel protective clothing will be decontaminated by first washing the soil items with a non-phosphate detergent and potable water mixture, followed by potable water and distilled water rinses. All disposable/expendable clothing will be placed into plastic trash bags for off-site disposal at a solid waste facility. All equipment that comes in contact with contaminated soil and groundwater will be decontaminated with a high-pressure steam cleaner.

The Contamination Reduction Zone setup will involve the construction of two temporary decontamination pads. The first decontamination pad will be used for the decontamination of personnel and small hand tools. The water generated from decontaminating equipment will be collected by placing 10-mil polyethylene sheeting over an approximately ten-foot by ten-foot area with raised sides and one low spot to direct the water to one corner of the pad. The collected water will be pumped into drums or a temporary storage tank (e.g., polyethylene tank) for management per Section 3.4.6 (Wastewater Management).

The second decontamination pad will be approximately 15-foot wide by 20-foot long (exact dimensions to be determined by the remedial contractor) and used for decontaminating large equipment. The pad will be constructed with a minimum of two-layers of 10-mil polyethylene sheeting with raised berms and overspray guards around the perimeter to maintain wash fluids on the pad. A portable spill containment pad with drive through berms and side panels may be used in lieu of the building a temporary equipment decontamination pad. All wash water will be collected and managed in accordance with Section 3.4.6 of this IRMWP.

Support Zone

A Support Zone will be established close to the Contamination Reduction Zone. It is anticipated that this zone will consist of construction trailers for project staff to provide necessary support, equipment and supplies required for implementing the remedy. While the contractor performing the excavations will provide their own site-specific health and safety plan (HASP) for this project, the support zone should also be used for the storage of first aid kits, fire extinguishers, PPE for site workers, the HASP, air monitoring equipment, spill containment equipment, etc.

3.4.1.3 Truck Routing

Truck transport routes will be determined taking into consideration the following: (a) limiting transport through residential areas or past sensitive sites; (b) use of city mapped truck routes; (c) limiting total distance to major highways; (d) promoting safety in access to highways, and overall safety in transport.

3.4.2 Soil Excavation

Upon completion of site preparation activities, soil removal will address areas across the Site, as

set forth on Figure 4 and in Table 1, to various depths of approximately 3 to 12 feet bgs based on the results of the previous investigations. The following materials will be removed from contaminant source areas:

- Grossly contaminated soil, as defined in 6 NYCRR Part 375-1.2(u);
- Underground storage tanks (USTs), buried drums, underground piping or other structures associated with a source of contamination; and
- All on-site soils within the AOCs which exceed industrial SCOs, as defined by 6 NYCRR Part 375-6.8. Table 1 below summarizes the approximate dimensions of the targeted AOC excavations.

Table 1: Excavation Dimensions

Area of Concern (AOC)	Dimension (l x w x h)	Volume (ft³)
1	20' x 20' x 3'	1,200
2	60' x 20' x 10'	12,000
3	25' x 20' x 4'	2,000
4	25' x 15' x 8'	3,000
5	70' x 20' x 6'	8,400
6	60' x 38' x 12'	27,360
7	20 x 20 x 10'	4,000
8	20' x 20' x 4'	1,600
9	20' x 20' x 4'	1,600
10	20' x 20' x 5'	2,000
11	70' x 45' x 6'	18,900
12	60' x 40' x 6'	14,400

Approximately 4,275 cubic yards (CY) of contaminated soil will be removed from the Site. Soil will be staged in temporary soil containment pads of sufficient size to store up to the maximum amount of soil that can be excavated in one day and will be lined with a minimum of 10-mil thick polyethylene sheeting. A one-foot high soil berm will be constructed around the perimeter of the pads to control runoff/run-on to and from the stockpiles. All stockpiles will be covered with 10-mil thick polyethylene sheeting while awaiting characterization, loading and off-site disposal, to prevent the contaminants from volatilizing into the air and/or causing potential odor problems around the project site and/or to prevent surface water from potentially conveying contaminants away from the project site. All sheeting used to cover stockpiles will be properly weighted down to prevent tearing and wind damage.

3.4.3 Confirmation Sampling

At the conclusion of the excavation activities, the resulting subgrade will be sampled to demonstrate that levels of remaining soil concentrations meet the Industrial Soil Cleanup Objectives (SCOs) set forth in the NYSDEC Division of Environmental Remediation Technical Guidance for Site Investigation and Remediation (DER-10). Per Section 5.4 (b) of this guidance, one sidewall sample will be collected every thirty (30) linear feet of the excavation, and one bottom sample will be collected every 900-square feet of bottom area.

Based on the estimated excavation areas identified in Figure 4 and described above, a minimum of 54 confirmatory soil samples are anticipated. Soil samples collected will be analyzed as described in Table 2 at the end of this document. In summary soil samples will be collected for the following parameters:

- Resource Conservation and Recovery Act (RCRA) 8 Metals by United States Environmental Protection Agency (USEPA) Method 6010C; and
- Copper by EPA Method 6010C.

Confirmatory soil samples will be collected and submitted to an off-site New York State Department of Health (NYSDOH) Environmental Laboratory Approval Program (ELAP)-certified laboratory for analysis, as described in Table 3 at the end of this document. Samples will be collected in accordance with the Field Sampling Plan (FSP) in Appendix A. Duplicate samples, matrix spike/matrix spike duplicate (MS/MSD) samples, analytical methods, sample volumes, preservation techniques and holding times will be collected in accordance with the Quality Assurance Project Plan (QAPP) provided in Appendix B. All samples collected for confirmatory sampling will be analyzed on a 24 or 48-hour turn-around time.

3.4.4 Site Characterization Sampling

At the conclusion of excavation activities, site characterization soil samples will also be collected from the AOC excavation areas that have not been sampled under the Site Characterization program, including but not limited to AOC-1, AOC-2 and AOC-6. A minimum of one side wall sample and one bottom soil sample will be collected from these AOC excavations for characterization purposes. Based on the estimated excavation areas identified in Figure 4, a maximum of 24 soil characterization samples are anticipated. Soil samples collected will be analyzed as described in Table 2 at the end of this document. In summary soil samples will be collected for the following parameters:

- Target compound list (TCL) volatile organic compounds (VOCs) by USEPA Method 8260,

- TCL semi-volatile organic compounds (SVOCs) by USEPA Method 8270;
- Target analyte list (TAL) metals by USEPA Method 6010C;
- Total cyanide by USEPA Method 9012;
- Pesticides by USEPA Method 8081;
- 1,4-dioxane by USEPA Method 8270 SIMS;
- Per-and poly-fluoroalkyl substances (PFAs) by USEPA Method 537; and
- Polychlorinated biphenyls (PCBs) by USEPA Method 8082.

Soil samples will be collected and submitted to an off-site NYSDOHELAP-certified laboratory for analysis, as described in Table 3. Samples will be collected in accordance with the FSP and QAPP as previously described. All samples collected for characterization sampling will be analyzed on a normal turn-around time (5-7 days).

3.4.5 Material Transport Off-Site

All transport of materials requiring off-site disposal at a permitted facility 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 loaded vehicles leaving the Site will be appropriately lined, tarped, securely covered, manifested, and placarded in accordance with appropriate Federal, State, and local requirements (and all other applicable transportation requirements).

Material transported by trucks exiting the Site will be secured with tight-fitting covers. Loose-fitting canvas and/or mesh-type truck covers will be prohibited. As previously indicated, trucks will be prohibited from transporting saturated soil. Rather, saturated soil should be placed on a containment pad to facilitate dewatering prior to shipment.

Every effort should be made to keep trucks, except for the interior of the dump box, from coming into contact with potentially contaminated Site soils, however all truck tires that come in contact with potentially contaminated soils will be washed prior to leaving the Site. A truck wash/decontamination pad will be operated onsite, if necessary. Egress points for truck and equipment transport from the Site will be kept clean of dirt and other materials during Site development. Cleaning of the adjacent streets will be performed as needed to maintain a clean condition with respect to Site-derived materials.

3.4.6 Material Disposal Off-Site

Soil excavated for off-site disposal will be characterized, transported and disposed of at an approved disposal facility in accordance with all local, State (including 6NYCRR Part 360) and Federal regulations. Prior to shipment of the material, the waste will be profiled based upon the waste characterization sampling (and historical documentation for the Site) and accepted by the

disposal facility. Actual disposal quantities and associated documentation will be reported to the NYSDEC in the Construction Completion Report. This documentation will include: waste profiles, test results, facility acceptance letters, manifests/bills of lading and facility receipts/weight tickets.

Waste Characterization Sample Laboratory Analysis

The soil samples will be submitted to a laboratory certified under the NYSDOH's ELAP for analysis of necessary waste characterization parameters following appropriate chain-of-custody protocols.

The specific analytical waste characterization requirements of the waste disposal facility may vary and will be verified prior to sampling, however typical industry practice requires one composite sample per every 1,000 tons of soil to be disposed of. Composite soil samples will be collected from stockpiled soil and submitted to the laboratory for the following analysis:

1. Toxicity Leaching Characteristic Procedure (TCLP) Extraction for VOCs by EPA Method 8260.
2. TCLP SVOCs by EPA Method 8270.
3. TCLP RCRA 8 Metals by EPA Method 6010
4. Total PCBs by EPA Method 8082
5. Pesticides and Herbicides by EPA Method 8081
6. Hazardous Waste Characteristics as defined under the Resource Conservation and Recovery Act (RCRA), including ignitability (flashpoint), corrosivity (pH) and reactivity.
7. Total Petroleum Hydrocarbons (TPH): Diesel Range Organics (DRO) and Gasoline Range Organics (GRO).
8. Per-and poly-fluoroalkyl substances (PFAS) by USEPA Method 537.
9. Percent Solids

As previously indicated, waste generated during remedial activities will be placed on containment pads or in containers until the wastes are characterized, profiled and disposed off-site at a properly permitted facility. The containers will be covered to prevent exposure to storm water and to reduce the potential release of organic vapor contaminants. Any trucks or equipment leaving the Site that have potentially been in contact with impacted soils will be decontaminated and cleaned to avoid tracking of potentially impacted soil onto adjacent areas, properties and roadways. Any construction & demolition (C&D) debris encountered, USTs or buried drums, if any, will be segregated, decontaminated if necessary, and disposed off-site at a properly. All bills of lading and waste manifests will be signed by the Owner. Fully executed documents will be included in

an appendix of the Construction Completion Report.

3.4.7 Wastewater Management

Site fluids include water produced from excavation dewatering, water collected in temporary containment pads, and decontamination procedures. While groundwater is not anticipated to be encountered during IRM activities, in the event that it is encountered or surface water into open excavations, measures will be implemented for removal from excavations, management, and disposal.

Pumping and collection of such water will be done in a manner to prevent the migration of particulates or soil/fill, and to prevent damage to the existing subgrade materials. All water collected from excavations and decontamination pads will be managed properly in accordance with all applicable regulations so as to prevent the endangerment of human health, property, or any portion of the remedial activities.

If a sheen is observed on the groundwater within the excavation area, oil-absorbent pads, booms or similar shall be deployed on the water surface. If significant light non-aqueous phase liquids (LNAPL) are encountered, a floating skimmer system will be utilized to remove this liquid for off-site disposal, and potential source soils will be excavated to the extent that product material is removed. The use of surfactants will not be permitted on the Site.

Water from decontamination activities will be containerized in 55-gallon drums and characterized for off-Site disposal. However, should dewatering of the excavation and temporary containment pads be deemed necessary, all Site liquids should be pumped to a frac tank for characterization and off-Site disposal to a treatment facility.

The groundwater collected from the excavation area and the decontamination pads will be placed in temporary containers (e.g. frac tanks) or tanker trucks and hauled to a local publicly owned treatment works (POTW), sewer authority or the permitted disposal facility.

All stored water will be placed in approved containers and labeled in accordance with United States Department of Transportation (USDOT) requirements. All water collected will be sampled by CHA on a frequency determined by the local POTW, sewer authority or the permitted disposal facility. If water is to be discharged to the POTW, a permit or other authorization will be obtained from the POTW or sewer authority prior to the discharge of treated water into the sewer system. Water samples will be analyzed, at a minimum, for the following:

1. Target compound list (TCL) VOCs by United States Environmental Protection Agency (USEPA) Method 8260.
2. TCL SVOCs by USEPA Method 8270.
3. TCL PCBs by USEPA Method 8082.

4. TAL metals and cyanide by USEPA Methods 6010, 7471 and 9012.
5. Pesticides via USEPA method 8081.
6. Herbicides via USEPA method 8081.
7. Total petroleum hydrocarbons (TPH).
8. Per-and poly-fluoroalkyl substances (PFAS) by USEPA Method 537
9. pH

Additional characterization may be necessary prior to discharging to the POTW or transporting the water for off-site disposal. Each sample will be placed directly into the laboratory-supplied containers, which will be labeled with the project name, sample identification, date, time, sampler's initials and applicable laboratory analysis. Sample containers will be stored in a cooler with ice, and submitted to ELAP certified laboratory under chain-of-custody protocols. Water will be transported in accordance with all USDOT requirements. All sampling and analysis will be performed in strict accordance with the QAPP included as Appendix B.

Temporary construction wastewater storage containers will conform to both New York State and Federal requirements. Appropriate controls will be used to prevent spills and overflows, including but not limited to, monitoring, gauging, quick-close shut-off valves, and secondary containment. All storage containers will be decontaminated following disposal or discharge activities. Any residual sediment in the storage containers will be dewatered/stabilized, if necessary, and disposed of off-site in a similar manner as the impacted soils.

3.4.8 Imported Material

On-site soil which does not exceed the excavation criteria noted above for any constituent, may be used anywhere on Site to backfill the excavation or re-grade the Site. Material proposed for import onto the Site will be in compliance with provisions in this IRMWP prior to receipt at the Site. Material from industrial sites, spill sites, other environmental remediation sites or other potentially contaminated sites will not be imported to the Site.

Before soils are brought onto the Site, the site Contractor will supply the NYSDEC Project Manager with the name, location, a brief history, and certified analytical test results for soils originating at the proposed site or facility for review and approval. No imported soils will be allowed onto the Site before they are approved by the NYSDEC Project Manager.

All imported backfill will be sampled, analyzed, and will meet Commercial Soil Cleanup Objectives at a minimum, contingent on owner approval, provided in DER-10 for the following criteria:

- VOCs via USEPA Method 8260

- SVOCs via USEPA Method 8270
- PCBs by USEPA Method 8081
- TAL Metals by USEPA Method 6010

Sampling methodology will include a combination of discrete and composite samples. Discrete/grab samples are samples taken directly from the soil material and will be analyzed for VOCs. Composite samples will consist of collecting discrete samples from 4 to 5 random locations from the volume of soil to be tested. The discrete samples are mixed/homogenized, and a sample of the mixture is analyzed for the remaining parameters detailed above.

Per DER-10, sampling is required for all imported soil for use as backfill or cover material. Sampling frequency will entail a minimum of one sample analyzed from every new source at the following sample frequency for:

1. Soil or sand imported from a virgin mine/pit, at least one round of characterization samples for the initial 100 cubic yards of material in accordance with the methodology detailed above; or
2. Material sources *other than* a virgin mine/pit (e.g., a former manufacturing site), in accordance with Table 4, below.

Table 4: Imported Soil Requirements

Recommended Number of Soil Samples for Soil Imported to or Exported from a Site per NYSDEC DER-10			
Contaminant	VOCs	SVOCs, Inorganics & PCBs/Pesticides	
Soil Quantity (cubic yards)	Discrete Samples	Composite	Discrete Samples/Composite
0-50	1	1	3-5 discrete samples from different locations in the fill being provided will comprise a composite sample for analysis
50-100	2	1	
100-200	3	1	
200-300	4	1	
300-400	4	2	
400-500	5	2	
500-800	6	2	
800-1000	7	2	
>1000	Add an additional 2 VOC and 2 composites for each additional 1000 cubic yards, or consult with DER		

The frequency of sampling described above pertains to imported fine grained soils only. Large grained fill with less than 10 percent fines passing a standard No. 200 sieve (such as open-graded stone or rip rap) will not be subject to the above sampling requirements if a letter from the

facility/quarry is provided, which states that the source is a virgin material and the source area was never utilized for commercial/industrial purposes.

An estimated fourteen (14) discrete samples for VOCs, and six (6) composite samples will be collected for fill material imported to the Site in accordance with Table 4.

Analytical methods, sample volumes, preservation techniques and holding times associated with the above samples are provided in the QAPP included as Appendix B.

3.5 REMEDIAL ACTION PROJECT PLANS

The following project plans were prepared as part of this document and incorporated within the IRMWP as appendices:

- Appendix A: Field Sampling Plan (FSP)
- Appendix B: Quality Assurance Project Plan (QAPP)
- Appendix C: Health and Safety Plan (HASP)
- Appendix D: Community Air Monitoring Plan (CAMP)

3.5.1 Field Sampling Plan

The work described in this IRMWP will be performed in accordance with the FSP that has been developed for this project. The FSP details the specific sampling objectives, procedures, and protocols associated with this project. A copy of the FSP is provided in Appendix A.

3.5.2 Quality Assurance Project Plan

The QAPP provided in Appendix B was prepared to present the policies, organization, objectives, functional activities and specific Quality Assurance (QA) and Quality Control (QC) activities designed to achieve the specific data quality goals associated with the Remedial Activities. The QAPP includes the following sections:

- Project organization
- Project responsibilities
- Sampling and custody procedures
- Calibration procedures
- QA objectives
- Analytical procedures
- Data analysis and reporting
- Internal QC checks
- Performance and system audits
- Preventative maintenance

- Method-specific procedures for assessing data precision, accuracy, and completeness
- Laboratory corrective actions
- QA reports.

3.5.3 Health & Safety Plan

A site-specific HASP was prepared to provide specific guidelines and establish procedures for the protection of CHA on-site personnel during construction activities. A copy of the HASP is included in Appendix C. The health and safety requirements for the remedial activities were developed in accordance with the Occupational Safety Health Administration (OSHA) regulations 29 CFR 1910 and 1926. The selected remedial contractor will be responsible for developing their own site-specific HASP that addresses all aspects of health and safety for the proposed project. The Contractor's HASP must cover activities their employees will be involved in (e.g. confined space program, lockout/tagout, hot work permits, etc.). Major elements of the plan include:

1. Health and safety risk or hazard analysis (i.e., physical or chemical hazard involved, concentration, primary hazard) for each site task or operation referenced in the work plan.
2. Employee training assignments to assure compliance with 29 CFR 1910.120 (e) including identification of the use of 24-Hour (part-time) and 40-Hour (full-time) OSHA trained on-site workers.
3. Personal protective level/equipment to be used for each site task or operation [29 CFR1910.120 (g)] selected as a result of the hazard analysis and consistent with OSHA Permissible Exposure Limits referenced in 29 CFR 1910.1000. This includes the identification of head, eye, ear, face, body, foot, skin, and respiratory protection necessary and the minimum level of protection that should be worn on-site at all times.
4. Medical surveillance requirements [29 CFR 1910.120 (f)] including the identification of the medical surveillance performed for 24-Hour and 40-Hour OSHA trained workers on-site, medical surveillance required for on-site workers to wear respirators, if necessary, and medical surveillance required should an on-site worker be overexposed.
5. Frequency and types of air monitoring (i.e., organic vapor, combustible gas, particulate), personnel monitoring (i.e., cold/heat, stress), and environmental sampling techniques and instrumentation, including methods of maintenance and calibration of equipment. This section should also list action levels, that when reached on the monitoring equipment, will cause operations to cease and further contingency actions to be taken.
6. Site control measures [29 CFR 1910.120 (d)] including the aerial designation of the exclusion, contamination reduction, and support zones and identification of how site security will be accomplished.
7. Decontamination procedures [29 CFR 1910.120 (k)] for on-site personnel and equipment including decontamination procedures to use in the event of an emergency as well as the identification of decontamination station equipment, and solutions.

8. Emergency response plan including location of and directions to the nearest hospital, fire/police emergency numbers, and communication procedures, on-site first aid available, acute exposure symptoms of hazards involved, and emergency procedures for injury within work zones, fire explosion, equipment failure, and chemical exposure.
9. Confined space entry procedures, if required, including a description of the permit system, attendant duty/system, barricading of space, atmospheric testing requirements, lockout, tagout requirements, and specialized equipment used.
10. Spill containment program [29 CFR 1910.120 (j)].
11. Line of command on-site (identification of Contractor Health and Safety Supervisor on-site) as well as identification of management, advisors, medical support, fire/rescue support, field team/work party, security hygienists, and others, if deemed necessary in the HASP.

3.5.4 Community Air Monitoring Plan

Air monitoring will be performed along the perimeter of the Site during the remedial activities in accordance with the NYSDOH *Generic Community Air Monitoring Plan*. This plan includes measures for monitoring both fugitive dust and organic vapors. Unlike work zone air monitoring conducted for the protection of workers, the CAMP will be utilized to alert the contractor of any dust or organic vapors that may leave the Site so that mitigation measures can be implemented. Additionally, the plan identifies action levels during construction and the mitigation methods to address any exceedances of the action levels. A copy of the CAMP is provided in Appendix D.

4.0 SCHEDULE

The following provides a proposed schedule for the completion of remedial activities specified in this Work Plan:

Table 5: Project Schedule

DESCRIPTION	ESTIMATED START	ESTIMATED FINISH
NYSDEC Review & Approval of IRM Work Plan	September 21, 2017	November 2017
Implementation of IRM field activities	September 29, 2017	Spring 2018

The overall progress of the IRM activities will be dependent upon a number of factors including, but not limited to: NYSDEC review periods, findings of the Site Characterization program, weather conditions at the time of construction, etc.

The NYSDEC has been notified at least 7 days prior to the proposed initiation of the field activities to be conducted in support of the IRM remedial action.

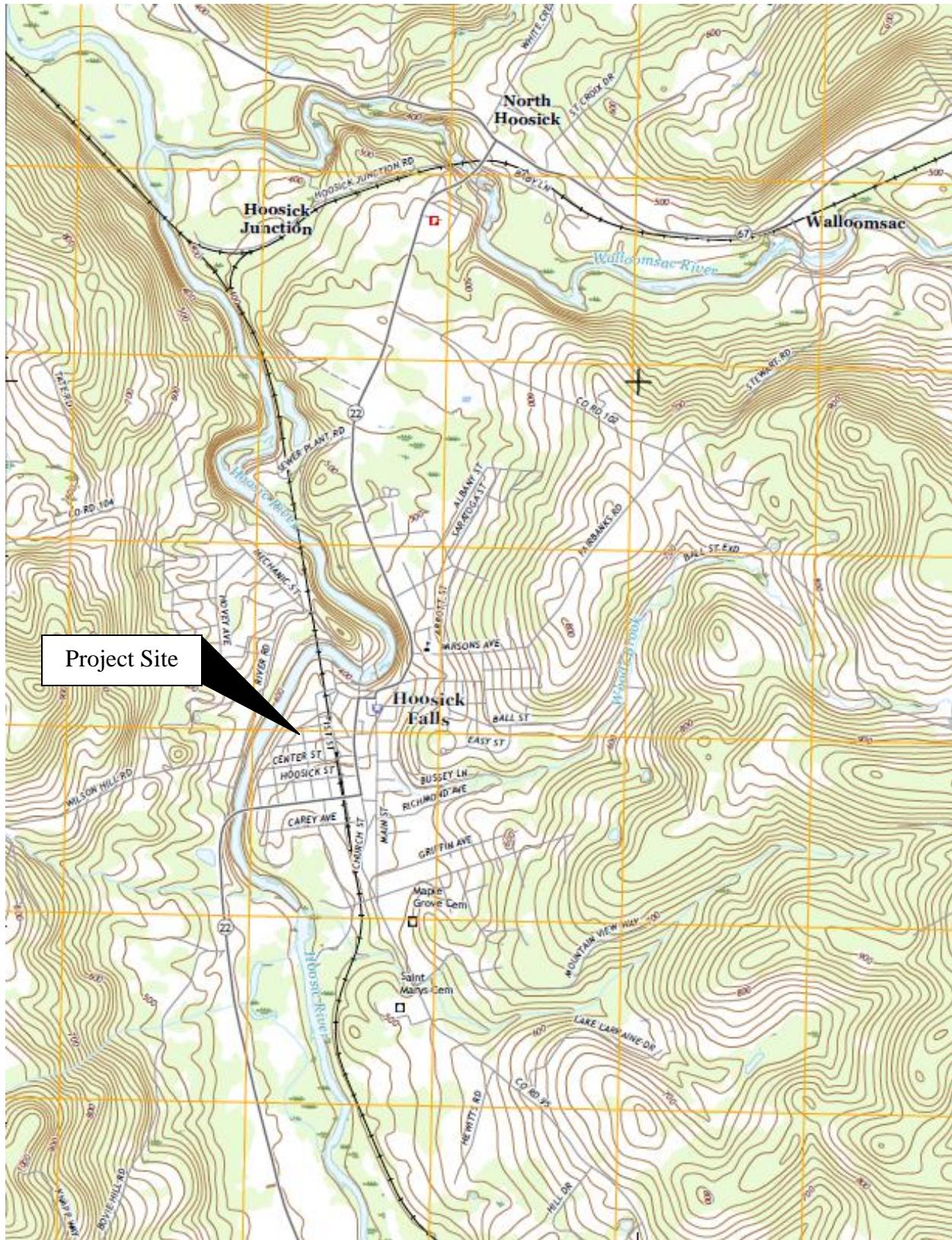
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5.0 CONSTRUCTION COMPLETION REPORT

The intent of the IRM is to remove soil in exceedance of the Industrial SCOs set forth in DER-10 from twelve (12) AOCs. A Construction Completion Report (CCR) will be prepared in accordance with DER-10 guidance to document the IRM activities. The CCR will include a description of the remedial activities, sample results, waste profiles, facility acceptance letters, manifests/bill of lading, and facility receipts/weight slips. The CCR will be reviewed and certified by a professional engineer. The CCR is not intended to be used to obtain a Certificate of Completion under the Consent Order. The CCR will be included a part of a site-wide Final Engineering Report (FER) once all required remedial activities are complete. The FER will also include a Site Management Plan (SMP), institutional and engineering controls (IC/EC), and a long-term monitoring program.

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FIGURES



SOURCE: USGS MapViewer



III Winner's Circle, Albany, NY
www.chacompanies.com

NOT TO SCALE

DATE: September 2017

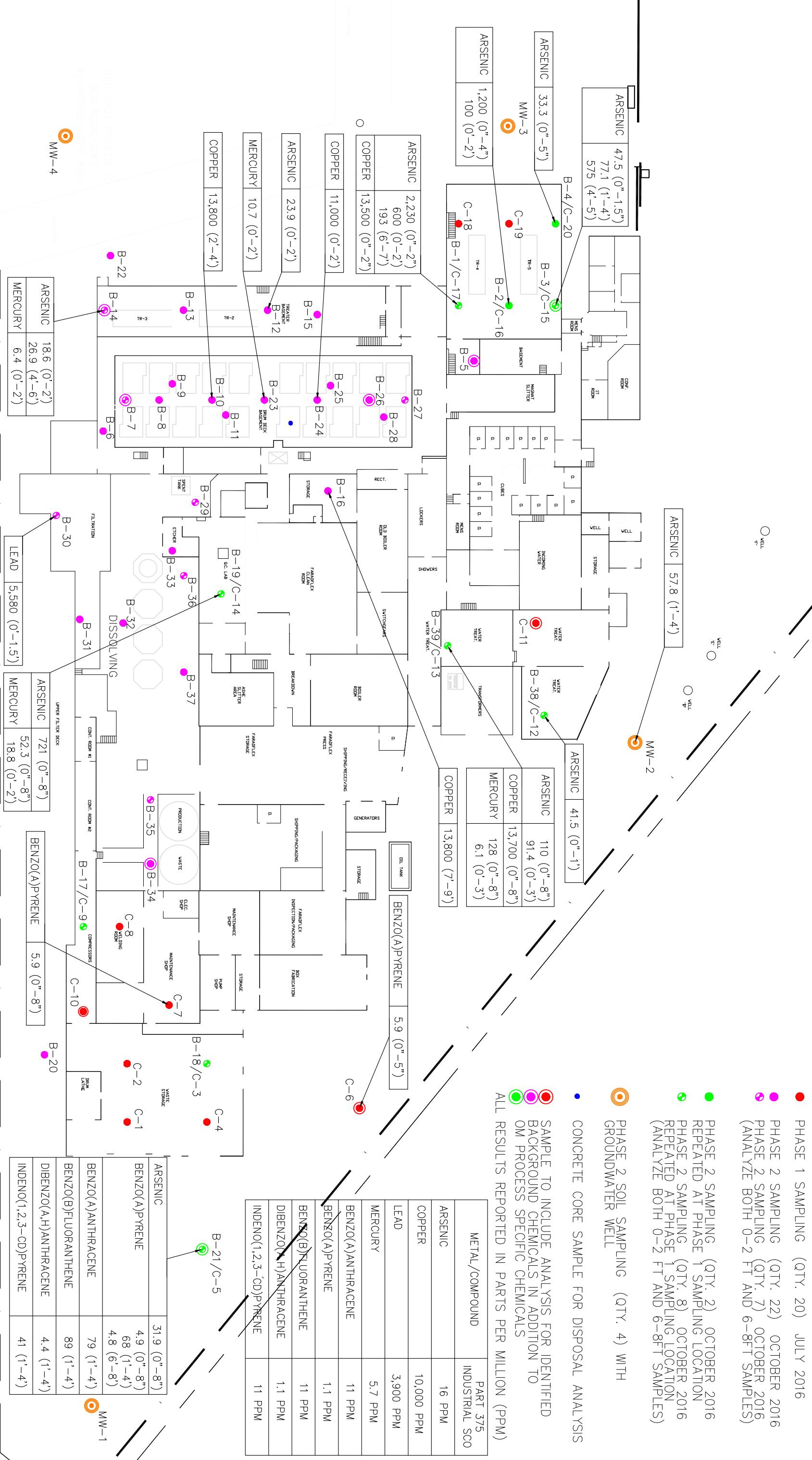
FIGURE 1
SITE LOCATION MAP
80 FIRST STREET
HOOSICK FALLS,
RENSELEER COUNTY, NEW YORK



MAP NOT TO SCALE

DATE: September 2017

FIGURE 2
SITE PLAN
80 FIRST STREET
HOOSICK FALLS
RENSSELAER COUNTY, STATE OF NEW YORK





TABLES

Table 2: Sampling Rationale

Area of Concern	Sample ID	Analytical Parameters	Rationale
AOC-1	SOIL-S100 – SOIL-S102	RCRA 8 Metals, Copper	A soil sample collected from this area during the Phase II subsurface investigation reported levels of arsenic that exceed the Industrial SCOs.
AOC-1	SOIL-S103	VOCs, SVOCs, TAL Metals, Total Cyanide, Pesticides, 1,4-dioxane, PFAS, PCBs	Sampling for these parameters fulfills requirements set forth by the NYSDEC, 6 NYCRR Part 375 and is being completed as part of the Site Characterization program.
AOC-1	SOIL-B100	VOCs, SVOCs, TAL Metals, Total Cyanide, Pesticides, 1,4-dioxane, PFAS, PCBs	Sampling for these parameters fulfills requirements set forth by the NYSDEC, 6 NYCRR Part 375 and is being completed as part of the Site Characterization program.
AOC-2	SOIL-S104 – SOIL-S108	RCRA 8 Metals, Copper	Soil samples collected from this area during the Phase II subsurface investigation reported levels of arsenic and copper that exceed the Industrial SCOs.
AOC-2	SOIL-S109	VOCs, SVOCs, TAL Metals, Total Cyanide, Pesticides, 1,4-dioxane, PFAS, PCBs	Sampling for these parameters fulfills requirements set forth by the NYSDEC, 6 NYCRR Part 375 and is being completed as part of the Site Characterization program.
AOC-2	SOIL-B101	RCRA 8 Metals, Copper	Soil samples collected from this area during the Phase II subsurface investigation reported levels of arsenic and copper that exceed the Industrial SCOs.
AOC-2	SOIL-B102	VOCs, SVOCs, TAL Metals, Total Cyanide, Pesticides, 1,4-dioxane, PFAS, PCBs	Sampling for these parameters fulfills requirements set forth by the NYSDEC, 6 NYCRR Part 375 and is being completed as part of the Site Characterization program.

Area of Concern	Sample ID	Analytical Parameters	Rationale
AOC-3	SOIL-S110 – SOIL-S112	RCRA 8 Metals, Copper	A soil sample collected from this area during the Phase II subsurface investigation reported levels of arsenic that exceed the Industrial SCOs.
AOC-3	SOIL-S113	VOCs, SVOCs, TAL Metals, Total Cyanide, Pesticides, 1,4-dioxane, PFAS, PCBs	Sampling for these parameters fulfills requirements set forth by the NYSDEC, 6 NYCRR Part 375 and is being completed as part of the Site Characterization program.
AOC-3	SOIL-B103	VOCs, SVOCs, TAL Metals, Total Cyanide, Pesticides, 1,4-dioxane, PFAS, PCBs	Sampling for these parameters fulfills requirements set forth by the NYSDEC, 6 NYCRR Part 375 and is being completed as part of the Site Characterization program.
AOC-4	SOIL-S114 – SOIL-S116	RCRA 8 Metals, Copper	A soil sample collected from this area during the Phase II investigation contained levels of arsenic and mercury that exceeded the Industrial SCOs.
AOC-4	SOIL-S117	VOCs, SVOCs, TAL Metals, Total Cyanide, Pesticides, 1,4-dioxane, PFAS, PCBs	Sampling for these parameters fulfills requirements set forth by the NYSDEC, 6 NYCRR Part 375 and is being completed as part of the Site Characterization program.
AOC-4	SOIL-B104	VOCs, SVOCs, TAL Metals, Total Cyanide, Pesticides, 1,4-dioxane, PFAS, PCBs	Sampling for these parameters fulfills requirements set forth by the NYSDEC, 6 NYCRR Part 375 and is being completed as part of the Site Characterization program.
AOC-5	SOIL-S118 – SOIL – S124	RCRA 8 Metals, Copper	Soil samples collected from this area during the Phase II investigation contained levels of copper and mercury that exceed the Industrial SCOs.

Area of Concern	Sample ID	Analytical Parameters	Rationale
AOC-5	SOIL-S125	VOCs, SVOCs, TAL Metals, Total Cyanide, Pesticides, 1,4-dioxane, PFAS, PCBs	Sampling for these parameters fulfills requirements set forth by the NYSDEC, 6 NYCRR Part 375. and is being completed as part of the Site Characterization program
AOC-5	SOIL-B105	RCRA 8 Metals, Copper	Soil samples collected from this area during the Phase II investigation contained levels of copper and mercury that exceed the Industrial SCOs.
AOC-5	SOIL-B106	VOCs, SVOCs, TAL Metals, Total Cyanide, Pesticides, 1,4-dioxane, PFAS, PCBs	Sampling for these parameters fulfills requirements set forth by the NYSDEC, 6 NYCRR Part 375 and is being completed as part of the Site Characterization program.
AOC-6	SOIL-S126 – SOIL-S128	RCRA 8 Metals, Copper	A soil sample collected from this area during the Phase II investigation contained levels of copper that exceed the Industrial SCO.
AOC-6	SOIL-S129	VOCs, SVOCs, TAL Metals, Total Cyanide, Pesticides, 1,4-dioxane, PFAS, PCBs	Sampling for these parameters fulfills requirements set forth by the NYSDEC, 6 NYCRR Part 375 and is being completed as part of the Site Characterization program.
AOC-6	SOIL-B107	VOCs, SVOCs, TAL Metals, Total Cyanide, Pesticides, 1,4-dioxane, PFAS, PCBs	Sampling for these parameters fulfills requirements set forth by the NYSDEC, 6 NYCRR Part 375 and is being completed as part of the Site Characterization program.
AOC-7	SOIL-S130 – SOIL-S132	RCRA 8 Metals, Copper	A soil sample collected from this area during the Phase II investigation contained levels of lead and copper that exceed the Unrestricted SCO.

Area of Concern	Sample ID	Analytical Parameters	Rationale
AOC-7	SOIL-S133	VOCs, SVOCs, TAL Metals, Total Cyanide, Pesticides, 1,4-dioxane, PFAS, PCBs	Sampling for these parameters fulfills requirements set forth by the NYSDEC, 6 NYCRR Part 375 and is being completed as part of the Site Characterization program.
AOC-7	SOIL-B108	VOCs, SVOCs, TAL Metals, Total Cyanide, Pesticides, 1,4-dioxane, PFAS, PCBs	Sampling for these parameters fulfills requirements set forth by the NYSDEC, 6 NYCRR Part 375 and is being completed as part of the Site Characterization program.
AOC-8	SOIL-S134 – SOIL-S136	RCRA 8 Metals, Copper	A soil sample collected from this area during the Phase II investigation contained levels of lead that exceed the Industrial SCOs.
AOC-8	SOIL-S137	VOCs, SVOCs, TAL Metals, Total Cyanide, Pesticides, 1,4-dioxane, PFAS, PCBs	Sampling for these parameters fulfills requirements set forth by the NYSDEC, 6 NYCRR Part 375 and is being completed as part of the Site Characterization program.
AOC-8	SOIL-B109	VOCs, SVOCs, TAL Metals, Total Cyanide, Pesticides, 1,4-dioxane, PFAS, PCBs	Sampling for these parameters fulfills requirements set forth by the NYSDEC, 6 NYCRR Part 375 and is being completed as part of the Site Characterization program.
AOC-9	SOIL-S138 – SOIL-S140	RCRA 8 Metals, Copper	A soil sample collected from this area during the Phase II investigation contained levels of arsenic and mercury that exceed the Industrial SCOs.
AOC-9	SOIL-S141	VOCs, SVOCs, TAL Metals, Total Cyanide, Pesticides, 1,4-dioxane, PFAS, PCBs	Sampling for these parameters fulfills requirements set forth by the NYSDEC, 6 NYCRR Part 375 and is being completed as part of the Site Characterization program.

Area of Concern	Sample ID	Analytical Parameters	Rationale
AOC-9	SOIL-B110	VOCs, SVOCs, TAL Metals, Total Cyanide, Pesticides, 1,4-dioxane, PFAS, PCBs	Sampling for these parameters fulfills requirements set forth by the NYSDEC, 6 NYCRR Part 375 and is being completed as part of the Site Characterization program.
AOC-10	SOIL-S142 – SOIL-S144	RCRA 8 Metals, Copper	A soil sample collected from this area during the Phase II investigation contained levels of arsenic, copper, and mercury that exceed the Industrial SCOs.
AOC-10	SOIL-S145	VOCs, SVOCs, TAL Metals, Total Cyanide, Pesticides, 1,4-dioxane, PFAS, PCBs	Sampling for these parameters fulfills requirements set forth by the NYSDEC, 6 NYCRR Part 375 and is being completed as part of the Site Characterization program.
AOC-10	SOIL-B111	VOCs, SVOCs, TAL Metals, Total Cyanide, Pesticides, 1,4-dioxane, PFAS, PCBs	Sampling for these parameters fulfills requirements set forth by the NYSDEC, 6 NYCRR Part 375 and is being completed as part of the Site Characterization program.
AOC-11	SOIL-S146 – SOIL-S152	RCRA 8 Metals, Copper	A soil sample collected from this area during the Phase II investigation contained levels of arsenic that exceed the Industrial SCO.
AOC-11	SOIL-S153	VOCs, SVOCs, TAL Metals, Total Cyanide, Pesticides, 1,4-dioxane, PFAS, PCBs	Sampling for these parameters fulfills requirements set forth by the NYSDEC, 6 NYCRR Part 375 and is being completed as part of the Site Characterization program.
AOC-11	SOIL-B112 – SOIL-B114	RCRA 8 Metals, Copper	A soil sample collected from this area during the Phase II investigation contained levels of arsenic that exceed the Industrial SCO.

Area of Concern	Sample ID	Analytical Parameters	Rationale
AOC-11	SOIL-B115	VOCs, SVOCs, TAL Metals, Total Cyanide, Pesticides, 1,4-dioxane, PFAS, PCBs	Sampling for these parameters fulfills requirements set forth by the NYSDEC, 6 NYCRR Part 375 and is being completed as part of the Site Characterization program.
AOC-12	SOIL-S154 – SOIL-S158	RCRA 8 Metals, Copper	A soil sample collected from this area during the Phase II investigation contained levels of arsenic that exceed the Industrial SCO.
AOC-12	SOIL-S159	VOCs, SVOCs, TAL Metals, Total Cyanide, Pesticides, 1,4-dioxane, PFAS, PCBs	Sampling for these parameters fulfills requirements set forth by the NYSDEC, 6 NYCRR Part 375 and is being completed as part of the Site Characterization program.
AOC-12	SOIL-B116 – SOIL-B117	RCRA 8 Metals, Copper	A soil sample collected from this area during the Phase II investigation contained levels of arsenic that exceed the Industrial SCO.
AOC-12	SOIL-B118	VOCs, SVOCs, TAL Metals, Total Cyanide, Pesticides, 1,4-dioxane, PFAS, PCBs	Sampling for these parameters fulfills requirements set forth by the NYSDEC, 6 NYCRR Part 375 and is being completed as part of the Site Characterization program.
AOC-2	SOIL-DUP100	RCRA 8 Metals, Copper	Per QAQC procedure, four blind duplicate samples will be collected with selected soil samples to determine the precision of laboratory analysis.
AOC-5	SOIL-DUP101	RCRA 8 Metals, Copper	Per QAQC procedure, four blind duplicate samples will be collected with selected soil samples to determine the precision of laboratory analysis.

Area of Concern	Sample ID	Analytical Parameters	Rationale
AOC-11	SOIL-DUP102	RCRA 8 Metals, Copper	Per QAQC procedure, four blind duplicate samples will be collected with selected soil samples to determine the precision of laboratory analysis.
AOC-7	SOIL-DUP103	VOCs, SVOCs, TAL Metals, Total Cyanide, Pesticides, 1,4-dioxane, PFAS, PCBs	Per QAQC procedure, four blind duplicate samples will be collected with selected soil samples to determine the precision of laboratory analysis.
AOC-12	SOIL-DUP104	VOCs, SVOCs, TAL Metals, Total Cyanide, Pesticides, 1,4-dioxane, PFAS, PCBs	Per QAQC procedure, one matrix spike duplicate (MSD) sample is required for every 20 samples (including duplicate samples and field or equipment blank samples).
AOC-1	SOIL-MS100 SOIL-MSD100	RCRA 8 Metals, Copper	Per QAQC procedure, one matrix spike (MS) sample is required for every 20 samples (including duplicate samples and field or equipment blank samples).
AOC-3	SOIL-MS101 SOIL-MSD101	RCRA 8 Metals, Copper	Per QAQC procedure, one matrix spike duplicate (MSD) sample is required for every 20 samples (including duplicate samples and field or equipment blank samples).
AOC-6	SOIL-MS102 SOIL-MSD102	RCRA 8 Metals, Copper	Per QAQC procedure, one matrix spike (MS) sample is required for every 20 samples (including duplicate samples and field or equipment blank samples).
AOC-4	SOIL-MS103 SOIL-MSD103	VOCs, SVOCs, TAL Metals, Total Cyanide, Pesticides, 1,4-dioxane, PFAS, PCBs	Per QAQC procedure, one matrix spike duplicate (MSD) sample is required for every 20 samples (including duplicate samples and field or equipment blank samples).

Area of Concern	Sample ID	Analytical Parameters	Rationale
AOC-9	SOIL-MS104 SOIL-MSD104	VOCs, SVOCs, TAL Metals, Total Cyanide, Pesticides, 1,4-dioxane, PFAS, PCBs	Per QAQC procedure, one matrix spike duplicate (MSD) sample is required for every 20 samples (including duplicate samples and field or equipment blank samples).
Soil Stockpiles	SOIL-WC100 – SOIL-WC110	TCLP VOC, TCLP SVOC, TAL Metals, TCLP Pesticides/Herbicides, PCBs, TPH DRO and GRO, Reactivity, Ignitability, Corrosivity, pH, PFAS	Eleven waste characterization soil samples will be collected to adequately characterize the excavated soils for off-site disposal at a permitted facility.
Imported Fill	SOIL-IFC100 – SOIL-IFC113	TCL VOC	Sampling for these parameters fulfills requirements set forth by the NYSDEC, 6 NYCRR Part 375.
Imported Fill	SOIL-IFC114 – SOIL-IFC119	TCL SVOC, TAL Metals, PCBs, Pesticides	Sampling for these parameters fulfills requirements set forth by the NYSDEC, 6 NYCRR Part 375.

Table 3: Analytical Methods/Quality Assurance Summary

Matrix (Sample Type)	Type of Sample	Analysis	Parameter/Fraction	Number of Primary Samples	Number of Duplicates/MS/MSD	Sampling Locations	Minimum Sample Volume/Container	Sample Preservation	Technical Holding Time
Soil	Subsurface Soil	EPA Method 8260C	TCL VOCs	24	2/2/2	SOIL-S103, SOIL-B100, SOIL-S109, SOIL-B102, SOIL-S113, SOIL-B103, SOIL-S117, SOIL-B104, SOIL-S125, SOIL-B106, SOIL-S129, SOIL-B107, SOIL-S133, SOIL-B108, SOIL-S137, SOIL-B109, SOIL-S141, SOIL-B110, SOIL-S145, SOIL-B111, SOIL-S153, SOIL-B115, SOIL-S159, SOIL-B118	4 oz glass wide	Cool to 4 °C	14 days
	Subsurface Soil	EPA Method 8270D	TCL SVOCs	24	2/2/2	SOIL-S103, SOIL-B100, SOIL-S109, SOIL-B102, SOIL-S113, SOIL-B103, SOIL-S117, SOIL-B104, SOIL-S125, SOIL-B106, SOIL-S129, SOIL-B107, SOIL-S133, SOIL-B108, SOIL-S137, SOIL-B109, SOIL-S141, SOIL-B110, SOIL-S145, SOIL-B111, SOIL-S153, SOIL-B115, SOIL-S159, SOIL-B118	4 oz glass wide	Cool to 4°C	14 days
	Subsurface Soil	EPA Methods 6010C, 7471B	RCRA8 Metals, Copper	54	3/3/3	SOIL-S100 to SOIL-S102, SOIL-S104 to SOIL-S108, SOIL-B101, SOIL-S110 to SOIL-S112, SOIL-S114 to SOIL-S116, SOIL-S118 to SOIL-S124, SOIL-B105, SOIL-S126 to SOIL-S128, SOIL-S130 to SOIL-S132, SOIL-S134 to SOIL-S136, SOIL-S138 to SOIL-S140, SOIL-S142 to SOIL-S144, SOIL-S146 to SOIL-S152, SOIL-B112 to SOIL-B114, SOIL-S154 to SOIL-S158, SOIL-B116 to SOIL-B117	8 oz glass wide	Cool to 4°C	180 days (28 days for mercury)
	Subsurface Soil	EPA Method 8082A	PCBs	24	2/2/2	SOIL-S103, SOIL-B100, SOIL-S109, SOIL-B102, SOIL-S113, SOIL-B103, SOIL-S117, SOIL-B104, SOIL-S125, SOIL-B106, SOIL-S129, SOIL-B107, SOIL-S133, SOIL-B108, SOIL-S137, SOIL-B109, SOIL-S141, SOIL-B110, SOIL-S145, SOIL-B111, SOIL-S153, SOIL-B115, SOIL-S159, SOIL-B118	4 oz glass wide	Cool to 4°C	14 days
	Subsurface Soil	EPA Method 6010C	TAL Metals	24	2/2/2	SOIL-S103, SOIL-B100, SOIL-S109, SOIL-B102, SOIL-S113, SOIL-B103, SOIL-S117, SOIL-B104, SOIL-S125, SOIL-B106, SOIL-S129, SOIL-B107, SOIL-S133, SOIL-B108, SOIL-S137, SOIL-B109, SOIL-S141, SOIL-B110, SOIL-S145, SOIL-B111, SOIL-S153, SOIL-B115, SOIL-S159, SOIL-B118	8 oz glass wide	Cool to 4°C	180 days
	Subsurface Soil	EPA Method 9012	Total Cyanide	24	2/2/2	SOIL-S103, SOIL-B100, SOIL-S109, SOIL-B102, SOIL-S113, SOIL-B103, SOIL-S117, SOIL-B104, SOIL-S125, SOIL-B106, SOIL-S129, SOIL-B107, SOIL-S133, SOIL-B108, SOIL-S137, SOIL-B109, SOIL-S141, SOIL-B110, SOIL-S145, SOIL-B111, SOIL-S153, SOIL-B115, SOIL-S159, SOIL-B118	4 oz glass wide	Cool to 4°C	14 days
	Subsurface Soil	EPA Method 8081B	Pesticides	24	2/2/2	SOIL-S103, SOIL-B100, SOIL-S109, SOIL-B102, SOIL-S113, SOIL-B103, SOIL-S117, SOIL-B104, SOIL-S125, SOIL-B106, SOIL-S129, SOIL-B107, SOIL-S133, SOIL-B108, SOIL-S137, SOIL-B109, SOIL-S141, SOIL-B110, SOIL-S145, SOIL-B111, SOIL-S153, SOIL-B115, SOIL-S159, SOIL-B118	4 oz glass wide	Cool to 4°C	14 days
	Subsurface Soil	EPA Method 8270	1,4-Dioxane	24	2/2/2	SOIL-S103, SOIL-B100, SOIL-S109, SOIL-B102, SOIL-S113, SOIL-B103, SOIL-S117, SOIL-B104, SOIL-S125, SOIL-B106, SOIL-S129, SOIL-B107, SOIL-S133, SOIL-B108, SOIL-S137, SOIL-B109, SOIL-	4 oz glass wide	Cool to 4°C	14 days

Matrix (Sample Type)	Type of Sample	Analysis	Parameter/Fraction	Number of Primary Samples	Number of Duplicates/MS/MSD	Sampling Locations	Minimum Sample Volume/Container	Sample Preservation	Technical Holding Time
						S141, SOIL-B110, SOIL-S145, SOIL-B111, SOIL-S153, SOIL-B115, SOIL-S159, SOIL-B118			
	Subsurface Soil	EPA Method 537	PFAS	24	2/2/2	SOIL-S103, SOIL-B100, SOIL-S109, SOIL-B102, SOIL-S113, SOIL-B103, SOIL-S117, SOIL-B104, SOIL-S125, SOIL-B106, SOIL-S129, SOIL-B107, SOIL-S133, SOIL-B108, SOIL-S137, SOIL-B109, SOIL-S141, SOIL-B110, SOIL-S145, SOIL-B111, SOIL-S153, SOIL-B115, SOIL-S159, SOIL-B118	250 mL plastic container (3)	1.25 g Trizma, Cool to 4°C	14 days
Waste Characterization Samples	Waste Soil	EPA Method 8260C	TCLP VOCs	5/1	0/0	Soil Stockpiles and Containerized Water	8 oz. amber jar	Cool to 4°C	14 days extract
	Waste Soil	EPA Method 8270D	TCLP SVOCs	5	0/0	Soil Stockpiles	8 oz. amber jar	Cool to 4°C	14 days extract
	Waste Soil	EPA Method 6010C, 7470A	TCLP Metals	5	0/0	Soil Stockpiles	8 oz. amber jar	Cool to 4°C	180 days (6010) 28 days (mercury) 14 days (cyanide)
	Waste Soil	EPA Method 8081B	TCLP Pesticides	5	0/0	Soil Stockpiles	4 oz. amber jar	Cool to 4°C	14 days extract
	Waste Soil	EPA Method 8081B	TCLP Herbicides	5	0/0	Soil Stockpiles	4 oz. amber jar	Cool to 4°C	14 days extract
	Waste Soil	EPA Method 8082	PCBs	5	0/0	Soil Stockpiles	4 oz. amber jar	Cool to 4°C	14 days extract
	Waste Soil	TPH	TPH DRO and GRO	5	0/0	Soil Stockpiles	4 oz. amber jar	Cool to 4°C	14 days extract
	Waste Soil	EPA Method 537	PFAS	5	0/0	Soil Stockpiles	250 mL plastic container (3)	1.25 g Trizma, Cool to 4°C	14 days
	Waste Soil	pH	pH	5	0/0	Soil Stockpiles	4 oz. amber jar	Cool to 4°C	14 days extract
	Waste Water	EPA Method 8260C	TCL VOCs	TBD	0/0	Waste Water Collected	40 mL amber VOA	NaSO4, Cool to 4 °C	7 days

Matrix (Sample Type)	Type of Sample	Analysis	Parameter/Fraction	Number of Primary Samples	Number of Duplicates/MS/MSD	Sampling Locations	Minimum Sample Volume/Container	Sample Preservation	Technical Holding Time
Waste Water Samples	Waste Water	EPA Method 8270D	TCL SVOCs including 1,4-Dioxane	TBD	0/0	Waste Water Collected	1000 mL amber glass	Cool to 4°C	7 days
	Waste Water	EPA Method 8082A	PCBs	TBD	0/0	Waste Water Collected	1000 mL amber glass	Cool to 4°C	7 days
	Waste Water	EPA Method 6010C	TAL Metals	TBD	0/0	Waste Water Collected	500 mL Plastic	HNO3, Cool to 4°C	180 days
	Waste Water	EPA Method 9012	Total Cyanide	TBD	0/0	Waste Water Collected	1000 mL amber glass	Cool to 4°C	7 days
	Waste Water	EPA Method 8081B	Pesticides	TBD	0/0	Waste Water Collected	1000 mL amber glass	Cool to 4°C	7 days
	Waste Water	EPA Method 8051	Herbicides	TBD	0/0	Waste Water Collected	1000 mL amber glass	Cool to 4°C	7 days
	Waste Water	EPA Method 537	PFAS	TBD	0/0	Waste Water Collected	250 mL plastic container (3)	1.25 g Trizma, Cool to 4°C	14 days
	Waste Water	EPA Method 8015C	TPH	TBD	0/0	Waste Water Collected	1000 mL amber glass	Cool to 4°C	7 days
	Waste Water	pH	pH	TBD	0/0	Waste Water Collected	250 mL Plastic	Cool to 4°C	48 hours
Imported Fill Samples	Imported Soil	EPA method 8260C	TCL VOC	14	0/0	Imported Fill	5 grams/40mL Amber VOA	NaSO4, Cool to 4 °C	14 days
	Imported Soil	EPA Method 8270D	TCL SVOC	6	0/0	Imported Fill	4 oz glass wide	Cool to 4°C	14 days
	Imported Soil	EPA Method 8082	Total PCBs	6	0/0	Imported Fill	4 oz glass wide	Cool to 4°C	14 days
	Imported Soil	EPA Method 8081	Pesticides	6	0/0	Imported Fill	4 oz glass wide	Cool to 4°C	14 days
	Imported Soil	EPA Method 6010	TAL Metals	6	0/0	Imported Fill	8 oz glass wide	Cool to 4°C	180 days

APPENDIX A

Field Sampling Plan

FIELD SAMPLING PLAN

**Oak Mitsui
Site # 442052
80 First Street
Hoosick Falls, New York**

CHA Project Number: 31861

Prepared for:

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TABLE OF CONTENTS

1.0	Introduction.....	1
2.0	General Sampling Protocols	2
2.1	Sample Designation	2
2.2	Sample Handling.....	2
2.3	Field Documentation.....	3
3.0	Investigation Activities	4
3.1	Confirmatory Soil Sampling.....	4
3.2	Site Characterization Sampling.....	4
3.3	Imported Material Sampling	5
3.4	Waste Characterization Sampling.....	6
3.5	Waste water Sampling	7
3.6	Survey	8
4.0	Equipment Decontamination	9
4.1.1	Small Equipment.....	9
4.1.2	Large Equipment.....	9
5.0	Fluids Management.....	11
6.0	Investigation Derived Waste.....	12

FIGURES

- Figure 1: Site Location Map
Figure 2: Site Plan
Figure 3: Areas of Excavation

TABLES

- Table 1: Sampling Rationale
Table 2: Imported Soil Requirements

APPENDICES

- Appendix A: CHA Standard Operating Procedures

LIST OF ACRONYMS & ABBREVIATIONS

AOC	Area of Concern
CHA	CHA Consulting, Inc.
CP	Cleanup Procedure
DER	Division of Environmental Remediation
ELAP	Environmental Laboratory Accreditation Program
FSP	Field Sampling Plan
HASP	Health and Safety Plan
IRM	Interim Remedial Measure
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
PCB	Polychlorinated Biphenyls
PFAs	Per-and poly-fluoroalkyl substances
PPE	Personal Protection Equipment
QAPP	Quality Assurance Project Plan
RCRA	Resource Conservation Recovery Act
SCO	Soil Cleanup Objective
SOP	Standard Operating Procedure
SVOC	Semi-Volatile Organic Compound
TAL	Target Analyte List
TCL	Target Compound List
TCLP	Toxicity Characteristic Leaching Procedure
USEPA	United States Environmental Protection Agency
VOC	Volatile Organic Compound
WAD Cyanide	Weak Acid Dissociable Cyanide

1.0 INTRODUCTION

This Field Sampling Plan (FSP) has been prepared for the Oak Mitsui Facility (Site), located at 80 First Street, in Hoosick Falls, New York, and is to be utilized during the Interim Remedial Measures (IRM) at the Site. The Site is a part of the New York State Department of Environmental Conservation's (NYSDEC) Consent Order program (Site Number 442052). The Site location is shown on Figure 1. A Site plan is provided on Figure 2.

This FSP outlines the protocols which will be followed during the IRM activities and has been prepared as an appendix to the IRM Work Plan for the project. In general, all activities will be performed in accordance with the CHA Consulting, Inc. (CHA) Standard Operating Procedures (SOP's) that are included in Appendix A.

The following activities will be conducted as part of the IRM activities:

- Confirmatory soil sampling;
- Site characterization soil sampling;
- Waste characterization sampling;
- Imported Fill Sampling;
- Equipment cleaning; and
- Waste handling.

2.0 GENERAL SAMPLING PROTOCOLS

The sampling approach and rationale for sample collection is described in the IRM Work Plan. The Data Quality Objectives for the project and the quality assurance and quality control procedures for the project are described in the Quality Assurance Project Plan (QAPP), found in Appendix B of the IRM Work Plan. Sampling activities will be conducted in a manner to protect both workers and the general public in accordance with the Health and Safety Plan (HASP), found in Appendix C of the IRM Work Plan.

2.1 SAMPLE DESIGNATION

Subsurface soil samples will be identified in accordance with CHA SOP#103 Sample Naming and Numbering. In summary, each sample will be uniquely defined by including the media type and sequential number. To avoid confusion with samples collected prior to this IRM Work Plan, CHA will start at number 100 on all media types (e.g. SOIL-100)

The following abbreviations will be used to identify media types:

Subsurface Soil.....	SOIL
Waste Characterization.....	WC
Imported Fill Characterization...	IFC

2.2 SAMPLE HANDLING

A new pair of disposable nitrile gloves will be used at each location sampled for chemical analyses. Additional glove changes will be undertaken as conditions warrant. All proper PFAS sampling protocol, as described in CHA SOP#341, will be implemented during the collection of the PFAS samples.

Sample containers will be new and delivered from the laboratory prior to the sampling event. Sample containers will come with the proper volume of chemical preservative appropriate for the type of analysis as detailed in CHA SOP#603. Specific containers (HDPE or polypropylene unlined containers) will be provided by the lab in separate cooler for the PFAS soil samples.

After sample collection, the sample containers will be logged onto a chain of custody record described in the Quality Assurance Project Plan. The sample containers will be placed on ice and/or ice packs in laboratory-supplied rigid coolers after collection and labeling. Remaining space will be filled with packing material to cushion the containers during transportation or shipment.

For this project CHA staff will hand deliver the sample coolers to the Test America Laboratories, Inc. Service Center located in Albany, New York, or coordinate with their courier service.

Samples will remain under the control of CHA's field representative until relinquished to the laboratory or commercial courier under chain-of-custody (see QAPP).

2.3 FIELD DOCUMENTATION

Pertinent field survey and sampling information shall be recorded in a logbook or on field logs during each day of the field effort per CHA SOP#101 Field Logbook and Photographs.

At a minimum, entries in a logbook shall include:

- Date and time of starting work
- Names of all personnel at site
- Weather conditions
- Purpose of proposed work effort
- Sampling equipment to be used and calibration of equipment
- Description of work area
- Location of work area, including map reference
- Details of work effort, particularly any deviation from the field operations plan or standard operating procedures
- Field observations
- Field measurements (e.g., PID readings)
- Field laboratory analytical results
- Daily health and safety entries, including levels of protection
- Type, number, and location of samples
- Sampling method, particularly deviations from the standard operating procedures
- Sample location and number
- Sample handling, packaging, labeling, and shipping information (including destination)

In addition to keeping logs, photographs will be taken to provide a physical record to augment the fieldworker's written observations. For each photograph taken, several items shall be recorded in the field logbooks:

- Date and time
- Name of photographer
- General direction faced and description of the subject

Additional protocols specific to each sampling method are presented in the following sections.

3.0 INVESTIGATION ACTIVITIES

3.1 CONFIRMATORY SOIL SAMPLING

At the conclusion of the excavation activities, the resulting subgrade will be sampled to demonstrate that levels of soil contamination meet the Industrial Soil Cleanup Objectives (SCOs) set forth in the NYSDEC Division of Environmental Remediation Technical Guidance for Site Investigation and Remediation (DER-10). Per Section 5.4 (b) of this guidance, one sidewall sample will be collected every thirty (30) linear feet of the excavation, and one bottom sample will be collected every 900-square feet of bottom area.

Soil samples will be collected and submitted to an off-site New York State Department of Health (NYSDOH) Environmental Laboratory Approval Program (ELAP)-certified laboratory for a select set of parameters, as described in Table 1. Based on the estimated excavation areas identified in Figure 3 and described above, a minimum of 54 grab samples are anticipated. All of the samples collected will be analyzed for Metals by United States Environmental Protection Agency (USEPA) Method 6010C and Copper by EPA Method 7471B. Duplicate samples will be collected in accordance with the QAPP provided in Appendix B of the IRM Work Plan.

3.2 SITE CHARACTERIZATION SAMPLING

At the conclusion of excavation activities, site characterization soil samples will also be collected from the AOC excavation areas that have not been sampled under the Site Characterization program, including but not limited to AOC-1, AOC-2 and AOC-6. A minimum of one side wall sample and one bottom soil sample will be collected from these AOC excavations. Based on the estimated excavation areas identified in Figure 4, a maximum of 24 soil characterization samples are anticipated. Soil samples collected will be analyzed as described in Table 2. In summary soil samples will be collected for the following parameters:

- Target compound list (TCL) volatile organic compounds (VOCs) by USEPA Method 8260;
- TCL semi-volatile organic compounds (SVOCs) by USEPA Method 8270;
- Target analyte list (TAL) metals by USEPA Method 6010C;
- Total cyanide by USEPA Method 9012;
- Pesticides by USEPA Method 8081;
- 1,4-dioxane by USEPA Method 8270 SIMS;
- Per-and poly-fluoroalkyl substances (PFAS) by USEPA Method 537; and
- Polychlorinated biphenyls (PCBs) by USEPA Method 8082.

Soil samples will be collected and submitted to an off-site New York State Department of Health (NYSDOH) Environmental Laboratory Approval Program (ELAP)-certified laboratory for analysis, as described in Table 3. Samples will be collected in accordance with the Field Sampling Plan (FSP) in Appendix A. Duplicate samples, matrix spike/matrix spike duplicate (MS/MSD) samples, analytical methods, sample volumes, preservation techniques and holding times will be collected in accordance with the Quality Assurance Project Plan (QAPP) provided in Appendix B. All samples collected for characterization sampling will be analyzed on a normal turn-around time (5-7 days).

3.3 IMPORTED MATERIAL SAMPLING

All imported backfill will be sampled, analyzed, and will contain concentrations less than the Commercial Soil Cleanup Objectives provided in DER-10 for the following criteria:

- VOCs via USEPA Method 8260
- SVOCs via USEPA Method 8270
- PCBs by USEPA Method 8081
- TAL Metals by USEPA Method 6010

Sampling methodology will include a combination of discrete and composite samples. Discrete/grab samples are samples taken directly from the soil material and will be analyzed for VOCs. Composite samples will consist of collecting discrete samples from 3 to 5 random locations from the volume of soil to be tested. The discrete samples are mixed, and a sample of the mixture is analyzed for the remaining parameters detailed above.

Per DER-10, sampling is required for all imported soil for use as backfill or cover material. Sampling frequency will entail a minimum of one sample analyzed from every new source at the following sample frequency for:

1. Soil or sand imported from a virgin mine/pit, at least one round of characterization samples for the initial 100 cubic yards of material in accordance with the methodology detailed above; or
2. Material sources *other than* a virgin mine/pit (e.g., a former manufacturing site), in accordance with Table 2, below.

Table 2: Imported Soil Requirements

Recommended Number of Soil Samples for Soil Imported to or Exported from a Site per NYSDEC DER-10			
Contaminant	VOCs	SVOCs, Inorganics & PCBs/Pesticides	
Soil Quantity (cubic yards)	Discrete Samples	Composite	Discrete Samples/Composite
0-50	1	1	3-5 discrete samples from different locations in the fill being provided will comprise a composite sample for analysis
50-100	2	1	
100-200	3	1	
200-300	4	1	
300-400	4	2	
400-500	5	2	
500-800	6	2	
800-1000	7	2	
>1000	Add an additional 2 VOC and 2 composites for each additional 1000 cubic yards, or consult with DER		

The frequency of sampling described above pertains to imported fine grained soils only. Large grained fill with less than 10 percent fines (such as open-graded stone or rip rap) will not be subject to the above sampling requirements if a letter from the facility/quarry is provided, which states that the source is a virgin material and the source area was never utilized for commercial/industrial purposes.

An estimated fourteen (14) discrete samples for VOCs, and six (6) composite samples will be collected for fill material imported to the Site in accordance with Table 2.

3.4 WASTE CHARACTERIZATION SAMPLING

Soil excavated for off-site disposal will be characterized, transported and disposed of at an approved disposal facility in accordance with all local, State (including 6NYCRR Part 360) and Federal regulations. Prior to shipment of the material, the waste will be profiled based upon the waste characterization sampling (and historical documentation for the Site) and accepted by the disposal facility. The soil samples will be submitted to a laboratory certified under the NYSDOH's ELAP for analysis of necessary waste characterization parameters following appropriate chain-of-custody protocols.

The specific analytical waste characterization requirements of the waste disposal facility may vary and will be verified prior to sampling, however typical industry practice requires one composite sample per every 1,000 tons of soil to be disposed of. An estimated 4,275 cubic yards

(approximately 5,985 tons) of soil are anticipated from the IRM activities, therefore a total of five (5) composite soil samples will be collected.

Composite soil samples will be collected from stockpiled soil and submitted to the laboratory for the following analysis:

1. Toxicity Leaching Characteristic Procedure (TCLP) Extraction for VOCs by EPA Method 8260.
2. TCLP SVOCs by EPA Method 8270.
3. TCLP RCRA 8 Metals by EPA Method 6010
4. Total PCBs by EPA Method 8082
5. Hazardous Waste Characteristics as defined under the Resource Conservation and Recovery Act (RCRA), including ignitability (flashpoint), corrosivity (pH) and reactivity.
6. Total Petroleum Hydrocarbons (TPH): Diesel Range Organics (DRO) and Gasoline Range Organics (GRO)
7. Per-and poly-fluoroalkyl substances (PFAS) by USEPA Method 537
8. Percent Solids

3.5 WASTE WATER SAMPLING

Waste water collected (i.e. from decontamination activities, groundwater in excavations, etc.) during the IRM activities will be placed in temporary containers (e.g. frac tanks) or tanker trucks and hauled to a local publicly owned treatment works (POTW), sewer authority or the permitted disposal facility.

All stored water will be placed in approved containers and labeled in accordance with United States Department of Transportation (USDOT) requirements. All water collected will be sampled by CHA on a frequency determined by the local POTW, sewer authority or the permitted disposal facility. If water is to be discharged to the POTW, a permit or other authorization will be obtained from the POTW or sewer authority prior to the discharge of treated water into the sewer system. Water samples will be analyzed, at a minimum, for the following:

1. Target compound list (TCL) VOCs by United States Environmental Protection Agency (USEPA) Method 8260.

-
- 2. TCL SVOCs by USEPA Method 8270.
 - 3. TCL PCBs by USEPA Method 8082.
 - 4. TAL metals and cyanide by USEPA Methods 6010, 7471 and 9012.
 - 5. Pesticides via USEPA method 8081.
 - 6. Herbicides via USEPA method 8081.
 - 7. Total petroleum hydrocarbons (TPH).
 - 8. Per-and poly-fluoroalkyl substances (PFAS) by USEPA Method 537
 - 9. pH

Additional characterization may be necessary prior to discharging to the POTW or transporting the water for off-site disposal. Each sample will be placed directly into the laboratory-supplied containers, which will be labeled with the project name, sample identification, date, time, sampler's initials and applicable laboratory analysis. Sample containers will be stored in a cooler with ice, and submitted to ELAP certified laboratory under chain-of-custody protocols. Water will be transported in accordance with all USDOT requirements. All sampling and analysis will be performed in strict accordance with the QAPP included as Appendix B.

3.6 SURVEY

After excavation is complete, CHA personnel will use geographic information system (GIS) enabled tablets to identify the perimeter of each excavation. This information will be necessary to determine which areas have been determined to meet the SCOs for the Site.

4.0 EQUIPMENT DECONTAMINATION

Prior to mobilization, the excavator shall be thoroughly cleaned to remove oil, grease, mud, and other foreign matter. Subsequently, before initiating excavation at each location, the excavator bucket and tracks (where applicable) will be cleaned to prevent cross-contamination. All cleaning will be conducted at a predetermined on-site location. Cleaning will be accomplished using the procedures outlined in the following sections and in accordance with CHA SOP's.

4.1.1 Small Equipment

For all activities, dedicated sampling equipment is preferred. However, if non-dedicated equipment is used (i.e. Macrocore barrel), the required decontamination procedure for all manual sampling equipment used to collect samples for chemical analysis is provided in CHA SOP#501 and summarized below:

1. Disassemble equipment, as required.
2. Remove gross contamination from the equipment by brushing and then rinsing with tap water.
3. Wash with Alconox and tap water.
4. Rinse with tap water.
5. Rinse with distilled water.
6. Air dry equipment.

Decontaminated equipment will be placed on polyethylene sheeting in order to avoid contacting a contaminated surface prior to use.

Field personnel will use a new pair of outer gloves before handling sample equipment after it is cleaned.

4.1.2 Large Equipment

Decontamination of large equipment (backhoe excavators, bulldozers, etc.) is necessary to prevent cross-contamination and the removal of contaminants from a contaminated Site. In accordance with CHA SOP#503, prior to equipment leaving the Site, a steam cleaning and/or Alconox® rinse of all equipment that has come in contact with potentially contaminated soils is necessary. Decontamination of equipment will take place on a temporary decontamination pad designed to

collect all rinsate generated during cleaning. Temporary pads should be lined with a water-impermeable material with no seams, and constructed on a level surface. Pads should be constructed so as to facilitate the collection of waste water with a sump in one corner or side, or with one corner generally lower than others. Where appropriate, side shields should be placed around the decontamination pad to facilitate the collection of overspray. All rinsate generated from decontamination activities shall be transferred from the decontamination pad to a 55-gallon drums for disposal in accordance with Section 5.0 of this report.

5.0 FLUIDS MANAGEMENT

Site fluids include water produced from excavation dewatering, water collected in temporary containment pads, and decontamination procedures. While groundwater is not anticipated to be encountered during IRM activities, in the event that it is encountered, measures will be implemented for reduction and management. Water from decontamination activities will be containerized in 55-gallon drums and characterized for off-Site disposal. However, should dewatering of the excavation and temporary containment pads be deemed necessary, all Site liquids should be pumped to a frac tank for characterization and off-Site disposal to a treatment facility. Waste characterization samples will be collected in accordance with the disposal facility requirements.

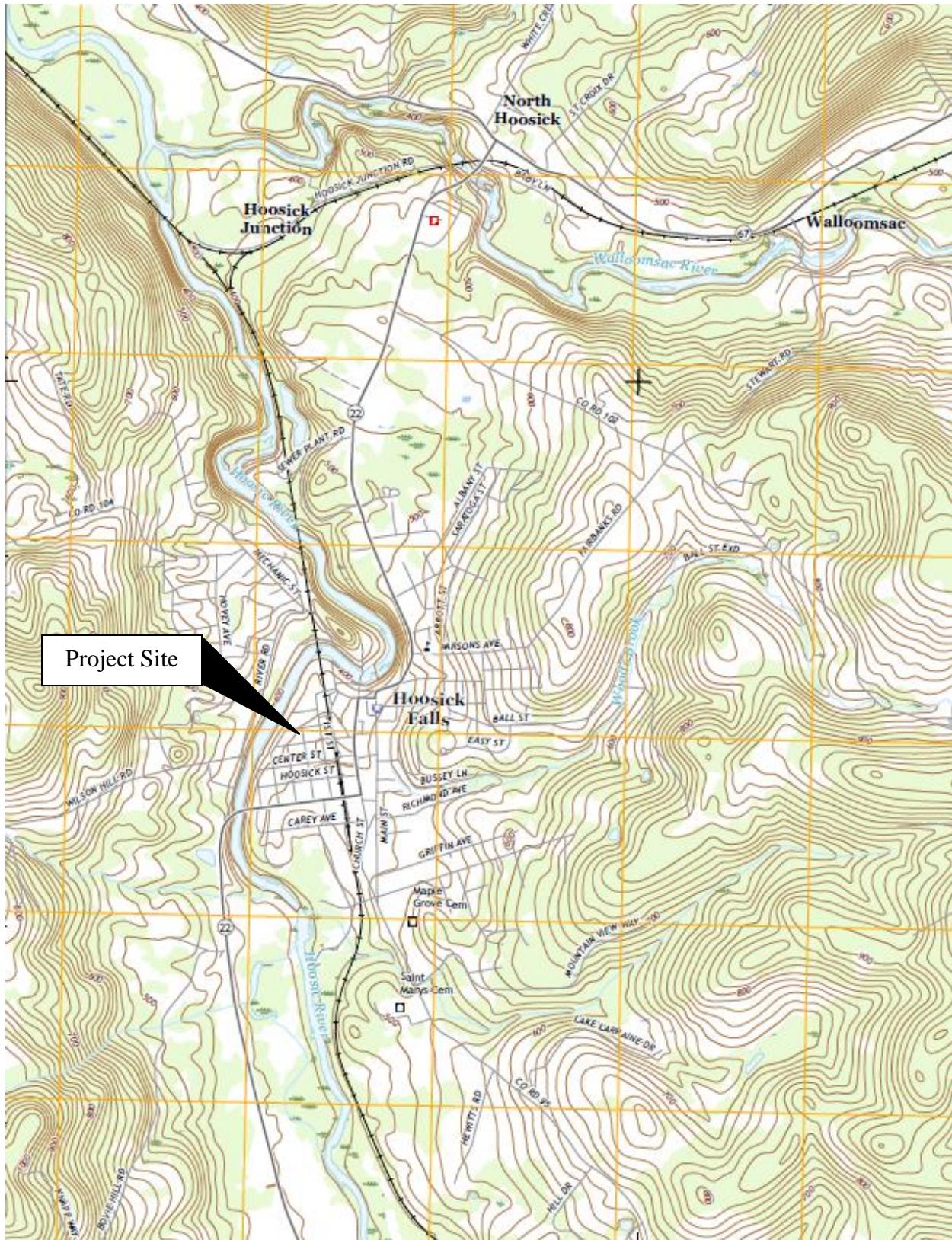
6.0 INVESTIGATION DERIVED WASTE

All soil removed from intrusive activities will be stockpiled on and covered with 10-mil thick polyethylene sheeting, in a predetermined staging area(s) to be characterized and disposed of at a permitted disposal facility. Approximately 4,275 cubic yards (cy) of soil are anticipated from these activities.

As described above, representative composite samples for waste characterization purposes will be collected. Based upon the estimates provided above, five (5) composite soil samples from the soil stockpile(s) will be collected for a select set of parameters, further described in Table 1.

Gloves, personal protection equipment, sampling materials, etc. will be collected daily and disposed of as solid waste. All work will be performed in accordance with CHA SOP#507.

FIGURES



SOURCE: USGS MapViewer



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NOT TO SCALE

DATE: September 2017

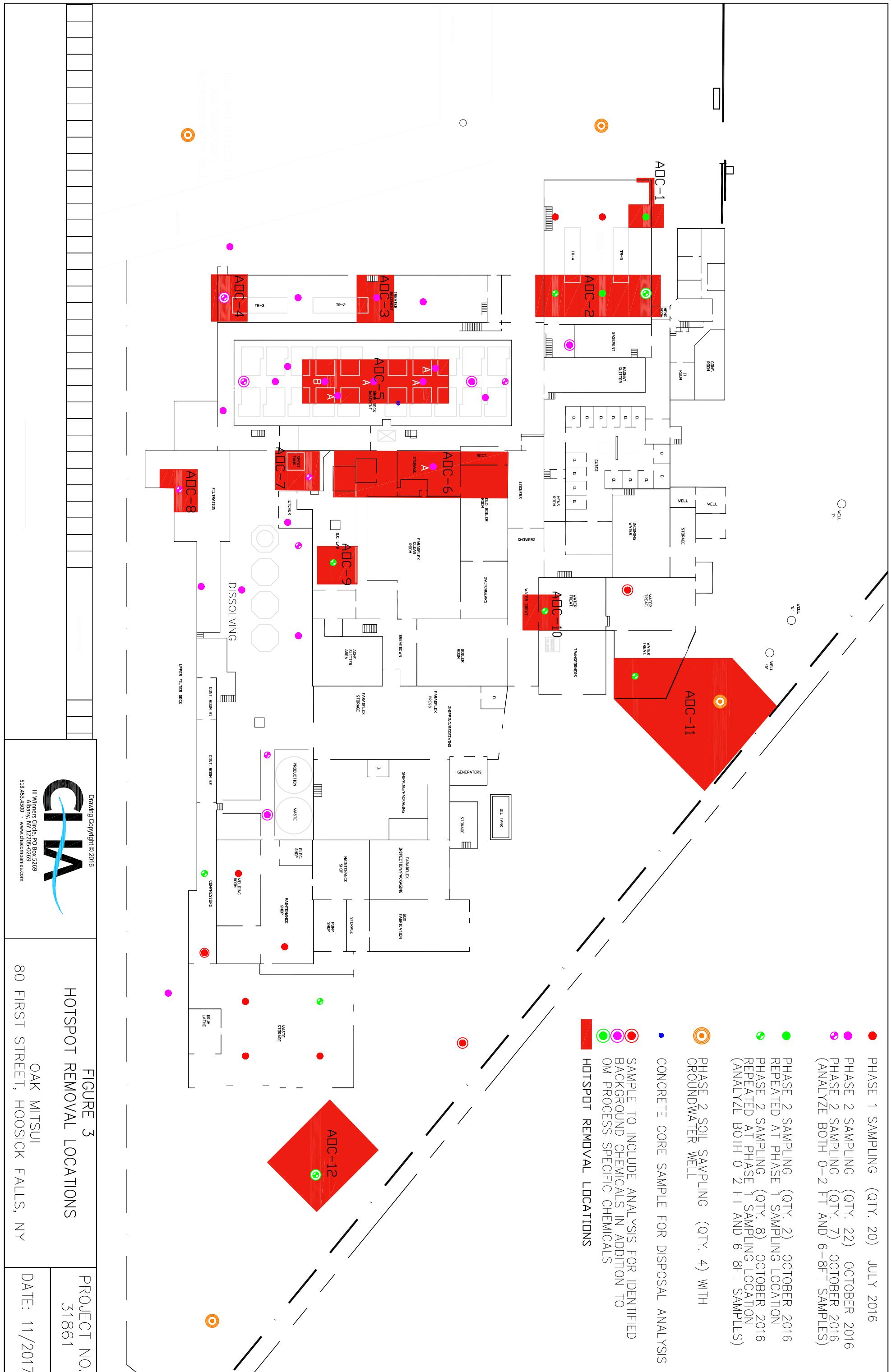
FIGURE 1
SITE LOCATION MAP
80 FIRST STREET
HOOSICK FALLS,
RENSELEER COUNTY, NEW YORK



MAP NOT TO SCALE

DATE: September 2017

**FIGURE 2
SITE PLAN
80 FIRST STREET
HOOSICK FALLS
RENSSELAER COUNTY, STATE OF NEW YORK**



TABLES

Table 1: Sampling Rationale

Area of Concern	Sample ID	Analytical Parameters	Rationale
AOC-1	SOIL-S100 – SOIL-S102	RCRA 8 Metals, Copper	A soil sample collected from this area during the Phase II subsurface investigation reported levels of arsenic that exceed the Industrial SCOs.
AOC-1	SOIL-S103	VOCs, SVOCs, TAL Metals, Total Cyanide, Pesticides, 1,4-dioxane, PFAS, PCBs	Sampling for these parameters fulfills requirements set forth by the NYSDEC, 6 NYCRR Part 375 and is being completed as part of the Site Characterization program.
AOC-1	SOIL-B100	VOCs, SVOCs, TAL Metals, Total Cyanide, Pesticides, 1,4-dioxane, PFAS, PCBs	Sampling for these parameters fulfills requirements set forth by the NYSDEC, 6 NYCRR Part 375 and is being completed as part of the Site Characterization program.
AOC-2	SOIL-S104 – SOIL-S108	RCRA 8 Metals, Copper	Soil samples collected from this area during the Phase II subsurface investigation reported levels of arsenic and copper that exceed the Industrial SCOs.
AOC-2	SOIL-S109	VOCs, SVOCs, TAL Metals, Total Cyanide, Pesticides, 1,4-dioxane, PFAS, PCBs	Sampling for these parameters fulfills requirements set forth by the NYSDEC, 6 NYCRR Part 375 and is being completed as part of the Site Characterization program.
AOC-2	SOIL-B101	RCRA 8 Metals, Copper	Soil samples collected from this area during the Phase II subsurface investigation reported levels of arsenic and copper that exceed the Industrial SCOs.

Area of Concern	Sample ID	Analytical Parameters	Rationale
AOC-2	SOIL-B102	VOCs, SVOCs, TAL Metals, Total Cyanide, Pesticides, 1,4-dioxane, PFAS, PCBs	Sampling for these parameters fulfills requirements set forth by the NYSDEC, 6 NYCRR Part 375 and is being completed as part of the Site Characterization program.
AOC-3	SOIL-S110 – SOIL-S112	RCRA 8 Metals, Copper	A soil sample collected from this area during the Phase II subsurface investigation reported levels of arsenic that exceed the Industrial SCOs.
AOC-3	SOIL-S113	VOCs, SVOCs, TAL Metals, Total Cyanide, Pesticides, 1,4-dioxane, PFAS, PCBs	Sampling for these parameters fulfills requirements set forth by the NYSDEC, 6 NYCRR Part 375 and is being completed as part of the Site Characterization program.
AOC-3	SOIL-B103	VOCs, SVOCs, TAL Metals, Total Cyanide, Pesticides, 1,4-dioxane, PFAS, PCBs	Sampling for these parameters fulfills requirements set forth by the NYSDEC, 6 NYCRR Part 375 and is being completed as part of the Site Characterization program.
AOC-4	SOIL-S114 – SOIL-S116	RCRA 8 Metals, Copper	A soil sample collected from this area during the Phase II investigation contained levels of arsenic and mercury that exceeded the Industrial SCOs.
AOC-4	SOIL-S117	VOCs, SVOCs, TAL Metals, Total Cyanide, Pesticides, 1,4-dioxane, PFAS, PCBs	Sampling for these parameters fulfills requirements set forth by the NYSDEC, 6 NYCRR Part 375 and is being completed as part of the Site Characterization program.
AOC-4	SOIL-B104	VOCs, SVOCs, TAL Metals, Total Cyanide, Pesticides, 1,4-dioxane, PFAS, PCBs	Sampling for these parameters fulfills requirements set forth by the NYSDEC, 6 NYCRR Part 375 and is being completed as part of the Site Characterization program.

Area of Concern	Sample ID	Analytical Parameters	Rationale
AOC-5	SOIL-S118 – SOIL – S124	RCRA 8 Metals, Copper	Soil samples collected from this area during the Phase II investigation contained levels of copper and mercury that exceed the Industrial SCOs.
AOC-5	SOIL-S125	VOCs, SVOCs, TAL Metals, Total Cyanide, Pesticides, 1,4-dioxane, PFAS, PCBs	Sampling for these parameters fulfills requirements set forth by the NYSDEC, 6 NYCRR Part 375. and is being completed as part of the Site Characterization program
AOC-5	SOIL-B105	RCRA 8 Metals, Copper	Soil samples collected from this area during the Phase II investigation contained levels of copper and mercury that exceed the Industrial SCOs.
AOC-5	SOIL-B106	VOCs, SVOCs, TAL Metals, Total Cyanide, Pesticides, 1,4-dioxane, PFAS, PCBs	Sampling for these parameters fulfills requirements set forth by the NYSDEC, 6 NYCRR Part 375 and is being completed as part of the Site Characterization program.
AOC-6	SOIL-S126 – SOIL-S128	RCRA 8 Metals, Copper	A soil sample collected from this area during the Phase II investigation contained levels of copper that exceed the Industrial SCO.
AOC-6	SOIL-S129	VOCs, SVOCs, TAL Metals, Total Cyanide, Pesticides, 1,4-dioxane, PFAS, PCBs	Sampling for these parameters fulfills requirements set forth by the NYSDEC, 6 NYCRR Part 375 and is being completed as part of the Site Characterization program.
AOC-6	SOIL-B107	VOCs, SVOCs, TAL Metals, Total Cyanide, Pesticides, 1,4-dioxane, PFAS, PCBs	Sampling for these parameters fulfills requirements set forth by the NYSDEC, 6 NYCRR Part 375 and is being completed as part of the Site Characterization program.

Area of Concern	Sample ID	Analytical Parameters	Rationale
AOC-7	SOIL-S130 – SOIL-S132	RCRA 8 Metals, Copper	A soil sample collected from this area during the Phase II investigation contained levels of lead and copper that exceed the Unrestricted SCOs.
AOC-7	SOIL-S133	VOCs, SVOCs, TAL Metals, Total Cyanide, Pesticides, 1,4-dioxane, PFAS, PCBs	Sampling for these parameters fulfills requirements set forth by the NYSDEC, 6 NYCRR Part 375 and is being completed as part of the Site Characterization program.
AOC-7	SOIL-B108	VOCs, SVOCs, TAL Metals, Total Cyanide, Pesticides, 1,4-dioxane, PFAS, PCBs	Sampling for these parameters fulfills requirements set forth by the NYSDEC, 6 NYCRR Part 375 and is being completed as part of the Site Characterization program.
AOC-8	SOIL-S134 – SOIL-S136	RCRA 8 Metals, Copper	A soil sample collected from this area during the Phase II investigation contained levels of lead that exceed the Industrial SCOs.
AOC-8	SOIL-S137	VOCs, SVOCs, TAL Metals, Total Cyanide, Pesticides, 1,4-dioxane, PFAS, PCBs	Sampling for these parameters fulfills requirements set forth by the NYSDEC, 6 NYCRR Part 375 and is being completed as part of the Site Characterization program.
AOC-8	SOIL-B109	VOCs, SVOCs, TAL Metals, Total Cyanide, Pesticides, 1,4-dioxane, PFAS, PCBs	Sampling for these parameters fulfills requirements set forth by the NYSDEC, 6 NYCRR Part 375 and is being completed as part of the Site Characterization program.
AOC-9	SOIL-S138 – SOIL-S140	RCRA 8 Metals, Copper	A soil sample collected from this area during the Phase II investigation contained levels of arsenic and mercury that exceed the Industrial SCOs.

Area of Concern	Sample ID	Analytical Parameters	Rationale
AOC-9	SOIL-S141	VOCs, SVOCs, TAL Metals, Total Cyanide, Pesticides, 1,4-dioxane, PFAS, PCBs	Sampling for these parameters fulfills requirements set forth by the NYSDEC, 6 NYCRR Part 375 and is being completed as part of the Site Characterization program.
AOC-9	SOIL-B110	VOCs, SVOCs, TAL Metals, Total Cyanide, Pesticides, 1,4-dioxane, PFAS, PCBs	Sampling for these parameters fulfills requirements set forth by the NYSDEC, 6 NYCRR Part 375 and is being completed as part of the Site Characterization program.
AOC-10	SOIL-S142 – SOIL-S144	RCRA 8 Metals, Copper	A soil sample collected from this area during the Phase II investigation contained levels of arsenic, copper, and mercury that exceed the Industrial SCOs.
AOC-10	SOIL-S145	VOCs, SVOCs, TAL Metals, Total Cyanide, Pesticides, 1,4-dioxane, PFAS, PCBs	Sampling for these parameters fulfills requirements set forth by the NYSDEC, 6 NYCRR Part 375 and is being completed as part of the Site Characterization program.
AOC-10	SOIL-B111	VOCs, SVOCs, TAL Metals, Total Cyanide, Pesticides, 1,4-dioxane, PFAS, PCBs	Sampling for these parameters fulfills requirements set forth by the NYSDEC, 6 NYCRR Part 375 and is being completed as part of the Site Characterization program.
AOC-11	SOIL-S146 – SOIL-S152	RCRA 8 Metals, Copper	A soil sample collected from this area during the Phase II investigation contained levels of arsenic that exceed the Industrial SCO.
AOC-11	SOIL-S153	VOCs, SVOCs, TAL Metals, Total Cyanide, Pesticides, 1,4-dioxane, PFAS, PCBs	Sampling for these parameters fulfills requirements set forth by the NYSDEC, 6 NYCRR Part 375 and is being completed as part of the Site Characterization program.

Area of Concern	Sample ID	Analytical Parameters	Rationale
AOC-11	SOIL-B112 – SOIL-B114	RCRA 8 Metals, Copper	A soil sample collected from this area during the Phase II investigation contained levels of arsenic that exceed the Industrial SCO.
AOC-11	SOIL-B115	VOCs, SVOCs, TAL Metals, Total Cyanide, Pesticides, 1,4-dioxane, PFAS, PCBs	Sampling for these parameters fulfills requirements set forth by the NYSDEC, 6 NYCRR Part 375 and is being completed as part of the Site Characterization program.
AOC-12	SOIL-S154 – SOIL-S158	RCRA 8 Metals, Copper	A soil sample collected from this area during the Phase II investigation contained levels of arsenic that exceed the Industrial SCO.
AOC-12	SOIL-S159	VOCs, SVOCs, TAL Metals, Total Cyanide, Pesticides, 1,4-dioxane, PFAS, PCBs	Sampling for these parameters fulfills requirements set forth by the NYSDEC, 6 NYCRR Part 375 and is being completed as part of the Site Characterization program.
AOC-12	SOIL-B116 – SOIL-B117	RCRA 8 Metals, Copper	A soil sample collected from this area during the Phase II investigation contained levels of arsenic that exceed the Industrial SCO.
AOC-12	SOIL-B118	VOCs, SVOCs, TAL Metals, Total Cyanide, Pesticides, 1,4-dioxane, PFAS, PCBs	Sampling for these parameters fulfills requirements set forth by the NYSDEC, 6 NYCRR Part 375 and is being completed as part of the Site Characterization program.
AOC-2	SOIL-DUP100	RCRA 8 Metals, Copper	Per QAQC procedure, four blind duplicate samples will be collected with selected soil samples to determine the precision of laboratory analysis.

Area of Concern	Sample ID	Analytical Parameters	Rationale
AOC-5	SOIL-DUP101	RCRA 8 Metals, Copper	Per QAQC procedure, four blind duplicate samples will be collected with selected soil samples to determine the precision of laboratory analysis.
AOC-11	SOIL-DUP102	RCRA 8 Metals, Copper	Per QAQC procedure, four blind duplicate samples will be collected with selected soil samples to determine the precision of laboratory analysis.
AOC-7	SOIL-DUP103	VOCs, SVOCs, TAL Metals, Total Cyanide, Pesticides, 1,4-dioxane, PFAS, PCBs	Per QAQC procedure, four blind duplicate samples will be collected with selected soil samples to determine the precision of laboratory analysis.
AOC-12	SOIL-DUP104	VOCs, SVOCs, TAL Metals, Total Cyanide, Pesticides, 1,4-dioxane, PFAS, PCBs	Per QAQC procedure, one matrix spike duplicate (MSD) sample is required for every 20 samples (including duplicate samples and field or equipment blank samples).
AOC-1	SOIL-MS100 SOIL-MSD100	RCRA 8 Metals, Copper	Per QAQC procedure, one matrix spike (MS) sample is required for every 20 samples (including duplicate samples and field or equipment blank samples).
AOC-3	SOIL-MS101 SOIL-MSD101	RCRA 8 Metals, Copper	Per QAQC procedure, one matrix spike duplicate (MSD) sample is required for every 20 samples (including duplicate samples and field or equipment blank samples).
AOC-6	SOIL-MS102 SOIL-MSD102	RCRA 8 Metals, Copper	Per QAQC procedure, one matrix spike (MS) sample is required for every 20 samples (including duplicate samples and field or equipment blank samples).

Area of Concern	Sample ID	Analytical Parameters	Rationale
AOC-4	SOIL-MS103 SOIL-MSD103	VOCs, SVOCs, TAL Metals, Total Cyanide, Pesticides, 1,4-dioxane, PFAS, PCBs	Per QAQC procedure, one matrix spike duplicate (MSD) sample is required for every 20 samples (including duplicate samples and field or equipment blank samples).
AOC-9	SOIL-MS104 SOIL-MSD104	VOCs, SVOCs, TAL Metals, Total Cyanide, Pesticides, 1,4-dioxane, PFAS, PCBs	Per QAQC procedure, one matrix spike duplicate (MSD) sample is required for every 20 samples (including duplicate samples and field or equipment blank samples).
Soil Stockpiles	SOIL-WC100 – SOIL-WC110	TCLP VOC, TCLP SVOC, TAL Metals, TCLP Pesticides/Herbicides, PCBs, TPH DRO and GRO, Reactivity, Ignitability, Corrosivity, pH, PFAS	Eleven waste characterization soil samples will be collected to adequately characterize the excavated soils for off-site disposal at a permitted facility.
Imported Fill	SOIL-IFC100 – SOIL-IFC113	TCL VOC	Sampling for these parameters fulfills requirements set forth by the NYSDEC, 6 NYCRR Part 375.
Imported Fill	SOIL-IFC114 – SOIL-IFC119	TCL SVOC, TAL Metals, PCBs, Pesticides	Sampling for these parameters fulfills requirements set forth by the NYSDEC, 6 NYCRR Part 375.

APPENDIX A

CHA STANDARD OPERATING PROCEDURES



SOP #101

REV. #1

August 18, 2015

Page 1 OF 2

Author: Chris Burns

Reviewer: Seth Fowler

Sandy Warner

FIELD LOGBOOK AND PHOTOGRAPHS

A. PURPOSE/SCOPE:

To produce an accurate and reliable record of all field activities, including field observations, sample collection activities, etc.

All pertinent field survey and sampling information shall be recorded in a logbook or on field logs during each day of the field effort.

In addition to keeping logs, photographs will be taken to provide a physical record to augment the field worker's written observations. They can be valuable to the field team during future inspections, informal meetings, and hearings. Photographs should be taken with a camera-lens system having a perspective similar to that afforded by the naked eye. A photograph must be documented if it is to be a valid representation of an existing situation.

B. EQUIPMENT/MATERIALS:

- Bound Field Book (with waterproof paper) or Field Logs
- Chain-of-Custody, Other Appropriate Forms
- Indelible Ink Pens
- Digital Camera with 50 mm lens or similar.

C. PROCEDURE:

1. At a minimum, entries in a logbook shall include:
 - a. Date and time of starting work
 - b. Names of all personnel at site
 - c. Summary of key conversations with contractors, agency representatives, etc.
 - d. Purpose of proposed work effort
 - e. Sampling equipment to be used
 - f. Field calibration of equipment or documentation of calibration of rented equipment
 - g. Description of work area
 - h. Location of work area, including map reference. Document sample locations with references to fixed landmarks (e.g., 10 feet from southwest corner of building).
 - i. Details of work effort, particularly any deviation from the field operations plan or standard operating procedures
 - j. Field observations and field measurements (e.g., pH)
 - k. Field laboratory analytical results
 - l. Personnel and equipment decontamination procedures
 - m. Daily health and safety entries, including levels of protection
 - n. Type and number of samples



SOP #101
REV. #1
August 18, 2015
Page 2 OF 2
Author: Chris Burns
Reviewer: Seth Fowler
Sandy Warner

FIELD LOGBOOK AND PHOTOGRAPHS

- o. Sampling method, particularly deviations from the standard operating procedures
- p. Sample location and number
- q. Sample handling, packaging, labeling, and shipping information (including destination)
- r. Time of leaving site.

For each photograph taken, several items shall be recorded in the field logbooks:

- a. Date and time – Camera set to record on photo
 - b. Name of photographer
 - c. General direction faced and description of the subject
 - d. Sequential number of the photograph
 - e. Always attempt to include an object in the photograph that helps show scale
 - f. Always try to shoot at approximately 50mm focal length (what human eye sees).
2. Each day's entries will be initialed and dated at the end by the author, and a line will be drawn through the remainder of the page.

D. **QA/QC REQUIREMENTS:**

All entries in the logbook shall be made in indelible ink. All corrections shall consist of single line-out deletions that are initialed.

The field task leader shall be responsible for ensuring that sufficient detail is recorded in the logbooks, and shall review the site logbooks daily.

E. **SPECIAL CONDITIONS:**

Photographs should be downloaded from the camera to the project folder and notes regarding the photographs should accompany the photos. Photographs should be no larger than 2 MB each unless they are being utilized for presentation purposes. CHA has software available to decrease file sizes if necessary.

As noted above, if a bound logbook is not used, then a field observation form must be used and information above should be captured on the form.

F. **REFERENCES:**

None

G. **APPENDICES/FORMS:**

Not Applicable

SAMPLE NAMING AND NUMBERING

A. PURPOSE/SCOPE:

The success of large environmental programs is greatly affected by the efficiency of data management and analysis. When performing environmental sampling, one of the most critical steps is appropriately naming or numbering samples so that they are uniquely identified and can be distinguished from all other samples by all future users.

Some of the potential benefits that can be obtained by adopting a naming convention include the following:

- a. To ensure that every sample collected at a site has a unique identifier
- b. To enhance clarity in cases of potential ambiguity
- c. To help avoid "naming collisions" that might occur when the data is imported into our Equis or other databases; and
- d. To provide meaningful data to be used in project handovers.

Note that many of our sampling programs are performed at sites with previously established sample locations and in these cases, we would not change sample names. Additionally, this process shall be applied at larger, more complex sites, and/or sites that are required to follow a site-specific QAAP. Simpler naming conventions may be implemented for small, simple sites.

B. EQUIPMENT/MATERIALS:

- Field Logbook
- Field Sample Login Sheet
- Site Map/ Work Plan
- Sampling Forms
- Chain-of-Custody
- Sample Containers with Labels

C. PROCEDURE:

1. Each sample shall be uniquely defined by a multi-field name. In general, three fields are required: [Project # or Name] – [Media Type] – [Location Name/Sequential Number].
2. If using a site name, abbreviate to 2-3 letters. (e.g., Congress St site would be “CS”).
3. Use the following abbreviations for media types:

Subsurface Soil	SOIL
Surface Soil.....	SURF
Sediment	SED
Groundwater	GW
Surface Water	SW
Waste Water.....	WW
Soil Vapor.....	SV
Storm Water.....	STORM

SAMPLE NAMING AND NUMBERING

4. All samples collected at a site shall be numbered sequentially for each media type, regardless of the field event or project phase. The use of hyphens to separate segments of a sample name is beneficial for sample name readability. It is also beneficial to use enough leading zeros to accommodate the Sequential Number (or sys_loc_code) portion of the sample name, which will assist in sorting sample IDs in the data management program or database (see EQUIS discussion below).
5. Do not include information such as time, sample depths, etc. in the name. This information should be recorded as defined in Section F (below).
6. In no cases shall the multi-field name be longer than 30 characters, including dashes. Ensure that each name is clearly written on both the sample label as well as the Chain of Custody.
7. Do not use special characters (e.g. #, ‘, “, @, !) when naming samples. Including such characters in the Serial Number (sys_loc_codes) or Sample Number (sys_sample_codes) can be incompatible with the database.
8. For QA/QC blank samples use the following abbreviations in place of the media type:

Trip Blank.....	TB
Equipment Rinse (Field Blank)	FB
Duplicate.....	DUP
Matrix Spike	MS
Matrix Spike Duplicate.....	SD

For Duplicate and MS/MSD samples we need to make sure we include the parent sample name. Add the DUP, MS or MSD indicator after the Sequential Number.

For Blind Duplicate samples, use the CHA indicator in place of the Sequential Number. The location should be recorded in the field logs for our evaluation purposes. For example, a blind duplicate sample number for soil collected at the 005 location would be "CS-SOIL-CHA-1."

You would record in the field log that the blind soil duplicate CHA-1 has SOIL-12345-005 as its parent sample.

9. Option to Include the Sample Collection Date - As an option, the date may be included in the sample name. NYS Electronic Data Deliverable guidance suggests using dates in the YYYYDDMM format. Placing the year first provides for ease of sorting data in the database:

However, adding the date adds 9 characters to the sample name thus increasing the complexity of sample numbering. The date is captured on the Chain-of-Custody and in field records.

D. QA/QC REQUIREMENTS:

All data must be documented on field data sheets or within site logbooks.

Field personnel should verify that all sample data and supporting information in log books is correct prior to leaving the site.



SOP #103
Revision #2
06/22/2015
Page 1 of 3
Author: Sarah Benson
Reviewer(s): Keith Cowan
Sandy Warner

SAMPLE NAMING AND NUMBERING

E. SPECIAL CONDITIONS:

NYSDEC EQuIS Considerations:

NYSDEC uses EQuIS for data management and generally requires data to be submitted in EQuIS format. EQuIS has three different sample name related fields, a sample_name, a sys_sample_code and a location_name. Location_name will almost always be simplified to something like SW-1, GW-2 etc. and is usually the last field of the sample name.

In terms of the other two, sample_name is what we record in the field. That is limited to 30 characters of text.

The laboratory generates the sys_sample_code by taking the sample_name field and adding another qualifier, such as the sample delivery group or work order number. EQuIS requires that the sys_sample_code field be unique within a database. This is limited to 40 characters of text so it typically will be the sample name plus up to 10 characters.

It is recommended to keep the CHA sample name as short as possible to work with the EQuIS format. The basic sample names identified above are 14 to 17 characters long. If the optional date format is used, sample names will be 23 to 26 characters which is near the limit for what EQuIS can accommodate (and you may have issues physically fitting the sample names legibly into the COC form).

F. REFERENCES:

NYSDEC, DER-10, Technical Guidance for Site Investigation and Remediation, May 2010,
http://www.dec.ny.gov/docs/remediation_hudson_pdf/der10.pdf

NYSDEC, Electronic Data Delivery Manual, January 2013,
http://www.dec.ny.gov/docs/remediation_hudson_pdf/eddmanual.pdf

New Jersey Department of Environmental Protection, August 2005, Field Sampling Procedures **Manual**,
Chap. 6, <http://www.nj.gov/dep/srp/guidance/fspm/>

G. APPENDICES/FORMS:

Not Applicable

END OF SOP
Final Check by C. Burns 12/2/15

SAMPLING PERFLUOROALKYL SUBSTANCES (PFASs) and PERFLUORINATED COMPOUNDS (PFCS)

A. PURPOSE/SCOPE:

The objective of this SOP is to ensure proper and uncontaminated collection of Perfluoroalkyl Substances (PFASs) and other Perfluorinated Compounds (PFCs). PFASs and PFCs are large groups of manufactured compounds used as surfactants in industrial applications, applied to many household products for grease, water, and stain resistance, and heavily used in Aqueous Film Forming Foams (AFFF) which are often used in firefighting. Although there are no federal regulations currently requiring remedial action for these chemicals, many states are adopting rules and regulation regarding these compounds. As rules continue to develop for these contaminants permitted and nonpermitted equipment, materials, and procedure are subject to change. The complete list of compounds in this group testable by current methodology is shown in Table 1.

**Table 1
List of PFAS and PFCs Accurately Measured by EPA Method 537**

<u>Analyte</u>	<u>Acronym</u>	<u>Chemical Abstract Services Registry Number (CASRN)</u>
N-ethyl perfluorooctanesulfonamidoacetic acid	NEtFOSAA	—
N-methyl perfluorooctanesulfonamidoacetic acid	NMeFOSAA	—
Perfluorobutanesulfonic acid	PFBS	375-73-5
Perfluorodecanoic acid	PFDA	335-76-2
Perfluorododecanoic acid	PFDoA	307-55-1
Perfluoroheptanoic acid	PFHpA	375-85-9
Perfluorohexanesulfonic acid	PFHxS	355-46-4
Perfluorohexanoic acid	PFHxA	307-24-4
Perfluorononanoic acid	PFNA	375-95-1
Perfluorooctanesulfonic acid	PFOS	1763-23-1
Perfluorooctanoic acid	PFOA	335-67-1
Perfluorotetradecanoic acid	PFTA	376-06-7
Perfluorotridecanoic acid	PFTrDA	72629-94-8
Perfluoroundecanoic acid	PFUnA	2058-94-8

SAMPLING PERFLUOROALKYL SUBSTANCES (PFASs) and PERFLUORINATED COMPOUNDS (PFCS)

Due to the prevalence of these chemicals in common goods, it is imperative that field personnel are conscious of potential cross contamination. This contamination can be from field equipment, field clothing and PPE, sample containers, decontamination, and food.

B. EQUIPMENT/MATERIALS:

Field equipment, field clothing, PPE, sample containers, and any other items used or present on site made of or containing the following materials **ARE NOT PERMITTED**:

- Low Density Polyethylene (LDPE) – Pumps and Tubing Only, Permitted for Sample Containers
- Aluminum foil
- Glass
- Polytetrafluoroethylene (PTFE) / Teflon™
- Waterproofed clothing or boots
- Clothing containing PTFE material (i.e. GORE-TEX®)
- Tyvek® material
- Waterproof/treated paper or field books
- Post-it notes
- Most repellents, sunscreens, moisturizers, cosmetics, or other related products
- Decon 90

A complete list of what is and is not permitted can be found in the appendix. This list should be given to personnel prior to sampling to ensure compliance.

Materials such as Teflon™ or PTFE may be found in common sampling equipment. It is important that field personnel examine and assess existing equipment to avoid accidental contamination. The following materials are **ALWAYS PERMITTED** in sampling equipment:

- Stainless steel
- High density polyethylene (HDPE)
- PVC
- Silicone
- Acetate
- Polypropylene

There are changes necessary in a number of the CHA's SOPs when sampling for PFASs and PFCs. The change relate to the sampling equipment and supplies used and are as follows for each SOP as referenced:

Borehole Installation and Sampling (SOP #303/309)

- If using an auger, it must be carbon steel and not coated.
- If collecting a soil or sediment core sample, it must be collected directly from single-use PVC liners that must not be decontaminated or reused at different locations.

SAMPLING PERFLUOROALKYL SUBSTANCES (PFASs) and PERFLUORINATED COMPOUNDS (PFCS)

Soil Sampling with a Hand Auger (SOP #305)

- A stainless steel hand auger without any coatings must be used when sampling.
- Scoops and spatula used must be stainless steel.

Well Development (SOP #311)

- Do not use bailers, unless entirely made of PVC or stainless steel. Teflon is not acceptable.
- Do not re-use PVC well material which has been used previously at sites where PFAS is known or suspected to be present
- Do not use any “plumber’s seal tape,” most contain PFCs

Conventional Groundwater Sampling (SOP #315) / Low-Flow Groundwater Purging/ Sampling (SOP #317) / Residential Well Sampling (SOP #319)

- Bailers should not be used unless entirely made of PVC or stainless steel. Teflon is not acceptable. Single use disposable polyethylene or silicone materials are also acceptable.
- Tubing can only be made of polyethylene, HDPE, or silicone.
- Do not use bladder pumps, most bladders are made of Teflon. Only bladder pumps with a bladder made of natural rubber are acceptable.
- Other pump types are typically okay, but should still be examined for Teflon or other prohibited materials.

Surface Soil Sampling (SOP #405)

- A stainless steel spoon and bowl should be used.

Small Equipment Decontamination (SOP #501)

- Water used for decontamination on site should be laboratory certified “PFAS-free” water.

Field Handling, Packaging, and Shipping (SOP #607)

- Plastic bags must be polyethylene.
- Only ice from water should be used, not chemical (blue) ice.

These equipment changes can be applied to other SOPs if PFASs and/or PFCs are being sampled. If equipment is not specifically mentioned, refer to the list of materials that are always permitted. If the materials are not mentioned do not use that sampling equipment.

SAMPLING PERFLUOROALKYL SUBSTANCES (PFASs) and PERFLUORINATED COMPOUNDS (PFCS)

C. PROCEDURE:

Standard operating procedures for sampling as outlined in a number of CHA's SOPs should be followed, but with the specific changes listed below for the specific SOPs referenced, if being used:

Borehole Installation and Sampling (SOP #303/309)

- When drilling the well use PFAS-free drilling fluids.
- Don't use detergent to decon drilling equipment, scrub with a plastic brush and rinse thoroughly in tap water, then triple-rinse in distilled or deionized water.
- Collect a representative water sample used during drilling activities.
- If using an auger, it must be steel and un-coated.

Conventional Groundwater Sampling (SOP #315) / Low-Flow Groundwater Purging/ Sampling (SOP #317) / Residential Well Sampling (SOP #319)

- When sampling prioritize drinking water, followed by surface water, followed by ground water.
- When sampling ground water; start with the upgradient well(s), then the furthest downgradient of the interpreted or known source, then wells downgradient to the source, and lastly the wells closest to the interpreted or known source.
- When sampling residential wells, any plumber's sealing tape should be noted, as these typically contain PFCs.
- Prior to sample collection, field personnel must wash their hands and wear a new set of nitrile gloves.
- PFAS/PFC samples should be taken first, prior to collecting samples for any other parameters into any other containers. Field personnel should avoid contact with any other type of sample container or package materials.
- When samples are collected and capped, place the sample bottle(s) in an individual sealed plastic bag (i.e. Ziploc®) separate from all other sample parameter bottles, and place in a shipping container packed only with ice.
- After collecting PFOA samples conduct the "Shaker Test:" A small portion of the sample (~10-25 ml) should be shaken by the sample collector on site. If foaming is noted within the sample, this should be documented when samples are submitted for analysis.

Surface Water Sampling (SOP #401)

- Surface water must be collected by inserting a capped sampling container with the opening pointing down to avoid the collection of surface films.
- Where conditions permit, sampling devices should be rinsed with site medium to be sampled prior to collection of the sample.

Surface Soil Sampling (SOP #405)

- PFAS/PFC samples should be taken first, prior to collecting samples for any other parameters into any other containers. Field personnel should avoid contact with any other type of sample container or package materials.

SAMPLING PERFLUOROALKYL SUBSTANCES (PFASs) and PERFLUORINATED COMPOUNDS (PFCS)

Large Equipment Decontamination (SOP #503)

- Don't use detergent to decon drilling equipment, scrub with a plastic brush and rinse thoroughly in tap water, then triple-rinse in distilled or deionized water.

Field Handling, Packaging, and Shipping (SOP #607)

- Ice should be double bagged and secured to avoid meltwater from contacting sample containers, or samples should be in an individual sealed plastic bag.

D. QA/QC REQUIREMENTS:

A variety of blanks should be collected to trace the sources of any artificially introduced contamination. Rinsate or equipment blanks, field blanks, and trip or travel blanks should all be collected during the sampling event. Rinsate or equipment blanks and field blanks should be collected once per day per matrix or once per 20 samples per matrix, whichever comes first. One trip blank is required per cooler.

Samples should be immediately placed in a cooler maintained at 4±2° Celsius.

E. SPECIAL CONDITIONS:

In the event of wet weather field personnel must avoid using personal waterproof or water-resistant rain gear. Instead a gazebo tent that is only touched or moved prior to or after sampling activities should be used.

No food or drink is permitted on-site, except for bottled water and hydration drinks, such as Gatorade. These drinks should only be consumed in the staging area. When field personnel require a break to eat or drink, they should remove their gloves and coveralls and move away from the sampling location, preferably downwind. When finished eating, field personnel should clean up and put their coveralls and gloves back on prior to returning to the work area.

Visitors to the site are asked to remain at least 30 feet from sampling areas.

If laboratory results are received and the combined concentration PFOA and PFOS was between 50 and 70 parts per trillion (ppt), consider contacting the laboratory to ensure that the analytical results reported are based on the more comprehensive technique from EPA Method 537 for measuring PFOA.

F. REFERENCES:

Chiang, D., Ph.D., P.E., Davis, K., Ph.D., Bogdan, D., Ph.D., Aucoin, M., & Woodward, D. (n.d.). PFAS Sampling. AECOM.

Shoemaker, J. A., Grimmet, P. E., & Boutin, B. K. (2009). Method 537. Determination of Selected Perfluorinated Alkyl Acids in Drinking Water by Solid Phase Extraction and Liquid



SOP #341

09/21/2017

Page 6 of 6

Author: Amy Bredes

Reviewer: Seth Fowler/Chris Burns

SAMPLING PERFLUOROALKYL SUBSTANCES (PFASs) and PERFLUORINATED COMPOUNDS (PFCS)

Chromatography/Tandem Mass Spectrometry (LC/MS/MS) (EPA/600/R-08/092) (USA, EPA, Office of Research and Development). Cincinnati, OH: U.S. Environmental Protection Agency.

G. APPENDICES/FORMS:

PFAS/PFC Sampling – Acceptable and Prohibited Items

END OF SOP

APPENDIX A – SOP 341
PFAS/PFC SAMPLING – ACCEPTABLE AND PROHIBITED ITEMS

PROHIBITED	ACCEPTABLE
Field Equipment	
Teflon containing materials	High-Density Polyethylene (HDPE) Materials
Low density polyethylene (LDPE) materials	Acetate Liners
Fluoropolymer tubing, valves and other parts in pumps	Silicon Tubing
Sharpies (acceptable by EPA) and other markers	Ball point pens
Waterproof field books, Post-it Notes, and any adhesive paper produces	Loose paper (non-waterproof)
Plastic clipboards, binders, or spiral hard cover notebooks	Aluminum field clipboards or with Masonite
Chemical (blue) ice packs	Regular Ice
Field Clothing and PPE	
New cotton clothing or synthetic water resistant, waterproof, or stain-treated clothing, clothing containing GORE-TEX	Well-laundered clothing made of natural fibers (preferably cotton)
Clothing laundered using fabric softener	No fabric softener
Boots containing GORE-TEX or treated for water resistance	Boots made with polyurethane and PVC
Tyvek	Cotton clothing
No cosmetics, moisturizers, hand cream, or other related products as part of personal cleaning/showering routine on the morning of sampling	Sunscreens – Alba Organics Natural Sunscreen, Yes to Cucumbers, Aubrey Organics, Jason Natural Sun Block, Kiss my Face, Baby sunscreens that are “free” or “natural” Insect Repellents – Jason Natural Quit Bugging Me, Repel Lemon Eucalyptus Insect Repellant, Herabt Armor, California Baby Natural Bug Spray, BabyGanics Sunscreen and Insect Repellant – Avon Skin So Soft Bug Guard Plus – SPF 30 Lotion
Sample Containers	
LDPE or glass containers	HDPE or polypropylene
PTFE or Teflon-lines caps	Unlined polypropylene caps
Equipment Decontamination	
Decon 90	Alconox and/or Liquinox
Water from an on-site well	Laboratory certified “PFAS-free” water
Food Considerations	
All food and drink, with exceptions noted	Bottled water and hydration fluids to be brought and consumed only in the staging areas. Eating should take place away from the sampling location, wash hands well after handling, wear powderless nitrile gloves

SMALL EQUIPMENT DECONTAMINATION

A. PURPOSE/SCOPE:

Proper decontamination of small equipment prevents cross-contamination of samples, introduction of contaminants to clean sites, and the mixture of incompatible substances. Equipment decontamination also assures the health and safety of all equipment users. Procedures for decontamination procedures vary depending on the matrix sampled, level of contamination, type of contaminants, and the target analytes of the sampling event. The procedure outlined in this SOP is a general procedure for field/ warehouse decontamination of equipment associated with water, soil and other surficial sampling activities.

Decontamination should be performed before sampling work commences and after each sampling event. Decontaminated equipment should be protected from contact with surroundings during storage and transport, and should be handled as little as possible before its use and always with disposable gloves. Note that all waste generated by decontamination procedures including liquids, solids, rags, gloves, etc., will be collected and disposed of properly according to the procedures outlined in SOP #507.

B. EQUIPMENT/MATERIALS:

- Alconox®
- Tap water
- Distilled and deionized water
- 10% Nitric acid rinse
- Acetone (or other pesticide grade organic solvent)
- 1-Gallon pressure spray bottles
- Long-handled brushes
- 5-Gallon plastic buckets

C. PROCEDURE:

Note that if it is logically impractical/ impossible to complete all steps listed below at the field site, Steps 1-4 should be performed prior to transport of equipment to a facility where all steps can be completed if required. All field decontamination should take place over a container and liquids should be properly disposed of.

1. Disassemble equipment as necessary.
2. Remove gross contamination from equipment by scraping, brushing and rinsing with tap water
3. Wash with Alconox® or other laboratory grade detergent to remove all visible particulate matter and residual oils and grease.
4. Rinse with tap water to remove detergent.
5. Rinse with distilled and deionized water.
6. Field personnel will use a new pair of outer gloves before handling sample equipment after it is cleaned.
7. If equipment will not be used immediately, wrap in aluminum foil (unless sampling for metals analysis) or seal in plastic bags (unless sampling for organics analysis) and store.
8. Record the date and method of decontamination on foil/bag and equipment log.



SOP #501

REV. #2

11/05/2015

Page 2 of 2

Author: Matt Renko

Reviewer: Seth Fowler

SMALL EQUIPMENT DECONTAMINATION

D. QA/QC REQUIREMENTS:

When necessary, field equipment rinsate blanks will be collected by pouring analyte-free water over decontaminated equipment and submitting them to the lab with the other blanks and samples. These blanks are used to assess the quality of equipment decontamination.

E. SPECIAL CONDITIONS:

Reusable PPE such as respirators, chemical-resistant overboots and gloves shall also undergo the equipment decontamination sequence. See SOP #505 for related information on Personnel decontamination.

If acetone is a known or expected contaminant another solvent may be substituted. Note that methanol cannot be used for decontamination when sampling gasoline or its by-products.

Additional decontamination procedures may be required for particular contaminants or when samples are to be analyzed at very low concentrations. Identify methods as needed but see for example Wilde, 2004.

F. REFERENCES:

New Jersey Department of Environmental Protection, August 2005. *Field Sampling Procedures Manual*.

USEPA, 1994. Sampling Equipment Decontamination. Environmental Response Team SOP #2006, Revision #0.0. Edison, NJ. <http://www.ert.org>.

USEPA, 1996. *Environmental Investigations Standard Operating Procedures and Quality Assurance Manual*. Region 4, Science and Ecosystem Support Division. Athens, GA.
<http://www.epa.gov/region04/sesd/eisopqam/eisopqam.html>

Wilde, F.D., ed., 2004. *Cleaning of Equipment for water sampling (ver. 2.0)*: U.S. Geological Survey Techniques of Water-Resources Investigations, book 9, chap. A3, April, accessed January 5, 2009 at <http://pubs.water.usgs.gov/twri9A3/>

G. APPENDICES/FORMS:

Not Applicable

END OF SOP

Final Check by C. Burns 10/27/15



SOP #503

REV. #02

June 22, 2015

Page 1 of 2

Author: Matt Renko

Reviewer: John Favreau

LARGE EQUIPMENT DECONTAMINATION

A. PURPOSE/SCOPE:

Decontamination of large equipment (drilling rigs, backhoe excavators, bulldozers, etc.) is necessary to prevent cross-contamination between sampling points and to prevent the removal of contaminants from a hazardous waste site.

B. EQUIPMENT/MATERIALS:

- Steam cleaner
- Generator
- Decontamination pad or supplies to construct a temporary pad
- Centrifugal pump
- Discharge hose
- 55-Gallon drums
- Alconox®
- Hexane
- Potable water source

C. PROCEDURE:

1. Drilling rigs and excavation equipment and materials should arrive on-site in a clean condition, free of oil, grease, and debris. Inspect rigs for any fluid leaks.
2. Unless otherwise approved, all decontamination of large equipment will take place on a decontamination pad designed to collect all rinsate generated during cleaning. Temporary pads should be lined with a water-impermeable material with no seams, and if possible, constructed on a level, paved surface. Pads should be constructed so as to facilitate the collection of wastewater, with a sump in one corner or side, or with one corner generally lower than others. Where appropriate, side shields should be placed around the decon pad to prevent overspray.
3. Steam clean the drill rig/ excavator, tools, drill bits, buckets, etc. prior to the start of work. Smaller equipment and tools should be elevated on saw horses to avoid any splashing. After steam cleaning, the equipment should be inspected for residues such as machine oil. If residues are observed, the equipment should be steam cleaned until such residues are removed. Steam cleaning procedures can be supplemented with manual scrubbing with Alconox® where necessary to remove contamination.
4. In the event that equipment is contaminated with heavy oils or products that cannot be removed by the standard decontamination procedures outlined above, the following modifications will be made. First, wipe all excess oil/tar from the equipment with a paper towel or clean rag. Second, with a paper towel or clean rag that has been soaked in hexane, wipe any residual contamination off the equipment. When equipment is relatively free of gross oil or tar contamination, proceed with the usual decontamination procedure.
5. At the completion of the project, or when required, all rinsate generated from decontamination activities shall be pumped from the decontamination pad to 55-gallon drums for disposal.



SOP #503
REV. #02
June 22, 2015
Page 2 of 2
Author: Matt Renko
Reviewer: John Favreau

LARGE EQUIPMENT DECONTAMINATION

D. QA/QC REQUIREMENTS:

Equipment field blanks may be required depending on job specifics.

E. SPECIAL CONDITIONS:

Not Applicable

F. REFERENCES:

New Jersey Department of Environmental Protection, 2005. *Field Sampling Procedures Manual*. August.

USEPA, 1996. *Environmental Investigations Standard Operating Procedures and Quality Assurance Manual*. Region 4, Science and Ecosystem Support Division. Athens, GA.

<http://www.epa.gov/region04/sesd/eisopqam/eisopqam.html>

G. APPENDICES/FORMS:

Not Applicable

END OF SOP

Final Check by C. Burns 10/22/15

RESIDUALS MANAGEMENT

A. PURPOSE/SCOPE:

The following standard operating procedure (SOP) presents a description of the methods generally employed for the management of residual waste. Field personnel are responsible for ensuring that state-specific standards/guidelines/regulations are followed, where applicable. In addition, field personnel are responsible for coordination efforts associated with the waste disposal facility, if known.

Improper handling and storage of residual waste can result in leaks and spills and pose a serious threat to the quality of the environment. Timely characterization and disposal of residual wastes shall be conducted in order to not exceed onsite quantity and/or storage regulations.

B. EQUIPMENT/MATERIALS:

Off-Site transportation and disposal of residual waste will be performed by a licensed waste hauler under the direction of CHA. The company will supply the necessary equipment and materials needed to remove the residual waste from the Site and transport it to an approved waste disposal facility.

The field geologist/engineer will obtain the necessary sample bottles with the associated preservatives, if required, from the analytical laboratory. See SOP #603, Sample Containers, Volumes, Preservations and Holding Times, for additional information on these topics. In addition, if a flame ionization detector (FID), photoionization detector (PID) and/or gas meter will be used to screen waste containers soils for the presence of volatile organic compounds (VOCs).

All other equipment required during transportation/disposal activities is the responsibility of the Contractor (waste hauler).

C. PROCEDURE:

1. During remedial activities all residual waste, including, but not limited to, soil cuttings, decontamination wash/rinse water, purge water and personal protective equipment (PPE) shall be containerized in United States Department of Transportation (USDOT) approved 55-gallon drums or similar waste containers, unless the Work Plan indicates otherwise. Each drum shall contain similar materials/matrices (e.g., soil, water, PPE).

2. Label each waste container using a permanent marker and weather proof label with the following:
 - a. Description of the container contents
 - b. Site name and address
 - c. Name of Site contact and associated phone number

Waste container labels shall be legible and easily understood by those unfamiliar with the Site.

3. Upon completion of remedial activities, the field geologist/engineer will conduct waste characterization of the residual waste prior to off-Site transportation and disposal. Depending upon the type of waste present, various waste disposal facilities may have different testing requirements. CHA will complete the required analytical testing. Upon receipt of analytical data and coordination with the disposal facility, the field geologist/engineer will supervise the removal of the waste from the Site.

RESIDUALS MANAGEMENT

4. Waste containers shall be transported and stored in a secure location on-Site. All waste containers shall be located in one location, if possible.
5. If waste containers are stored for a period of time prior to collecting waste characterization samples, all waste containers shall be inspected for signs of the potential presence of explosive/flammable gases and/or toxic vapors. These signs include pressurization (bulging/dimples); crystals formed around the drum opening; leaks, holes, stains; labels, marking; composition and type (steel/poly and open/bung); condition, age, rust; and sampling accessibility. Drums showing evidence of pressurization and crystals shall be further assessed to determine proper drum opening techniques.
6. All metal waste containers not in direct contact with the earth shall be grounded.
7. Open the waste container with spark resistant tools (e.g., brass, beryllium).
8. Screen the waste containers for explosive gases and/or toxic vapor with appropriate air monitoring instruments as necessary.
9. Obtain the necessary sample bottles with the associated preservatives, if required, from the analytical laboratory. See SOP #603, Sample Containers, Volumes, Preservations and Holding Times, for information regarding field preservation of sample containers, if necessary.
10. Each matrix (e.g., soil, water) shall be sampled for waste characterization purposes. The field geologist/engineer shall determine the quantity of similar waste characterization samples to be collected from the waste containers in conjunction with the project manager and/or waste disposal facility. Containers with similar wastes (e.g., soil, water) generated from one area of the site may require only one composite sample from each of the waste containers. This determination shall also be made in conjunction with the project manager and/or waste disposal facility.
11. Use a decontaminated spade or shovel to collect representative solid waste samples from each waste container or use a beaker, bailer or similar mechanism to collect representative liquid waste samples from each waste container.
12. Immediately place sample in the pre-preserved sample containers and close the waste container(s).
13. Chill all samples to 4°C from sample collection until laboratory analysis.
14. Package and ship samples per SOP #607.

D. **QA/QC REQUIREMENTS:**

This section includes QA/QC requirements associated with tank closure activities. The following general requirements apply to this SOP:

1. All data must be documented on field data sheets or within site logbooks.
2. All instrumentation must be operated in accordance with operating instructions as supplied by the manufacturer, unless otherwise specified in the work plan.
3. Equipment checkout and calibration activities must occur prior to sampling/operation, and must be documented.



SOP #507

Revision #0

03/21/2012

Page 3 of 3

Author: Meghan Platt, P.E.

Reviewer: Scott Smith, P.E.

RESIDUALS MANAGEMENT

E. **SPECIAL CONDITIONS:**

In no case, will CHA be considered the generator of the waste. The site owner shall always take responsibility for waste disposal. Additionally, CHA may only act as agent for the owner relative to signing manifests with specific permission from CHA's in-house counsel. In most every case, the owner should sign waste manifests.

F. **REFERENCES:**

United States Environmental Protection Agency, Science and Ecosystem Support Division, Waste Sampling Standard Operating Procedure: <http://www.epa.gov/region4/sesd/fbqstp/Waste-Sampling.pdf>

G. **APPENDICES/FORMS:**

Not Applicable

END OF SOP

Final Check by C. Burns 10/26/15

SAMPLE CONTAINERS, VOLUMES, PRESERVATIONS AND HOLDING TIMES

A. PURPOSE/SCOPE:

The following standard operating procedure (SOP) presents general guidelines for sample containers, volumes, preservations and holding times associated with air, water and soil/sediment samples. Field personnel are responsible for ensuring that state-specific standards/guidelines/regulations are followed, where applicable.

Improper preserving, storing and handling of air, water and soil/sediment samples are critical if the integrity of the samples are to be maintained. Samples collected in the field may undergo biological, chemical or physical changes following removal from their environment. In order to minimize those changes, many samples must have preservatives in the form of strong acids or bases added prior to delivery to the laboratory. If samples are to be collected as part of a government program, the governing agency typically must be notified 30 days prior to sample collection.

B. EQUIPMENT/MATERIALS:

Pre-cleaned sample containers along with associated preservations within the sample containers will be provided to CHA from the analytical laboratory. The field geologist/engineer will provide the necessary personal protective equipment to place samples collected within the appropriate sample containers per SOPs 300 through 417. However, if field preservation is required the following equipment and materials shall be obtained:

- Hydrochloric (HCl) Acid Reagent A.S.C. 38%
- Nitric (HNO₃) Acid Reagent A.S.C. 71%
- Sodium Hydroxide (NaOH) 97%
- 10 mL glass pipettes
- Narrow range (0-3 and 12-14) pH paper
- Nitrile gloves

C. PROCEDURE:

1. Review Table 1 which details typical parameters of interest at environmental sites and the associated methods, preservation, container type, holding time and required sample volume.
2. Obtain pre-cleaned and pre-preserved sample containers from the laboratory. If pre-preserved sample containers were provided skip to Step 7; if not proceed to Step 3.
3. Put on a clean pair of nitrile gloves.
4. In a clean, non-dusty environment, remove the cap of the sample container.
5. Using a clean, 10 mL glass pipette draw the required amount of acid or base and insert into the sample container.
6. Volatile Organic Compounds – 2 mL of HCl acid (water samples).
7. Total and Dissolved Metals (including mercury) – 5 mL Nitric acid (water samples).
8. Cyanide – 15-20 Sodium Hydroxide pellets (water samples).

SAMPLE CONTAINERS, VOLUMES, PRESERVATIONS AND HOLDING TIMES

9. Chemical Oxygen Demand, Oil and Grease, Organic Carbon, Phenolics, Total Dissolved Phosphorous, Hydrolyzable Phosphorus, Ammonia, Nitrate and Nitrite – 5 mL Sulfuric acid (water samples).
10. Immediately replace and tighten the sample container cap.
11. Collect sample using equipment and procedures outlined in other SOPs as appropriate. The volume of the sample collected shall be sufficient to conduct the analysis required, as well as associated quality assurance/quality control samples (QA/QC). QA/QC samples shall be collected in accordance with SOP 605.
12. Place samples immediately in the pre-preserved sample containers.
13. Chill all samples to 4°C from sample collection until laboratory analysis.
14. Package and ship samples per SOP #607.

D. **QA/QC REQUIREMENTS:**

This section includes QA/QC requirements associated with sample containers, volumes, preservations, and holding times. The following general requirements apply to this SOP:

1. All data must be documented on field data sheets or within site logbooks.
2. All instrumentation must be operated in accordance with operating instructions as supplied by the manufacturer, unless otherwise specified in the work plan.
3. Equipment checkout and calibration activities must occur prior to sampling/operation, and must be documented.
4. QA/QC samples shall be collected in accordance with SOP 605.

The following procedure shall be conducted to provide a QA/QC check of water (aqueous) samples to ensure the samples were preserved to the proper pH prior to shipping for laboratory analysis.

Volatile Organic Compounds:

1. Collect one additional VOA vial at every third aqueous sampling location.
2. Fill the extra vial with the sample.
3. Using the extra VOA vial, remove the cap and using a clean, 10 mL glass pipette extract approximately 1 mL of water.
4. Place two drops of the water on a 1-inch strip of 0-3 range pH paper.
5. Compare pH strip's color while wet with that of the color key included on the pH paper container.
6. If pH is not less than 2, add additional HCL to the remaining 3 VOA vials prior to collecting the sample.
7. Discard the vial used to check the pH.

SAMPLE CONTAINERS, VOLUMES, PRESERVATIONS AND HOLDING TIMES

Total and Dissolved Metals, Mercury, Ammonia, Nitrate plus Nitrite, Total Dissolved Phosphorus, COD, Oil & Grease, Organic Carbon, Phenolics

1. Collect sample and tightly reseal the cap.
2. Agitate the sample by gently shaking the sample bottle to mix the acid and water.
3. Remove the cap and using a clean, 10 mL glass pipette extract approximately 1 mL of sample.
4. Place approximately two drops of sample on a 1 inch strip of 0-3 range pH paper.
5. Compare pH strip's color while wet with that of the color key included on the pH paper container.
6. If pH is not less than 2, add appropriate additional Sulfuric Acid to the sample using a clean pipette.
7. Recheck sample using steps 2 through 6 until sample pH is less than 2.

Cyanide

1. Collect sample and tightly reseal the cap.
2. Agitate the sample by gently shaking the sample bottle until the NaOH pellets are dissolved.
3. Remove the cap and using a clean 10 mL glass pipette extract approximately 1 mL of sample.
4. Place approximately two drops of sample on a 1-inch strip of 12-14 range pH paper.
5. Compare pH strip's color while wet with that of the color key included on the pH paper container.
6. If pH is not greater than 12, add additional NaOH to the sample using standard procedures.
7. Recheck sample using steps 2 through 6 until sample pH is greater than 12.

E. SPECIAL CONDITIONS:

Not Applicable

F. REFERENCES:

Alpha Analytical Aqueous and Soil/Solid Reference Guides.

G. APPENDICES/FORMS:

Table 1 Laboratory Analysis: Summarizing parameters, methods, preservations, container type, holding times and minimum sample volumes are included as an attachment to this SOP.

END OF SOP

Final Check by C. Burns 10/27/15

Table 1

Laboratory Analysis	EPA Method	Standard Method and/or SW846 Method	Preservation	Container	Holding Time	Minimum Volume
WATER						
Acid Soluble & Insoluble Sulfide	-----	9030B	Cool to 4 deg C No Headspace	P or G	7 Days	8 oz.
Acidity as CaCO ₃	305.1	2310B	Cool to 4 deg C	P or G	14 Days	100 mL
Alkalinity	-----	2320B	Cool to 4 deg C	P or G	14 Days	100 mL
Alkalinity as CaCO ₃	310.1	2320B	Cool to 4 deg C	P or G	14 Days	100 mL
Ammonia	350.2 / 3	4500-NH ₃ B,E	Cool to 4 deg C, H ₂ SO ₄ to pH<2	P or G	28 Days	400 mL
Aromatic Hydrocarbons	602	8021B	1:1 HCl to pH <2, Cool to 4 deg C 0.008% Na ₂ S ₂ O ₃ if residual chlorine present	G, Vial screw cap with center hole Teflon-faced silicone septum	14 Days	40 mL
Biochemical Oxygen Demand	405.1	5210B	Cool to 4 deg C	P or G	48 Hrs.	500 mL
Bromide	300	-----	None	P or G	28 Days	250 mL
Calcium	-----	3120B	HNO ₃ to pH<2	P or G	6 Months	100 mL
Calcium-Hardness	200.7	3111B	HNO ₃ to pH<2	P or G	6 Months	100 mL
Carbamates	531.1	-----	Cool to 4 deg C, 0.08% Na ₂ S ₂ O ₃ if residual chlorine present	G, screw cap Teflon faced silicone septum	14 Days	100 mL
Carbonaceous BOD	-----	5210B	Cool to 4 deg C	P or G	48 Hrs.	1000 mL
Chloride	300	4500-CLD 4110	Cool to 4 deg C	P or G	28 Days	100 mL
Chloride, Residual Disinfectant	-----	4500Cl-G	Cool to 4 deg C	P or G	Analyze Immediately	200 mL
COD	410.4	5220D	H ₂ SO ₄ to pH<2, Cool to 4 deg C	P	28 days	250 mL
Color	-----	2120B	Cool to 4 deg C	P or G	24 Hrs	100 mL
Conductivity	-----	2510B	Cool to 4 deg C	P or G	28 Days	100 mL
Cyanide	335.4	4500-CN C&E	Cool to 4 deg C, NaOH pH>12	P or G	14 Days	250 mL
Cyanide	335.2	9010B, 9012A, 9014	Cool to 4 deg C, NaOH to pH>12 0.6 g ascorbic acid if residual chlorine present	P or G	Sulfide absent, 14 days; sulfide present 24 Hrs	250 mL
Dioxin	-----	8280A	Cool to 4 deg C 0.008% Na ₂ S ₂ O ₃ if residual chlorine present	G, Amber Teflon-lined screw cap	7 days until extraction 40 days after extraction	1000 mL
DRO	-----	8015B	Cool to 4 deg C 0.008% Na ₂ S ₂ O ₃ if residual chlorine present	G, Amber Teflon-lined screw cap	7 days until extraction 40 days after extraction	1000 mL
Escherichia Coli	-----	9222B	0.008% Na ₂ S ₂ O ₃ if residual chlorine present 0.3 mL/125 mL 15% EDTA if > 0.01 mg/L heavy metals	Sterile P or G	30 Hrs. for Drinking Water 6 Hrs. for Waste Water	125 mL
Extractable Org. Compounds			Cool to 4 deg C, Store in dark	G, Amber Teflon-lined screw cap	* 7 days	4000 mL

Table 1

Laboratory Analysis	EPA Method	Standard Method and/or SW846 Method	Preservation	Container	Holding Time	Minimum Volume
Fecal Coliform	-----	9222B or D	0.008% Na2S2O3 if residual chlorine present 0.3 mL/125 mL 15% EDTA if > 0.01 mg/L heavy metals	Sterile P or G	30 Hrs. for Drinking Water 6 Hrs. for Waste Water	125 mL
Fecal Streptococci	-----	9230C	Cool to 4 deg C 0.008% Na2S2O3 if residual chlorine present	Sterile P or G	30 Hrs. for Drinking Water 6 Hrs. for Waste Water	125 mL
Fluoride	300	4500 F-B,C S	Cool to 4 deg C	P or G	28 Days	300 mL
Foaming Agents (MBAS)	-----	5540C	Cool to 4 deg C	P or G	48 Hrs	250 mL
Gases	-----	3810	Cool to 4 deg C 0.008% Na2S2O3 if residual chlorine present 1:1 HCl to pH <2	G, Vial screw cap with center hole Teflon-faced silicone septum	7 days without HCl 14 days with HCl	40 mL
GRO	-----	8015B	1:1 HCl to pH <2, Cool to 4 deg C 0.008% Na2S2O3 if residual chlorine present	G, Vial screw cap with center hole Teflon-faced silicone septum	7 days w/o HCl 14 days w/HCl	40 mL
Hardness	-----	9215B	HNO3 to pH<2	P	6 months	1000 mL
Heterotrophic Plate Count	-----	3500Cr-D	Cool to 4 deg C 0.008% Na2S2O3 if residual chlorine present	Sterile P or G	30 Hrs. for Drinking Water 6 Hrs. for Waste Water	125 mL
Hexavalent Chromium	7196A	8330	Cool to 4 deg C	P	24 hours	500 mL
HPLC (Explosive)	-----	8310	Cool to 4 deg C	G, Amber Teflon-lined screw cap	7 days until extraction 40 days after extraction	1000mL
HPLC (Explosive)	-----	7470A	Cool to 4 deg C	P or G	28 Days	8 oz.
Mercury Metals	200.7	-----	HNO3 to pH<2	P	6 Months	100 mL
Nitrate	300	-----	Cool to 4 deg C	P or G	48 Hrs.	100 mL
Nitrate (Chlorinated)	353.2	4500-NO3 F	Cool to 4 deg C	P or G	48 Hrs	250 mL
Nitrate (Non-chlorinated)	353.2	4500-NO3 F	H2SO4 to pH<2, Cool to 4 deg C	P or G	14 Days	250 mL
Nitrite	300	4500-NO3 D	Cool to 4 deg C	P or G	48 Hrs	100 mL
Odor	-----	2150B	Cool to 4 deg C	G only	24 Hrs	200 mL
Oil and Grease	1664	-----	HCl to pH<2, Cool to 4 deg C	G, Amber Teflon-lined screw cap	28 days	1000 mL
Organic Nitrogen	351.1	-----	Cool to 4 deg C, H2SO4 to pH<2	G	28 Days	500 mL

Table 1

Laboratory/Analysis	EPA Method	Standard Method and/or SW846 Method	Preservation	Container	Holding Time	Minimum Volume
Organochlorine Pesticides/PCB	608	8081A,8082	Cool to 4 deg C 0.008% Na2S2O3 if residual chlorine present. If aldrin is to be determined bind to pH 5-9.	G, Amber Teflon-lined screw cap	7 days until extraction 40 days after extraction	1000 mL
Ortho Phosphate	300	4500 P-E	Cool to 4 deg C	P or G	48 Hrs.	50 mL
Orthophosphate	365.2	----	Filter immediately. Cool to 4 deg C	P or G	48 Hrs.	50 mL
pH, Hydrogen ion	-----	4500-H-B	Cool to 4 deg C	P or G	Analyze Immediately	25 mL
Phenols	420.1	9065, 510ABC	Cool to 4 deg C, H2SO4 to pH<2	G	28 Days	500 mL
Pseudomonas Aeruginosa	-----	9213E	Cool to 4 deg C 0.008% Na2S2O3 if residual chlorine present	Sterile P or G	30 Hrs. for Drinking Water 6 Hrs. for Waste Water	125 mL
Purgeable Halocarbons	601	8021B	Cool to 4 deg C 0.008% Na2S2O3 if residual chlorine present	G, Vial screw cap with center hole Teflon-faced silicone septum	14 Days	40 mL
Radiological	-----	-----	HNO3 to pH<2	P or G	6 Months	100 mL
Residue- Settleable (SS)	160.5	-----	Cool to 4 deg C	P or G	48 Hrs.	1000 mL
Residue-filtered (TDS)	160.1	-----	Cool to 4 deg C	P or G	7 Days	100 mL
Residue-non- filtered (TSS)	160.2	-----	Cool to 4 deg C	P or G	7 Days	100 mL
Residue-Total Volatile Solids	160.4	2540 E	Cool to 4 deg C	P or G	7 Days	100 mL
Salinity	-----	2520 C	Cool to 4 deg C	G	28 Days	100 mL
Semivolatile Organic Compounds (Unregulated)	525.2	-----	If residual chlorine is present, add 40-50 mg Sodium Thiosulfate. If not chlorinated, add 6N HCl to pH<2	G, Amber Teflon-lined screw cap	7 Days for extraction, 30 after extraction	1000 mL
Semivolatile Organics	625	8270C	Cool to 4 deg C 0.008% Na2S2O3 if residual chlorine present	G, Amber Teflon-lined screw cap	7 days for extraction 40 days after extraction	1000 mL
Silica	200.7	----	Cool to 4 deg C	P only	7 Days	50 mL
Specific Conductance	120.1	----	Cool to 4 deg C	P or G	28 Days	100 mL
Sulfate	300	4500-SO4	Cool to 4 deg C	P or G	28 Days	50 mL
Sulfate	375.4	----	Cool to 4 deg C	P or G	28 Days	50 mL
Sulfide	376.2	9030 B, 4500S2-AD	Cool to 4 deg C, add zinc plus NaOH to pH>9	P or G	7 Days	50 mL
Sulfite (SO3)	377.1	----	None Required	G, Bottle and Top	Analyze Immediately	50 mL
Surfactants (MBAS)	425.1	----	Cool to 4 deg C	P or G	48 Hrs.	250 mL

Table 1

Laboratory Analysis	EPA Method	Standard Method and/or SW846 Method	Preservation	Container	Holding Time	Minimum Volume
TDS	2550B	Cool to 4 deg C	P	7 days	500 mL	
Temperature	170.1	None Required	P or G	Analyze Immediately	1000 mL	
Total Kjeldahl Nitrogen	353.3 / 1 4500Norg-C	H2SO4 to pH<2 , Cool to 4 deg C 0.008% Na2S2O3 if residual chlorine present 0.3 mL/125 mL 15% EDTA if > 0.01 mg/L heavy metals	G, Bottle and Top P or G	Analyze Immediately	1000 mL	
Total Coliform	9221D			28 days	250 mL	
				30 Hrs. for Drinking Water 6 Hrs. for Waste Water	125 mL	
Total Dissolved Solids	160.1 2540C	Cool to 4 deg C	P or G	7 Days	100 mL	
Total Hardness	130.2 , 200.7	HNO3 to pH<2 H2SO4 to pH<2	P or G	6 Months	100 mL	
Total Kjeldahl Nitrogen	351.3	H2SO4 to pH<2	P or G	28 Days	500 mL	
Total Metals	200.7 6010B, 6020, 7000A 200.8	HNO3 to pH<2	P	6 months (Hg 28 days)	500 mL	
Total Organic Carbon (TOC)	415.1 9060, 5310C	H2SO4 to pH<2, Cool to 4 deg C	G, Amber Teflon-lined screw cap	28 days	80 mL	
Total Organic Halides	5320B	1N H2SO4 to pH<2	P or G	28 Days	50 mL	
Total Phosphorus	365.2	Cool to 4 deg C, H2SO4 to pH<2	G	28 Days	50 mL	
Total Recoverable Oil & Grease	413.1, 166 4A	Cool to 4 deg C, HCl or H2SO4 to pH<2	G	Petroleum Based 3 Days; Non-Petroleum Based 24 hours	1000 mL	
Total Residue (TS)	160.3 2540B 180.1 2130B	Cool to 4 deg C Cool to 4 deg C	P or G P or G	7 Days 48 Hrs	100 mL 100 mL	
Volatile Organics	624 8260B	1:1 HCl to pH <2, Cool to 4 deg C 0.008% Na2S2O3 if residual chlorine present	G, Vial screw cap with center hole Teflon-faced silicone septum	7 days w/o HCl 14 days w/HCl	40 mL	
Volatiles (Regulated)	524.2	Cool to 4 deg C HCl to pH<2	G, Vial screw cap with center hole Teflon-faced silicone septum	14 Days	60-120 mL	
SOIL						
Acid Soluble & Insoluble Sulfide	9030B	Cool to 4 deg C, no headspace	P or G	7 Days	8 oz.	
Amenable Cyanide	9213	Cool to 4 deg C	P or G	14 Days	4 oz.	
Bromide	9211	Cool to 4 deg C	P or G	28 Days	8 oz.	
Cation - Exchange Capacity	9080, 9081	None	P	-----	8 oz.	
Chloride	9212, 9056, 9253	None	P or G	28 Days	8 oz.	
Chlorinated Herbicides	8151A	Cool to 4 deg C	G, wide mouth, teflon liner	14 Days	8 oz.	
Corrosivity pH Wastes>20% water	9040B	Cool to 4 deg C	P	Analyze Immediately	4 oz.	

Table 1

Laboratory Analysis	EPA Method	Standard Method and/or SW846 Method	Preservation	Container	Holding Time	Minimum Volume
Corrosivity Toward Steel	-----	11110	Cool to 4 deg C	P	14 Days	4 oz.
Cyanide	-----	9010B, 4500CN	Cool to 4 deg C	G, Amber	14 Days	4 oz
Dioxin	8280A	8280A	Cool to 4 deg C	G	14 Days	8 oz.
DRO	-----	8015B	Cool to 4 deg C	G, Amber	14 Days	4 oz.
Extractable Organic Compounds	-----	-----	Cool to 4 deg C, Store in dark	G	14 days	8 oz
Extractable Sulfide	-----	9031	Cool to 4 deg C, fill top of sample with 2N Zinc Acetate until moistened	P or G	7 Days	8 oz.
Fluoride	-----	9214	None	P	28 Days	8 oz.
Gases	-----	3810	Cool to 4 deg C	G, Amber	14 Days	8 oz.
Grain Size	-----	-----	N/A	G	N/A	8 oz
GRO	-----	8015B	Cool to 4 deg C, check state regulations for proper preservative. NJ (methanol), PA (encore samplers) NY (cool to 4 deg C).	G, Amber VOA via	14 Days	15 Grams
HPLC (PAH)	-----	8310	Cool to 4 deg C	G, Amber Teflon-lined screw cap	14 days until extraction 40 days after extraction	4 oz.
Ignitability	-----	1010	None	P or G	None	8 oz.
Ignitability of Solids	-----	1030	None	P or G	None	8 oz.
Mercury	245.1	7471A	Cool to 4 deg C	G, Amber	28 Days	4 oz.
Metals	-----	6010B, 6020, 7000A	Cool to 4 deg C	G, Amber	6 Months	8 oz.
Moisture Content	-----	-----	Store in airtight jar 3-30 deg C	G	N/A	8 oz
Nitrate	-----	9210	Cool to 4 deg C	P or G	48 Hrs	8 oz.
Oil & Grease (Sludge, Sludge- Hem)	-----	9071B	Cool to 4 deg C	G	28 Days	8 oz.
Organochlorine	-----	8081A	Cool to 4 deg C	P or G	14 Days	8 oz.
Paint Filter Liquids Test	-----	9095A	Cool to 4 deg C	P or G	-----	8 oz.
PCBs	-----	8082	Cool to 4 deg C	G, Amber Teflon-lined screw cap	14 Days	4 oz.
pH	-----	9045C	Cool to 4 deg C	G, Amber	Analyze	4 oz.
pH, Soil and Waste	-----	9045A	Cool to 4 deg C	G	Immediately Analyze	8 oz.
Phenol	-----	9065, 9066, 9067	Cool to 4 deg C	G, Amber	Immediately	
Radio logical	-----	-----	Cool to 4 deg C	G	28 Days	4 oz.
Reactivity Cyanide	-----	SW-846 7.3.3.2	Cool to 4 deg C	P	6 Months	8 oz.
Reactivity Sulfide	-----	SW-846 7.3.4.2	Cool to 4 deg C	P	14 Days	8 oz.
Semivolatile Organics	-----	8270C	Cool to 4 deg C	G, Amber	14 Days	8 oz.

Table 1

Laboratory Analysis	EPA Method	Standard Method and/or SW846 Method	Preservation	Container	Holding Time	Minimum Volume
Sulfate	-----	9035, 9036, 9038	Cool to 4 deg C	P or G	28 Days	8 oz.
Sulfides	-----	9215	Cool to 4 deg C	P or G	7 Days	8 oz.
TCLP Metals	-----	1311, 6010B, 6020, 7000A, 7470A	Cool to 4 deg C	G, Amber	180 Days (Hg 28 days)	8 oz
TCLP Herbicides	-----	1311	Cool to 4 deg C	G, Amber	14 Days	8 oz.
TCLP Pesticides	-----	1311	Cool to 4 deg C	G, Amber	14 Days	8 oz.
TCLP Semivolatile Organics	-----	1311, 8270C, 8081A, 8151A	Cool to 4 deg C	G, Amber Teflon Lined	14 Days	8 oz.
TCLP Volatile Organics	-----	1311, 8260B	Cool to 4 deg C	G, Amber VOA Vial Teflon Lined	14 Days	8 oz.
Temperature	-----	2550	-----	P	Analyze	4 oz.
TOC	-----	Lloyd Kahn Method	Cool to 4 deg C	G, Amber	14 days	4 oz.
Total Coliform	-----	9131	Cool to 4 deg C	Sterile, P or G	6 Hrs	4 oz.
Total Coliform	-----	9132	Cool to 4 deg C	Sterile, P or G	6 Hrs	4 oz.
Total Cyanide	-----	9013	Cool to 4 deg C	P or G	14 Days	8 oz.
Volatile Organic Compounds	-----	8260B	Cool to 4 deg C Check individual state regulations for proper preservative. NJ (methanol), PA (encore samplers), NY (cool to 4 deg C)	G, wide mouth, teflon liner	14 Days	4 oz.
Volatile Organic Compounds	-----	8021	G, wide mouth, teflon liner	G, wide mouth, teflon liner	14 Days	4 oz.
CLP Sampling and Holding Time Information						
Cyanide (aqueous)	ILM04.1	NaOH to pH>12, Cool to 4 deg C	P		12 Days VTSR	1000ml
Cyanide**	ILM04.1	Cool to 4 deg C	G			8 oz
Mercury (aqueous)	ILM04.1	HNO3 to pH<2, Cool to 4 deg C	P		26 Days VTSR	1000ml
Mercury (solid/soils)	ILM04.1	Cool to 4 deg C	G			8 oz
Metals (aqueous)	ILM04.1	HNO3 to pH<2, Cool to 4 deg C	P		180 Days VTSR	1000ml
Metals (solid/soils)	ILM04.1	Cool to 4 deg C	G			8 oz
PCBs (aqueous)	OLM04.2	Na2S203, Cool to 4 deg C	G		See Note 7	1000ml
PCBs (solid/soils)	OLM04.2	Cool to 4 deg C	G		See Note 6	8 oz
Pesticides (aqueous)	OLM04.2	Na2S203, Cool to 4 deg C	G		See Note 7	1000ml
Pesticides (solid/soils)	OLM04.2	Cool to 4 deg C	G		See Note 6	8 oz
Semivolatile Organic Compounds (aqueous)	OML04.2	Cool to 4 deg C	G		See Note 8	1000ml
Semivolatile Organic Compounds (solid/soils)	OLM04.2	Cool to 4 deg C	G		See Note 6	8 oz
Volatile Organic Compounds (aqueous)	OLM04.2	HCl pH < 2, Cool to 4 deg C	G		W/preservative: 40ml 10 days VTSR; W/O: 7 days VTSR	40ml 10 days VTSR
Volatile Organic Compounds (solid/soils)	OLM04.2	Cool to 4 deg C	G			4 oz

Table 1

Laboratory Analysis	EPA Method	Standard Method and/or SW846 Method	Preservation	Container	Holding Time	Minimum Volume
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Notes:

1. P - Plastic.
2. G - Glass.
3. Minimum volume is the minimum volume required by the laboratory to conduct the analysis. The laboratory will likely require additional sample volume.
4. * Extraction within seven (7) days of collection; analysis within 40 days of extraction.
5. **When chlorine is present ascorbic acid is used to remove the interference (0.6 g ascorbic acid).
6. VTSR - Validated time of sample receipt.
7. Ten (10) days from VTSR for extraction and 40 days following extraction.
8. Five (5) days from VTSR for extraction 14 days after extraction.
9. Five (5) days from VTSR for extraction 40 days after extraction.
10. Holding times are from the time of sample collection unless otherwise noted.

APPENDIX B

Quality Assurance Quality Control Plan

QUALITY ASSURANCE PROJECT PLAN

**Oak Mitsui
Site # 442052
80 First Street
Hoosick Falls, New York**

CHA Project Number: 31861

Prepared for:

*Oak Mitsui
80 First Street
Hoosick Falls, NY*

Prepared by:



*III Winners Circle
Albany, New York 12205
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November 2017

Submission No.	Submission Date	Project Manager Signature	QA Officer Signature

TABLE OF CONTENTS

1.0	Introduction.....	1
1.1	Site Description.....	1
1.2	Scope of Work	2
2.0	Project Organization and Responsibility	2
3.0	Quality Assurance Objectives For Measurement Data.....	6
3.1	Level of QA Effort.....	6
3.2	Accuracy, Precisions and Sensitivity of Analyses	6
3.3	Completeness, Representativeness and Comparability.....	7
3.4	Field Documentation.....	7
4.0	Sampling Procedures	9
5.0	Sample Custody and Document Control.....	13
5.1	Chain-Of-Custody (COC).....	13
5.2	Sample Documentation in the Laboratory	13
5.3	Storage of Samples	13
6.0	Calibration Procedures and Frequency	15
6.1	Instrument Calibration and Tuning.....	15
6.2	Field Instrument Calibration	15
7.0	Data Reduction, Validation, Assessment and Reporting	16
7.1	General.....	16
7.2	Field Data.....	16
7.3	Laboratory Reporting.....	16
7.4	Electronic Data.....	17
7.5	Data Validation	17
8.0	Internal Quality Control Checks and Frequency	18
8.1	Field Quality Control	18
8.2	Laboratory Quality Control.....	18
8.2.1	Blank Samples	18
8.2.2	Matrix Spike/Matrix Spike Duplicates	18
8.2.3	Surrogate Analyses	18
9.0	Procedures Used to Assess Performance	19
9.1	Precision.....	19
9.2	Accuracy	19
9.3	Representativeness, Completeness and Comparability.....	19
9.4	Outliers.....	20
10.0	Quality Assurance Report to Management	21

TABLES

Table 1:	Key Project Personnel.....	5
Table 2:	Analytical Methods/Quality Assurance Summary.....	10

APPENDICES

Appendix A:	CHA Standard Operating Procedures
Appendix B:	CHA Staff Resumes
Appendix C:	Field Calibration Log

LIST OF ACRONYMS & ABBREVIATIONS

AOC	Area of Concern
ASP	Analytical Services Protocol
bgs	Below Ground Surface
CHA	CHA Consulting, Inc.
COC	Chain of Custody
DER	Division of Environmental Remediation
ELAP	Environmental Laboratory Approval Program
FSP	Field Sampling Plan
IRM	Interim Remedial Measure
IRMWP	Interim Remedial Measure Work Plan
MS/MSD	Matrix Spike/Matrix Spike Duplicate
NYCRR	New York Codes, Rules and Regulations
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
QA	Quality Assurance
QAPP	Quality Assurance Project Plan
QC	Quality Control
SCO	Soil Cleanup Objective
SOP	Standard Operating Procedure
SVOC	Semivolatile Organic Compound
TA	Test America Laboratories, Inc.
USEPA	United States Environmental Protection Agency

1.0 INTRODUCTION

This Quality Assurance Project Plan (QAPP) presents the policies, organization, objectives, functional activities and specific Quality Assurance (QA) and Quality Control (QC) activities designed to achieve the specific data quality goals associated with the Interim Remedial Measure (IRM) that will be conducted at the Oak Mitsui Facility in Hoosick Falls, New York. The scope of work associated with the investigation activities and specific areas of concern that will be addressed are summarized in the Interim Remedial Measure Work Plan (IRMWP).

This QAPP has been prepared to identify procedures for sample preparation and handling, sample chain-of-custody, laboratory analyses, and reporting to be implemented during this investigation to ensure the accuracy and integrity of the data generated during the investigation. This QAPP has been prepared in accordance with the New York State Department of Environmental Conservation's (NYSDEC) Department of Remediation (DER-10) Technical Guidance for Site Investigation and Remediation. Field activities will be performed in accordance with CHA Consulting, Inc. (CHA) standard operating procedures (SOPs), included in Appendix A.

1.1 Site Description

The Oak Mitsui Facility (site) is located at 80 First Street in the Village of Hoosick Falls, Rensselaer County, New York. The site is situated on the southern bank of the Hoosick River and is bound to the east by the Pan Am Railroad line and to the south by residences. The site is comprised of three (3) parcels which are zoned Industrial, Commercial-Industrial and Residential. A site location map is provided as Figure 1.

According to Sanborn Fire Insurance maps, the subject site was historically utilized for industrial purposes dating back to the late 1800s. Previous operations included a foundry, a machine shop, paper mill machine manufacturing facility and coal gas manufacturing facility. Oak Mitsui has occupied the site since 1976 and the primary business of Oak Mitsui has been the manufacture of electrodeposited copper foil. All copper foil manufacturing operations in Hoosick Falls occurred at the 80 First Street location.

From 1977 to 2001, the site was used for high volume manufacturing of copper foil and administrative offices. From mid-2001 to 2015, the site was used for administrative offices and other activities as follows:

- From 2005 to 2010, the site was used for pilot scale (research and development) copper foil electroplating. This process utilized some of the copper foil manufacturing equipment still at the site from the high volume manufacturing period.

- From 2003 to 2015, an OMI subsidiary, Oak Mitsui Technologies LLC (OMT) produced FaradFlex products at the 80 First Street site. FaradFlex is produced by using heat & pressure to bond 2 pieces of adhesive coated copper foil to either side an insulating film. The adhesive coated copper foil was purchased from suppliers in Japan & Malaysia. The insulating film was also purchased from overseas suppliers. A large heated hydraulic press was installed along with other sheeting & collating equipment to manufacture this product.

In 2015, the manufacturing operations were moved to Malaysia. Remaining administration staff were moved to leased office space at 8 John Street, Hoosick Falls. Oak Mitsui ceased plant operations and has since been in the process of decommissioning and eventually demolishing the Hoosick Falls facility.

Characterization of the contamination via Phase I and Phase II Subsurface Environmental Investigation indicated widespread metal contamination. No underground storage tanks or other containers (e.g. drums) are known to be present on the site. A complete description of the current information regarding nature and extent of contamination and previous environmental investigations is provided in the IRM Work Plan.

1.2 Scope of Work

This QAPP has been prepared in accordance with NYSDEC DER-10 (May 2010) to outline the procedures and protocols that will be utilized to conduct an IRM that will provide the necessary data to address the environmental conditions associated with the Site. The primary objective of this IRM is to address twelve (12) areas of concern (AOC) where contamination is known to be greater than the industrial soil cleanup objectives (SCOs) identified in Title 6 of the New York Codes, Rules, and Regulations (NYCRR) Part 375.

In general, the IRM program will include the following activities:

- Excavate twelve (12) AOCs to various depths below ground surface (bgs);
- Collection of confirmatory soil samples;
- Collection of soil characterization samples;
- Collection of waste characterization samples;
- Collection of imported fill materials;
- Equipment cleaning; and
- Waste handling.

2.0 PROJECT ORGANIZATION AND RESPONSIBILITY

The IRM activities are being conducted by Oak Mitsui under the supervision of the Oak Mitsui Project Manager, who is the prime contact for communication with the NYSDEC. Engineering oversight and coordination of these activities are to be provided by CHA. The CHA Project Manager is responsible for the delivery of CHA services. Resumes for CHA staff providing environmental services are included in Appendix B.

Oak Mitsui Facility

Larry Vosh – Director of Engineering

- Responsible for the overall engineering program for the Former Oak Mitsui facility.

CHA

Cailyn Locci – CHA Project Manager, Technical Manager/Project Coordinator

- Responsible for following the approved IRMWP, notifying the NYSDEC of any deficiencies, and obtaining approval by the NYSDEC for all modifications to the project;
- Provide overall and day-to-day project management;
- Ensure all resources of CHA are available on an as-required basis;
- Participate in key technical negotiations with the NYSDEC, as necessary;
- Provide managerial guidance to CHA's technical group;
- Evaluate data;
- Prepare and coordinate the issuance of reports;
- Provide immediate supervision of all on-site activities;
- Assist in preparation and review of final report; and
- Provide technical representation for field activities.

Dr. Christopher Burns, PG - CHA QA/QC

- Conduct internal audit of field investigation and sampling;
- Review laboratory activities;
- Determine laboratory data corrective action;
- Review analytical data validation and assessment;
- Review laboratory QA/QC;
- Assist in preparation and review of final report; and,
- Provide technical representation for analytical activities.

John Favreau - Field Oversight and Quality Control Coordinator

- Serve as Field Team Leader;
- Work with field crew to prepare for field activities and conduct investigations; and,
- On-Site to:
 1. Provide oversight and coordination of field activities.
 2. Ensure that required QC procedures are followed for soil boring and monitoring well installation activities, material handling, and sample collection.
 3. Initiate informal and/or formal corrective actions as necessary.
 4. Maintain and report QC records (i.e. chain-of-custody, field equipment calibration, etc.).
 5. Report to the Project Manager.
 6. Provide field management of sample collection and field QA/QC;
 7. Responsible for maintenance of the field equipment; and

-
8. Assist in preparation and review of final report.

Laboratory

Alpha Analytical Inc. is the analytical laboratory chosen to perform the proposed work and is certified by the New York State Department of Health ([NYSDOH](#)) Environmental Laboratory Approval Program (ELAP) Number 11148 to perform the required analyses in accordance with the most recent version of the NYSDEC Analytical Services Protocol (ASP).

Project Manager, Analytical Contractor

- Ensure resources of laboratory are available on an as-required basis;
- Coordinate laboratory analyses;
- Supervise laboratory's in-house chain-of-custody (COC);
- Schedule analyses of samples;
- Oversee review of data;
- Oversee preparation of analytical reports; and,
- Approve final analytical reports prior to submission to CHA.

Quality Assurance/ Quality Control Officer, Analytical Contractor

- Overview laboratory QA/QC;
- Overview QA/QC documentation;
- Conduct detailed data review;
- Decide laboratory corrective actions, if required; and,
- Provide technical representation for laboratory QA/QC procedures.

Sample Custodian, Analytical Contractor

- Receive and inspect the sample containers;
- Record the condition of the sample containers;
- Sign appropriate documents;
- Verify chain-of-custodies and their correctness;
- Notify laboratory project manager and laboratory QA/QC Officer of sample receipt and inspection;
- Assign a unique laboratory identification number correlated to CHA's sample identification number, and enter each into the sample receiving log;
- Initiate transfer of the samples to the appropriate lab sections with assistance from the laboratory project manager; and,
- Control and monitor access to and storage of samples and extracts.

Table 1 below, identifies key personnel assigned to the project and provides contact information.

Table 1: Key Project Personnel

Name	Address	Responsibilities
Larry Vosh Oak Mitsui <i>Oak Mitsui Director of Engineering</i>	80 First St. Hoosick Fall, NY 12090 (518) 260-4028 larry.vosh@oakmitsui.com	Mr. Vosh will represent Oak Mitsui in the review and oversight of the project, participate in citizen participation activities, and serve as the point of contact for Oak Mitsui.
Cailyn Locci CHA <i>Project Manager</i>	III Winners Circle Albany, NY 12205 (518) 453-4733 clocchi@chacompanies.com	Ms. Locci will oversee the project, provide quality control on documents and determinations and mentor the daily task manager.
Dr. Christopher Burns, P.G. CHA <i>Quality Assurance/ Quality Control Officer</i>	9020 Stony Point Parkway Suite 160 Richmond, VA 23235-4700 (804) 897-0954 ext. 248 cburns@chacompanies.com	Dr. Burns will act as CHA's QA/QC Officer, which will include providing an internal audit of field sampling procedures, a review of laboratory activities and QA/QC, assistance in the preparation and review of final reports.
Cailyn Locci CHA <i>Technical Manager/ Project Coordinator</i>	III Winners Circle Albany, NY 12205 (518) 453-4733 clocchi@chacompanies.com	Ms. Locci will provide immediate supervision of all on-site activities, provide field management of sample collection and field QA/QC, assist in preparation and review of final report, and provide technical representation for field activities.
John Favreau CHA <i>Field Leader & Health and Safety Officer</i>	III Winners Circle Albany, NY 12205 (518) 453-8795 jfavreau@chacompanies.com	Mr. Favreau will supervise field investigation activities and will also serve as database manager. Mr. Favreau will serve as the Health and Safety point of contact for CHA staff.
Candace Fox Alpha Analytical, Inc <i>Laboratory Project Manager</i>	275 Cooper Ave Tonawanda, NY 14150 (716) 427-5223 cfox@alphalab.com	Ms. Fox will act as CHA's point of contact with the contracted laboratory.

3.0 QUALITY ASSURANCE OBJECTIVES FOR MEASUREMENT DATA

The overall QA objective is to develop and implement procedures for sample preparation and handling, sample COC, laboratory analyses, and reporting, to provide accurate data. Specific procedures to be followed for sampling, sample custody and document control, calibration, laboratory analyses and data reduction, validation, assessment and reporting are presented in Sections 4.0 through 8.0 of this QAPP.

The purpose of this Section is to define the goals for the level of QA effort; namely, accuracy; precision and sensitivity of analyses; and completeness, representativeness and comparability of measurement data from the analytical laboratories. QA objectives for field measurements are also discussed.

3.1 Level of QA Effort

To assess the quality of data resulting from the field sampling program, field duplicate samples, and samples for laboratory matrix spike/matrix spike duplicate (MS/MSD) analyses will be collected (where appropriate) and submitted to the contract laboratory. CHA SOP#605 will be adhered to for all QAQC procedures.

For field samples collected, field duplicate samples will be submitted at a frequency of one per 20 investigative samples or, in the event that a sampling round consists of less than 20 samples, one field duplicate will be collected. Field duplicate samples for subsurface soil matrices will be collected and analyzed as a check on the aggregate analytical and sampling protocol precision. MS/MSD samples will be analyzed at a minimum frequency of one set per 20 investigative samples. In the event that a sampling event consists of less than 20 samples, one MS/MSD sample will be collected. MS/MSD samples will be analyzed as a check on the analytical method's accuracy and precision.

The sampling and analysis program is summarized in Table 2 and lists the specific parameters to be measured, the number of samples to be collected and the level of QA effort required for each matrix.

3.2 Accuracy, Precision and Sensitivity of Analyses

The fundamental QA objective with respect to the accuracy, precision and sensitivity of analytical data is to achieve the QC acceptance of each analytical protocol. The method(s) precision (relative percent difference of duplicate analysis) will be determined from the duplicate analyses of MS samples. A minimum of one sample will be spiked and analyzed in duplicate. Additional details are provided in CHA SOP#605. Analysis will compare with the criteria presented in the appropriate methods identified in Section 4.0.

The method(s) accuracy (percent recovery) for water and soil samples will be determined by spiking selected samples (matrix spikes) with test compounds. Accuracy will be reported as the percent recovery of the test compound and will compare with the criteria given in the appropriate methods as identified in Section 4.0.

Project-specific accuracy and precision goals are identified in Section 9.0.

3.3 Completeness, Representativeness and Comparability

It is expected that all analyses conducted in accordance with the selected methods will provide data meeting QC acceptance criteria for 80 percent of all samples tested. Any reasons for variances will be documented.

The sampling program has been designed to provide data representative of Site conditions. During development of these networks, consideration was given to location of historic activities, existing data from past studies completed for the Site and the physical Site setting. The extent to which existing and planned analytical data will be comparable depends on the similarity of sampling and analytical methods. The procedures used to obtain the planned analytical data are documented in this QAPP. Comparability of laboratory analyses will be ensured by the use of consistent units. Following completion of data collection, the existing database will be evaluated for representativeness.

3.4 Field Documentation

Pertinent field survey and sampling information shall be recorded in a logbook or on field logs during each day of the field effort per CHA SOP#101 Field Logbook and Photographs.

At a minimum, entries in a logbook shall include:

- Date and time of starting work;
- Names of all personnel at site;
- Weather conditions
- Purpose of proposed work effort;
- Sampling equipment to be used and calibration of equipment;
- Description of work area;
- Location of work area, including map reference;
- Details of work effort, particularly any deviation from the field operations plan or standard operating procedures;
- Field observations;
- Field measurements (e.g., Photoionization Detector (PID) readings);
- Field laboratory analytical results;
- Daily health and safety entries, including levels of protection;
- Type, number, and location of samples;
- Sampling method, particularly deviations from the standard operating procedures;
- Sample location and number; and
- Sample handling, packaging, labeling, and shipping information (including destination).

In addition to keeping logs, photographs will be taken to provide a physical record to augment the fieldworker's written observations. For each photograph taken, several items shall be recorded in the field logbooks:

- Date and time;
- Name of photographer;
- General direction faced and description of the subject

Additional protocols specific to each sampling method are presented in the following sections.

The general QA objective for measurement data is to obtain reproducible and comparable measurements to a degree of accuracy consistent with the use of standardized procedures.

4.0 SAMPLING PROCEDURES

The sampling program to be implemented will include the collection subsurface soil, waste characterization samples, waste water samples and imported backfill material samples. Details regarding specific sampling activities are provided in the IRMWP and the procedures for collecting samples and for performing related field activities are described in detail in the Field Sampling Plan (FSP), included in Appendix A of the IRMWP. The number of samples, analytical methods, sample volumes, preservation techniques and holding times are provided in Table 2, below. CHA SOP#603 procedures will be followed for all QAQC efforts.

Table 2: Analytical Methods/Quality Assurance Summary

Matrix (Sample Type)	Type of Sample	Analysis	Parameter/Fraction	Number of Primary Samples	Number of Duplicates/MS/MSD	Sampling Locations	Minimum Sample Volume/Container	Sample Preservation	Technical Holding Time
Soil	Subsurface Soil	EPA Method 8260C	TCL VOCs	24	2/2/2	SOIL-S103, SOIL-B100, SOIL-S109, SOIL-B102, SOIL-S113, SOIL-B103, SOIL-S117, SOIL-B104, SOIL-S125, SOIL-B106, SOIL-S129, SOIL-B107, SOIL-S133, SOIL-B108, SOIL-S137, SOIL-B109, SOIL-S141, SOIL-B110, SOIL-S145, SOIL-B111, SOIL-S153, SOIL-B115, SOIL-S159, SOIL-B118	4 oz glass wide	Cool to 4°C	14 days
	Subsurface Soil	EPA Method 8270D	TCL SVOCs	24	2/2/2	SOIL-S103, SOIL-B100, SOIL-S109, SOIL-B102, SOIL-S113, SOIL-B103, SOIL-S117, SOIL-B104, SOIL-S125, SOIL-B106, SOIL-S129, SOIL-B107, SOIL-S133, SOIL-B108, SOIL-S137, SOIL-B109, SOIL-S141, SOIL-B110, SOIL-S145, SOIL-B111, SOIL-S153, SOIL-B115, SOIL-S159, SOIL-B118	4 oz glass wide	Cool to 4°C	14 days
	Subsurface Soil	EPA Methods 6010C, 7471B	RCRA8 Metals, Copper	54	3/3/3	SOIL-S100 to SOIL-S102, SOIL-S104 to SOIL-S108, SOIL-B101, SOIL-S110 to SOIL-S112, SOIL-S114 to SOIL-S116, SOIL-S118 to SOIL-S124, SOIL-B105, SOIL-S126 to SOIL-S128, SOIL-S130 to SOIL-S132, SOIL-S134 to SOIL-S136, SOIL-S138 to SOIL-S140, SOIL-S142 to SOIL-S144, SOIL-S146 to SOIL-S152, SOIL-B112 to SOIL-B114, SOIL-S154 to SOIL-S158, SOIL-B116 to SOIL-B117	8 oz glass wide	Cool to 4°C	180 days (28 days for mercury)
	Subsurface Soil	EPA Method 8082A	PCBs	24	2/2/2	SOIL-S103, SOIL-B100, SOIL-S109, SOIL-B102, SOIL-S113, SOIL-B103, SOIL-S117, SOIL-B104, SOIL-S125, SOIL-B106, SOIL-S129, SOIL-B107, SOIL-S133, SOIL-B108, SOIL-S137, SOIL-B109, SOIL-S141, SOIL-B110, SOIL-S145, SOIL-B111, SOIL-S153, SOIL-B115, SOIL-S159, SOIL-B118	4 oz glass wide	Cool to 4°C	14 days
	Subsurface Soil	EPA Method 6010C	TAL Metals	24	2/2/2	SOIL-S103, SOIL-B100, SOIL-S109, SOIL-B102, SOIL-S113, SOIL-B103, SOIL-S117, SOIL-B104, SOIL-S125, SOIL-B106, SOIL-S129, SOIL-B107, SOIL-S133, SOIL-B108, SOIL-S137, SOIL-B109, SOIL-S141, SOIL-B110, SOIL-S145, SOIL-B111, SOIL-S153, SOIL-B115, SOIL-S159, SOIL-B118	8 oz glass wide	Cool to 4°C	180 days
	Subsurface Soil	EPA Method 9012	Total Cyanide	24	2/2/2	SOIL-S103, SOIL-B100, SOIL-S109, SOIL-B102, SOIL-S113, SOIL-B103, SOIL-S117, SOIL-B104, SOIL-S125, SOIL-B106, SOIL-S129, SOIL-B107, SOIL-S133, SOIL-B108, SOIL-S137, SOIL-B109, SOIL-S141, SOIL-B110, SOIL-S145, SOIL-B111, SOIL-S153, SOIL-B115, SOIL-S159, SOIL-B118	4 oz glass wide	Cool to 4°C	14 days
	Subsurface Soil	EPA Method 8081B	Pesticides	24	2/2/2	SOIL-S103, SOIL-B100, SOIL-S109, SOIL-B102, SOIL-S113, SOIL-B103, SOIL-S117, SOIL-B104, SOIL-S125, SOIL-B106, SOIL-S129, SOIL-B107, SOIL-S133, SOIL-B108, SOIL-S137, SOIL-B109, SOIL-S141, SOIL-B110, SOIL-S145, SOIL-B111, SOIL-S153, SOIL-B115, SOIL-S159, SOIL-B118	4 oz glass wide	Cool to 4°C	14 days
	Subsurface Soil	EPA Method 8270	1,4-Dioxane	24	2/2/2	SOIL-S103, SOIL-B100, SOIL-S109, SOIL-B102, SOIL-S113, SOIL-B103, SOIL-S117, SOIL-B104, SOIL-S125, SOIL-B106, SOIL-S129, SOIL-B107, SOIL-S133, SOIL-B108, SOIL-S137, SOIL-B109, SOIL-S141, SOIL-B110, SOIL-S145, SOIL-B111, SOIL-S153, SOIL-B115, SOIL-S159, SOIL-B118	4 oz glass wide	Cool to 4°C	14 days
	Subsurface Soil	EPA Method 537	PFAS	24	2/2/2	SOIL-S103, SOIL-B100, SOIL-S109, SOIL-B102, SOIL-S113, SOIL-B103, SOIL-S117, SOIL-B104, SOIL-S125, SOIL-B106, SOIL-S129, SOIL-B107, SOIL-S133, SOIL-B108, SOIL-S137, SOIL-B109, SOIL-S141, SOIL-B110, SOIL-S145, SOIL-B111, SOIL-S153, SOIL-B115, SOIL-S159, SOIL-B118	250 mL plastic container (3)	1.25 g Trizma, Cool to 4°C	14 days

Matrix (Sample Type)	Type of Sample	Analysis	Parameter/Fraction	Number of Primary Samples	Number of Duplicates/MS/MSD	Sampling Locations	Minimum Sample Volume/Container	Sample Preservation	Technical Holding Time
Waste Characterization Samples	Waste Soil	EPA Method 8260C	TCLP VOCs	5/1	0/0	Soil Stockpiles and Containerized Water	8 oz. amber jar	Cool to 4°C	14 days extract
	Waste Soil	EPA Method 8270D	TCLP SVOCs	5	0/0	Soil Stockpiles	8 oz. amber jar	Cool to 4°C	14 days extract
	Waste Soil	EPA Method 6010C, 7470A	TCLP Metals	5	0/0	Soil Stockpiles	8 oz. amber jar	Cool to 4°C	180 days (6010) 28 days (mercury) 14 days (cyanide)
	Waste Soil	EPA Method 8081B	TCLP Pesticides	5	0/0	Soil Stockpiles	4 oz. amber jar	Cool to 4°C	14 days extract
	Waste Soil	EPA Method 8081B	TCLP Herbicides	5	0/0	Soil Stockpiles	4 oz. amber jar	Cool to 4°C	14 days extract
	Waste Soil	EPA Method 8082	PCBs	5	0/0	Soil Stockpiles	4 oz. amber jar	Cool to 4°C	14 days extract
	Waste Soil	TPH	TPH DRO and GRO	5	0/0	Soil Stockpiles	4 oz. amber jar	Cool to 4°C	14 days extract
	Waste Soil	EPA Method 537	PFAS	5	0/0	Soil Stockpiles	250 mL plastic container (3)	1.25 g Trizma, Cool to 4°C	14 days
	Waste Soil	pH	pH	5	0/0	Soil Stockpiles	4 oz. amber jar	Cool to 4°C	14 days extract
Waste Water Samples	Waste Water	EPA Method 8260C	TCL VOCs	TBD	0/0	Waste Water Collected	40 mL amber VOA	NaSO ₄ , Cool to 4 °C	7 days
	Waste Water	EPA Method 8270D	TCL SVOCs including 1,4-Dioxane	TBD	0/0	Waste Water Collected	1000 mL amber glass	Cool to 4°C	7 days
	Waste Water	EPA Method 8082A	PCBs	TBD	0/0	Waste Water Collected	1000 mL amber glass	Cool to 4°C	7 days
	Waste Water	EPA Method 6010C	TAL Metals	TBD	0/0	Waste Water Collected	500 mL Plastic	HNO ₃ , Cool to 4°C	180 days

Matrix (Sample Type)	Type of Sample	Analysis	Parameter/Fraction	Number of Primary Samples	Number of Duplicates/MS/MSD	Sampling Locations	Minimum Sample Volume/Container	Sample Preservation	Technical Holding Time
	Waste Water	EPA Method 9012	Total Cyanide	TBD	0/0	Waste Water Collected	1000 mL amber glass	Cool to 4°C	7 days
	Waste Water	EPA Method 8081B	Pesticides	TBD	0/0	Waste Water Collected	1000 mL amber glass	Cool to 4°C	7 days
	Waste Water	EPA Method 8051	Herbicides	TBD	0/0	Waste Water Collected	1000 mL amber glass	Cool to 4°C	7 days
	Waste Water	EPA Method 537	PFAS	TBD	0/0	Waste Water Collected	250 mL plastic container (3)	1.25 g Trizma, Cool to 4°C	14 days
	Waste Water	EPA Method 8015C	TPH	TBD	0/0	Waste Water Collected	1000 mL amber glass	Cool to 4°C	7 days
	Waste Water	pH	pH	TBD	0/0	Waste Water Collected	250 mL Plastic	Cool to 4°C	48 hours
Imported Fill Samples	Imported Soil	EPA method 8260C	TCL VOC	14	0/0	Imported Fill	5 grams/40mL Amber VOA	NaSO ₄ , Cool to 4 °C	14 days
	Imported Soil	EPA Method 8270D	TCL SVOC	6	0/0	Imported Fill	4 oz glass wide	Cool to 4°C	14 days
	Imported Soil	EPA Method 8082	Total PCBs	6	0/0	Imported Fill	4 oz glass wide	Cool to 4°C	14 days
	Imported Soil	EPA Method 8081	Pesticides	6	0/0	Imported Fill	4 oz glass wide	Cool to 4°C	14 days
	Imported Soil	EPA Method 6010	TAL Metals	6	0/0	Imported Fill	8 oz glass wide	Cool to 4°C	180 days

5.0 SAMPLE CUSTODY AND DOCUMENT CONTROL

5.1 Chain-Of-Custody (COC)

As per CHA SOP#105, a COC will be maintained to document the transfer of all samples from the field to the laboratory. Each sample container will be properly sealed. Sample container labels will include the sample name, required analysis, and date and time of collection. Sample containers will be taken to the Contract Laboratory courier center at 4°C ($\pm 2^\circ\text{C}$) in sealed coolers.

Each sample cooler will contain an appropriately completed COC form. One copy will be returned to CHA upon receipt of the samples by the laboratory. One copy will be returned to CHA with the data deliverables package.

Upon receipt of the cooler at the laboratory, it will be inspected by the designated sample custodian. The condition of the cooler and sample containers will be noted on the COC record sheet by the sample custodian. The sample custodian will also document the date and time of receipt of the container and sign the form.

If damage or discrepancies are noticed, they will be recorded in the remarks column of the record sheet, and be dated and signed. Any damage or discrepancies will be reported to the lab supervisor who will inform the lab manager, QA Officer and CHA Project Manager.

5.2 Sample Documentation in the Laboratory

Each sample or group of samples shipped to the laboratory for analysis will be given a unique identification number by the laboratory. The laboratory sample custodian will record the client name, number of samples and date of receipt of samples in the Sample Control Log Book.

The Contract Laboratory will be responsible for maintaining analytical log books and laboratory data as well as sample inventory on hand for submittal to CHA on an "as required" basis. Samples will be maintained by the laboratory for a period of 30 days, under the conditions prescribed by the appropriate United States Environmental Protection Agency (USEPA) methods, for additional analyses, if necessary. Raw laboratory data files will be inventoried and maintained by the Contract Laboratory for a period of five years, at which time CHA will advise them as to the need for additional storage.

5.3 Storage of Samples

Evidentiary files for the entire project will be inventoried and maintained by CHA and will consist of the following:

- 1) Project related plans;
- 2) Project log books;
- 3) Field data records;
- 4) Sample identification documents;
- 5) Chain-of-Custody records;

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- 6) Report notes, calculations, etc.;
 - 7) References, literature;
 - 8) Miscellaneous - photos, maps, drawings, etc.; and
 - 9) Copies of all final reports pertaining to the project.

The project file materials will be the responsibility of CHA's Project Manager with respect to document maintenance and management.

6.0 CALIBRATION PROCEDURES AND FREQUENCY

6.1 Instrument Calibration and Tuning

Calibration of instrumentation is required to ensure that the analytical system is operating correctly and functioning at the proper sensitivity to meet established reporting limits. Each instrument is calibrated with standard solutions appropriate to the type of instrument and the linear range established for the analytical method. The frequency of calibration and the concentration of calibration standards is determined by the manufacturer's guidelines, the analytical method, or the requirements of special contracts.

6.2 Field Instrument Calibration

Calibration of the field instruments will be completed prior to each day's use in accordance with the manufacturer's instructions. The field equipment will be maintained, calibrated and operated in a manner consistent with the manufacturer's guidelines and USEPA standard methods. However, since the majority of field measurements will be limited to organic vapor readings (PID readings), the calibration procedures will be conducted at a minimum frequency of once per day. Records of calibration, repair or replacement will be filed and maintained by the Field Team Leader on the log provided in Appendix C.

7.0 DATA REDUCTION, VALIDATION, ASSESSMENT AND REPORTING

7.1 General

The Contract Laboratory will perform analytical data reduction and validation in-house under the direction of the laboratory QA Officer. The laboratory's QA Officer will be responsible for assessing data quality and advising of any data which were rated "preliminary" or "unacceptable" or other qualifications based on the QC criteria outlined in the methods, which would caution the data user of possible unreliability.

Assessment of analytical and field data will include checks for data consistency by looking for comparability of duplicate analyses, laboratory QA procedures, adherence to accuracy and precision criteria, transmittal errors and anomalously high or low parameter values. The results of these data validations will be reported to the project managers, noting any discrepancies and their effect upon acceptability of the data.

7.2 Field Data

Raw data from field measurements and sample collection activities that are used in project reports will be appropriately identified and appended to the report. Where data have been reduced or summarized, the method of reduction will be documented in the report. Field data will be reviewed for anomalously high or low values that may appear to be inconsistent with other data.

Field sampling data will be reviewed by the CHA QA/QC Officer to ensure the following information has been properly documented:

- Sample identification;
- Source;
- Date and time of sampling;
- Sampling equipment;
- Person(s) collecting the sample; and
- Results of field monitoring and/or observations.

In addition, the field sampling data will be evaluated to ensure:

- The use of approved sampling and sample handling procedures;
- Proper packing/shipping procedures were used; and
- Proper COC was maintained.

7.3 Laboratory Reporting

Reporting and deliverables for groundwater and soil samples will be in accordance with NYSDEC July 2005 ASP, Category B. Reports will be received by CHA within 30 days of the last day of sampling. Sample data and its corresponding QA/QC data shall be maintained accessible to CHA either in hard copy or on disk. All other reporting and deliverables (i.e. waste characterization samples) will be in accordance with Standard Laboratory Procedure.

7.4 Electronic Data

The laboratory will also provide the analytical data in an electronic format. The data will be added into the existing database maintained by CHA staff. From there the data can be processed and compared to existing standards using the existing software. An electronic copy of the analytical data in Category B format and in EQuIS format will be provided to NYSDEC.

7.5 Data Validation

A qualified third party will conduct an independent evaluation of the Category B data reduction and reporting by the laboratory. The data validation will be performed in accordance with the following documents: "USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review EPA 540/R-99-008, October 1999" and "USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review EPA 540/R-04-004, October 2004". Data analyzed using methods not covered in these documents will be validated using the general principles used in these documents, and the analytical requirements specified in the methods pertaining to USEPA Region 2 Data Validation.

8.0 INTERNAL QUALITY CONTROL CHECKS AND FREQUENCY

8.1 Field Quality Control

QC procedures for field measurements will be limited to checking the reproducibility of the measurement in the field by obtaining multiple readings and by calibrating the instruments (where appropriate).

QC of field sampling will involve collecting field duplicates with the applicable site activities described in the IRMWP/FSP. Field QC samples are also discussed in Section 4.0.

8.2 Laboratory Quality Control

Specific procedures related to internal laboratory QC samples (namely blanks, MS/MSD, surrogates and QC check samples) are described in the following subsections.

8.2.1 Blank Samples

A reagent blank will be analyzed by the laboratory at a frequency of one blank per 10 analyses, or in the event that an analytical round consists of less than 10 samples, one reagent blank will be analyzed. The reagent blank, an aliquot of analyte-free water or solvent, will be carried through the entire analytical procedure.

8.2.2 Matrix Spike/Matrix Spike Duplicates

An MS/MSD sample will be analyzed at a minimum frequency one sample for every 20 investigative samples that are collected. For sampling events consisting of less than 20 investigative samples, one MS/MSD sample set will be collected. Acceptable criteria and compounds that will be used for matrix spikes are identified in the appropriate methods. Percent spike recoveries will be used to evaluate analytical accuracy while percent relative standard deviation or the relative percent difference (RPD) between matrix spike analyses will be used to assess analytical precision.

8.2.3 Surrogate Analyses

Surrogates are organic compounds which are similar to the analytes of interest, but which are not normally found in environmental samples. Surrogates are added to samples by the laboratory to monitor the effect of the matrix on the accuracy of the analysis. Every blank, standard and environmental sample analyzed by GC or GC/MS, including MS/MSD samples, will be spiked with surrogate compounds prior to sample preparation.

Surrogates will be spiked into samples according to the appropriate analytical methods. Surrogate spike recoveries will be compared with the control limits set by procedures specified in the method (or from laboratory specific control limits) for analytes falling within the quantification limits without dilution. Dilution of samples to bring the analyte concentration into the linear range of calibration may dilute the surrogates out of the quantification limit; assessment of analytical quality in these cases will be based on the quality control embodied in the check and MS/MSD samples.

9.0 PROCEDURES USED TO ASSESS PERFORMANCE

9.1 Precision

Precision will be assessed by comparing the analytical results between duplicate spike analyses. Precision as RPD will be calculated as follows:

$$\text{Precision} = \frac{[D_2 - D_1]}{(D_1 + D_2)/2} \times 100$$

D₁ = matrix spike recovery

D₂ = matrix spike duplicate spike recovery

Acceptance criteria for duplicate soil samples will be $\leq 30\%$ RPD. Acceptance criteria for duplicate water samples will be $\leq 20\%$ RPD between field and laboratory data.

Percent relative standard deviation or the RPD between matrix spike analyses will be used to assess laboratory analytical precision. Acceptable criteria and compounds that will be used are identified in the appropriate EPA methods.

9.2 Accuracy

Accuracy will be assessed by comparing a set of analytical results to the accepted or "true" values that would be expected. In general, MS/MSD and surrogate spike recoveries will be used to assess accuracy. Accuracy as percent recovery will be calculated as follows:

$$\text{Accuracy} = \frac{A-B}{C} \times 100$$

A = The analyte determined experimentally from the spike sample.

B = The background level determined by a separate analysis of the unspiked sample.

C = The amount of spike added.

Percent spike recoveries in MS/MSD and surrogate spike recoveries will be used to evaluate analytical accuracy. Acceptable criteria and compounds that will be used for matrix spikes are identified in the appropriate EPA methods.

The evaluation of accuracy of field measurements will be limited to checking the reproducibility of the measurement in the field by obtaining multiple readings and by calibrating the instruments (where appropriate).

9.3 Representativeness, Completeness and Comparability

Completeness is a measure of the amount of valid data obtained from a measurement system compared with the amount that was expected to be obtained under normal conditions.

To be considered complete, the data set must contain all QC check analyses verifying precision and accuracy for the analytical protocol. In addition, all data are reviewed in terms of stated goals in order to determine if the database is sufficient.

When possible, the percent completeness for each set of samples will be calculated as follows:

$$\text{Completeness} = \frac{\text{valid data obtained}}{\text{total data planned}} \times 100 \text{ percent}$$

A completeness goal of 100 percent has been established for this project. However, if the completeness goal is not met, site decisions may be based on any, or all of, the remaining, validated data. Representativeness will be addressed by collecting the samples as described in this document. Comparability will be addressed by collecting, analyzing, and reporting the data as described in this document.

9.4 Outliers

Procedures discussed previously will be followed for documenting deviations. In the event that a result deviates significantly from method established control limits, this deviation will be noted and its effect on the quality of the remaining data will be assessed and documented.

10.0 QUALITY ASSURANCE REPORT TO MANAGEMENT

The CHA Project Manager will receive reports on the performance of the measurement system and the data quality following each sampling round and at the conclusion of the project.

At a minimum, these reports will include:

- 1) Assessment of measurement quality indicators; (i.e. data accuracy, precision and completeness);
- 2) Results of systems audits; and
- 3) QA problems and recommended solutions.

CHA's QA/QC Officer will be responsible within the organizational structure for preparing these periodic reports. The final report for the project will also include a separate QA section which will summarize data quality information contained in the periodic QA/QC reports to management, and present an overall data assessment and validation in accordance with the data quality objectives outlined in this QAPP.

APPENDIX A

CHA STANDARD OPERATING PROCEDURES



SOP #101

REV. #1

August 18, 2015

Page 1 OF 2

Author: Chris Burns

Reviewer: Seth Fowler

Sandy Warner

FIELD LOGBOOK AND PHOTOGRAPHS

A. PURPOSE/SCOPE:

To produce an accurate and reliable record of all field activities, including field observations, sample collection activities, etc.

All pertinent field survey and sampling information shall be recorded in a logbook or on field logs during each day of the field effort.

In addition to keeping logs, photographs will be taken to provide a physical record to augment the field worker's written observations. They can be valuable to the field team during future inspections, informal meetings, and hearings. Photographs should be taken with a camera-lens system having a perspective similar to that afforded by the naked eye. A photograph must be documented if it is to be a valid representation of an existing situation.

B. EQUIPMENT/MATERIALS:

- Bound Field Book (with waterproof paper) or Field Logs
- Chain-of-Custody, Other Appropriate Forms
- Indelible Ink Pens
- Digital Camera with 50 mm lens or similar.

C. PROCEDURE:

1. At a minimum, entries in a logbook shall include:
 - a. Date and time of starting work
 - b. Names of all personnel at site
 - c. Summary of key conversations with contractors, agency representatives, etc.
 - d. Purpose of proposed work effort
 - e. Sampling equipment to be used
 - f. Field calibration of equipment or documentation of calibration of rented equipment
 - g. Description of work area
 - h. Location of work area, including map reference. Document sample locations with references to fixed landmarks (e.g., 10 feet from southwest corner of building).
 - i. Details of work effort, particularly any deviation from the field operations plan or standard operating procedures
 - j. Field observations and field measurements (e.g., pH)
 - k. Field laboratory analytical results
 - l. Personnel and equipment decontamination procedures
 - m. Daily health and safety entries, including levels of protection
 - n. Type and number of samples



SOP #101
REV. #1
August 18, 2015
Page 2 OF 2
Author: Chris Burns
Reviewer: Seth Fowler
Sandy Warner

FIELD LOGBOOK AND PHOTOGRAPHS

- o. Sampling method, particularly deviations from the standard operating procedures
- p. Sample location and number
- q. Sample handling, packaging, labeling, and shipping information (including destination)
- r. Time of leaving site.

For each photograph taken, several items shall be recorded in the field logbooks:

- a. Date and time – Camera set to record on photo
 - b. Name of photographer
 - c. General direction faced and description of the subject
 - d. Sequential number of the photograph
 - e. Always attempt to include an object in the photograph that helps show scale
 - f. Always try to shoot at approximately 50mm focal length (what human eye sees).
2. Each day's entries will be initialed and dated at the end by the author, and a line will be drawn through the remainder of the page.

D. **QA/QC REQUIREMENTS:**

All entries in the logbook shall be made in indelible ink. All corrections shall consist of single line-out deletions that are initialed.

The field task leader shall be responsible for ensuring that sufficient detail is recorded in the logbooks, and shall review the site logbooks daily.

E. **SPECIAL CONDITIONS:**

Photographs should be downloaded from the camera to the project folder and notes regarding the photographs should accompany the photos. Photographs should be no larger than 2 MB each unless they are being utilized for presentation purposes. CHA has software available to decrease file sizes if necessary.

As noted above, if a bound logbook is not used, then a field observation form must be used and information above should be captured on the form.

F. **REFERENCES:**

None

G. **APPENDICES/FORMS:**

Not Applicable



SOP #105
Revision #01
02/13/2013
Page 1 of 3

Author: Sarah Newell, Mark Corey
Reviewer: Keith Cowan, Sandy Warner

COMPLETING A CHAIN-OF-CUSTODY RECORD

A. PURPOSE/SCOPE:

This protocol provides a standard operating procedure (SOP) for initiating and maintaining a Chain of Custody (COC) document. A COC is a legal document designed to track persons who are responsible for the preparation of the sample container, sample collection, sample delivery, sample storage, and sample analysis. A COC is an appropriate format to record important data associated with each individual sample. In general, a sample requiring a COC will follow a path as follows:

Sample Collector → Sample Courier/Operator → Sample Custodian

Verification of who has possessed the samples and data and where the samples have been is completed when staff follow chain-of-custody procedures.

B. EQUIPMENT/MATERIALS:

- Chain of Custody form
- Ball-point, permanent pens
- Gallon-Sized Ziploc Bag (to keep COC dry)
- Field Logbook
- Custody seals
- Padlock(s) (optional)

C. PROCEDURE:

1. Once a sample has been determined to require a COC, the Sample Collector must initiate the COC. The Sample Collector must fill in the fields provided on the COC. The words “Chain of Custody” must be located in a conspicuous location at the top of the document.
2. The form is generally a three-page carbon copy document, including a white, yellow and pink sheet. While CHA generally uses COCs provided by the applicable laboratory, it is important to ensure that the COC from each lab contains places for all necessary information.
3. The COC at that time should include the fourteen-digit CHA project number and phase, the project name and location.
4. The Client Information Section must be completed. In most cases the “client” will be CHA Consulting, Inc.
5. The first field of information is the Sample Identification or Sample Identification Number. This identification/number must match the identification/number located on the sample container.
6. An information line for the date, time, phone number, printed name of Sample Collector, signature of Sample Collector, organization name (no acronyms), organization’s full mailing address, and sample description must also be included.
7. Sampling personnel should enter the sample number(s) (which should correspond with a unique number on a sample container [SOP #103] if applicable, and parameters to be analyzed. The “Sample ID” must be included and must match the number on the sample.



SOP #105
Revision #01
02/13/2013
Page 1 of 3

Author: Sarah Newell, Mark Corey
Reviewer: Keith Cowan, Sandy Warner

COMPLETING A CHAIN-OF-CUSTODY RECORD

8. Subsequent fields must be provided to allow for documentation of information about any subsequent Sample Couriers/Operators or Sample Custodians. These fields must contain the date, time, phone number, printed name of person taking custody of sample, signature of person taking custody of sample and organization name (no acronyms).
9. Field Information - The COC must contain places to enter the following field information: sample number, sampling date, and type of sample. Other field information may be recorded as specified in the field sampling plan or proposal for the project. It is imperative that there be only one sample with a particular sample number per project/study so as to prevent duplicates in Excel files and EQuIS databases.
10. Laboratory Information - Once the sample is delivered to the lab, the laboratory personnel will sign and date the "received by" line located at the bottom of the COC. Other laboratory information may be recorded as specified in the project/study work plan/proposal.
11. Signatures - The COC must contain places for all people who handle the sample to sign his/her name. This is a record of persons who had custody of the sample during all steps of the process from container preparation, sample collection, sample storage and transport, and sample analysis. There should be signature lines to relinquish custody of the sample and to receive custody of the sample.

D. QA/QC REQUIREMENTS:

The Field Team Leader or senior person on the sampling team will review the completed COC form to verify that all fields are properly completed. For purposes of this SOP, signing the form under Collected/Delivered by is considered evidence that the COC form has been checked for accuracy and completeness.

E. SPECIAL CONDITIONS:

Whenever samples are split with a source or government agency, a separate chain of custody form should be completed for the samples and the relinquisher (sampler) and recipient should sign. If a representative is unavailable or refuses to sign for the samples, this can be noted in the "remarks" area of the form. When appropriate, as in the case where the representative is unavailable, the custody record should contain a statement that the samples were delivered to the designated location at the designated time. A copy of the chain of custody form for split samples must be kept with the project file.

Samples may require short term storage in field locations prior to delivery to the laboratory for analyses. The storage may be in vehicles or lodging locations. The samples must be secured to limit access to them. A locked vehicle is considered controlled access. However, simply a locked lodging room is not secure due to potential custodial access. If an unattended lodging room is used for sample storage, the samples must be further secured. This may entail a padlock on the ice chest, samples in an ice chest secured in an inner bag with a custody seal on it, and/or ice chest taped shut with custody seal on the outside of it.

F. REFERENCES:

Sampling Guidelines and Protocols, NYSDEC, <http://www.dec.ny.gov/regulations/2636.html>
Chain of Custody Protocol is in Appendix 5X.2.



**SOP #105
Revision #01
02/13/2013
Page 1 of 3**

**Author: Sarah Newell, Mark Corey
Reviewer: Keith Cowan, Sandy Warner**

COMPLETING A CHAIN-OF-CUSTODY RECORD

Chain of Custody Procedures for Samples and Data, EPA 50 minute Self Instructional Course:
<http://www.epa.gov/apti/coc>

SOP for Chain of Custody, EPA Region 1:
http://www.epa.gov/region6/qa/qadeftools/mod5_sops/misc_docs/r1_chain-of-custody.pdf

G. APPENDICES/FORMS:

CHA COC Form

END OF SOP
Final Check by C. Burns 10/7/15

SAMPLE CONTAINERS, VOLUMES, PRESERVATIONS AND HOLDING TIMES

A. PURPOSE/SCOPE:

The following standard operating procedure (SOP) presents general guidelines for sample containers, volumes, preservations and holding times associated with air, water and soil/sediment samples. Field personnel are responsible for ensuring that state-specific standards/guidelines/regulations are followed, where applicable.

Improper preserving, storing and handling of air, water and soil/sediment samples are critical if the integrity of the samples are to be maintained. Samples collected in the field may undergo biological, chemical or physical changes following removal from their environment. In order to minimize those changes, many samples must have preservatives in the form of strong acids or bases added prior to delivery to the laboratory. If samples are to be collected as part of a government program, the governing agency typically must be notified 30 days prior to sample collection.

B. EQUIPMENT/MATERIALS:

Pre-cleaned sample containers along with associated preservations within the sample containers will be provided to CHA from the analytical laboratory. The field geologist/engineer will provide the necessary personal protective equipment to place samples collected within the appropriate sample containers per SOPs 300 through 417. However, if field preservation is required the following equipment and materials shall be obtained:

- Hydrochloric (HCl) Acid Reagent A.S.C. 38%
- Nitric (HNO₃) Acid Reagent A.S.C. 71%
- Sodium Hydroxide (NaOH) 97%
- 10 mL glass pipettes
- Narrow range (0-3 and 12-14) pH paper
- Nitrile gloves

C. PROCEDURE:

1. Review Table 1 which details typical parameters of interest at environmental sites and the associated methods, preservation, container type, holding time and required sample volume.
2. Obtain pre-cleaned and pre-preserved sample containers from the laboratory. If pre-preserved sample containers were provided skip to Step 7; if not proceed to Step 3.
3. Put on a clean pair of nitrile gloves.
4. In a clean, non-dusty environment, remove the cap of the sample container.
5. Using a clean, 10 mL glass pipette draw the required amount of acid or base and insert into the sample container.
6. Volatile Organic Compounds – 2 mL of HCl acid (water samples).
7. Total and Dissolved Metals (including mercury) – 5 mL Nitric acid (water samples).
8. Cyanide – 15-20 Sodium Hydroxide pellets (water samples).

SAMPLE CONTAINERS, VOLUMES, PRESERVATIONS AND HOLDING TIMES

9. Chemical Oxygen Demand, Oil and Grease, Organic Carbon, Phenolics, Total Dissolved Phosphorous, Hydrolyzable Phosphorus, Ammonia, Nitrate and Nitrite – 5 mL Sulfuric acid (water samples).
10. Immediately replace and tighten the sample container cap.
11. Collect sample using equipment and procedures outlined in other SOPs as appropriate. The volume of the sample collected shall be sufficient to conduct the analysis required, as well as associated quality assurance/quality control samples (QA/QC). QA/QC samples shall be collected in accordance with SOP 605.
12. Place samples immediately in the pre-preserved sample containers.
13. Chill all samples to 4°C from sample collection until laboratory analysis.
14. Package and ship samples per SOP #607.

D. **QA/QC REQUIREMENTS:**

This section includes QA/QC requirements associated with sample containers, volumes, preservations, and holding times. The following general requirements apply to this SOP:

1. All data must be documented on field data sheets or within site logbooks.
2. All instrumentation must be operated in accordance with operating instructions as supplied by the manufacturer, unless otherwise specified in the work plan.
3. Equipment checkout and calibration activities must occur prior to sampling/operation, and must be documented.
4. QA/QC samples shall be collected in accordance with SOP 605.

The following procedure shall be conducted to provide a QA/QC check of water (aqueous) samples to ensure the samples were preserved to the proper pH prior to shipping for laboratory analysis.

Volatile Organic Compounds:

1. Collect one additional VOA vial at every third aqueous sampling location.
2. Fill the extra vial with the sample.
3. Using the extra VOA vial, remove the cap and using a clean, 10 mL glass pipette extract approximately 1 mL of water.
4. Place two drops of the water on a 1-inch strip of 0-3 range pH paper.
5. Compare pH strip's color while wet with that of the color key included on the pH paper container.
6. If pH is not less than 2, add additional HCL to the remaining 3 VOA vials prior to collecting the sample.
7. Discard the vial used to check the pH.

SAMPLE CONTAINERS, VOLUMES, PRESERVATIONS AND HOLDING TIMES

Total and Dissolved Metals, Mercury, Ammonia, Nitrate plus Nitrite, Total Dissolved Phosphorus, COD, Oil & Grease, Organic Carbon, Phenolics

1. Collect sample and tightly reseal the cap.
2. Agitate the sample by gently shaking the sample bottle to mix the acid and water.
3. Remove the cap and using a clean, 10 mL glass pipette extract approximately 1 mL of sample.
4. Place approximately two drops of sample on a 1 inch strip of 0-3 range pH paper.
5. Compare pH strip's color while wet with that of the color key included on the pH paper container.
6. If pH is not less than 2, add appropriate additional Sulfuric Acid to the sample using a clean pipette.
7. Recheck sample using steps 2 through 6 until sample pH is less than 2.

Cyanide

1. Collect sample and tightly reseal the cap.
2. Agitate the sample by gently shaking the sample bottle until the NaOH pellets are dissolved.
3. Remove the cap and using a clean 10 mL glass pipette extract approximately 1 mL of sample.
4. Place approximately two drops of sample on a 1-inch strip of 12-14 range pH paper.
5. Compare pH strip's color while wet with that of the color key included on the pH paper container.
6. If pH is not greater than 12, add additional NaOH to the sample using standard procedures.
7. Recheck sample using steps 2 through 6 until sample pH is greater than 12.

E. SPECIAL CONDITIONS:

Not Applicable

F. REFERENCES:

Alpha Analytical Aqueous and Soil/Solid Reference Guides.

G. APPENDICES/FORMS:

Table 1 Laboratory Analysis: Summarizing parameters, methods, preservations, container type, holding times and minimum sample volumes are included as an attachment to this SOP.

END OF SOP

Final Check by C. Burns 10/27/15

Table 1

Laboratory Analysis	EPA Method	Standard Method and/or SW846 Method	Preservation	Container	Holding Time	Minimum Volume
WATER						
Acid Soluble & Insoluble Sulfide	-----	9030B	Cool to 4 deg C No Headspace	P or G	7 Days	8 oz.
Acidity as CaCO ₃	305.1	2310B	Cool to 4 deg C	P or G	14 Days	100 mL
Alkalinity	-----	2320B	Cool to 4 deg C	P or G	14 Days	100 mL
Alkalinity as CaCO ₃	310.1	2320B	Cool to 4 deg C	P or G	14 Days	100 mL
Ammonia	350.2 / 3	4500-NH ₃ B,E	Cool to 4 deg C, H ₂ SO ₄ to pH<2	P or G	28 Days	400 mL
Aromatic Hydrocarbons	602	8021B	1:1 HCl to pH <2, Cool to 4 deg C 0.008% Na ₂ S ₂ O ₃ if residual chlorine present	G, Vial screw cap with center hole Teflon-faced silicone septum	14 Days	40 mL
Biochemical Oxygen Demand	405.1	5210B	Cool to 4 deg C	P or G	48 Hrs.	500 mL
Bromide	300	-----	None	P or G	28 Days	250 mL
Calcium	-----	3120B	HNO ₃ to pH<2	P or G	6 Months	100 mL
Calcium-Hardness	200.7	3111B	HNO ₃ to pH<2	P or G	6 Months	100 mL
Carbamates	531.1	-----	Cool to 4 deg C, 0.08% Na ₂ S ₂ O ₃ if residual chlorine present	G, screw cap Teflon faced silicone septum	14 Days	100 mL
Carbonaceous BOD	-----	5210B	Cool to 4 deg C	P or G	48 Hrs.	1000 mL
Chloride	300	4500-CLD 4110	Cool to 4 deg C	P or G	28 Days	100 mL
Chloride, Residual Disinfectant	-----	4500Cl-G	Cool to 4 deg C	P or G	Analyze Immediately	200 mL
COD	410.4	5220D	H ₂ SO ₄ to pH<2, Cool to 4 deg C	P	28 days	250 mL
Color	-----	2120B	Cool to 4 deg C	P or G	24 Hrs	100 mL
Conductivity	-----	2510B	Cool to 4 deg C	P or G	28 Days	100 mL
Cyanide	335.4	4500-CN C&E	Cool to 4 deg C, NaOH pH>12	P or G	14 Days	250 mL
Cyanide	335.2	9010B, 9012A, 9014	Cool to 4 deg C, NaOH to pH>12 0.6 g ascorbic acid if residual chlorine present	P or G	Sulfide absent, 14 days; sulfide present 24 Hrs	250 mL
Dioxin	-----	8280A	Cool to 4 deg C 0.008% Na ₂ S ₂ O ₃ if residual chlorine present	G, Amber Teflon-lined screw cap	7 days until extraction 40 days after extraction	1000 mL
DRO	-----	8015B	Cool to 4 deg C 0.008% Na ₂ S ₂ O ₃ if residual chlorine present	G, Amber Teflon-lined screw cap	7 days until extraction 40 days after extraction	1000 mL
Escherichia Coli	-----	9222B	0.008% Na ₂ S ₂ O ₃ if residual chlorine present 0.3 mL/125 mL 15% EDTA if > 0.01 mg/L heavy metals	Sterile P or G	30 Hrs. for Drinking Water 6 Hrs. for Waste Water	125 mL
Extractable Org. Compounds			Cool to 4 deg C, Store in dark	G, Amber Teflon-lined screw cap	* 7 days	4000 mL

Table 1

Laboratory Analysis	EPA Method	Standard Method and/or SW846 Method	Preservation	Container	Holding Time	Minimum Volume
Fecal Coliform	-----	9222B or D	0.008% Na2S2O3 if residual chlorine present 0.3 mL/125 mL 15% EDTA if > 0.01 mg/L heavy metals	Sterile P or G	30 Hrs. for Drinking Water 6 Hrs. for Waste Water	125 mL
Fecal Streptococci	-----	9230C	Cool to 4 deg C 0.008% Na2S2O3 if residual chlorine present	Sterile P or G	30 Hrs. for Drinking Water 6 Hrs. for Waste Water	125 mL
Fluoride	300	4500 F-B,C S	Cool to 4 deg C	P or G	28 Days	300 mL
Foaming Agents (MBAS)	-----	5540C	Cool to 4 deg C	P or G	48 Hrs	250 mL
Gases	-----	3810	Cool to 4 deg C 0.008% Na2S2O3 if residual chlorine present 1:1 HCl to pH <2	G, Vial screw cap with center hole Teflon-faced silicone septum	7 days without HCl 14 days with HCl	40 mL
GRO	-----	8015B	1:1 HCl to pH <2, Cool to 4 deg C 0.008% Na2S2O3 if residual chlorine present	G, Vial screw cap with center hole Teflon-faced silicone septum	7 days w/o HCl 14 days w/HCl	40 mL
Hardness	-----	9215B	HNO3 to pH<2	P	6 months	1000 mL
Heterotrophic Plate Count	-----	3500Cr-D	Cool to 4 deg C 0.008% Na2S2O3 if residual chlorine present	Sterile P or G	30 Hrs. for Drinking Water 6 Hrs. for Waste Water	125 mL
Hexavalent Chromium	7196A	8330	Cool to 4 deg C	P	24 hours	500 mL
HPLC (Explosive)	-----	8310	Cool to 4 deg C	G, Amber Teflon-lined screw cap	7 days until extraction 40 days after extraction	1000mL
HPLC (Explosive)	-----	7470A	Cool to 4 deg C	P or G	28 Days	8 oz.
Mercury Metals	200.7	-----	HNO3 to pH<2	P	6 Months	100 mL
Nitrate	300	-----	Cool to 4 deg C	P or G	48 Hrs.	100 mL
Nitrate (Chlorinated)	353.2	4500-NO3 F	Cool to 4 deg C	P or G	48 Hrs	250 mL
Nitrate (Non-chlorinated)	353.2	4500-NO3 F	H2SO4 to pH<2, Cool to 4 deg C	P or G	14 Days	250 mL
Nitrite	300	4500-NO3 D	Cool to 4 deg C	P or G	48 Hrs	100 mL
Odor	-----	2150B	Cool to 4 deg C	G only	24 Hrs	200 mL
Oil and Grease	1664	-----	HCl to pH<2, Cool to 4 deg C	G, Amber Teflon-lined screw cap	28 days	1000 mL
Organic Nitrogen	351.1	-----	Cool to 4 deg C, H2SO4 to pH<2	G	28 Days	500 mL

Table 1

Laboratory/Analysis	EPA Method	Standard Method and/or SW846 Method	Preservation	Container	Holding Time	Minimum Volume
Organochlorine Pesticides/PCB	608	8081A,8082	Cool to 4 deg C 0.008% Na2S2O3 if residual chlorine present. If aldrin is to be determined bind to pH 5-9.	G, Amber Teflon-lined screw cap	7 days until extraction 40 days after extraction	1000 mL
Ortho Phosphate	300	4500 P-E	Cool to 4 deg C	P or G	48 Hrs.	50 mL
Orthophosphate	365.2	----	Filter immediately. Cool to 4 deg C	P or G	48 Hrs.	50 mL
pH, Hydrogen ion	-----	4500-H-B	Cool to 4 deg C	P or G	Analyze Immediately	25 mL
Phenols	420.1	9065, 510ABC	Cool to 4 deg C, H2SO4 to pH<2	G	28 Days	500 mL
Pseudomonas Aeruginosa	-----	9213E	Cool to 4 deg C 0.008% Na2S2O3 if residual chlorine present	Sterile P or G	30 Hrs. for Drinking Water 6 Hrs. for Waste Water	125 mL
Purgeable Halocarbons	601	8021B	Cool to 4 deg C 0.008% Na2S2O3 if residual chlorine present	G, Vial screw cap with center hole Teflon-faced silicone septum	14 Days	40 mL
Radiological	-----	-----	HNO3 to pH<2	P or G	6 Months	100 mL
Residue- Settleable (SS)	160.5	-----	Cool to 4 deg C	P or G	48 Hrs.	1000 mL
Residue-filtered (TDS)	160.1	-----	Cool to 4 deg C	P or G	7 Days	100 mL
Residue-non- filtered (TSS)	160.2	-----	Cool to 4 deg C	P or G	7 Days	100 mL
Residue-Total Volatile Solids	160.4	2540 E	Cool to 4 deg C	P or G	7 Days	100 mL
Salinity	-----	2520 C	Cool to 4 deg C	G	28 Days	100 mL
Semivolatile Organic Compounds (Unregulated)	525.2	-----	If residual chlorine is present, add 40-50 mg Sodium Thiosulfate. If not chlorinated, add 6N HCl to pH<2	G, Amber Teflon-lined screw cap	7 Days for extraction, 30 after extraction	1000 mL
Semivolatile Organics	625	8270C	Cool to 4 deg C 0.008% Na2S2O3 if residual chlorine present	G, Amber Teflon-lined screw cap	7 days for extraction 40 days after extraction	1000 mL
Silica	200.7	----	Cool to 4 deg C	P only	7 Days	50 mL
Specific Conductance	120.1	----	Cool to 4 deg C	P or G	28 Days	100 mL
Sulfate	300	4500-SO4	Cool to 4 deg C	P or G	28 Days	50 mL
Sulfate	375.4	----	Cool to 4 deg C	P or G	28 Days	50 mL
Sulfide	376.2	9030 B, 4500S2-AD	Cool to 4 deg C, add zinc plus NaOH to pH>9	P or G	7 Days	50 mL
Sulfite (SO3)	377.1	----	None Required	G, Bottle and Top	Analyze Immediately	50 mL
Surfactants (MBAS)	425.1	----	Cool to 4 deg C	P or G	48 Hrs.	250 mL

Table 1

Laboratory Analysis	EPA Method	Standard Method and/or SW846 Method	Preservation	Container	Holding Time	Minimum Volume
TDS	2550B	Cool to 4 deg C	P	7 days	500 mL	
Temperature	170.1	None Required	P or G	Analyze Immediately	1000 mL	
Total Kjeldahl Nitrogen	353.3 / 1 4500Norg-C	H2SO4 to pH<2 , Cool to 4 deg C 0.008% Na2S2O3 if residual chlorine present 0.3 mL/125 mL 15% EDTA if > 0.01 mg/L heavy metals	G, Bottle and Top P or G	Analyze Immediately	1000 mL	
Total Coliform	9221D			28 days 30 Hrs. for Drinking Water 6 Hrs. for Waste Water	250 mL 125 mL	
Total Dissolved Solids	160.1 2540C	Cool to 4 deg C	P or G	7 Days	100 mL	
Total Hardness	130.2 , 200.7	HNO3 to pH<2 H2SO4 to pH<2	P or G	6 Months	100 mL	
Total Kjeldahl Nitrogen	351.3	H2SO4 to pH<2	P or G	28 Days	500 mL	
Total Metals	200.7 6010B, 6020, 7000A 200.8	HNO3 to pH<2	P	6 months (Hg 28 days)	500 mL	
Total Organic Carbon (TOC)	415.1 9060, 5310C	H2SO4 to pH<2, Cool to 4 deg C	G, Amber Teflon-lined screw cap	28 days	80 mL	
Total Organic Halides	5320B	1N H2SO4 to pH<2	P or G	28 Days	50 mL	
Total Phosphorus	365.2	Cool to 4 deg C, H2SO4 to pH<2	G	28 Days	50 mL	
Total Recoverable Oil & Grease	413.1, 166 4A	Cool to 4 deg C, HCl or H2SO4 to pH<2	G	Petroleum Based 3 Days; Non-Petroleum Based 24 hours	1000 mL	
Total Residue (TS)	160.3 2540B 180.1 2130B	Cool to 4 deg C Cool to 4 deg C	P or G P or G	7 Days 48 Hrs	100 mL 100 mL	
Volatile Organics	624 8260B	1:1 HCl to pH <2, Cool to 4 deg C 0.008% Na2S2O3 if residual chlorine present	G, Vial screw cap with center hole Teflon-faced silicone septum	7 days w/o HCl 14 days w/HCl	40 mL	
Volatiles (Regulated)	524.2	Cool to 4 deg C HCl to pH<2	G, Vial screw cap with center hole Teflon-faced silicone septum	14 Days	60-120 mL	
SOIL						
Acid Soluble & Insoluble Sulfide	9030B	Cool to 4 deg C, no headspace	P or G	7 Days	8 oz.	
Amenable Cyanide	9213	Cool to 4 deg C	P or G	14 Days	4 oz.	
Bromide	9211	Cool to 4 deg C	P or G	28 Days	8 oz.	
Cation - Exchange Capacity	9080, 9081	None	P	-----	8 oz.	
Chloride	9212, 9056, 9253	None	P or G	28 Days	8 oz.	
Chlorinated Herbicides	8151A	Cool to 4 deg C	G, wide mouth, teflon liner	14 Days	8 oz.	
Corrosivity pH Wastes>20% water	9040B	Cool to 4 deg C	P	Analyze Immediately	4 oz.	

Table 1

Laboratory Analysis	EPA Method	Standard Method and/or SW846 Method	Preservation	Container	Holding Time	Minimum Volume
Corrosivity Toward Steel	-----	11100	Cool to 4 deg C	P	14 Days	4 oz.
Cyanide	-----	9010B, 4500CN	Cool to 4 deg C	G, Amber	14 Days	4 oz
Dioxin	8280A	8280A	Cool to 4 deg C	G	14 Days	8 oz.
DRO	-----	8015B	Cool to 4 deg C	G, Amber	14 Days	4 oz.
Extractable Organic Compounds	-----	-----	Cool to 4 deg C, Store in dark	G	14 days	8 oz
Extractable Sulfide	-----	9031	Cool to 4 deg C, fill top of sample with 2N Zinc Acetate until moistened	P or G	7 Days	8 oz.
Fluoride	-----	9214	None	P	28 Days	8 oz.
Gases	-----	3810	Cool to 4 deg C	G, Amber	14 Days	8 oz.
Grain Size	-----	-----	N/A	G	N/A	8 oz
GRO	-----	8015B	Cool to 4 deg C, check state regulations for proper preservative. NJ (methanol), PA (encore samplers) NY (cool to 4 deg C).	G, Amber VOA via	14 Days	15 Grams
HPLC (PAH)	-----	8310	Cool to 4 deg C	G, Amber Teflon-lined screw cap	14 days until extraction 40 days after extraction	4 oz.
Ignitability	-----	1010	None	P or G	None	8 oz.
Ignitability of Solids	-----	1030	None	P or G	None	8 oz.
Mercury	245.1	7471A	Cool to 4 deg C	G, Amber	28 Days	4 oz.
Metals	-----	6010B, 6020, 7000A	Cool to 4 deg C	G, Amber	6 Months	8 oz.
Moisture Content	-----	-----	Store in airtight jar 3-30 deg C	G	N/A	8 oz
Nitrate	-----	9210	Cool to 4 deg C	P or G	48 Hrs	8 oz.
Oil & Grease (Sludge, Sludge- Hem)	-----	9071B	Cool to 4 deg C	G	28 Days	8 oz.
Organochlorine	-----	8081A	Cool to 4 deg C	P or G	14 Days	8 oz.
Paint Filter Liquids Test	-----	9095A	Cool to 4 deg C	P or G	-----	8 oz.
PCBs	-----	8082	Cool to 4 deg C	G, Amber Teflon-lined screw cap	14 Days	4 oz.
pH	-----	9045C	Cool to 4 deg C	G, Amber	Analyze	4 oz.
pH, Soil and Waste	-----	9045A	Cool to 4 deg C	G	Immediately Analyze	8 oz.
Phenol	-----	9065, 9066, 9067	Cool to 4 deg C	G, Amber	Immediately	
Radiological	-----	-----	Cool to 4 deg C	G	28 Days	4 oz.
Reactivity Cyanide	-----	SW-846 7.3.3.2	Cool to 4 deg C	P	6 Months	8 oz.
Reactivity Sulfide	-----	SW-846 7.3.4.2	Cool to 4 deg C	P	14 Days	8 oz.
Semivolatile Organics	-----	8270C	Cool to 4 deg C	G, Amber	14 Days	8 oz.

Table 1

Laboratory Analysis	EPA Method	Standard Method and/or SW846 Method	Preservation	Container	Holding Time	Minimum Volume
Sulfate	-----	9035, 9036, 9038	Cool to 4 deg C	P or G	28 Days	8 oz.
Sulfides	-----	9215	Cool to 4 deg C	P or G	7 Days	8 oz.
TCLP Metals	-----	1311, 6010B, 6020, 7000A, 7470A	Cool to 4 deg C	G, Amber	180 Days (Hg 28 days)	8 oz
TCLP Herbicides	-----	1311	Cool to 4 deg C	G, Amber	14 Days	8 oz.
TCLP Pesticides	-----	1311	Cool to 4 deg C	G, Amber	14 Days	8 oz.
TCLP Semivolatile Organics	-----	1311, 8270C, 8081A, 8151A	Cool to 4 deg C	G, Amber Teflon Lined	14 Days	8 oz.
TCLP Volatile Organics	-----	1311, 8260B	Cool to 4 deg C	G, Amber VOA Vial Teflon Lined	14 Days	8 oz.
Temperature	-----	2550	-----	P	Analyze	4 oz.
TOC	-----	Lloyd Kahn Method	Cool to 4 deg C	G, Amber	14 days	4 oz.
Total Coliform	-----	9131	Cool to 4 deg C	Sterile, P or G	6 Hrs	4 oz.
Total Coliform	-----	9132	Cool to 4 deg C	Sterile, P or G	6 Hrs	4 oz.
Total Cyanide	-----	9013	Cool to 4 deg C	P or G	14 Days	8 oz.
Volatile Organic Compounds	-----	8260B	Cool to 4 deg C Check individual state regulations for proper preservative. NJ (methanol), PA (encore samplers), NY (cool to 4 deg C)	G, wide mouth, teflon liner	14 Days	4 oz.
Volatile Organic Compounds	-----	8021	G, wide mouth, teflon liner	G, wide mouth, teflon liner	14 Days	4 oz.
CLP Sampling and Holding Time Information						
Cyanide (aqueous)	ILM04.1	NaOH to pH>12, Cool to 4 deg C	P		12 Days VTSR	1000ml
Cyanide**	ILM04.1	Cool to 4 deg C	G			8 oz
Mercury (aqueous)	ILM04.1	HNO3 to pH<2, Cool to 4 deg C	P		26 Days VTSR	1000ml
Mercury (solid/soils)	ILM04.1	Cool to 4 deg C	G			8 oz
Metals (aqueous)	ILM04.1	HNO3 to pH<2, Cool to 4 deg C	P		180 Days VTSR	1000ml
Metals (solid/soils)	ILM04.1	Cool to 4 deg C	G			8 oz
PCBs (aqueous)	OLM04.2	Na2S203, Cool to 4 deg C	G		See Note 7	1000ml
PCBs (solid/soils)	OLM04.2	Cool to 4 deg C	G		See Note 6	8 oz
Pesticides (aqueous)	OLM04.2	Na2S203, Cool to 4 deg C	G		See Note 7	1000ml
Pesticides (solid/soils)	OLM04.2	Cool to 4 deg C	G		See Note 6	8 oz
Semivolatile Organic Compounds (aqueous)	OML04.2	Cool to 4 deg C	G		See Note 8	1000ml
Semivolatile Organic Compounds (solid/soils)	OLM04.2	Cool to 4 deg C	G		See Note 6	8 oz
Volatile Organic Compounds (aqueous)	OLM04.2	HCl pH < 2, Cool to 4 deg C	G		W/preservative: 40ml 10 days VTSR; W/O: 7 days VTSR	40ml 10 days VTSR
Volatile Organic Compounds (solid/soils)	OLM04.2	Cool to 4 deg C	G			4 oz

Table 1

Laboratory Analysis	EPA Method	Standard Method and/or SW846 Method	Preservation	Container	Holding Time	Minimum Volume
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Notes:

1. P - Plastic.
2. G - Glass.
3. Minimum volume is the minimum volume required by the laboratory to conduct the analysis. The laboratory will likely require additional sample volume.
4. * Extraction within seven (7) days of collection; analysis within 40 days of extraction.
5. **When chlorine is present ascorbic acid is used to remove the interference (0.6 g ascorbic acid).
6. VTSR - Validated time of sample receipt.
7. Ten (10) days from VTSR for extraction and 40 days following extraction.
8. Five (5) days from VTSR for extraction 14 days after extraction.
9. Five (5) days from VTSR for extraction 40 days after extraction.
10. Holding times are from the time of sample collection unless otherwise noted.

QUALITY ASSURANCE/QUALITY CONTROL SAMPLES

A. PURPOSE/SCOPE:

This standard operating procedure explains the purpose and correct usage of Quality Assurance/Quality Control (QA/QC) samples. QA/QC samples are intended to validate the results of sample analysis by providing the means to determine the influence of outside factors on the sample and analysis. There are several types of QA/QC samples in use to ensure the best practices are being followed by both the laboratory performing the analysis and the sampling team in the field. This is a general procedure for the use of QA/QC samples. Also refer to any guidelines provided by the laboratory.

B. EQUIPMENT/MATERIALS:

QA/QC samples require the following materials:

- Sample containers:
They should be the same containers in number and type of preservative as the containers for the samples for which QA/QC samples are being taken.
- Analyte-free water
- Any laboratory supplied QA/QC materials.

C. PROCEDURE:

The following are types of QA/QC samples.

1. Duplicate Sample

A duplicate sample is a sample that is collected concurrently with the routine samples. It consists of an additional set of sample containers to be analyzed for the same parameters as the routine samples. It is taken at a sample point of the samplers choosing and at the same time as the routine sample for that sample point is taken. It is labeled and included on the Chain of Custody (COC) Form (see SOP 105) with a name unknown to the laboratory.

Example:

- Sample Point ID is **MW-1**
- Duplicate Sample ID is **CHA-1**

The duplicate sample is submitted as a ‘blind’ sample to the laboratory. The purpose of a duplicate sample is to allow the sampler to determine the precision of laboratory analysis. The results of the duplicate sample are compared with the results of the concurrent routine sample by the sampler. These results should be within the margin of error for the test being performed.

One duplicate sample should be taken for every twenty (20) routine samples. For example if 16 samples points were sampled, there would be 1 duplicate sample taken at one of the sample points for a total of 17 sample sets submitted to the lab.

2. Field Blank

The Field Blank sample is a type of QA/QC sample used to account for possible external contamination of the routine samples, usually by exposure to the air from being on site. It consists of an additional set of sample containers to be analyzed for the same parameters as the routine samples. It is common to only conduct a Field Blank for volatile organic compound (VOC) parameters even when sampling

QUALITY ASSURANCE/QUALITY CONTROL SAMPLES

to additional parameters. This is because VOCs are more likely to be present in the atmosphere at the site than a parameter like metals. However a Field Blank can be conducted for any parameter.

The containers are prepared prior to sampling by filling the containers with analyte-free water. The containers are then transported with the routine sample containers to the site. Once at the site the containers are placed in a location representative of the site conditions and their caps are removed. At the end of the sampling event the caps are then replaced. The sample is labeled and included on the COC as **Field Blank** or **FB**.

If any results are positive for the Field Blank it can be assumed that the routine samples have also been exposed to a similar amount of contaminant and that contaminant is probably present in the atmosphere at the site.

One Field Blank should be taken as required for each day of sampling at the site. They are only used for the collection of aqueous samples.

3. Equipment Blank

An Equipment Blank is a QA/QC sample designed to measure the effectiveness of the decontamination of field equipment. It consists of an additional set of sample containers being analyzed for the same parameters as the routine samples.

An Equipment Blank is collected by pouring analyte-free water directly over/on/into the decontaminated sampling equipment coming into contact with the samples being collected. The water is then collected in the sample containers. Once the containers are filled they are capped and sent to the lab with the other routine samples. The sample is labeled and included on the COC as **Equipment Blank** or **EQ Blank**.

A positive result for the analysis of the Equipment Blank could signal inadequate decontamination of the equipment which may result in cross-contaminated samples and thus suspect results.

One Equipment Blank should be taken for every twenty (20) routine samples collected. The Equipment Blank is not necessary when using dedicated sampling equipment or sampling equipment that is disposed of between each sample point.

4. Matrix Spike/Matrix Spike Duplicate Sample

The Matrix Spike/Matrix Spike Duplicate (MS/MSD) Sample is a quality control system used by the laboratory to check the accuracy of their instruments. It consists of a set of two (2) samples taken at a sample point concurrently with the routine sample for a total of three (3) sets of containers for that sample point. Therefore, the MS/MSD samples should be collected from sample points with sufficient sample volume (e.g., monitoring wells that have low recharge are not good candidates). They are labeled and included on the COC as 'Sample ID' MS and 'Sample ID MSD'.

Example:

- Sample Point ID is **MW-1**
- Matrix Spike would be **MW-1 MS**
- Matrix Spike Duplicate would be **MW-1 MSD**

QUALITY ASSURANCE/QUALITY CONTROL SAMPLES

The MS/MSD samples are submitted to the laboratory with the routine samples. Once at the laboratory they will have a known amount of an analyte added, known as the spike. The sample will then be run as a routine sample. Once the results are received they are compared to the results of the routine sample (MW-1 results are compared to MW-1 MS results). There should be a difference in the amount of analyte detected between the samples that should be within the margin of error of the amount of analyte spike that was added to the MS sample. This process is repeated for the MSD sample. This process is an internal review of results for the laboratory to determine the accuracy of their instruments.

One MS/MSD set should be taken for every twenty (20) samples (including Duplicate Samples and Field or Equipment Blank Samples). For example if 12 samples are taken, there should also be a set of MS/MSD samples taken for a total of 14 sample sets submitted to the lab. If 20 samples will be taken, only one set of MS/MSD samples needs to be submitted (total number of samples being 22).

The following QA/QC samples are used for only specific analyses or functions.

5. Trip Blank

A Trip Blank is a form of QA/QC that is utilized to account for possible exposure to an external source of VOCs during storage and transport of the sample containers and samples to and from the laboratory. It consists of a VOC sample container prepared by the laboratory and filled with analyte-free water. Trip Blanks are only required when aqueous samples are being collected for VOC analysis, all other parameters do not need one.

The Trip Blank is placed in the cooler with the sample containers when they are sent from the lab to the client. The Trip Blanks will remain in the cooler with the sample containers at all times. When the samples are collected they are placed in the cooler and put on ice with the Trip Blanks for shipment to the lab. At no time should the Trip Blanks be opened or removed from the coolers containing VOC samples. The Trip Blank should be labeled and included on the COC as **Trip Blank or TB**.

Each cooler that contains samples for VOC analysis must have a Trip Blank. It is good practice to combine all VOC containers from a site into one cooler to minimize the number of Trip Blanks required. For example if there are five coolers of samples, place all the VOC containers into one cooler and the remaining containers in the other four coolers. Thus only the VOC cooler requires a Trip Blank, which saves on the cost of analysis.

A positive result on the Trip Blank for a VOC could indicate the samples had been exposed during transportation which can have an effect on the results of the routine samples.

Different laboratories have different practices concerning their Trip Blanks. For example some laboratories will include just one VOA vial as their trip blank while others will utilize multiple vials for theirs. The extra vials are often included only as a backup in the event one of the Trip Blank vials is broken during transport, and will not be analyzed unless necessary.

D. QA/QC REQUIREMENTS:

Not Applicable



SOP #605

Revision #1

08/31/2010

Page 4 of 4

Author: Will Pierce

Reviewer: Chris Burns

QUALITY ASSURANCE/QUALITY CONTROL SAMPLES

E. SPECIAL CONDITIONS:

Temperature Blanks are a type of QA/QC that fall outside of the umbrella of QA/QC Samples.

A Temperature Blank is a container provided by the lab and is used to obtain the temperature of the cooler upon receipt at the lab, usually with an infrared thermometer. It is generally a ~125 mL plastic bottle filled with tap water.

- The Temperature Blank should be left in the cooler during sampling. When the cooler is being prepared for shipment, place the Temperature Blank in the center of the cooler next to the sample containers. There is no need to open the container; it is filled with tap water and therefore harmless unless otherwise noted on the container.
- It should be noted that not all laboratories require a Temperature Blank. There is no cost associated with the Temperature Blanks in the coolers.

F. REFERENCES:

United States Environmental Protection Agency (July 2007), *Samplers Guide, Contract Laboratory Program Guidance for Field Samplers*, Section 3.4, retrieved April 6, 2009, from
http://www.epa.gov/superfund/programs/clp/download/sampler/clp_sampler_guidance.pdf

United States Environmental Protection Agency (May 2002), *Ground-Water Sampling Guidelines for Superfund and RCRA Project Managers*, Page 34, retrieved December 15, 2010, from
http://www.epa.gov/tio/tsp/download/gw_sampling_guide.pdf

G. APPENDICES/FORMS:

Not Applicable

END OF SOP

Final Check by C. Burns 10/27/15

APPENDIX B
CHA STAFF RESUMES



Christopher A. Burns, PhD, PG

Chief Scientist

Dr. Burns has 29 years of experience managing CERCLA remedial investigations and feasibility studies, hydrogeological investigations, Phase I & II site assessments, and siting studies for solid waste management facilities. He has provided project management for new municipal wells, well contamination investigations, and water resource protection:

Town of Salina, NY, Salina Landfill Superfund Site. Project Manager for completion of a Remedial Investigation, Feasibility Study, and Remedial Design of 55-acre inactive hazardous waste landfill. Investigated extent of contamination associated with PCBs and solvents and impact on surface waters and ground waters. Project also included a search for Potentially Responsible Parties and a Human Health and Ecological Risk Assessment. Project was challenging because it required review and interaction with both the NYSDEC and the USEPA.

HDR, Inc., Utica City Dump, NY Inactive Hazardous Waste Site. Project Manager for completion of a Remedial Investigation and Feasibility Study (RI/FS) of 110-acre inactive hazardous waste landfill. Used magnetometry, test pits, historical aerial photography to define nature and limits of waste. Investigated impact to surface water bodies bordering the site to the north and to the south. Conducted groundwater investigation influenced by controlled discharge through adjacent Erie Canal. Documented that groundwater flow direction can vary seasonally as influenced by flow in adjacent surface water bodies.

Solvents & Petroleum Service, RCRA Facility Investigation. Project Manager responsible for completing RCRA Facility Investigation Report for solvent and petroleum distribution facility. The Report consisted of a summary of all activities and sampling performed over the last 7 years. A review of historical information revealed gaps in the understanding of groundwater contamination.

Confidential Client, Buffalo, NY Inactive Hazardous Waste Sites. Project Manager for 7 Buffalo, NY- area sites involving potential disposal of hazardous -wastes. Projects were in different phases of investigation and clean-up. Directly communicated with NYSDEC and City Officials on project and supervised team of consultants and attorneys.

USEPA Region III, Butz Landfill Superfund Site, PA. Project Manager of RI/FS to define nature and extent of TCE plume in fractured bedrock aquifer. Used borehole geophysics, packer testing, pump testing, and ground water sampling to delineate plume and performed fate and transport analysis to predict plume migration.



Keith E. Cowan, CPG

Senior Principal Scientist

Keith has over 20 years of experience in the environmental consulting industry. His resume includes remedial investigations and feasibility studies, petroleum spill and remediation projects, solid and hazardous waste landfill investigations and closures, environmental site characterizations, hazardous materials assessments, environmental compliance projects, and brownfields projects. Representative project experience includes:

Education

University at Buffalo, NY, BA. in Geology

Registrations

Certified Professional Geologist

Memberships & Affiliations

National Ground Water Association

Hudson-Mohawk Professional Geologists Association

Air and Water Management Association

Firm

CHA

Years Experience

Total: 21 | With CHA: 17

Confidential Client, Environmental Services Term Agreement. Project Manager, for environmental consulting services to an international chemical manufacturing company at two of their New York facilities. CHA has conducted a series of RCRA Facility Investigations (RFI), as well as Feasibility Studies (FS) for the investigation and remediation of soil and groundwater contamination. CHA's services have included subsurface investigations, Corrective Measures Studies to screen and evaluate the potential remedial alternatives, as well as remedial design services.

NYSOGS, Rome School for the deaf PCB Remedial Services. Project Manager for the investigation of PCB impacts related to leaking transformers at the Rome School for the Deaf. The project included the delineation of the extent of contamination and a remedial action plan that was approved by the NYSDEC. Following the investigation, CHA was responsible for providing the necessary plans and specifications for the remediation activities.

Town of Floyd, Highway Garage, Environmental Engineering Services. This project is being conducted per the conditions of a NYSDEC Stipulation Agreement. Mr. Cowan was responsible for the evaluation and determination of the extent of impact from a historic release from a series of former, underground fuel storage tanks. The scope of the investigation includes the implementation of an extensive subsurface investigation program including groundwater monitoring, providing agency interface and regulatory guidance.

Former ALCO Site, USEPA Brownfield Investigation. Project Manager for a large-scale Remedial Investigation of the Former ALCO Brownfield Site located along the waterfront. The investigation was performed under a USEPA Brownfield Grant and included the installation of soil borings and monitoring wells, a surficial soil screening program, river sediment sampling, a large-scale soil vapor investigation, test pitting, as well as the collection and analysis of numerous soil and groundwater samples. The site is currently in the planning phase for redevelopment into a multi-use waterfront area.



Scott M. Smith, PE

Principal Engineer/Technical Group Leader

Scott has over 20 years' experience providing consulting engineering services for civil and environmental projects. His expertise includes Phase I & II ESAs, site design, listed hazardous waste site characterizations and feasibility studies, and subsurface investigations for brownfield projects. Representative project experience includes:

Town of Salina, NY, Salina Landfill Superfund Site. Senior Project Engineer responsible for reviewing the remedial design documents and was the lead engineer responsible for design modifications during the implementation of the remedial action of a 55-acre inactive hazardous waste landfill. The primary elements of the remedial action included off-site disposal hazardous (PCB) waste, waste consolidation of over 145,000 cubic yards of waste, a gas venting system, a combination of clay and geosynthetic Part 360 caps, a leachate collection trench, stormwater controls, and wetlands mitigation. The project was complicated by numerous aboveground and subsurface utilities bisecting the Site and involvement of multiple agencies. Mr. Smith also provided guidance to engineering staff during the preparation of the Final Engineering Report and Site Management Plan for the site.

Confidential Client, Environmental Remedial Design Services. Senior Project Engineer responsible for preparing design documents for an in-situ remediation system, including a thermally enhanced soil vapor extraction (SVE) system, a conductive soil heating system using a network of wells, a groundwater extraction system to dewater the treatment zone, and controls for each system. As part of the remedial design process, Mr. Smith developed design work plan submittals for NYSDEC approval as wells as a detailed Site Management Plan. Mr. Smith was also responsible for preparation of two Construction Completion Reports (CCRs) in accordance with the NYSDEC requirements. The CCRs were associated with site preparation to facilitate the proposed in-situ remedy and the installation of a groundwater collection system along the down-gradient side of the site to address the migration of off-site contamination.

DeLaval Property, Poughkeepsie, NY, Environmental Restoration Project. Senior Project Engineer responsible for all technical aspects of this \$14.5 Million cleanup project along the Hudson River waterfront for mixed use development. Mr. Smith developed work plans for the project, prepared all remedial design documents, and was instrumental in the construction administration of this challenging project. Mr. Smith was also responsible for developing the post-cleanup site management plan and the final engineer report for the project.



Cailyn E. Locci

Senior Scientist

Cailyn has more than 15 years of experience in providing environmental consulting services to various state agencies including the NYSDEC, private industries, municipalities, developers, and financial institutions. Her current responsibilities include the oversight and management of environmental site assessments, site investigations and remediation design and implementation. Ms. Locci is well versed in all aspects of site investigations including soil, groundwater, vapor, bedrock, sediment, and surface water sampling. Other projects completed by Cailyn include Phase I/II Environmental Site Assessments, Brownfield investigations, remediation and redevelopment. Her strong expertise lies in petroleum contaminated soils, groundwater and soil vapor. Representative project experience includes:

Oak Mitsui:

- *Limited Subsurface Investigation.* Senior Scientist for a two phase sub-slab investigation including coring and soil sample collection. Phase I includes investigation of a treater area, hazardous waste storage area, wastewater treatment area, lab, outdoor parking, maintenance and air compressor area. Phase II will include remaining treater areas, oxygen dissolving area, drum deck and dissolving room areas.
- *Permit Closeout for Air and SPDES Permits.* Senior Scientist for a wastewater treatment system closure plan in accordance with Part 750-2.11(b).

Confidential Client, Environmental Services Term Agreement. Senior Scientist working with the client to maintain and implement environmental programs at their NY facility. The programs have included site remediation, investigation of wastewater exceedances, establishment of mechanical integrity program for the WWTP, completion of a mechanical inspection of the WWTP, preparation of BMP plans, permitting of the WWTP, preparation of SPCC Plans and inspection of bulk storage tanks.

The Pioneer Companies, Remedial Construction Phase Consulting Services. Senior Scientist for a site within the NYSDEC Brownfield Cleanup Program. The goal was to investigate and remediate to achieve Track 1: Unrestricted Use requirements. The work included archeological investigation oversight, collection of waste characterization soil samples, preparation of Alternative Analysis Report and the Remedial Action Work Plan, oversight of remedial activities and the preparation of a Final Engineering Report.

Hannaford Bros. Co., SPCC Plan and Annual Training. Senior Scientist providing annual training and updating the SPCC Plan for the distribution center.

Dormitory Authority of New York State, Cooling Tower Monitoring and Testing. Weekly and bi-weekly inspections and dip slide testing for cooling towers at 17 OMH facilities statewide.

Education

Tulane University, LA, B.S. in Geology

Memberships & Affiliations

Hudson-Mohawk Professional Geologist Association (HMPGA)
Association for Corporate Growth (ACG-NY)
Upstate Venture Association of New York (UVANY)
NY Association of Convenient Stores (NYACS)
Long Island Gasoline Retailers Association (LIGRA)

Firm

CHA

Years Experience

Total: 17 | With CHA: 1



John L. Favreau, CHMM

Senior Scientist

John has over 26 years of diverse experience in environmental consulting, including site assessment, remediation, regulatory compliance and hazardous materials management. Mr. Favreau has extensive experience in environmental due diligence assessments of commercial and industrial properties, soil and groundwater investigation and remediation of petroleum-contaminated sites, and preparation of technical reports. In addition, he has experience in many aspects of environmental contracting work, including remedial system installation, hazardous waste disposal and emergency spill response. Mr. Favreau is also experienced in the management and execution of environmental services associated with the design and development of wireless telecommunications facilities. Representative project experience includes:

Education

State University of New York at Buffalo, NY, B.S. in Environmental Studies

Registrations

Certified Hazardous Materials Manager

Memberships & Affiliations

Environmental & Historic Preservation Compliance Training (Federal Communications Commission)

The Princeton Course: Groundwater Pollution and Hydrology (NGWA, 1991)

Evaluation of Geochemical Data: The Project Manager's Perspective (NGWA, 1994)

Remediation Technology Training (Groundwater Technology, Inc., 1994)

Firm

CHA

Years Experience

Total: 26 | With CHA: 5

Village of Dolgeville, 102 South Main Street – Site Investigation/Interim

Remedial Measures. Senior Scientist for a site investigation and completion of interim remedial measures at a former petroleum distribution facility/gasoline retail station/automobile repair garage. The project was completed under the NYSDEC's Environmental Restoration Program and involved excavation of test pits, installation of monitoring wells, soil and groundwater sampling, removal of 15 underground storage tanks (up to 15,000 gallons in size), removal of hydraulic lifts, abatement of asbestos containing materials, building demolition, excavation and off-site disposal of approximately 5,000 tons of petroleum-contaminated soil and restoration of the site for future development. Mr. Favreau was responsible for preparation of the SI and IRM work plans, oversight and documentation of field activities and preparation of the SI/IRM and Remedial Alternatives Analysis reports.

Schenectady Metroplex Development Authority, Broadway – Site

Investigation/Interim Remedial Measures. Senior Scientist for a site investigation at a former commercial property/municipal parking lot. The project was completed under the NYSDEC's Environmental Restoration Program (ERP) and involved installation of monitoring wells, soil and groundwater sampling, and removal of PCB-contaminated waste. Mr. Favreau was responsible for preparation of the SI and IRM work plans, oversight and documentation of field activities and preparation of the SI/IRM and Remedial Alternatives Analysis reports.

Schuyler Heights Fire District – Site Investigation. Senior Scientist for a

site investigation at a former rail and scrap metal yard. The project was completed under the NYSDEC's Environmental Restoration Program (ERP) and involved excavation of test pits, installation of monitoring wells, and soil and groundwater sampling. Mr. Favreau was responsible for preparation of the SI work plan, oversight and documentation of field activities and preparation of the SI and Remedial Alternatives Analysis reports.



Elizabeth M. Wos

Project Engineer

Ms. Wos is an Engineer I in our Environmental Technical Group with two years of consulting experience. Her experience includes conducting compliance evaluations, Phase I Environmental Site Assessments, groundwater monitoring, and asbestos abatement oversight and air monitoring for both public and private industrial clients. Representative project experience includes:

Former Oak Mitsui Manufacturing Plan, Sub-Surface Investigation and Sampling. Ms. Wos oversaw the installation of several soil borings and groundwater monitoring wells in order to determine the potential presence of groundwater contamination at a large industrial property. Ms. Wos also carried out the initial and follow up rounds of groundwater sampling at the site.

Albany City School District Middle School Property, Phase I ESA with Limited Subsurface Investigation. Environmental Engineer completing the site inspection, records review, interviews, and report writing for a Due Diligence Phase I ESA of a multi-story middle school facility and surrounding grounds. The Phase I ESA was performed in accordance with ASTM E 1527-13 standard guidelines. In addition, a limited subsurface investigation was conducted concurrently which consisted of the collection of surface soil samples to be analyzed for an array of compounds. Ms. Wos reduced the analytical data by comparison to applicable NYSDEC regulatory standards, and summarized the subsurface findings in the Phase I ESA report.

Hudson River Psychiatric Center, Confidential Document Destruction. Lead Engineer at the Site overseeing the removal and destruction of confidential documents at the Hudson River Psychiatric Center (HRPC) lower campus. Confidential records were retrieved and destroyed in accordance with the Health Insurance Portability and Accountability Act (HIPAA) requirements. Files were assumed to be contaminated with asbestos and lead due to the poor building conditions. Ms. Wos was the onsite project monitor overseeing the removal activities from the building as well as the processing of the files at a specialized "file destruction room". The files were shredded, bagged, and disposed of as asbestos waste by a team of certified individuals.

Finch Waste Company, LLC, Consolidated Landfill Facility. Ms. Wos oversaw the installation of ten groundwater monitoring wells associated with planned expansion of the landfill facility. Once the wells were installed, Ms. Wos was involved with gauging the wells and conducting slug testing of the wells. While in the field Ms. Wos was responsible for the observation and documentation of all field activities being conducted. In addition, Ms. Wos has assisted with the collection of groundwater samples from the existing monitoring well network at the landfill on a quarterly basis.

APPENDIX C

FIELD CALIBRATION LOG

PID Calibration Log

Meter Make and Model:		Serial Number:				
Name of Person Performing Calibration:			CHA Project Number:			
Test Type (Bump/full cal.)	Gas Tested	Calibration Parameters	Results	Pass/Fail	Date/Time	Signature



APPENDIX C

Health and Safety Plan

HEALTH AND SAFETY PLAN
for

**OAK MITSUI
SITE # 442052
80 FIRST STREET
HOOSICK FALLS, NEW YORK 12090**

CHA Project Number: 31861

Prepared for:

*Oak Mitsui
80 First Street
Hoosick Falls, NY 12090*

Prepared by:



*III Winners Circle
Albany, NY 12205
Phone: (518)453-4700*

November 2017

Table of Contents

1.0	INTRODUCTION	1
2.0	KEY PERSONNEL	3
2.1	OFF-SITE PERSONNEL.....	3
2.2	ON-SITE PERSONNEL	3
2.3	ON-SITE OPTIONAL PERSONNEL	4
2.4	AS-NEEDED PERSONNEL	5
2.5	CLIENT-SPECIFIC CONTACTS	5
3.0	SITE ENTRY.....	6
3.1	OBJECTIVES	6
3.2	SAFETY MEETINGS.....	6
3.3	SAFETY TRAINING	6
3.4	MEDICAL SURVEILLANCE.....	7
3.5	SITE MAPPING	7
4.0	SITE CHARACTERIZATION.....	8
4.1	SITE DESCRIPTION	8
4.2	NEIGHBORING PROPERTIES.....	9
4.3	SITE TOPOGRAPHY.....	10
4.4	METEROLOGIC DATA	10
5.0	HAZARD EVALUATION.....	11
5.1	CHEMICAL HAZARDS	11
5.2	DISPERSION PATHWAYS.....	13
5.3	PHYSICAL HAZARDS	14
5.4	BIOLOGICAL HAZARDS.....	14
5.5	HAZARD IDENTIFICATION AND CONTROL	15
6.0	AIR MONITORING AND ACTION LEVELS	20
6.1	AIR MONITORING	20
6.2	ACTION LEVELS.....	22
7.0	SITE CONTROL MEASURES	23
7.1	COMMUNICATION.....	23
8.0	HAZARD COMMUNICATION	24
9.0	CONFINED SPACE.....	24
10.0	PERSONAL PROTECTIVE EQUIPMENT	25
11.0	DECONTAMINATION	27

12.0	EMERGENCY PROCEDURES.....	30
13.0	EMERGENCY MEDICAL CARE.....	32
13.1	EMERGENCY NOTIFICATION NUMBERS.....	33
13.2	ON-SITE FIRST AID	33
14.0	CERTIFICATION	35
15.0	STANDARD OPERATING PROCEDURES	36

SITE SPECIFIC HEALTH AND SAFETY PLAN

1.0 INTRODUCTION

The following Health and Safety Plan (HASP) has been created for the protection of CHA Consulting, Inc. (CHA) staff on the Interim Remedial Measures (IRM) activities, located at 80 First Street in the Village of Hoosick Falls, New York (see Figure 1). This project's various assignments require CHA employees to perform tasks where personal safety could be compromised due to chemical, physical, and/or biological hazards. While conducting field work, CHA employees may be exposed to chemical, physical, and/or biological hazards including but not limited to:

- Chemical and dust exposure due to the presence of subsurface contamination in areas of proposed excavation installation
- Slip/Trips/Falls and falls from differing elevations (i.e. pits)
- Excavations
- Heat/Cold Stress
- Excessive noise for certain operations
- Heavy equipment operation
- Environmental and Biological hazards (e.g. insects, plants, UV exposure, etc.)

The requirements and guidelines in this HASP are based on a review of available information and an evaluation of potential on-site hazards, including: Phase I and Phase II Subsurface Environmental Investigation. This HASP will be discussed with site personnel and will be available on-site for review while work is underway. CHA personnel will report to the Project Manager (PM) and consult with the Health and Safety Coordinator (HSC) in matters of health and safety. The Site Safety Officer (SSO) and Field Team Leader (FTL) is the same person for this project and is responsible for ensuring compliance with this HASP, stopping work when necessary, and for implementation of this HASP for daily site activities.

Non-intrusive activities within CHA's Scope of work are those that do NOT have the potential to jeopardize the health and safety of site workers, the public, or the environment with respect to site contaminants. Intrusive activities within CHA's Scope of Work are those that have the potential to cause health and safety concerns to site workers, the public, or the environment. These activities

and any non-intrusive activities conducted in an Exclusion Zone require training per 29 CFR 1910.120 on a NYSDEC remedial site.

2.0 KEY PERSONNEL

2.1 OFF-SITE PERSONNEL

Title: CHA Corporate Director of Health & Safety

Description: Responsible for the CHA's corporate health and safety program and developing procedures, policies, and coordinating training programs. Additionally, provides senior level guidance on development of HASPs and interpretation of regulations.

Contact:

Margaret Rudzinski

(518) 453-2830 (Office)

(518) 469-9259 (Cell)

Title: Project Manager

Description: Reports to upper level management, provides sufficient authority and resources to satisfy health and safety requirements, and assumes total control over site activities. The Project Manager is ultimately responsible for ensuring field implementation of this HASP.

Contact:

Cailyn Locci

(518) 453-4733 (Office)

(518) 727-6555 (Cell)

2.2 ON-SITE PERSONNEL

Title: Site Safety Officer

Description: Advises the field team on all aspects of health and safety issues, recommends stopping work if any operation threatens worker or public health and safety.

Contact:

John Favreau

(518) 453-8795 (Office)

(518) 858-7068 (Cell)

Title: Field Team Leader

Description: Responsible for coordinating project requirements in the field. The Field Team Leader oversees daily activities of the project and are, therefore, responsible for implementing health and safety requirements and following safety procedures in the field. The Field Team Leader will contact the local emergency response organizations to notify concerned affiliates of the hazards associated with this project.

Contact:

John Favreau

(518) 453-8795 (Office)

(518) 858-7068 (Cell)

Title: Work Party

Description: Performs field operations

Contact:

John Favreau

(518) 453-8795 (Office)

(518) 858-7068 (Cell)

2.3 ON-SITE OPTIONAL PERSONNEL

Title: Health and Safety Coordinator

Description: Responsible for making recommendations regarding the work area to the SSO. Inspections may be periodically conducted to monitor worker health and safety and will address such issues as appropriate PPE, required air monitoring, decontamination procedures, and worker safety.

Contact:

Jeff Malo

(518) 453-4702 (Office)

Title: Scientific Advisor

Description: Guides the Project Team Leader in scientific matters.

Contact:

Christopher Burns, Ph.D., PG

(804) 897-0954 x 248 (Office)

2.4 AS-NEEDED PERSONNEL

Title: Fire Department

Description: Responds to fires and performs rescues

Contact:

911

Title: NRC

Description: Responds to spills and other environmental emergencies that may arise

Contact:

Chris Kirgan

(518) 355-0197

Title: EPA National Response Center

Description: Responds to all oil, chemical, radiological, biological and etiological discharges into the environment, anywhere in the United States and its territories.

Contact:

(800) 424-8802

2.5 CLIENT-SPECIFIC CONTACTS

Title: Director of Engineering

Description: Oak Mitsui Director of Engineering

Contact:

Larry Vosh

(518) 260-4028

3.0 SITE ENTRY

3.1 OBJECTIVES

The objectives of the site entry are to:

1. Oversee the remedial activities carried out as described in the Interim Remedial Measure (IRM) Work Plan.
2. Document contractor activities.
3. Document approximate quantity of soil removed from the site.
4. Collect confirmatory soil samples, site characterization samples, waste characterization samples, waste water samples and clean backfill soil samples.

The intrusive site activities may include the following:

1. Oversight of hot-spot soil excavation.
2. Sampling of soil for laboratory analysis.
3. Oversight of proper spoil disposal into trucks for off-site transport to permitted facilities.

3.2 SAFETY MEETINGS

To ensure that the HASP is being followed, the SSO shall conduct a safety meeting prior to entry to the site or the initiation of any site activity, if any conditions change, and before each work day. The Daily Job Site Safety Brief form in Attachment A should be utilized to document these daily jobsite briefings.

3.3 SAFETY TRAINING

The SSO will confirm that every person assigned to a task has had adequate training for that task and that the training is up-to-date by checking with the CHA Safety Coordinator and online database. CHA staff working on this project shall have a minimum of:

- 40-Hour Initial Hazardous Waste Operations and Emergency Response (HAZWOPER) training in accordance with 29 CFR 1910.120

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- Current 8-hour HAZWOPER Refresher Training
 - Training on CHA Respiratory Protection Plan
 - Field equipment safety training where applicable

All training will have been conducted and certified by CHA in accordance with OSHA regulations.

3.4 MEDICAL SURVEILLANCE

All CHA personnel will have had a medical surveillance physical consistent with CHA Procedures and/or OSHA regulations and performed by a qualified occupational health physician. The SSO shall confirm prior to initiation of work on this site that every CHA person assigned to a task has had an annual physical and respiratory fit test, has passed the medical examination, and has been determined medically fit by the occupational health physician for respirator use and this type of work if deemed necessary by the PM.

3.5 SITE MAPPING

Site mapping has been included in the Figures section of the HASP. Figure 1 illustrates the location of the subject Site. Figure 2 illustrates the route to the nearest hospital from the subject site.

4.0 SITE CHARACTERIZATION

4.1 SITE DESCRIPTION

The Oak Mitsui Facility (site) is located at 80 First Street in the Village of Hoosick Falls, Rensselaer County, New York. The site is situated on the southern bank of the Hoosick River and is bound to the east by the Pan Am Railroad line and to the south by residences. The site is comprised of three (3) parcels which are zoned Industrial, Commercial-Industrial and Residential. A site location map is provided as Figure 1.

According to Sanborn Fire Insurance maps, the subject site was historically utilized for industrial purposes dating back to the late 1800s. Previous operations included a foundry, a machine shop, paper mill machine manufacturing facility and gas manufacturing facility. Oak Mitsui has occupied the site since 1976 and the primary business of Oak Mitsui has been the manufacture of electrodeposited copper foil. All copper foil manufacturing operations in Hoosick Falls occurred at the 80 First Street location.

From 1977 to 2001, the site was used for high volume manufacturing of copper foil and administrative offices. From mid-2001 to 2015, the site was used for administrative offices and other activities as follows:

- From 2005 to 2010, the site was used for pilot scale (research and development) copper foil electroplating. This process utilized some of the copper foil manufacturing equipment still at the site from the high volume manufacturing period.
- From 2003 to 2015, an OMI subsidiary, Oak Mitsui Technologies LLC (OMT) produced FaradFlex products at the 80 First Street site. FaradFlex is produced by using heat & pressure to bond 2 pieces of adhesive coated copper foil to either side an insulating film. The adhesive coated copper foil was purchased from suppliers in Japan & Malaysia. The insulating film was also purchased from overseas suppliers. A large heated hydraulic press was installed along with other sheeting & collating equipment to manufacture this product.

In 2015, the manufacturing operations were moved to Malaysia. Remaining administration staff were moved to leased office space at 8 John Street, Hoosick Falls. Oak Mitsui ceased plant operations and has since been in the process of decommissioning and eventually demolishing the Hoosick Falls facility.

Characterization of the contamination via Phase I and Phase II Subsurface Environmental Investigation indicated widespread metal contamination. No underground storage tanks or other containers (e.g. drums) are known to be present on the site. A complete description of the current information regarding nature and extent of contamination and previous environmental investigations is provided in the IRM Work Plan.

Modifications to this HASP and its PPE requirements must occur if site investigations indicate higher levels of contamination than the previous investigations noted, site sampling, or the presence of underground storage tanks or other containers are discovered.

NOTE: Underground Storage Tanks (USTs) are not known to be present on the site. However, if USTs (drums or drum carcasses and/or other containers) are encountered:

1. Work will stop and the PM will be notified.
2. Upgrade to Level C PPE is required regardless of the air monitoring results.

4.2 NEIGHBORING PROPERTIES

The site is bordered by the following:

- **North:** Hoosic River
- **East:** Pan Am Railroad
- **South:** Residential Buildings, First Street and Nixon Street
- **West:** Hoosic River

4.3 SITE TOPOGRAPHY

The topography of the site is relatively flat, with an elevation of approximately 420 feet above mean sea level. The Hoosick River bounds the site to the west and north and is directly adjacent to the Oak Mitsui property boundary. The project area slopes gently toward the Hoosick River to the west and north.

4.4 METEROLOGIC DATA

The time of year that work is to be conducted is from September through November. The weather and temperature for that time of year is expected to vary, but cooler temperatures are typically expected and it is possible that snowy conditions could be encountered. Prior to each day's activities, the daily forecast should be monitored for indications of adverse work conditions. If poor weather hinders the continuation of the day's activities, the Team Leader may notify the PM and stop work for the day. To monitor wind direction in real time on site a wind sock will be established.

5.0 HAZARD EVALUATION

Hazards are generally divided into three (3) categories; 1) exposure to chemicals and hazardous materials, 2) safety/physical hazards, and 3) biological hazards. Chemical and hazards materials are further segregated by their specific compound, exposure threshold, and route of exposure. Safety/physical hazards are generally hazards such as slips/trips/falls, falls from elevated surfaces and confined spaces. Biological hazards typically include plants, animals, and insects.

5.1 CHEMICAL HAZARDS

Chemical	OSHA PEL	NIOSH REL	IDLH	Ionization Potential (I.P)	Characteristics	Routes of Exposure	Symptoms of Exposure and Health Effects
Arsenic	TWA 0.010 mg/m ³	Ca C 0.002 mg/m ³ (15-minute)	5 mg/m ³	N/A	Metal: silver-gray or tin-white, brittle, odorless solid	inhalation, skin absorption, skin and/or eye contact, ingestion	ulceration of nasal septum; dermatitis; GI disturbances; peripheral neuropathy; respiratory irritation; hyperpigmentation of the skin; carcinogenic
Chromium	TWA 0.05 mg/m ³	TWA 0.05 mg/m ³	25 mg/m ³	NA	Appearance and odor vary depending upon the specific compound	inhalation, ingestion, skin and/or eye contact	irritation of the eyes; sensitization dermatitis
Copper	TWA 1 mg/m ³	TWA 1 mg/m ³	100 mg/m ³	NA	Reddish, lustrous, malleable, odorless solid	Inhalation, ingestion, skin and/or eye contact	irritation of eyes, nose, throat; nasal septum perforation; metallic taste; dermatitis; in animals: lung, liver, kidney damage; anemia
Lead	TWA 0.05 mg/m ³	TWA 0.05 mg/m ³	100 mg/m ³	NA	A heavy, ductile, soft, gray solid	inhalation, ingestion, skin and/or eye contact	lassitude (weakness, exhaustion), insomnia; facial pallor; anorexia, low-weight, malnutrition; constipation, abdominal pain, colic; anemia; gingival lead line; tremors; paralysis of the wrists, ankles; encephalopathy; kidney disease; irritation of the eyes; hypotension

Chemical	OSHA PEL	NIOSH REL	IDLH	Ionization Potential (I.P)	Characteristics	Routes of Exposure	Symptoms of Exposure and Health Effects
Mercury	TWA C 0.105 mg/m ³ (skin n)	TWA 200 pm0.050.1 mg/m ³ (skin)	1000pp m1010 mg/m ³ (as Hg)	NA	Metal: Silver-white, heavy, odorless liquid	inhalation, absorption, ingestion, skin and/or eye contact	irritation of eyes, skin; cough, chest pain, dyspnea (breathing difficulty), bronchitis, pneumonitis; tremors, insomnia, irritability, indecision, headache, lassitude; stomatitis, salivation; GI distress, anorexia, low-weight; proteinuria
Zinc	TWA 15 mg/m ³ (total dust) TWA 5 mg/m ³ (resp. dust)	Dust: TWA 5 mg/m ³ C 15 mg/m ³	500 mg/m ³	NA	White, odorless solid	inhalation	Metal fume fever: chills, muscle ache, nausea, fever, dry throat, cough; lassitude; metallic taste' headache; blurred vision; lower back pain; vomiting; malaise; chest tightness; dyspnea; decreased pulmonary function
Polychlorinated Biphenyl (PCB - Aroclor 1245)	0.5 mg/m ³	Ca TWA 0.0001 mg/m ³	CA 5 mg/m ³	NA	Colorless to pale-yellow, viscous liquid or solid (below 50°F) with a mild, hydrocarbon odor	inhalation, absorption, ingestion, skin and/or eye contact	Irritation of the eyes; liver damage; reproductive effects; carcinogenic
Potassium Cyanide	TWA 5 mg/m ³	C 5 mg/m ³ (4.7 ppm)	25 mg/m ³	NA	White, granular or crystalline solid with a faint, almond-like odor	Inhalation, absorption, ingestion, skin and/or eye contact	Irritation of the eyes, skin, upper respiratory system; asphyxia; lassitude, headache, confusion; nausea, vomiting; increased respiration rate, slow gasping respiration; thyroid, blood changes
Benzo [a] pyrene	TWA 0.2 mg/m ³	Ca TWA 0.1 mg/m ³	80 mg/m ³	N/A	Black or dark-brown amorphous residue	inhalation, skin and/or eye contact	dermatitis; bronchitis; carcinogenic
PFAS (Perfluoroalkyls)	NA	NA	NA	NA	Chemical Compound	Ingestion (predomina nt route), inhalation, absorption, skin and/or	Research is ongoing. Preliminarily mice/rat research indicates: liver damage, changes in blood cholesterol and triglyceride levels, decreases in the size of the

Chemical	OSHA PEL	NIOSH REL	IDLH	Ionization Potential (I.P)	Characteristics	Routes of Exposure	Symptoms of Exposure and Health Effects
						eye contact	spleen and thymus and impaired immune function.

Ca – Cancerous

C – Ceiling value

TWA – Time Weighted Average

IDLH – Immediately Dangerous to Life and Health

OSHA – Occupational Safety and Health Administration

PEL – Permissible Exposure Limit

NIOSH – National Institute for Occupational Safety and Health

REL – Recommended Exposure Limit

NA – Not Available

5.2 DISPERSION PATHWAYS

The potential exposure mechanism that can transport constituents of concern from the areas of the intrusive site activities to other areas of the site as well as beyond the boundaries of the site are:

- Projection of contaminated material in air
- Movement of dust particles
- Conveyance in sediment laden water runoff
- Failure to adhere to containerization and/or decontamination procedures
- Failure to adhere to the Field Sampling Plan and/or Standard Operating Procedures

Visible emissions can be a problem at any site that involves intrusive activities and should be controlled. The primary effect of visible dust is irritation of the eyes, nose, and throat. While it is not anticipated, visible emissions should be monitored and the following corrective actions can be implemented if irritation or concern of dust arises.

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- Minimizing the amount of exposed ground surface/covering exposed surfaces
 - Reducing speed of excavation activities
 - Lightly wetting surfaces or applying misters
 - Using chemical or foam dust suppressants (with authorization only)
 - Reducing vehicle speeds

The primary effect of nuisance dust is irritation of the eyes, nose, and throat with elevated concentrations.

5.3 PHYSICAL HAZARDS

Physical hazards such as the following may be encountered on site:

- Slip/Trip/Fall
- Falls from elevated surfaces
- Excavations
- UV radiation
- Lifting (generators, drums, equipment)
- Traffic – on access roadways at the facility
- Caught in/between moving parts or equipment
- Cold Stress/Frost Bite

5.4 BIOLOGICAL HAZARDS

Biological hazards such as the following may be encountered on site:

- Ticks, mosquitoes, stinging insects, arachnids, chiggers

- Rodents, snakes, zoonotic diseases (Infectious diseases that can be transmitted to humans by animals)

5.5 HAZARD IDENTIFICATION AND CONTROL

Hazard controls generally consist of following specific safety procedures, training, engineering controls, air monitoring, and PPE selection. CHA employees are required to use the PPE appropriate to their work task and potential exposures as outlined in this HASP.

The levels of PPE assigned to each activity are based on available information on the estimation of exposure potential associated with each work task.

Affected Personnel	Task/Operation	Hazards	Hazard Control
All personnel in Exclusion Zone and Contamination Reduction Zone	contamination excavation/removal	<ul style="list-style-type: none">• Skin and/or eye contact with contaminated soil and/or groundwater, decontamination solutions, and sample preservation agents.• The inhalation of volatile organic vapors, dusts, and other airborne vapor or particulates during site activities.	<ul style="list-style-type: none">• Conduct air monitoring in accordance with Section 6.0. Wear the required personal protective equipment when conditions or activities indicate the need for it. Stand upwind to extent possible to reduce inhalation hazard.• Establish a wind sock local to operations.• Avoid walking through puddles, and contacting other potential sources of contaminants such as drums.• Keep airborne dust levels to a minimum by wetting surfaces.

All personnel in Exclusion Zone and Contamination Reduction Zone	Collection of soil, and groundwater samples	<ul style="list-style-type: none"> • Skin and/or eye contact with contaminated soil and/or groundwater, decontamination solutions, and sample preservation agents. • The inhalation of volatile organic vapors, dusts, and other airborne particulates during site activities. 	<ul style="list-style-type: none"> • Conduct air monitoring in accordance with Section 6.0. Wear the required personal protective equipment when conditions or activities indicate the need for it. Stand upwind to extent possible to reduce inhalation hazard. • Avoid walking through puddles, and contacting other potential sources of contaminants such as drums. • Keep airborne dust levels to a minimum by wetting surfaces.
All personnel	All field activities	Slips, trips, & falls	<ul style="list-style-type: none"> • Wear appropriate work boots. • Avoid slippery surfaces. • exercise good housekeeping practices. • Be observant of activities around. • Cover, barricade and/or demark all pits and excavations.
All personnel	All field activities	Physical injuries, such as abrasions or cuts	<ul style="list-style-type: none"> • Use safe work practices • Don proper PPE • Have a first aid kit readily available at site
All personnel	Heavy lifting	Back injuries from lifting	<ul style="list-style-type: none"> • Practice safe lifting techniques. • Always use a minimum of 2 people for lifts over 50lbs

			<ul style="list-style-type: none"> • Lift with legs. Do not twist while carrying load.
All personnel	Cold stress	Exposure to low temperatures associated with working outdoors in variable weather conditions	<ul style="list-style-type: none"> • Wear warm, dry clothing & layers • Take frequent breaks in warm areas • Understand cold stress symptoms
All personnel	All field activities	Fire (general)	<ul style="list-style-type: none"> • Identify location of fire extinguisher(s) – contractor sourced • Keep ignition sources away from flammable materials and atmospheres.
All personnel	All field activities	Noise Exposure	<ul style="list-style-type: none"> • Wear hearing protection if you must shout to hear someone who is standing one foot or less away.
All personnel	All field activities	Contact with heavy equipment and traffic	<ul style="list-style-type: none"> • Do not stand unnecessarily close to the excavator, geoprobe® or other equipment when it is operating • Do not stand in lanes of traffic. Use cones or barricades to delineate work areas when work within access roads is required. • Wear a hard hat and high visibility clothing

			<ul style="list-style-type: none"> • Make eye contact with the operator/drivers
All personnel	All field activities	Security	<ul style="list-style-type: none"> • Stay alert to all on-site activities • Report suspicious activities to PM and/or Oak Mitsui
All personnel	All field activities	Ticks	<ul style="list-style-type: none"> • Avoid unnecessary entry into tall grass and brushy areas. • Wear insect repellents containing DEET. • Wear light colored clothing to easily identify ticks. • Inspect yourself throughout the day and following completion of field activities. • Tuck pants into socks or boots, wear long sleeves and minimize skin exposure.
All personnel	All field activities	Stinging insects (bees, hornets, wasps and yellow jackets)	<ul style="list-style-type: none"> • Do not agitate nests unless absolutely necessary. • Be aware of holes in the ground within the work area. • Avoid wearing/using scented items (e.g., perfume, cologne, soaps). • Inspect food and drinks prior to consumption. • Use insecticide when necessary.

All personnel	All field activities	zoonotic diseases	<ul style="list-style-type: none"> • Avoid dermal contact with animals, droppings or carcasses. • Avoid inhalation of dust that is contaminated with droppings or caucuses.
All personnel	All field activities	Mosquitos/EEE/West Nile Virus	<ul style="list-style-type: none"> • Eliminate mosquito breeding areas (standing water) at the work site. • Apply insect repellent containing DEET to exposed, unbroken skin per the manufacturer's instructions. • Wear light colored clothing (pants, long sleeved shirts and socks).
All personnel	All field activities	Snakes	<ul style="list-style-type: none"> • Avoid actions which increase the risk of encountering a snake (e.g., overturning logs, rocks, etc.). • Wear tall leather work boots.
All personnel	All field activities	Rodents	<ul style="list-style-type: none"> • Avoid contact with rodents and burrowing animals.
All personnel	All field activities	Arachnids	<ul style="list-style-type: none"> • Avoid actions which increase the risk of encountering arachnids (e.g., overturning logs, placing hands in dark places).

All personnel	All field activities	UV Exposure	<ul style="list-style-type: none"> • Cover skin and limit time in sun to extent practical. • Apply all natural sunscreen.
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6.0 AIR MONITORING AND ACTION LEVELS

6.1 AIR MONITORING

The following environmental monitoring instruments shall be used on site at the specified intervals. Monitoring instruments will be calibrated prior to each full day of equipment usage or more frequently in accordance with manufacturer's recommendations. Calibrations will be performed and specified as noted in the QAPP, included in Appendix B of the IRM Work Plan.

- Photoionization Detector (VOC)
- Dust Trac (Particulates)

The photoionization detector (PID) shall be used to detect volatile organic compounds in the ambient air and will be calibrated and setup prior to the start of the days' activities.

Contaminant/Method	Frequency	Action Level	SSO Action
Organic Vapors	At least hourly within breathing zone	10 ppm	Stop work and notify PM of elevated organic vapors

Particulate concentrations will be monitored continuously using a Dust Trac at the upwind and downwind perimeters of the exclusion zone at temporary particulate monitoring stations (one placed upwind and one placed downwind). The particulate monitoring will 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 will be equipped with an audible alarm to indicate exceedance

of the action level. In addition, fugitive dust migration will be visually assessed during all work activities.

6.2 ACTION LEVELS

Should action levels be reached, work operations shall cease until further evaluation is performed and safe levels are prevalent. If through engineering controls and monitoring, safe levels (below action levels) cannot be achieved, an upgrade in personal protection equipment shall be mandated by the SSO, or operations shall cease in that portion of the site. The PM will be notified of any changes in PPE. All PPE level changes must be authorized by PM.

7.0 SITE CONTROL MEASURES

Exclusion Zone (EZ): Will include a 25-foot buffer around all excavation areas, and all areas where soil sampling and screening activities will occur including contaminated soil excavation areas.

Hazards within the EZ include excessive noise, slips/trips/falls, falls from elevated surfaces, contact with heavy equipment, and hazards associated with proximity to excavation activities; including direct contact with contaminated soil or water and inhalation of vapors from contamination.

Contamination Reduction Zone (CRZ): Will be established immediately adjacent to the Exclusion Zone and will be utilized for decontamination of personnel and equipment donning and doffing of PPE. Whenever possible, the CRZ shall be placed upwind of the EZ. A wind sock will be established within the CRZ.

Hazards within the CRZ include contact with contaminated soil or water, inhalation of vapors from contamination, and slips/trips/falls. Physical hazards may pose a risk and good judgement should be utilized.

Support Zone: Will include all areas outside the EZ and CRZ.

Hazards within the support zone include slips/trips/falls and other physical hazards associated with work area.

7.1 COMMUNICATION

Communication shall be accomplished by person to person verbal correspondence and through the use of cellular telephones. Communication procedures will be reviewed during the Daily Jobsite Safety Brief before entering the work zone.

8.0 HAZARD COMMUNICATION

In compliance with 29 CFR 1910.1200, any hazardous materials brought on site by any personnel (CHA or other onsite contractors) shall be accompanied with the material's Safety Data Sheet (SDS). The SSO shall be responsible for maintaining the SDSs on site, reviewing them for hazards that working personnel may be exposed to, and evaluating their use on site with respect to compatibility with other materials including personal protective equipment, and their hazards. Should the SSO deem the material too hazardous for use on the subject site, the party responsible for bringing the material on site will be required to remove it from the site.

9.0 CONFINED SPACE

During this project CHA personnel will not be permitted to enter any confined space. If a confined space entry becomes necessary, the PM will be notified, this HASP will be revised to outline all confined space entry procedures, techniques, and equipment consistent with OSHA regulations 29 CFR part 1926, subpart AA—Confined Spaces in Construction as set forth in 29 CFR 1926.1201. Additionally, all entrants and attendants will be trained in Confined Space Awareness training consistent with the applicable regulation.

10.0 PERSONAL PROTECTIVE EQUIPMENT

Level A and B PPE are not expected to be needed. If site conditions change and contamination is present at levels above the action level, the PM will be notified and this HASP will be updated to reflect greater protection of personnel. The following is a list of required PPE.

Task/Operation	Level of PPE	Equipment
General site observation at a distance greater than 25 feet from intrusive activities. <ul style="list-style-type: none">• No drums present• No free product visible• 2-Minute Breathing Zone PID Readings < 10 ppm with the 10.6 eV bulb• <0.025 mg/m³ metals• <50mg/m³ dust• No odors present	D	<ul style="list-style-type: none">• Long pants (no shorts)• Shirts with sleeves• Hard hat• Safety glasses• Reflective vests or yellow Hi-Visibility shirt• Work boots with safety toe• Hearing protection (if required)• Gloves (as appropriate)
Site Observation or Screening/Sampling Activities within the Exclusion Zone <ul style="list-style-type: none">• No drums present• No free product visible• 2-Minute Breathing Zone PID Readings >10 ppm with the 10.6 eV bulb• >0.025 mg/m³ metals	C	<ul style="list-style-type: none">• Same as D, plus• Full-faced air purifying respirator (APR) with dual particulate-organic/acid vapor cartridges• Protective coveralls (e.g. Tyvek)• Protective outer boot covers• Outer gloves with disposable nitrile or latex

<ul style="list-style-type: none">• >50mg/m³ dust• odors noted		<p>inner gloves Inner polyethylene boot covers with outer latex boot covers</p> <ul style="list-style-type: none">• Both inner and outer gloves must be chemically resistant• Flame retardant coveralls under protective coveralls whenever drums or drum carcasses are encountered.
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11.0 DECONTAMINATION

Personnel working in the Exclusion Zone (within 25 feet of Site activities) will be required to enter and exit the work area through the Contamination Reduction Zone. Personnel engaged in decontamination will wear protective equipment including appropriate disposable clothing and respiratory protection and will also undergo decontamination procedures prior to leaving the decontamination area. The decontamination area will be placed upwind of the Exclusion Zone.

The following equipment is needed for decontamination:

- Alconox
- Water
- Impermeable Containers

The following list summarizes typical decontamination steps for personnel existing the Exclusion Zone. Additional steps may be warranted based upon specific site conditions.

Level D

- Remove any protective equipment.
- Discard disposable garments.
- Wash/rinse boots.
- Containerize wash and decontamination water for disposal, as necessary.

Level C

- Wash/rinse outer suit and boots.
- Wash/rinse outer gloves.
- Remove outer boots.
- Remove outer gloves.
- Deposit disposables in container for proper disposal.
- Remove suit.
- Remove respirator.

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- Remove inner gloves.
 - Containerize wash and decontamination water for disposal, as necessary.

Level B

- Will not be used.

Level A

- Will not be used.

PPE will be decontaminated with soap (i.e. Alconox) and water. Disposable items will be disposed of in dry, impermeable containers.

Equipment and vehicles used in the Exclusion zone to handle contaminated materials will undergo decontamination procedure in the Contamination Reduction Zone prior to leaving the Site. The SSO will document in the daily field log that each piece of equipment has been decontaminated prior to removal from the Site. The decontamination procedures will include but are not limited to:

- Movement of equipment to the decontamination pad
- Removal of heavily-caked material with brushes or shovels and
- Triple-rinsing with high pressure water or steam.

Small Equipment:

For soil sampling, dedicated sampling equipment is preferred. However, if non-dedicated equipment is used (i.e. stainless steel soil sampling equipment), the required decontamination procedure for all manual sampling equipment used to collect samples for chemical analysis is:

- Disassemble equipment, as required.
- Remove gross contamination from the equipment by brushing and then rinsing with tap water.
- Wash and scrub with low phosphate detergent (e.g. Alconox®).

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- Tap water rinse.
 - Distilled water rinse.
 - Air dry.

All decontaminated equipment will be placed on polyethylene sheeting or aluminum foil in order to avoid contacting a contaminated surface prior to use. Field personnel will use a new pair of outer gloves before handling sample equipment after it is cleaned. During periods of transportation and non-use, all decontaminated sampling equipment will be wrapped in aluminum foil.

Large Equipment:

CHA personnel are not responsible for the decontamination of large equipment. Information for large equipment decontamination is provided by the site contractor. Decontamination of heavy construction equipment will be performed by the contractor under the contractor's HASP.

12.0 EMERGENCY PROCEDURES

911 service is available and confirmed at this location; always call 911 immediately as the first option for emergency medical assistance. Only if 911 is unavailable or has a long lead time should someone be driven to the nearest medical facility.

On-site emergencies can range in intensity from minor to serious conditions. Various procedures for responding to site emergencies are listed in this section. The designated SSO is responsible for contacting the CHA Project Manager who will notify the Oak Mitsui Representative and local emergency services as appropriate in emergency situations (however, others must assume responsibility if the situation warrants). An injured person shall be accompanied by another worker at all times.

Should an on-site emergency occur at the project site (related to the project or otherwise) the following procedures shall be followed:

- Call 911 for emergency response.
- If the emergency occurs and is project specific, notify your assigned Health and Safety Coordinator after emergency care is provided to activate the appropriate actions.
- Properly trained personnel will determine if the emergency can be contained or remediated and initiate the appropriate action(s). Personnel shall not respond beyond their level of training.
- Employees are not to risk their health or life in taking aggressive action(s) to fight fire or stop releases. Only defensive actions shall occur until an action plan is resolved.
- Choose an exit route that provides fast, and safe, egress from the work area. The route taken should always be away from obvious obstructions or other hazardous conditions. Consult an evacuation map if you are unsure of where the nearest exit route is located.
- Do not delay evacuation to retrieve personal items or equipment.
- All persons shall exit areas in groups and attempt to stay together during evacuation procedures.

- While evacuating, notice any conditions which should be reported to emergency personnel. Be alert for the location of smoke, fire and/or vapors. Report any of these conditions to emergency personnel.
- Be aware of emergency response vehicles and avoid interference with these.

Remain calm, keep voices low and wait for instructions from the Incident Commander. Do not leave the scene prior to notifying your assigned Project Manager and Site Field Team Leader. An incident report form is included in Appendix C.

13.0 EMERGENCY MEDICAL CARE

In general, if emergency care is needed, personnel should call 911 and request emergency service come to the site. Trained EMS personnel will have better training and equipment to administer care immediately. However, if necessary, transport injured personnel to the nearest hospital: Southwestern Vermont Medical Center

Address: 100 Hospital Drive
 Bennington, VT 05201

Emergency Room Telephone Number: (802) 442-6361

Directions from site:

1. Take John St to Church St, 39 s (0.1 mi)
2. Head east on 1st St toward John St, 276 ft
3. Turn right onto John St, 449 ft
4. Turn right onto Church St, 2 min (0.3 mi)
5. Take Hill Rd to NY-7 E in Hoosick, 5 min (2.8 mi)
6. Continue straight to stay on Church St, 0.4 mi
7. Continue onto Main St, 0.2 mi
8. Continue onto Hill Rd, 2.3 mi
9. Follow NY-7 E and VT-9 E to West Rd in Bennington, 9 min (6.6 mi)
10. Turn left onto NY-7, 2.4 mi
11. Turn right to stay on NY-7 E, Entering Vermont, 0.9 mi
12. Continue onto VT-9 E/West Rd, 3.4 mi
13. Take Monument Ave to your destination, 4 min (1.2 mi)
14. Turn right onto West Rd, 118 ft
15. Turn right at the 1st cross street onto Monument Ave, 0.9 mi
16. Turn left, 0.2 mi
17. Turn right, 200 ft
18. Turn left
19. Destination will be on the right, 69 ft

13.1 EMERGENCY NOTIFICATION NUMBERS

Fire Dept.: 911

Police Dept.: 911

Department of Emergency Services: 911

Poison Control: (800) 222-1222

CHA Contact: Cailyn Locci, (518) 453-4733 (Office) (518) 727-6555 (Cell)

13.2 ON-SITE FIRST AID

First aid kits will be available in the Support Zone (e.g. vehicles). General first aid procedures include:

Skin/Eye Contact: Flush eyes and/or skin thoroughly with water for 15 minutes. Remove contaminated clothing. If skin was contacted with a dry material, brush it off first, then flush with water. Seek medical attention if irritation develops.

Ingestion: Do not induce vomiting. Call Poison Control Center. Tell them what was swallowed, if possible. Follow instructions. Have SDS available for reference.

Inhalation: Remove person from contaminated environment without risking your own safety. DO NOT ENTER A CONFINED SPACE. DO NOT ENTER EXCLUSION ZONE UNLESS WEARING ONE LEVEL HIGHER PROTECTION THAN VICTIM WAS WEARING.
Administer CPR, if necessary.

Injuries: Do not move a victim who may have a back injury. Cover them with coats, blankets, or other appropriate items to keep them warm. Personnel should immediately dial emergency services (i.e. 911).

Use latex gloves. Apply pressure to bleeding wounds. If the victim is able, have the victim apply pressure to the wound. If they are not able, wear gloves to protect from exposure to blood. Put gauze bandages or other clean cloth over the wound. Do not remove blood-soaked bandages or cloth - instead put additional bandages or cloths over the blood-soaked bandages. Elevate the limb with the injury above the heart.

Administer CPR if victim does not have a pulse and if you are currently certified in CPR. Have someone call for an ambulance immediately if there is any possibility that the victim is having or had a heart attack.

Shock is likely to develop in any serious injury or illness. The following are signals of shock: restlessness or irritability; altered consciousness; pale, cool, moist skin; rapid breathing; and/or rapid pulse. In the event of shock, do the following: Immediately have someone call for an ambulance; have the victim lie down; elevate legs 12 inches unless you suspect head, neck, or back injuries; if victim is cool, cover the victim to prevent chilling; do not give the victim anything to drink, even if thirsty. Note time symptoms began and report to emergency responders.

14.0 CERTIFICATION

All site personnel covered by this HASP have read the HASP and are familiar with its contents and provisions.

Name

Title

Date

15.0 STANDARD OPERATING PROCEDURES

OSHA Quick Cards and applicable standard operating procedures are available in Appendix A.

16.0 JOB HAZARD ANALYSIS -- attach the following if needed

- Airport Safety
- Asbestos Abatement
- ATV-4 Wheeler
- Bridge Inspection

X Cold Stress/Winter Weather

- Confined Space
- Dogs
- Electrical Safety

**X Environmental
Sampling/Outdoor Hazards****X Excavation**

- Exposure to Electrical Transmission Lines

- Hand-Power Tools

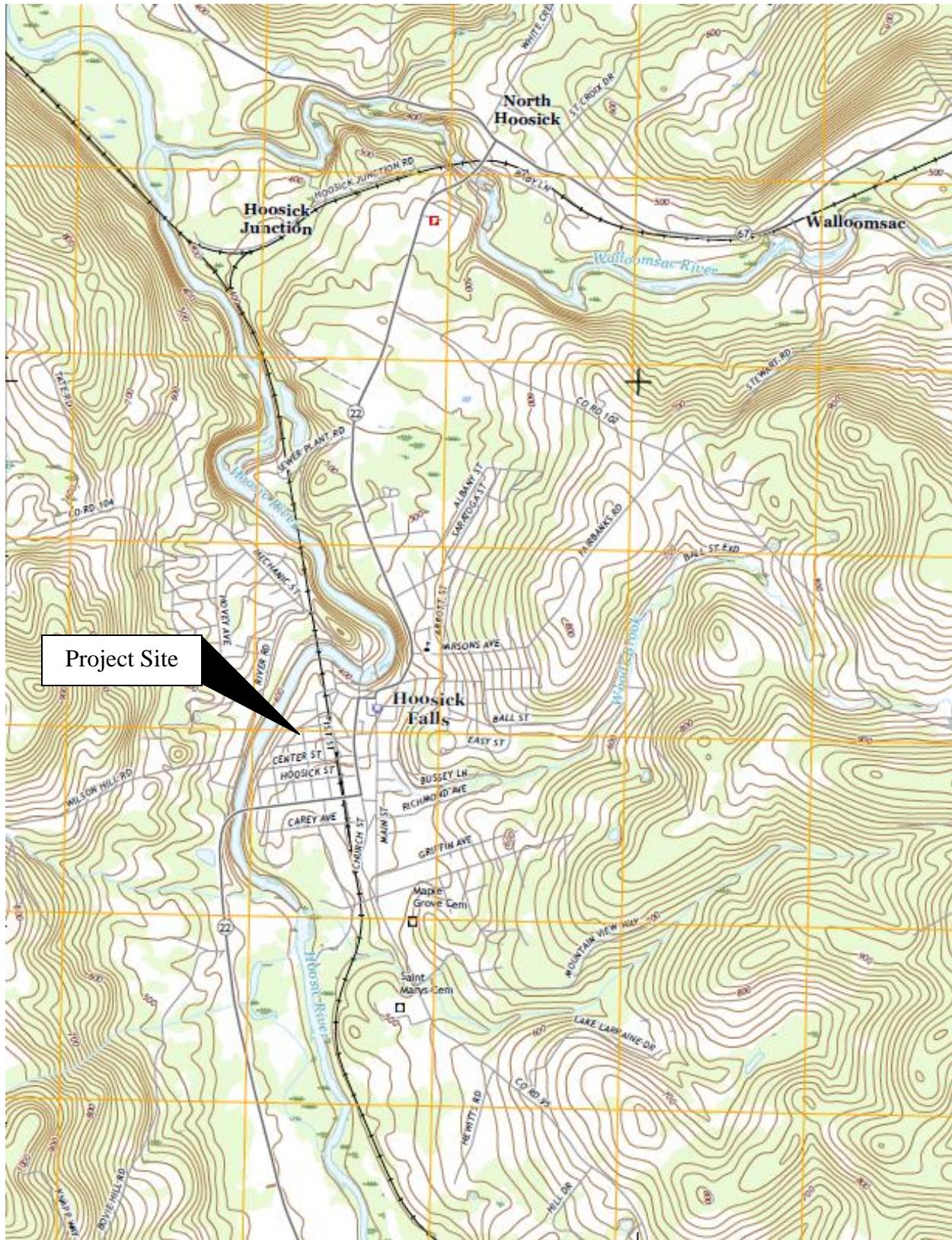
X Heat Stress**X Heavy Equipment**

- Pressurized Cans
- Rail Safety

X Slips, Trips, Falls**X Working In-Around Traffic**

- Working Over Water
- Working With Ladders

Figures



SOURCE: USGS MapViewer

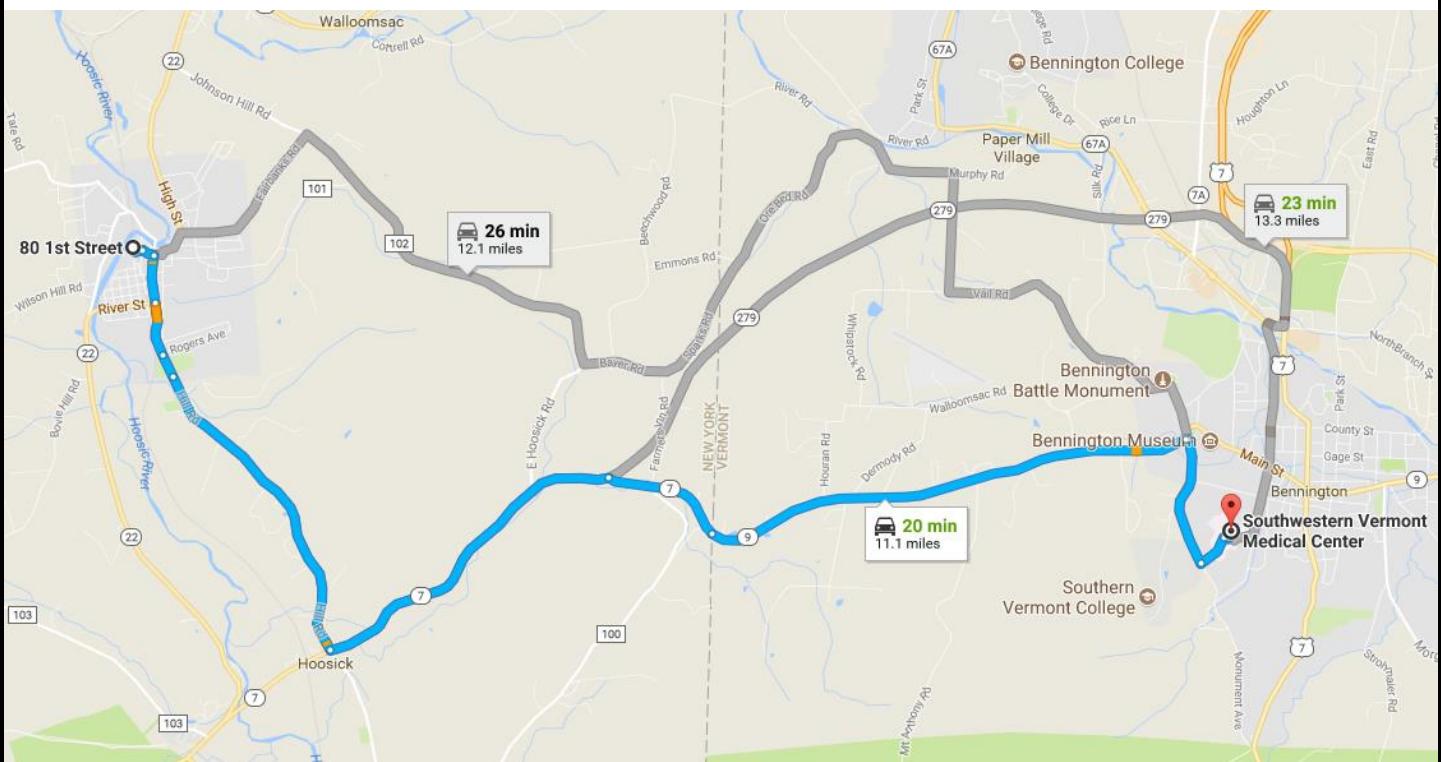


III Winner's Circle, Albany, NY
www.chacompanies.com

NOT TO SCALE

DATE: September 2017

FIGURE 1
SITE LOCATION MAP
80 FIRST STREET
HOOSICK FALLS,
RENSELEER COUNTY, NEW YORK



SOURCE: Google Maps

80 1st St

Hoosick Falls, NY 12090

1. Take John St to Church St, 39 s (0.1 mi)
2. Head east on 1st St toward John St, 276 ft
3. Turn right onto John St, 449 ft
4. Turn right onto Church St, 2 min (0.3 mi)
5. Take Hill Rd to NY-7 E in Hoosick, 5 min (2.8 mi)
6. Continue straight to stay on Church St, 0.4 mi
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14. Turn right onto West Rd, 118 ft
15. Turn right at the 1st cross street onto Monument Ave, 0.9 mi
16. Turn left, 0.2 mi
17. Turn right, 200 ft
18. Turn left
19. Destination will be on the right, 69 ft

Southwestern Vermont Medical Center

100 Hospital Dr, Bennington, VT 05201



FIGURE 2
DIRECTIONS TO NEAREST HOSPITAL
80 FIRST STREET
HOOSICK FALLS
RENSSELAER, NEW YORK

Appendix A
Daily Jobsite Safety Brief



DAILY JOBSITE SAFETY BRIEF

PROJECT INFORMATION							
Project Start Date:	Completion Date:	Weather:					
Project Location:		Project Task:					
<i>Complete a Site Health & Safety Plan per Task</i>							
Description of Work: <i>Be Specific:</i>							
Key Personnel: <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 25%;">Responsibilities:</td> <td style="width: 25%;">Project Manager</td> <td style="width: 25%;">Field Team Leader</td> <td style="width: 25%;">Site Safety Officer</td> </tr> </table>				Responsibilities:	Project Manager	Field Team Leader	Site Safety Officer
Responsibilities:	Project Manager	Field Team Leader	Site Safety Officer				
Description of Hazards: <hr/> <hr/> <hr/>							

The Daily Jobsite Safety Brief must be completed before work begins daily or Scope of Work changes

Weather: _____ <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;">All staff have reviewed and signed site and safety plan</td> <td style="width: 15%; text-align: center;"><input type="checkbox"/> Yes</td> <td style="width: 15%; text-align: center;"><input type="checkbox"/> No</td> <td style="width: 20%;">All staff have proper PPE</td> <td style="width: 15%; text-align: center;"><input type="checkbox"/> Yes</td> <td style="width: 15%; text-align: center;"><input type="checkbox"/> No</td> </tr> <tr> <td>Hazards and precautions have been discussed</td> <td style="text-align: center;"><input type="checkbox"/> Yes</td> <td style="text-align: center;"><input type="checkbox"/> No</td> <td>Safety Controls in place</td> <td style="text-align: center;"><input type="checkbox"/> Yes</td> <td style="text-align: center;"><input type="checkbox"/> No</td> </tr> </table>				All staff have reviewed and signed site and safety plan	<input type="checkbox"/> Yes	<input type="checkbox"/> No	All staff have proper PPE	<input type="checkbox"/> Yes	<input type="checkbox"/> No	Hazards and precautions have been discussed	<input type="checkbox"/> Yes	<input type="checkbox"/> No	Safety Controls in place	<input type="checkbox"/> Yes	<input type="checkbox"/> No
All staff have reviewed and signed site and safety plan	<input type="checkbox"/> Yes	<input type="checkbox"/> No	All staff have proper PPE	<input type="checkbox"/> Yes	<input type="checkbox"/> No										
Hazards and precautions have been discussed	<input type="checkbox"/> Yes	<input type="checkbox"/> No	Safety Controls in place	<input type="checkbox"/> Yes	<input type="checkbox"/> No										
Additional Notes/Comments: _____ <hr/> <hr/> <hr/>															
Signed: _____	Date/Time: _____														
Signed: _____	Date/Time: _____														
Signed: _____	Date/Time: _____														

Weather: _____ <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;">All staff have reviewed and signed site and safety plan</td> <td style="width: 15%; text-align: center;"><input type="checkbox"/> Yes</td> <td style="width: 15%; text-align: center;"><input type="checkbox"/> No</td> <td style="width: 20%;">All staff have proper PPE</td> <td style="width: 15%; text-align: center;"><input type="checkbox"/> Yes</td> <td style="width: 15%; text-align: center;"><input type="checkbox"/> No</td> </tr> <tr> <td>Hazards and precautions have been discussed</td> <td style="text-align: center;"><input type="checkbox"/> Yes</td> <td style="text-align: center;"><input type="checkbox"/> No</td> <td>Safety Controls in place</td> <td style="text-align: center;"><input type="checkbox"/> Yes</td> <td style="text-align: center;"><input type="checkbox"/> No</td> </tr> </table>				All staff have reviewed and signed site and safety plan	<input type="checkbox"/> Yes	<input type="checkbox"/> No	All staff have proper PPE	<input type="checkbox"/> Yes	<input type="checkbox"/> No	Hazards and precautions have been discussed	<input type="checkbox"/> Yes	<input type="checkbox"/> No	Safety Controls in place	<input type="checkbox"/> Yes	<input type="checkbox"/> No
All staff have reviewed and signed site and safety plan	<input type="checkbox"/> Yes	<input type="checkbox"/> No	All staff have proper PPE	<input type="checkbox"/> Yes	<input type="checkbox"/> No										
Hazards and precautions have been discussed	<input type="checkbox"/> Yes	<input type="checkbox"/> No	Safety Controls in place	<input type="checkbox"/> Yes	<input type="checkbox"/> No										
Additional Notes/Comments: _____ <hr/> <hr/> <hr/>															

Signed: _____ Date/Time: _____
Signed: _____ Date/Time: _____
Signed: _____ Date/Time: _____

Weather: _____

All staff have reviewed and signed site and safety plan	<input type="checkbox"/> Yes <input type="checkbox"/> No	All staff have proper PPE	<input type="checkbox"/> Yes <input type="checkbox"/> No
Hazards and precautions have been discussed	<input type="checkbox"/> Yes <input type="checkbox"/> No	Safety Controls in place	<input type="checkbox"/> Yes <input type="checkbox"/> No

Additional Notes/Comments: _____



Protect Yourself
Construction
Personal Protective
Equipment (PPE)

Eye and Face Protection

- Safety glasses or face shields are worn any time work operations can cause foreign objects to get in the eye. For example, during welding, cutting, grinding, nailing (or when working with concrete and/or harmful chemicals or when exposed to flying particles). Wear when exposed to any electrical hazards, including working on energized electrical systems.
- Eye and face protectors – select based on anticipated hazards.

Foot Protection

- Construction workers should wear work shoes or boots with slip-resistant and puncture-resistant soles.
- Safety-toed footwear is worn to prevent crushed toes when working around heavy equipment or falling objects.

Hand Protection

- Gloves should fit snugly.
- Workers should wear the right gloves for the job (examples: heavy-duty rubber gloves for concrete work; welding gloves for welding; insulated gloves and sleeves when exposed to electrical hazards).

Head Protection

- Wear hard hats where there is a potential for objects falling from above, bumps to the head from fixed objects, or of accidental head contact with electrical hazards.
- Hard hats – routinely inspect them for dents, cracks or deterioration; replace after a heavy blow or electrical shock; maintain in good condition.

Hearing Protection

- Use earplugs/earmuffs in high noise work areas where chainsaws or heavy equipment are used; clean or replace earplugs regularly.

For more complete information:



Occupational
Safety and Health
Administration

U.S. Department of Labor

www.osha.gov (800) 321-OSHA

OSHA 3260-09N-05

OSHA QUICK CARD™

Protect Yourself Respirators

Respiratory protection must be worn whenever you are working in a hazardous atmosphere. The appropriate respirator will depend on the contaminant(s) to which you are exposed and the protection factor (PF) required. Required respirators must be NIOSH-approved and medical evaluation and training must be provided before use.

Single-strap dust masks are usually not NIOSH-approved. They must not be used to protect from hazardous atmospheres. However, they may be useful in providing comfort from pollen or other allergens.



Approved filtering facepieces (dust masks) can be used for dust, mists, welding fumes, etc. They do not provide protection from gases or vapors. DO NOT USE FOR ASBESTOS OR LEAD; instead, select from the respirators below.



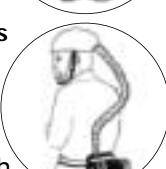
Half-face respirators can be used for protection against most vapors, acid gases, dust or welding fumes. Cartridges/filters must match contaminant(s) and be changed periodically.



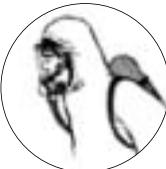
Full-face respirators are more protective than half-face respirators. They can also be used for protection against most vapors, acid gases, dust or welding fumes. The face-shield protects face and eyes from irritants and contaminants. Cartridges/filters must match contaminant(s) and be changed periodically.



Loose-fitting powered-air-purifying respirators (PAPR) offer breathing comfort from a battery-powered fan which pulls air through filters and circulates air throughout helmet/hood. They can be worn by most workers who have beards. Cartridges/filters must match contaminant(s) and be changed periodically.



A Self-Contained Breathing Apparatus (SCBA) is used for entry and escape from atmospheres that are considered immediately dangerous to life and health (IDLH) or oxygen deficient. They use their own air tank.



For more complete information:



Occupational
Safety and Health
Administration

U.S. Department of Labor
www.osha.gov (800) 321-OSHA

OSHA 3280-10N-05

CHA Consulting, Inc.

Job Hazard Analysis

Heavy Equipment

Task	Hazard Type and Description	Hazard Control
Heavy equipment	Pinch points Struck-by/Caught between	Never work or walk under loads, and only one person is to act as the signal person. Avoid working near swing radius's. Maintain eye contact with operators when approaching equipment. Riggers and Operators must possess additional safety training for competency. (Competent/Qualified Training)
Road grading and material cleanup	Potential for personnel to be run over with equipment Struck-by/Caught between	Ensure equipment is operated by qualified operator, and all personnel working on or near roadway wear reflective vests. Be sure that equipment back-up alarms are working properly. Always make eye contact with equipment operators prior to approaching
Personnel working near heavy equipment	Slips and falls Struck-by/Caught between	Make sure there is a good working surface. Cover or barricade excavations as soon as practical. Wear a hard hat, safety glasses, ear plugs, a Class II ANSI safety vest as well as steel toed boots when necessary
Operation	Strains and sprains	Think about your body position; avoid over-reaching, hyper-extending, location/position of extremities, and think if you are in the best position for leverage


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[Wellness](#)
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[How to Stay Safe and Warm in Cold](#)
[Temperatures](#)

How to Stay Safe and Warm in Cold Temperatures

7 Tips for Working in Extreme Cold

The risks of being exposed to the extreme cold are numerous and dangerous. The AllOne Health medical expertise has compiled information on how to stay warm in the cold and how to notice the warning signs of hypothermia.

Tips for Working in the Extreme Cold

- *Wear appropriate clothing.*
 - *Wear several layers of clothing. The layers should fit loosely because tight clothing reduces blood circulation and warm blood needs to be circulated to the extremities.*
 - *When choosing clothing, be aware that some clothing may restrict movement which, in and of itself, may create a hazardous working situation.*
- *Make sure to protect the ears, face, hands and feet in extremely cold weather.*
 - *Boots should be waterproof and insulated.*
 - *Be sure to wear a hat.*
 - *The goal should be to expose as little skin as possible to the cold environment.*
- *Workers in extreme conditions should take frequent, short breaks in warm, dry shelters to allow their bodies to warm up.*
- *Drink warm beverages and eat warm, high-calorie foods.*
- *Avoid exhaustion and fatigue because they can*

RELATED NEWS ITEMS

- [Preventing Heat Related Illness](#)
- [Everything You Need to Know About Ticks](#)
- [Scary Incident Highlights](#)
- [Importance of DOT Changes Going Into Effect This Week](#)
- [Are You Ready for the Summer? A Guide for Staying Safe in the Heat!](#)
- [Leading Indicators: The Future for Great Safety Performance](#)
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- [The Long Term Benefits of Audiometric Testing](#)
- [E-Cigarettes in the Workplace](#)
- [The Dangers of Ebola Waste Disposal](#)
- [Corporate Medical Director Fred Kohanna, MD, MBA, FACOEM Presenting at OSHA Oil and Gas Conference](#)
- [AllOne Health Executive](#)

- Working in cold weather can cause you to lose energy, and energy is needed to keep muscles warm.*
- Use the buddy system - work in pairs so that one worker can recognize danger signs.*
- Learn the signs and symptoms of cold-induced illnesses and injuries and what to do to help workers.*

Signs and Symptoms of Hypothermia (dangerously low body temperature)

Early Stage

- Shivering*
- Fatigue*
- Loss of coordination*
- Confusion and disorientation*

Hypothermia is a medical emergency. If not treated in the early stage, the condition will become life-threatening.

Late Stage

- No shivering*
- Blue skin*
- Dilated pupils*
- Slowed pulse and breathing*
- Loss of consciousness*
- Request immediate medical assistance.*

First Aid for Hypothermia

- Request emergency medical assistance.*
- Move the victim into a warm room or shelter.*
- Remove any wet clothing.*
- Warm the center of the victim's body first, that is, the chest, neck, head, and groin. One may also use loose, dry layers of blankets, clothing, towels, or sheets.*
- If the victim is conscious, warm beverages may help increase the body temperature, but do not give alcoholic beverages.*
- After the victim's body temperature has increased, keep the victim dry and wrapped in a warm blanket, including the head and neck.*

If victim has no pulse, begin cardiopulmonary resuscitation (CPR).

Extremely cold weather presents unique challenges to employers and employees. The best weapon against the cold is knowledge of how to prepare for it and what to do in the event of an emergency.

[Leader Deborah Talbot, RN, COHN-S/CM](#)
[Featured in Safety + Health Magazine](#)
[Surviving the Stresses of the Holiday Season: A Guide](#)
[Importance of a Safety Culture in the Workplace](#)
[The Real Cost of Workplace Injuries and How to Prevent Them](#)
[Your Complete Guide to Understanding and Managing Stress](#)
[Understanding the New OSHA Recordkeeping Requirements](#)
[One of the Biggest Reasons Workers Don't Return from Injury](#)
[Tuberculosis: Still a Modern Threat](#)
[Handle Heat Hazards with Prevention and Preparation](#)
[A Safety Guide for Outdoor Workers](#)
[Commonly Overlooked OSHA Standards](#)
[Decrease in the Death Rate in the Oil & Gas Industry](#)
[The Benefits of Pre-Work Screening Programs](#)
[Are You Prepared for Employees' Exposure to Heavy Metals?](#)

To keep you and your workplace safe during the harsh winter months remember planning ahead, dressing in loose layers that cover all of your body and checking the forecast before leaving the house goes a long way to protect you from the cold.

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Email or call

1.877.720.7770

to speak with a specialist now.

CHA Consulting, Inc.

Job Hazard Analysis

Excavations

Task	Hazard Type and Description	Hazard Control
Noise exposure	Hearing loss & psychological stress	Utilize muffler systems and other engineering controls with increasing working distance. Wear approved safety ear plugs when working close enough to heavy equipment/backhoe
Drilling	Inhalation hazards from dust and dirt. Struck-by and caught between.	Wear appropriate PPE to protect from dust such as a fit- tested half-face air purifying respirator with appropriate dust cartridges. The respirator should be worn whenever field instruments indicate the need, or when wind-blown dust is obvious in combination with detected contaminates Stay alert and maintain safe distance from operating parts.
General excavation activity	Contact of dirt or dust after work activities on one's skin	Wear coveralls or tyvek suits to protect clothing, boots, hair, and skin. Remove work clothes including boots before entering environments outside of the work site
Being near moving parts of machinery	Physical injury from moving parts Struck-by and caught between	Avoid moving parts of machinery. Keep finger, hand and arms away from backhoe bucket and other pinch points. Wear leather gloves when using hands for activities other than sampling, and steel-toed boots. Wear hard hat at all times
Working in the vicinity of heavy machinery	Struck-by and caught between	Personnel on the ground should keep away from the work area and backhoe unless they are required for the task. Ask for assistance when

		carrying or moving heavy loads. Use legs to lift. Do not carry heavy equipment without first establishing eye contact with the operator. Use standard hand signals when noise levels inhibit auditory communication. Ensure that all heavy machinery have audible back-up signals. All workers must wear reflective traffic vests when appropriate. Barricade work area and permit only excavation personnel in the area
Working where there is site vehicle traffic	Struck-by and caught between	Restrict outside vehicular traffic on the job site. Use flaggers and a specific traffic route if necessary
Digging where there are unknown underground utilities and pipes	Striking underground utilities or other significant obstructions Running into an electrical duct bank Potential for fires, spills, damaged underground utilities, high noise Slips, trips and falls walking in general vicinity of planned excavation	Observe marked locations of underground utilities if marked. Excavate by hand when within five feet in any direction of known underground obstructions. Machine digging allowed within two feet after visual identification and de-energized. If utilities can be confirmed as abandoned, hand digging is not required. Use detection systems if applicable! Hand digging required to visually establish location. Machine digging per competent person evaluation and JSA/STA Utilize a qualified spotter probe bar, appropriate PPE (hard hat, safety glasses, steel toed boots, Nomex coveralls, ear plugs and gloves as necessary) Review general terrain and evaluate surface conditions. Look for ruts, large rocks, and uneven terrain
Scanning with electronic	Trips and falls, strain from	Have an assistant help spot various

equipment	lifting heavy instruments	hazards in area if focusing on instrument is too distracting. If lifting or pushing scanning instruments of heavier weights, get assistance with movements to avoid strains
Probing with metal tipped fiberglass rods	Slips, trips, and falls walking in general area of intended excavation Back strains, hand injury from probing rod	Review overall terrain and identify surface conditions. Look for ruts, large rocks, and uneven terrain Avoid excessive force attempting to penetrate deeper with rods. Wear leather gloves to avoid blisters and other hand injuries
Working in the Ditch	Potential for cave-in, atmospheric hazards, struck-by/caught-between. Ladder safety Water accumulation	Have a competent person evaluate the excavations. Excavations over 5 feet deep shall properly protected from cave-ins (protective systems – sloped, benched, shoring, A competent person shall oversee all excavation safety issues and properly assess working conditions. shielding). Utilize a 4 way calibrated monitor at all times while employees are in the ditch. Only one person act as signalman, but anyone can call emergency stop. The spoil pile shall be located at least two feet from the edge of the trench if not as far away as possible and slope the pile away from the excavation Ladders used for access must be tied off and extend 3' over landing. When ascending/descending employee must face ladder and maintain three (3) points of contact. Angle ladder at a ¼ of working length (75degrees) for safe climbing. The competent person shall inspect the installation of the protective

		barrier and the conditions of trenching before it is entered and daily before every shift thereafter, or after a rain storm. Thus, the competent person shall also monitor the water level, and determine when safe limits have been exceeded. Any accumulation of water in the trench shall be kept at a minimum by portable pumps
Working near the ditch	Falling into eight foot deep trench	At a minimum, barricades shall be erected six feet away from the edge of the trench. Such barricades must be made visible by using high visibility methods when left unattended. Anyone within a six feet boundary must be protected from falls utilizing fall protection (i.e. railing or fall restrain by tethering workers). Provide a walkway or bridge with standard guardrails if employee must cross over the excavation
Equipment Damage	Excavations left open and unattended near roadways & walkways, equipment roll over hazard, high noise, airborne dust	Confirm location of all power lines. If lines are unable to shut-in maintain a minimum of ten feet clearance from equipment. Verify and increase distance (per approach charts) for lines in excess of 50,000 volts. Maintain spotter with no other duties than watching for interference, if power lines are within swing radius. Inform local operations and any remote operation of activities. Do not use cell phones while operating equipment. Tape and/or barricade unattended excavations.
Working outside	Bad weather (rain, cold/heat, etc..)	If rain and/or lightning starts, stop all activities and allow competent person to advise further regarding safety practices and procedures.
Excavator with grapple attachment	Employees working near building(s) can potentially have a crushing injury and atmospheric hazard. Striking	Keep personnel at a safe distance from the equipment. Monitor atmospheric conditions. Make eye contact with the operator before

	a person within radius of boom	approaching equipment. Only one person is to act as signalman; however, anyone can call emergency stop
--	--------------------------------	--

CHA Consulting, Inc.

Job Hazard Analysis

Environmental Sampling/Outdoor Hazards

Task	Hazard Type and Description	Hazard Control
Working in hot environments	Heat disorders including heat cramps, heat exhaustion, and heat stroke	Employers can control this hazard by providing heat stress training to exposed employees, providing access to shade, and allowing employees to gradually get used to hot environments. Employees working in hot environments are advised to take breaks in cool rest areas, rotate physically demanding tasks, save most demanding work for cooler times of day, and utilize the heat index chart to determine exposure risk. Be sure that every employee working in the hot environments is drinking one cup of water every fifteen minutes. Recognize the signs such as above normal body temperature, headaches, nausea, cramping, fainting, increased heart rate, and pale as well as clammy skin
	Sunburn	The risk of sunburn is higher when working at high elevations, or when working around water (from reflection). In these conditions, you can be burned even in overcast conditions; therefore, wear protective clothing and use sunscreen
High wind events	Severe wind events can create	Employees should avoid areas

	“wind throws” where strong winds can blow down trees	during high wind occurrences that exhibit previous wind damage
Working at high altitudes	Altitude sickness	Recognize signs of acute mountain sickness including headaches, light-headedness, inability to catch one’s breath, nausea, and vomiting. Practice prevention by acclimating slowly to high elevations and staying hydrated. If the following symptoms progress, immediately descend to lower elevations and seek medical attention: difficulty breathing, chest pain, confusion, decreased consciousness, and loss of balance
Electrical storms	Being struck by lightning	While working outside, watch the sky for thunderstorms and seek shelter before the weather deteriorates. Stop working in streams and lakes. Someone at the job site must be able to begin revival techniques (i.e. CPR) if someone is struck by lightning. Do not use telephones. If caught in electrical storms, seek shelter inside a vehicle or building. When in a building, keep away from doors, windows, plugged in appliances, and metal. When in a vehicle, avoid contact with metal objects inside. If outside with no shelter, obey the following procedures: do not congregate, do not use metal objects, avoid standing near isolated trees, seek lower elevations such as valleys or canyons, and avoid being on peaks as well as trees. If you feel your hairs standing on end and your skin tingling, this is a sign that lightening might be about to strike so crouch immediately (feet together, hands on knees). Wait a minimum of 20-30 minutes after the last lightning flash to return to the field or outside area.

Being outdoors in cold weather for extended periods of time	<p>Hypothermia</p> <p>Frostbite</p>	<p>Recognize the signs including shivering, numbness, drowsiness, muscle weakness, dizziness, nausea, unconsciousness, low/weak pulse, and large pupils. Exercise practice prevention such as staying dry, wearing the appropriate clothing (layers), listen to the weather forecast to plan accordingly, stay hydrated, cover head with warm clothing, and stay active. Be aware of the role that wind-chill can play in hypothermia; under certain conditions, hypothermia can occur without any rain or being wet.</p> <p>Dress for the weather- layers are best, and mittens are better than gloves (keeps your warm fingers together while warming each other). Wear two pairs of socks with the inner layer made of synthetic fiber, such as polypropylene, to wick water away from the skin and the outer layer made of wool for increased insulation. Shoes should be waterproof. Keep your head, face, nose, and ears covered at all times. Clothes should fit loosely to avoid a decrease in blood flow to the arms and legs. Always travel with a friend in case help is needed. Be especially wary of wet and windy conditions; the "feels like" temperature (wind chill) is actually much lower than the stated air temperature. The very old, those who are not in good physical condition, and people with diabetes and anyone with vessel disease should take extra precautions.</p>
Working in areas with	Giardia	Treat, filter, or boil drinking water.

limited access to clean drinking water		Do not drink untreated water from streams, lakes or springs.
Working outdoors	Rattlesnakes	<p>Be alert and do not put your feet or hands where you cannot see what is on the ground (for example if you are stepping over a log and you cannot see what's on the other side). If you encounter a rattle snake do not pick it up- give it a wide berth and walk around it. If bitten, seek immediate professional medical attention and remove jewelry. If bitten on an extremity lower than the heart, cover wound with a sterile band while seeking medical attention.</p>
	Bears	<p>If you encounter a bear, be alert but stay calm, and give it as much room as possible. Try to leave the area, but DO NOT RUN. Back away slowly. If the bear follows, stop and hold your ground: wave your arms to make yourself look big and talk in a normal voice. Work in teams of two to deter bear attacks. If the bear makes contact, surrender: fall to the ground and play dead (a bear will break off an attack once it feels the threat has been eliminated). If the bear continues to bite after you assume a defensive posture. Their attack is predatory and you should fight back vigorously</p>
	Mountain Lions	<p>Be alert, calm, and do not panic. If you see a mountain lion, do not run as it may stimulate its predatory nature. Instead, shout and wave arms to let it know that you are not prey: fight back</p>

	<p>Tick bites</p> <p>Roughskin Newts</p> <p>Bee stings</p>	<p>Use DEET based repellants on exposed skin and/or permethrin on clothes. Check for ticks during and after field work. If you find a tick remove it with tweezers within 24 hours, preferably immediately: do not leave the head embedded or extract the tick with matches, petroleum jelly, or other coatings (e.g. motor oil)</p> <p>Avoiding handling them as their skin contains a potent neurotoxin. If necessary for the protocol, handle only when wearing gloves. Do not “lick” for “killer buzz” as people have died from attempting to eat roughskin newts</p> <p>If you know or suspect you are allergic to bee stings, carry appropriate allergy kits prescribed by a doctor for treating anaphylactic shock. Carry and take diphenhydramine (Benadryl). Follow the label instructions for allergy control. Inform your supervisor if you suspect you are allergic. Watch for ground nests</p>
Travel movement or work in area with poison oak or poison ivy	Allergic reaction to poison oak/poison ivy plants	Learn to recognize poison oak. Avoid contact by using ivy block and wearing long pants and long-sleeve shirts if traveling in dense areas. If skin contact is made, flush the area with cold water as soon as possible. Do not flush your skin with warm water or soap as it can open your pores and increase the reaction. To wash and rinse use

		Tecnu or similar product with cold water to remove oils
Encountering irrigation pipes, marijuana plantation, or grow operations	Unfriendly encounters with criminal elements	<p>Do not wear uniforms and carry a radio backpack that is not visible.</p> <p>Do not confront strangers and act like a tourist if you must speak.</p> <p>Work in pairs or groups. If working in areas likely to contain operations, check in with park staff when leaving vehicle and returning to vehicle. Watch for black piping or other signs. If you find a definite grow operation, leave immediately, note the location, and report it to the authorities</p>

CHA Consulting, Inc.

Job Hazard Analysis

Slips/Trips/Falls

Common hazards

- Slippery surfaces (e.g., wet, oily or greasy)
- Seasonal trip hazards (snow and ice)
- Spills of wet or dry substances
- Changes in walkway levels and slopes
- Unsecured mats
- Poor lighting
- Debris and items stored in walkways
- Trailing cables in pedestrian walkways
- Smoke, steam or dust obscuring view
- Unsuitable footwear

Controlling hazards

When establishing safe work practices, consider:

- Characteristics of physical work area
- Weather conditions (snow, ice, rain)
- Tasks performed
- Workers' work practices
- Equipment

Hazard Control/Engineering Controls

- Type of flooring
- Slope of surface (ramps, handrails)
- Surface free of obstructions/holes
- Drainage
- Lighting levels, non-glare, contrast
- Equipment to be used/not carrying too much at once
- Signage
- Sufficient space
- Minimizing environmental influences, e.g., blocking wind to prevent wet surfaces icing at entrances

Hazard Control/Administrative Controls

- Training workers/awareness
- Safe practices such as a procedure for cleaning spills or requirement for two workers to transport a large equipment that one worker cannot see around or can't handle
- Reporting hazards
- Prompt maintenance
- Job design (identifying tasks requiring excessive pushing/pulling, line-of-sight obstruction)
- Equipment readily available
- Addressing poor work practices
- Inspections
- Review slips, trips and same-level fall hazards

Hazard Control/Housekeeping

- Clean spills
- Remove debris, snow and ice
- Keep equipment clean
- Keep wires, etc. controlled, taped, etc.

Hazard Control/Personal Protective Equipment

- Appropriate footwear for task, which may include appropriate heels, soles and anti-slip boots

Appendix B
Respiratory Protection Plan Checklist



RESPIRATOR INSPECTION RECORD
(To Be Completed Daily when Respirator is Used)

Name _____
Date _____

Project _____

1. TYPE _____

2. MODEL _____

3. Half Mask APR Full Face APR
SAR SCBA
PAPR

4. **Respirator Component:** **Defects: NO** **YES**

A. Facepiece

B. Inhalation/ Exhalation Valve

C. Headbands

D. Cartridge Holder

E. Cartridge/Canister

F. Filter

G. Harness Assembly

H. Hose Assembly

I. Speaking Diaphragm

J. Gaskets

K. Connections

L. Defective Component Not Mentioned Above _____

If any of the above were answered yes, please complete the following pages and contact
Margaret Rudzinski in the Health & Safety Department at 518-453-2830 or Amanda Fripp at
518-453-3903 before using this respirator.

Signed: _____

Date: _____



Potential Defect:

Defected: Yes

Elaborate:

Facepiece

- | | | |
|------------------------------|--------------------------|-------|
| Excessive dirt | <input type="checkbox"/> | _____ |
| Distorted (not flexible) | <input type="checkbox"/> | _____ |
| Cracks/Tears/Holes | <input type="checkbox"/> | _____ |
| Valves not properly inserted | <input type="checkbox"/> | _____ |
| Purifying units damaged | <input type="checkbox"/> | _____ |
| Threads badly worn | <input type="checkbox"/> | _____ |
| Missing gaskets | <input type="checkbox"/> | _____ |
| Other | <input type="checkbox"/> | _____ |

Inhalation/ Exhalation Valve

- | | | |
|-------------------------------------|--------------------------|-------|
| Foreign material | <input type="checkbox"/> | _____ |
| Cracks/Tears/Distortions | <input type="checkbox"/> | _____ |
| Defects in sealing surface | <input type="checkbox"/> | _____ |
| Valve put in facepiece incorrectly | <input type="checkbox"/> | _____ |
| Valve put in valve body incorrectly | <input type="checkbox"/> | _____ |
| Defective/Missing valve cover | <input type="checkbox"/> | _____ |
| Other | <input type="checkbox"/> | _____ |

Headbands

- | | | |
|------------------------------|--------------------------|-------|
| Breaks | <input type="checkbox"/> | _____ |
| Loss of elasticity or twists | <input type="checkbox"/> | _____ |
| Buckles in poor condition | <input type="checkbox"/> | _____ |
| Other | <input type="checkbox"/> | _____ |

Cartridge Holder

- | | | |
|--------------------|--------------------------|-------|
| Cracks/Distortions | <input type="checkbox"/> | _____ |
| Other | <input type="checkbox"/> | _____ |

Cartridge/Canister

- | | | |
|---------------------------|--------------------------|-------|
| Incorrect cartridge | <input type="checkbox"/> | _____ |
| Used/Seal broken | <input type="checkbox"/> | _____ |
| Expired | <input type="checkbox"/> | _____ |
| Cracks/Dents | <input type="checkbox"/> | _____ |
| Incorrect installation | <input type="checkbox"/> | _____ |
| Loose connections | <input type="checkbox"/> | _____ |
| Thread-crossing in holder | <input type="checkbox"/> | _____ |
| Missing/Worn gaskets | <input type="checkbox"/> | _____ |
| Other | <input type="checkbox"/> | _____ |

Filter

- | | | |
|----------------|--------------------------|-------|
| Leaks detected | <input type="checkbox"/> | _____ |
| Other | <input type="checkbox"/> | _____ |

Harness Assembly

- | | | |
|---------------------|--------------------------|-------|
| Attachments damaged | <input type="checkbox"/> | _____ |
| Other | <input type="checkbox"/> | _____ |

**Hose Assembly**

- | | | |
|--------------------------------|--------------------------|-------|
| Material contains cracks/tears | <input type="checkbox"/> | _____ |
| Missing/Defective parts | <input type="checkbox"/> | _____ |
| Other | <input type="checkbox"/> | _____ |

Speaking Diaphragm

- | | | |
|----------------------|--------------------------|-------|
| Not working properly | <input type="checkbox"/> | _____ |
| Other | <input type="checkbox"/> | _____ |

Gaskets

- | | | |
|-------------------|--------------------------|-------|
| In poor condition | <input type="checkbox"/> | _____ |
| Missing gaskets | <input type="checkbox"/> | _____ |
| Other | <input type="checkbox"/> | _____ |

Connections

- | | | |
|-----------------------------------|--------------------------|-------|
| Connections not all firmly sealed | <input type="checkbox"/> | _____ |
| Leaks/Defects | <input type="checkbox"/> | _____ |
| Other | <input type="checkbox"/> | _____ |

Other Defects Not Mentioned Above

Donning/Doffing Procedures for APR's

Donning Procedures:

- Extend the straps out to the end tabs. Pull back over facepiece.
- Put the facepiece on, chin first, pull the head harness over the head with the opening in the web centered in position on the back of the head. (Clear hair from seal.)
- Pull the straps snug, starting with the chin straps, then the temple straps and finishing with the forehead strap.
- The straps should be pulled snug enough to ensure a good seal but not so tight that you are uncomfortable or distort your face.

Doffing procedures shall be the reverse of the above procedures.

- The head harness should be pulled over the facepiece for storage.

**Appendix C
Incident Reports**



Incident Report

Please note: This form must be completed within (24) hours of an employee's injury or illness during the workday. This form can be completed by the employee or supervisor (or a witness if his/her supervisor is unavailable).

Employee Information				
Employee's Name	Title	Group	Supervisor	
Incident Details				
Date of Incident	Time of Incident	Location of Incident (provide address, if available)		
List the Nature of the Employee's Injury & Body Parts Affected (Indicate whether a similar work-related injury has occurred in the past): 				
Explain What the Employee Was Doing When the Incident Occurred: 				
Describe How the Incident Occurred: 				
List any Applicable Objects That Were Directly Involved in the Injury (i.e. motor vehicle, etc): 				
Did the Employee Stop Work Due to the Injury?		If Yes, Has the Employee Returned to Work?		
Medical Treatment (<i>if known</i>)				
Did the Employee Seek Medical Treatment?	Date of First Medical Treatment	Location of Treatment (provide address, if available)	Type of Facility (i.e. emergency room, hospital, urgent care, doctor's office)	What Type of Treatment
Acknowledgment				
Employee Signature:			Date:	
Supervisor (or Witness) Name (Printed):		Supervisor (or Witness) Signature:		

RETURN COMPLETED FORM TO MEGAN ROBERTSON IN HUMAN RESOURCES

PHONE NUMBER - (518) 453-8750

FAX NUMBER - (518) 453-2889

E-MAIL ADDRESS - MROBERTSON@CHACOMPANIES.COM

cc: Health & Safety
M. Platt

CHA (Your Location) Office

- What to do for Accidents, Incidents, Safety Hazards & Near Misses

1) If any injury occurs, no matter how minor:

- a. Get it treated immediately as required. Notify supervisor.
- b. Contact Megan Robertson as soon as possible. Contact Margaret Rudzinski if Megan cannot be reached.
- c. Complete a CHA incident report form and return to Megan Robertson within 24 hours. (V:\Public\ANY\Health_&_Safety\Incident Reporting)

'Contact' means phone until you talk to the person directly. Voicemails and emails do not count.

(Employees should not provide their personal medical insurance information to the medical facility for work-related incidents. Please contact HR for further direction on how your work-related medical claim will be paid.)

2) For any accident, incident, safety hazard or near miss (no injury occurs)

- a. Use your 'Stop Work' Authority as required. EVERYONE has the authority to stop work if they see a significant safety issue.
- b. For all – Report to your supervisor within 24 hours.

'Report' means phone, leave voicemail or email as appropriate.

Megan Robertson (Director of HR Operations)	1-518-453-8750 – Office phone 1-518-453-2889 – Fax mrobertson@chacompanies.com	For all Project accidents and incident and/or potential workmen's compensation claims
Margaret Rudzinski (Sr. VP, Corporate Environmental Health & Safety)	1-518-453-2830 – Office phone 1-518-469-9259 – Cell phone mrudzinski@chacompanies.com	Report all safety hazards/issues to Margaret Rudzinski

Recommendations for additional contacts:

- Office Leader
- Safety Coordinator

APPENDIX D

Community Air Monitoring Plan

Community Air Monitoring Plan (CAMP)

**Oak Mitsui Site
80 First St.
Hoosick Falls, New York**

The following Community Air Monitoring Plan (CAMP) will be implemented during the Interim Remedial Measures (IRMs) to be performed at the Oak Mitsui site (Site). Air monitoring will be conducted in accordance with the New York State Department of Health (NYSDOH) *Generic Community Air Monitoring Plan (CAMP)*. All air monitoring will be conducted on a real-time basis, using both hand-held field instruments and perimeter air monitoring stations, for VOCs and/or particulate levels at the perimeter of the exclusion zone or work area.

Continuous monitoring will be performed for all ground intrusive activities including the break-up and removal of concrete foundations and the excavation of contaminated soil. Periodic monitoring for VOCs and particulates will be required during non-intrusive activities (if required) such as the collection of soil samples or the placement of clean backfill or cover materials.

This CAMP is not intended for use in establishing action levels for worker respiratory protection that shall be described in the site-specific HASP prepared by the Contractor for the proposed excavations . Rather, its intent is to provide a measure of protection for the downwind community (i.e. off-site receptors including residences and businesses) from potential airborne contaminant releases as a direct result of the proposed remedial work activities. Reliance on this CAMP should not preclude simple, common-sense measures to keep VOCs, dust, and odors at a minimum around the work areas. The action levels specified herein require increased monitoring, corrective actions to abate emissions, and/or work shutdown. Additionally, this CAMP will help prevent the remedial construction activities from spreading contamination off-site through the air.

Particulate Monitoring, Response Levels, and Actions

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.

Particulate concentrations will be monitored continuously at the upwind and downwind perimeters of the exclusion zone at temporary particulate monitoring stations (one placed upwind and one placed downwind). The particulate monitoring will 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 will be equipped with an audible alarm to indicate exceedance of the action level. In addition, fugitive dust migration will be visually assessed during all work activities.

1. If the downwind PM-10 particulate level is 100 micrograms per cubic meter (mcg/m³) 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/m³ 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/m³ 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/m³ of the upwind level and in preventing visible dust migration.
3. All readings will be recorded and be available for State (DEC and NYSDOH) and County Health personnel to review if requested.

VOC Monitoring, Response Levels, and Actions

Volatile organic compounds (VOCs) will 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 will be measured at the start of each workday and periodically thereafter to establish background conditions, particularly if wind direction changes. The monitoring work will be performed using equipment appropriate to measure the types of contaminants known or suspected to be present. The equipment will be calibrated at least daily for the contaminant(s) of concern or for an appropriate surrogate. The equipment will 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 will be recorded and be available for State (DEC and NYSDOH) personnel to review if requested. Instantaneous readings, if any, used for decision purposes

will also be recorded.